# ETS Reference Manual

## For the Lantronix ETS Family of Multiport Device Servers

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**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.

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 doît accepter n'importé quelle interférence reìue qui peut causer uneopération indésirable.

# Contents

# 1: Introduction

## 1.1 Product Overview

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

Lantronix servers store their executable software in Flash (rewritable) ROM, meaning that they do not have to download software from a host each time they boot. Software must only be downloaded when a new software version becomes available. See *Appendix D* for more information.

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

## 1.2 Protocol Support

The ETS supports five industry-standard network protocols:

**TCP/IP**

TCP/IP is a widely-used protocol that can be run on networks with Macintoshes, PCs, and Unix workstations. Server support includes Telnet, Rlogin, DNS, and the LPR and RTEL printing systems.

**NetWare (IPX/SPX )**

NetWare allows devices attached to the ETS to act as networked printers. The ETS supports all NetWare frame types: Ethernet v2, Native Mode (802.3), 802.2, and 802.2 SNAP. In addition, it supports both Bindery mode and NetWare Directory Services (NDS).

**Local Area Transport (LAT)**

LAT is a protocol developed by Digital Equipment Corporation for local network terminal connections and is supported on almost all Digital operating systems. It provides both logins to remote hosts and host-initiated print spooling.

**AppleTalk**

AppleTalk allows networked Apple Macintosh computers to see devices attached to the ETS and access them as they would any networked printer.

**LAN Manager**

The ETS allows devices on LAN Manager networks to access networked printers. Systems running Windows NT can access the devices using the Digital Network Port for Windows NT or the NetBIOS protocol.

# 1.3 Terms

In this manual, the following terms are used to describe parts of a network. See the *Glossary* for more detailed explanations of these terms.

**host** A computer, sometimes referred to as a CPU, attached to the network. The term **host**

**node** Any intelligent device directly connected to the Ethernet network and having its own Ethernet addresses, such as a host, an Ethernet printer, or a terminal or print server. Devices connected to the ETS are *not* nodes.

**service** A resource that can be accessed locally or via the network. For example, a host is a service to which terminals can connect. The ETS can offer its attached printers and modems to the network as services.

**session** A logical connection to a service. A typical session is a terminal connected to a host through the terminal server.

**Local mode** The ETS user interface, which is used to issue configuration and session management commands and establish sessions with services.

# 1.4 Server Features

**AppleTalk Support**

The ETS provides Ethernet access to attached laser printers; ETS print services appear in the Macintosh Chooser window like any other printer on the network. Bi-directional communication (either a serial or IEEE 1284 parallel interface) is required.

**LAN Manager Support**

The ETS can be configured to appear as a print node to other LAN Manager nodes. Supported systems include Windows NT and Windows 95.

**LAT and Digital Compatibility**

The ETS supports LAT and TSM/NCP, making it fully compatible with most Digital Equipment Corporation operating environments.

**NetWare Support**

The ETS is used primarily for print serving. The ETS can also be configured and logged into from a NetWare fileserver, and can function as a print node for other NetWare fileservers.

**TCP/IP and UNIX Compatibility**

Almost all UNIX systems support Telnet, an established industry standard. Telnet can be used for interactive sessions, or for logging into the server to issue configuration commands. UNIX systems generally implement Rlogin as well, unless security considerations dictate that it be disabled at a particular site. Support for domain name servers, network gateways, SLIP access, and a local domain name are all provided. In addition, IP security can be enabled to control access to the server.

**Connectivity**

The Server connects terminals directly to the network, which conserves physical ports on the host, allows the terminal to access more than one host, and simplifies terminal cabling.

**Multiple Session Support**

Users can open multiple outgoing LAT, Rlogin, and Telnet sessions, and can easily switch among active sessions. Up to eight sessions are supported per connected terminal. Each session can be connected to any host and can use any supported protocol.

**Load Balancing**

If a LAT service is provided by more than one node, the server chooses the least busy service for the connection. This helps balance CPU usage and provides better user response times.

**Small Size**

The small, attractive case is designed to fit into any office environment. Because there is no internal fan, the ETS operates silently.

**Ease of Use**

The server's Local mode supports command line editing, command line recall, and command completion. An extensive Help facility is also provided.

**Easy Configuration**

The EZWebCon utility (provided on CD-ROM) allows users to configure the ETS from a any host machine running the Java Virtual Machine (JVM). It also allows remote host logins into the Server, which are similar to Telnet and LAT logins.

**Note:** *You must be Supervisor to run the EZWebCon utility on a NetWare client.*

Dialback ports, which allow managers to improve security for dial-in modem users. A menu mode, which enables managers to tailor which individual commands users are allowed to use.

**Remote Configuration**

The ETS can be logged into and remotely configured using one of the following methods:

- Digital's NCP and TSM facilities
- The Telnet console port, similar to the NCP remote console
- The network login feature, which allows managers to log into the ETS via TCP/IP, LAT, and NetWare.
- EZWebCon, a configuration application that runs on any host computer running the Java Virtual Machine (JVM).

**Command Line Interface**

A simple but powerful command interface is provided for both users and system managers. The ETS operating code is downloaded automatically at power-up, making software upgrades as easy as copying a file.

The ETS stores its operating software permanently on-board, so it does not need to download code unless new versions become available. Servers can also be configured to request a downloaded configuration file at boot time.

The *Command Reference* chapter of this reference manual describes the commands available in the ETS's local command line mode. These commands control port and server configuration, session management, and other tasks. Ports can be set to secure to allow only a subset of the commands. In addition, a menu mode is provided so that users will not have to learn the Server command set, but can instead choose from a table of commands.

**Note:** *See the Command Reference for more information on the command line, command recall, and command completion features.*

**Context-Sensitive Help**

Context-sensitive on-line help is available at any point. You may type "HELP" by itself for overall help, "HELP *command*" for help on a specific command, or a partial command line followed by a question mark for help on what is appropriate at that particular point.

**Note:** *See Help on page 12-13 for more information.*

**Host-Initiated Connections**

The ETS may be configured to provide its attached devices as services to other nodes, allowing hosts to share printers and modems. AppleTalk, LAN Manager, LAT, NetWare, and TCP/IP hosts can queue jobs to ETS services simultaneously. The optional RTEL host software provides both printer backend access and a named pipe interface to the ETS from TCP/IP hosts.

**IPX Redirector**

The IPX Redirector is an application that allows PCs on an IPX network to share modems connected to the server using Microsoft Windows or DOS communications software that supports the INT 14 or NASI redirector interface. With the help of the Redirector, PC users can dial out, connect to a modem available as an ETS service, and connect to a remote host.

**Security**

The ETS includes several configurable security features. They include:

- Group codes, which allow the ETS to act as a filter to limit the user's knowledge of, and access to, specific services.
- Automatic session logouts when a port is disconnected or a device is turned off.
- Password protection for privileges, ports, services, maintenance commands, and the remote console.
- The ability to secure certain ports, which prevents them from issuing privileged commands and giving them a limited view of the network.
- The ability of an individual user to lock his or her port, as well as specify the password that will unlock it.

- An IP security table, which allows the server manager to restrict incoming and outgoing TCP/IP connections to certain ports and hosts. This allows managers to restrict Server access to a particular local network segment or host. It also allows restrictions for SLIP access to the network.

**DHCP Support**

The Server can obtain an IP address from a DHCP server at boot time.

**SNMP Support**

The ETS supports the Simple Network Management Protocol (SNMP), which can be used by network managers to monitor network load and error conditions. No enterprise-specific MIBs are supplied by Lantronix.

**Diagnostics**

Power-up and interactive diagnostics help system managers troubleshoot network and serial line problems.

# 1.5 How To Use This Manual

The rest of the chapters in this manual describe the features and commands of the ETS. Information is broken down as follows:

- Chapters 2 through 6 cover general functionality:
- Chapter 2, *Concepts*, explains the basic ideas behind ETS operation.
- Chapter 3, *Getting Started*, explains available configuration methods, as well as steps needed for reconfiguration and maintenance operation.
- Chapter 4, *Server Configuration*, explains server-wide configuration options, including protocol-specific configuration and security issues.
- Chapter 5, *Ports*, details the port-specific configuration options, including serial port parameters and modem-related commands.
- Chapter 6, *Using the ETS*, introduces end-users to the Server. It also explains how to use the Server interactively.
- Chapters 7 through 11 cover protocol-specific issues and troubleshooting:
  - Chapter 7 covers TCP/IP Host Setup.
  - Chapter 8 covers NetWare Host Setup.
  - Chapter 9 covers LAT Host Setup for VMS.
  - Chapter 10 covers AppleTalk Host Setup.
  - Chapter 11 covers LAN Manager Host Setup.

- Chapter 12, *Command Reference*, lists the ETS command set in detail, including syntax, options, errors, examples, and where to find related information.
- Appendices provide supplementary information, including Technical Support contact information, troubleshooting tips, and pinout information.

**Note:** *Installation and cabling are covered in your Server's Installation Guide.*

# 2: Concepts

The ETS provides two major functions: outgoing sessions, which are basically interactive connections to other nodes, and incoming connections to services, such as printer and modem support.

## 2.1 Services

Services are the basic method of connecting to the ETS from any host or another server. In general, a service is required on the ETS before any job or connection queueing will take place. See the *Server Configuration* chapter for details on creating and using services.

## 2.2 Serial Protocols

The ETS models support RS-423 and RS-422 serial protocols. In addition, they are compatible with RS-232 devices.

### 2.2.1 RS-232

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

RS-232 is used for connecting devices across short distances, at speeds up to 230.4 kb/s. Faster speeds require shorter cabling to ensure error-free communications. The maximum cable length at a given speed is determined by many factors, including the immediate electrical environment and the quality of cable used, but is usually less than 10 meters at high speeds.

Lantronix MSS models have RS-232 ports. RS-232 devices are interoperable with RS-423 devices.

### 2.2.2 RS-423

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

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

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

### 2.2.3 RS-422

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

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

RS-422 ports are interoperable with RS-423 ports, but not with RS-232. When connecting an RS-422 port to an RS-423 port, you must be sure that your connector cable is properly configured. Please consult the connector pinout drawings in Appendix C before making a connector cable.

## 2.3 Network Protocols

A network protocol describes the data contained in Ethernet packets. The network protocols provided by the ETS are completely separate, other than the use of the Ethernet data layer. The following figure shows the protocol stacks supported by the ETS.

**Figure 2-1:** Supported Network Protocols

<table>
<tr><th>AppleTalk</th><th>LAN Manager</th><th>LAT</th><th>NetWare</th><th>TCP/IP</th></tr>
<tr><td>Printer Access Protocol</td><td>SMB</td><td rowspan="3">LAT</td><td>NCP</td><td>Telnet/ Rlogin/ RTEL/ lpd</td></tr>
<tr><td>ATP</td><td rowspan="2">NetBEUI</td><td>SPX</td><td>TCP</td></tr>
<tr><td>DDP</td><td>IPX</td><td>IP</td></tr>
<tr><td colspan="5">Ethernet/IEEE 802.3 Data Layer</td></tr>
</table>

There are three different Ethernet frame formats, one of which is subdivided:

- What is typically called *Ethernet* is technically referred to as Ethernet v2. This is the default frame type for most TCP/IP, LAT, and MOP/NCP protocol stacks. It can also be used for NetWare.
- The IEEE 802.2 frame format comes with either a regular or a SNAP SAP (Service Access Point). AppleTalk uses the SNAP format by default. Both types can be used by NetWare.
- NetWare 2.x and 3.x stations, by default, do not use any of these frame types. They use a *native mode* format that is being phased out.

# 2.4 AppleTalk

AppleTalk is a protocol used primarily by Apple Macintoshes to access network resources such as file servers and printers. AppleTalk is also available for UNIX, NetWare, and other operating systems. The AppleTalk protocol can be run over Ethernet (EtherTalk), Token Ring (TokenTalk), or LocalTalk, which is a medium speed network type built into every Macintosh. These various network media can be connected with AppleTalk routers to allow all nodes to communicate with one another. The AppleTalk protocol supports features such as file sharing and security in addition to printing.

The ETS supports only the Printer Access Protocol (PAP) and therefore cannot create outgoing AppleTalk sessions—only incoming print requests are accepted. Any services on the ETS with AppleTalk enabled will show up as LaserWriters in Macintosh Chooser windows and are associated with an available zone (explained in Section 2.4.2). Users who select a ETS service as their LaserWriter will have their print jobs forwarded to the ETS for printing, or for queueing if the print port on the ETS is in use or otherwise unavailable.

AppleTalk printing is different from printing in other protocols. There are standard Macintosh drivers provided for specific Apple printer types, such as LaserWriters and ImageWriters, but there are no plain ASCII line printers by default. ASCII jobs are converted into PostScript (for laser printers) or bitmaps (for ImageWriters) when printed. Only laser printer devices are supported by the ETS under AppleTalk.

The Macintosh client will need to query the printer about status, so only laser printers that reply to these interactive PostScript requests can be used. The ETS parallel ports support Bitronics mode, provided the attached laser printer also implements it.

## 2.4.1 Addressing

AppleTalk provides for dynamic node addressing, allowing a node to choose its address at boot time. It will send network packets to the other nodes to avoid choosing a node ID already in use. A node can also discover its network number by listening for AppleTalk router broadcasts; if none are heard, a default network number is chosen. The ETS will save zone/network/node ID triplets in permanent memory, which reduces traffic at reboot time, although the ETS AppleTalk address may change across boots in response to any network changes.

Network numbers are configured in the routers, so the only AppleTalk configuration supported by the ETS is the specification of a zone name other than the default. Due to the generally non-configurable nature of AppleTalk, most AppleTalk devices are truly “plug-and-play”— they can be powered up and used right out of the box.

## 2.4.2 Zones

Zones are arbitrary groupings of AppleTalk nodes used to organize resources into groups that are easier for users to understand. For example, a college may organize zones around departments, like **Math Department** and **Physics Department**. Zones allow users to sift through large numbers of nodes by choosing those groups they are familiar with regardless of the organization of the network. In general, zones need not have a correlation to physical or network location, thus any node can declare itself a member of any single zone.

Zones, like nodes, originate from and are configured on AppleTalk routers. One zone on each network will be chosen by the router as the **default** zone. If there are no AppleTalk routers on the network, there will be only one zone (the default zone) of which all nodes are members. If no zone name has been previously defined on the ETS, or if the defined zone is no longer valid, the ETS will join the default zone and no other configuration is needed. The ETS can be placed in a different zone with the **Define Protocols AppleTalk** command. Each time the ETS is booted, or when its zone is changed, it will verify the zone name with a router.

### 2.4.3 Name Binding Protocol (NBP)

NBP is used by AppleTalk to advertise resources, such as printers and fileservers, to the network. Any resource that other users can access will have NBP information that must be communicated to other nodes. The items in the Chooser window reflect the NBP resources on the network.

NBP and the Chooser organize resources by three levels: name, type, and zone. Names are arbitrary strings assigned by users, such as **Kathy** or **MyPrinter**. Types are generic classes of resources, such as **Macintosh IIci** and **LaserWriter**. Zones, mentioned previously, are collections of nodes on the network. Typical Macintosh NBP information might be [Kathy, Macintosh IIci, Accounting] for the name, type, and zone, respectively. A service offered by the ETS called **MyPrinter** that has AppleTalk enabled and that is located in the **Engineering** zone would have an NBP description of [MyPrinter, LaserWriter, Engineering]. If the LaserWriter resource in the Engineering zone were selected in the Chooser, one of the resources shown would be the MyPrinter service offered by the ETS.

The NBP type **LaserWriter** designates a PostScript printer, so nodes printing to printers of type LaserWriter assume that the printer supports PostScript. Care must be taken to attach only PostScript printers to ETS services with AppleTalk enabled, and to disable AppleTalk on services that do not support PostScript printers. It is not possible to print to non-PostScript printers (for example, ImageWriters and StyleWriters) from a Macintosh via the ETS.

## 2.5 LAN Manager

LAN Manager is based on the NetBIOS protocol. It is used by several PC-based operating systems, notably OS/2, Windows NT, and Windows for Workgroups, although LAN Manager servers have been written for HP and Sun workstations. The ETS implements only enough of the NetBIOS protocol stack to provide print services to nodes; no interactive logins are allowed.

The ETS also implements the straightforward and easy to use DLC printer protocol typically used by HP laser printers. You must select the hardware address of the ETS as the target for the print job. DLC operation is only supported under Windows NT. DLC does not provide queueing on the ETS, nor does it allow printing to more than one service on the ETS.

### 2.5.1 Networking

NetBIOS is not a routable protocol, so the ETS can only communicate with local nodes or nodes that are accessible via a gateway capable of bridging the NetBIOS data.

LAN Manager node lookups take a text resource name and resolve it into a hardware address. For this reason, node and resource names must be unique on the network, and the ETS will print an error message if any configuration that violates this rule is attempted.

**Note:** *NetBIOS can be run over TCP/IP, but the ETS does not support this mode of operation.*

# 2.6 LAT

Digital Equipment Corporation's LAT (Local Area Transport) networking software is designed to ease the process of accessing and managing local area networks.

LAT is significantly different from other protocols in two important ways. First, LAT is not routable. There is no way to divide LAT networks into smaller subnetworks and use routers to reduce traffic between nodes. Second, LAT is a timer-driven protocol. Packets are expected at certain intervals, and the protocol cannot adapt to slow network links dynamically. For these reasons, LAT traffic over wide areas is typically carried inside (or **encapsulated** in) TCP/IP or IPX/SPX packets. The latter two protocols are fully routable, and can handle wide-area, slow network links.

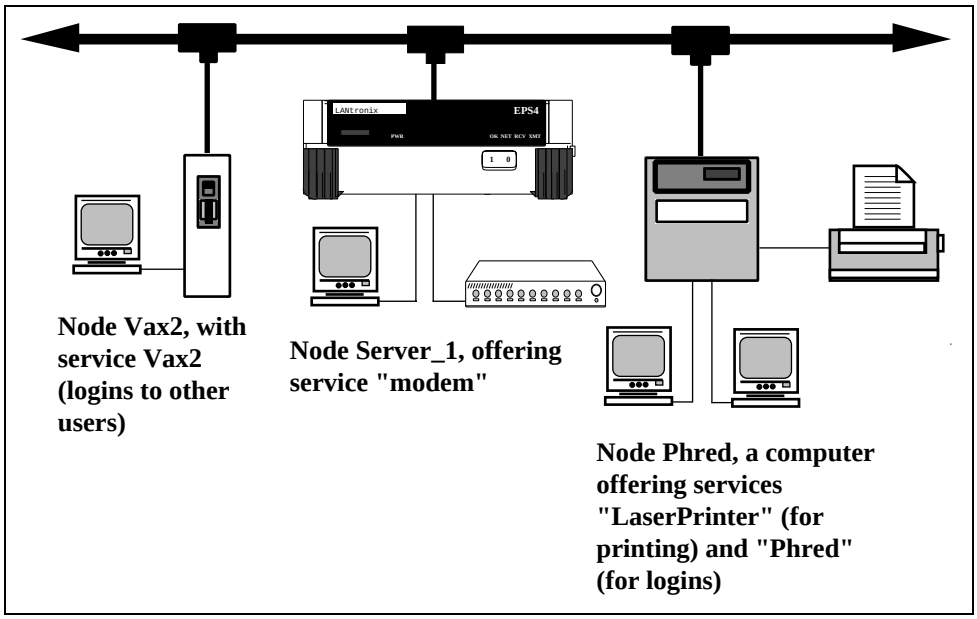
**Note:** *If LAT is bridged across slow links, session time-outs and errors are likely.*

LAT software is built around the concept of **services**. A service may be provided by a dedicated device, such as a printer, or by a network host. A device that offers one or more services, such as your ETS, is called a **node**.

Services have names, and there can be more than one service on a network with the same name. For example, you could attach eight modems to a server and set up the service modem to use ports 1-8; a user who typed Connect Modem would not necessarily know which port would be used for the connection. Note that if a service is provided by the local ETS and also a by remote node, there is no guarantee that a connect command issued locally would result in a connection to the local service (although this can be explicitly requested).

In general, all services offered by the ETS are associated with one or more ports; exceptions to this rule will be noted later. Figure 2-2 shows an example of services offered on a network.

**Figure 2-2:** Example of Network Services




Nodes advertise their services to the network by broadcasting occasional messages about them. These messages, referred to as **multicasts**, contain the node's name and its list of services. By monitoring multicast messages, all hosts on the network know what nodes and services are available and can provide this information to their interactive users. The **Show Services** and **Show Nodes** commands display this information.

LAT multicast messages contain a **rating** for each service offered. Ratings range from 0 to 255; 0 means the service is unavailable, while 255 means the service is available and has no current users. Ratings for a given service may change over time. For example, the rating for a computer accepting logins will generally change as its workload changes. Conversely, ratings for a modem are typically either 0 (in use) or 255 (not in use). In the example above, the server with eight modems attached will continue to advertise that the service "modem" is available (a 255 rating) until all eight modems are in use (a 0 rating).

Service ratings may concern even casual users, since they are used to determine which service a user will be connected to whenever there is a choice. For example, if a user types `Connect Hub` and five nodes offer service **hub**, the user will be connected to the least busy node automatically. In the case mentioned above, where both the local ETS and a remote node offered the same service, the ratings determine which node will service the connection attempt.

Another major network management feature of LAT is the concept of **service groups**. Each port on the ETS and each service on the network can be thought of as belonging to one or more groups. When a user or device requests a service connection, the LAT host will check to see if the groups to which the requester belongs match those of the requested service. If any group number is common to both the requester and the service, the connection attempt continues. If there are no common group numbers, the connection attempt fails.

**Note:** *There may be additional access restrictions on the service, such as password protection.*

Suppose Bob is logged into port 4 on his ETS and the server manager has given port 4 access to groups 1, 7, 13, and 105. Bob, or anyone else using port 4, can only access services that have one of those group numbers. Suppose Bob wishes to access a modem on a different server. If the server to which the modem is attached allows access to groups 8, 12, 16, 42, and 105; Bob will be allowed to use the modem because he and the modem service have group 105 in common.

**Note:** *See Set/Define Port Authorized Groups on page 12-28 and Set/Define Server Service Groups on page 12-80 for more information.*

Group numbers also are useful to nodes because each node only needs to pay attention to multicasts that involve its users' groups. As a result, groups can hide services that would otherwise be visible. The server manager can also hide services from a set of ports. Setting up and managing services and groups is discussed in more detail in the *Server Configuration* chapter, next.

ETS units used in the LAT environment support remote configuration of server ports by VMS hosts. This feature of the LAT software allows the server to implement VMS commands that change a user's "terminal line." For instance, if user Bob connects to a VMS host and types the command Set Terminal/Speed=2400, the speed will be changed on the host and the host will ask the ETS to change the "real" terminal line (in this case, Bob's serial port on the server). This feature supports changes to parity and flow control as well.

**Note:** *Remote control can be disabled; see Set/Define Port Remote Configure on page 12-49.*

# 2.7 TCP/IP

## 2.7.1 IP Addresses

Every TCP/IP node on a network has an IP address, which is unique to that network and an Ethernet Address, which is unique across all hardware in the world. The IP address provides information needed to forward packets across multiple networks, if necessary.

The address is of the form *n.n.n.n*, where each *n* is a number from zero to 254, as in 192.0.0.1. The exception is that there cannot be a zero in the last segment of the address.

**Note:** *The number 255 is strictly reserved for broadcast packets.*

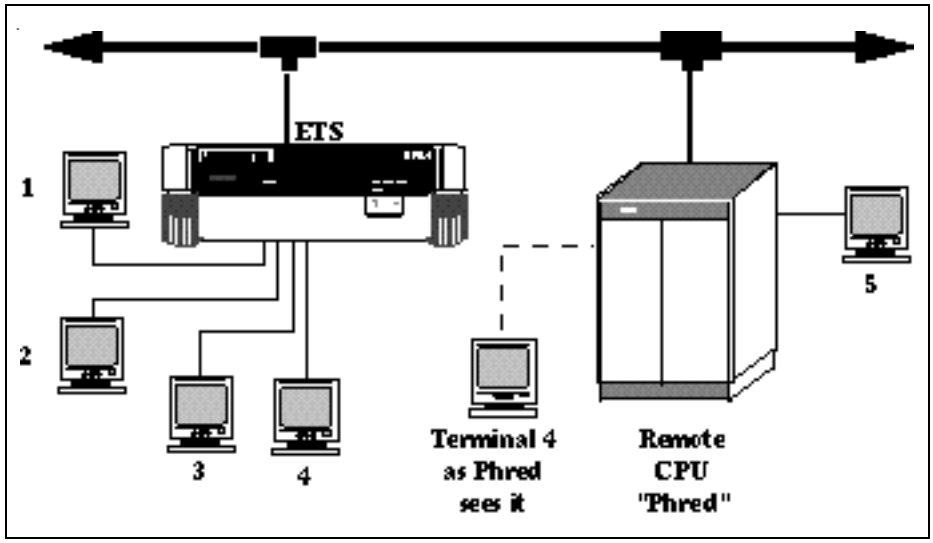
A unique IP address must be specified on the ETS before any of the TCP/IP functionality is available. See your *Installation Guide* for more information on configuring the IP address.

A DHCP server can be used to temporarily assign a leased IP address to the ETS. See *Dynamic Host Control Protocol (DHCP)* on page 12-10 for more information.

## 2.7.2 Telnet

**Telnet** is an industry-standard network protocol. Networks that support Telnet can (and do) stretch for thousands of miles and contain thousands of hosts. The theory behind Telnet is that a user anywhere on the network can access a foreign host and start a terminal session. The user does not have to worry about what kind of computer or operating system he is dealing with, and the remote host does not need to know the type of terminal the user is using. Telnet accomplishes this compatibility with the virtual terminal: any Telnet connection looks the same from both sides of the network. Figure 2-3 illustrates this concept.

**Figure 2-3:** ETS Network Telnet Example




### 2.7.2.1 Telnet Connections

All terminals on the network can access all hosts, but do not need to know (nor can they know) the host's exact hardware type. Theoretically, terminal 4 in the example above could establish a Telnet session with host Phred, and would see the same type of session as it would with a direct terminal connection to terminal 5. Phred, the CPU, will also treat terminal 4 as if it were directly connected.

A Telnet connection begins with both parties in the connection assuming that the other terminal is "dumb," that it knows little about characters, fonts, cursor movement, and so on. The two sides negotiate options to determine the capabilities of the other. For example, a terminal might support full cursor-control characters. Once the connection is established, the terminal and host may agree to support the extra characters. This all happens transparently to the user, who sees only a login screen and none of the negotiation process.

By default, Telnet connects to a pre-set port number to access a remote host's Telnet server. The ETS allows the specification of a port number other than the default to be used for the connection. For example, if a host is set up to listen to Telnet requests on port number 1034, that port number can be specified in the Telnet command entered into the ETS.

**Note:** *The Telnet command is explained in the Command Reference chapter.*

### 2.7.2.2 Rlogin

In addition to Telnet, ETS users can use the Rlogin application to connect to remote TCP/IP hosts. Rlogin is similar to Telnet, but it can be configured to allow trusted users to log into a host without password verification. For this reason, Rlogin can be a security problem, and is not enabled on all sites. TCP/IP Server Parameters on page 4-5 explains how to set up Rlogin access and discusses the methods of user verification. Like the UNIX version of the command, the ETS Rlogin command allows the user to specify a different username for logging into remote devices. Both Telnet and Rlogin support the port's Termtype field, which allows hosts to discover the type of terminal device automatically.

**Note:** *Rlogin is explained in the Command Reference.*

TCP/IP implementations generally have no knowledge of remote hosts until a connection is attempted. There is no searching for a host until the actual connection request is made. The UNIX operating system supports the rwho facility to allow hosts to see each other without an active connection, but it is not always implemented, enabled, or supported. Hosts running rwho send out occasional broadcasts containing the host name, address, and user information. The ETS will listen for rwho broadcasts and keep track of which UNIX hosts are available. See **Show/Monitor/List [Telnet] Hosts** on page 12-113 or your local host documentation for more information.

### 2.7.2.3 Subnetworks

TCP/IP Internets are usually broken down into **networks**, where a host is able to see only the hosts on its own network or sub-unit. TCP/IP networks then rely on **routers** (or **gateways**) to transfer network traffic to hosts on other networks.

Routers are typically connected to two or more networks, and will pass, or route, TCP/IP messages across network boundaries. The ETS can be told explicitly which hosts are the gateways for the local network. If no gateways are currently specified, the ETS will listen to routing protocol packets (for example, RIP) to decide which hosts are acting as gateways. See **Set/Define Server Gateway** on page 12-66 for more information.

The ETS decides at connection time whether the desired TCP/IP host is on the local network segment with the help of the **subnet mask** on the server. This mask tells how much of the IP address is the network address, and is applied to the IP addresses of both the ETS and the remote host. If the resulting addresses are identical, the connection is deemed local and the host is contacted directly. If not, the connection attempt and all subsequent messages to this host will be directed to the ETS's gateway host for forwarding. The subnet mask, if not set explicitly, will be automatically configured for the given IP address. See **Set/Define Server Subnet Mask** on page 12-83 for more information.

## 2.7.3 Name Resolution

TCP/IP hosts generally have an alphanumeric host name, such as Phred, in addition to a numeric IP address, such as 192.0.1.99. For this reason, the ETS supports the use of a local host table and domain name servers— hosts that can translate text host names into the numeric addresses that are needed for a connection.

Text names make it unnecessary to remember long strings of address numbers. For example, suppose user Bob wishes to log into a host named “alex.weasel.ctcorp.com.” The other hosts on the network have no knowledge of which piece of hardware is associated with this name, so the ETS must translate the name into a numeric address, such as 199.25.172.6. After the name is translated (or resolved), the connection can be attempted.

See **Set/Define Server Domain** on page 12-65 for more information.If there is no local host table or name server to provide text name translation, or if the name server(s) cannot translate the name, the host’s numeric IP address would have to be used for the connection. Also, if the ETS has not been told which local host is acting as the name server (see the **Set/Define Server Nameserver** command), it assumes that none is available and the connect request will likely fail.

The ETS also allows the setting of a default domain name to be appended to any host name for which name resolution is performed. In the example above, if Bob’s server had a default domain name of weasel.ctcorp.com, then Bob could type telnet alex and the ETS would attempt to resolve alex.weasel.ctcorp.com. This name checking occurs for all ETS commands that require text name resolution, such as Telnet, Rlogin, and Ping. If the connect destination name ends with a period, the domain name is not added to the hostname for resolution.

## 2.7.4 Local Host Table

The ETS enhances name resolution by providing a simple host table, which is a list of node names and corresponding IP addresses. Using the **Set/Define Telnet Hosts** command, the server manager can add hosts to this table. This allows the user to enter a text name described in the table in place of an IP address, which in turn eliminates the need to remember IP addresses. The local host table is especially useful for sites that do not have a domain name server, or in cases where a few hosts are accessed frequently.

The Show Hosts command displays all currently-known IP nodes and how they were learned: via the local host table, a local name server, rwho broadcasts, or name resolution during a connection attempt.

If name serving is enabled, the name server will be asked for the node’s IP address only if the local host table does not contain the information. This means that incorrect information in the local host table will be used, even if it is contrary to what a nameserver might report. The local host table does not have to be consistent with the name server, but consistency will avoid confusion. To maintain consistency, remove the old hosts from the host table with the **Clear/Purge Telnet Hosts** command.

Host table aliases should be easy to type, remember, and recognize. They are limited to 64 characters, with a maximum length of 16 characters per segment. For example, alex.weasel.ctcorp is legal, while alex.communicationsserver.ctcorp is not.

The ETS can also get host names and IP addresses from node rwho broadcasts and attempt to add entries to the host table based on this information. If the rwho addresses are cleared from the table, they will reappear the next time the host sends out an rwho message. Addresses will also reappear if a user attempts to connect to one of them.

## 2.7.5 Dynamic Host Control Protocol (DHCP)

DHCP, an extension to BOOTP, allows network administrators to lease IP addresses to network nodes as needed. ETS servers offer two levels of DHCP support: boot and runtime.

If your ETS has boot mode DHCP support, the ETS will attempt to acquire an IP address via DHCP at boot time. If it succeeds, the ETS will save the IP address into NVR and continue with the boot process. Once running, the ETS's operational code will attempt to acquire the same IP address from the DHCP server. If for some reason the runtime DHCP request fails (for example, if there is no response for 15 seconds), the ETS will use the address saved in NVR.

If your ETS does not support DHCP at the boot level, you can still use DHCP at the operational level. To enable DHCP in the runtime code, enter the **Set/Define Server DHCP Enabled** command and reboot the server.

**Note:** *Enabling DHCP will remove the IP address saved in NVRAM, if there is one.*

The ETS will use BOOTP or RARP to acquire an IP address at boot time, and then it will request an IP address via DHCP once it is running. If the runtime DHCP request fails, the server will use the IP address stored in NVRAM. If the DHCP request succeeds, the ETS will use the resulting IP address. It will **not** save the IP address to NVRAM or overwrite the saved address (the one acquired by BOOTP or RARP).

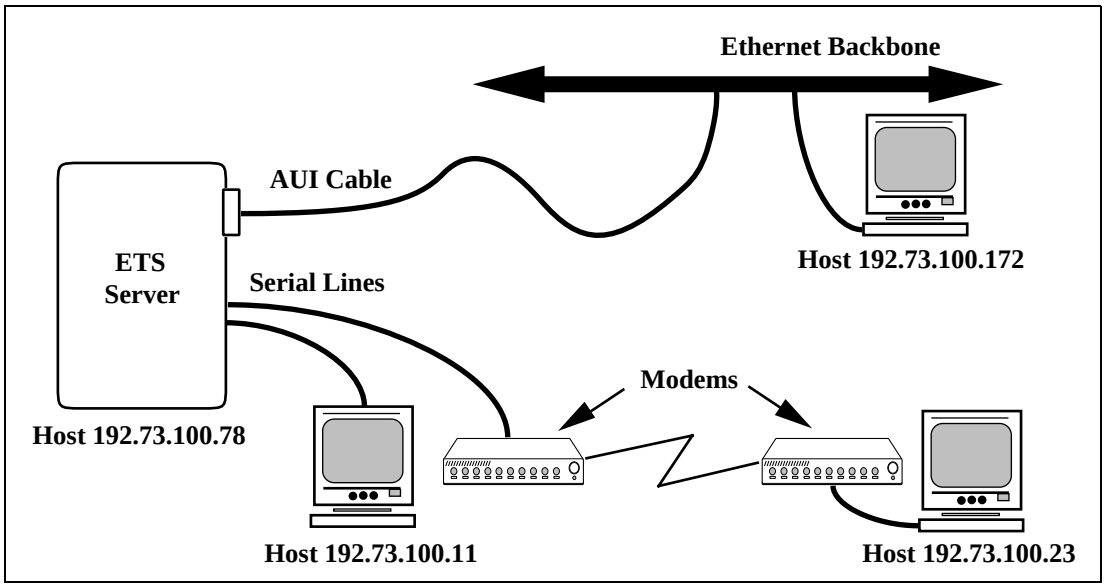
If you enter a new IP address with the **Set/Define Server IPaddress** command, the ETS will assume that you want to use that address in the future, and will disable DHCP.

**Note:** *When DHCP is used, the IP address saved in NVRAM will change each time the ETS boots, and the List Server Bootparams command (which shows the characteristics that will be in effect the next time the ETS boots) may show a different IP address than the one that is currently in use.*

## 2.7.6 Serial Line Internet Protocol (SLIP)

The SLIP protocol allows hosts to communicate via TCP/IP over a serial line instead of Ethernet. Due to the point-to-point nature of serial lines, only two hosts can communicate over a single line. SLIP is most frequently used for dialup modem lines, where a SLIP-equipped TCP/IP host can dial into the ETS, begin a SLIP session, and thus gain access to the network attached to the ETS. The remote host can start sessions to the ETS or any other host on the network, subject to security and other login restrictions. If multiple TCP/IP hosts are connected to the ETS via SLIP connections, each SLIP host can also access any of the other SLIP hosts, with the ETS routing packets between the serial lines. An example SLIP setup is shown below.

**Figure 2-4:** SLIP Example




**Note:** *See Set/Define SLIP on page 12-95 for more details.*

In the example above, assume all hosts have a subnet mask of 255.255.255.0. All four hosts will appear to be on the same network segment, and all four will be able to start TCP/IP connections with each other.

The ETS in this case “routes” packets between the serial lines and the Ethernet without help from the hosts involved. Note that since all the hosts are on the same network, the ETS is not routing in the true sense of the word, and any “real” IP routers on the network will not be affected by the SLIP sessions. The ETS is only directing network traffic to the proper serial port.

The ETS checks each packet it receives to see if it is destined for the ETS, or if it should send it to one of the SLIP hosts or out to the Ethernet. If an Ethernet packet is sent to the ETS and there is no SLIP connection for it, or if a packet is received from a SLIP port but is not from the host that is supposed to be there, the packet is discarded. This prevents other hosts from connecting to an active SLIP line and accessing the ETS’s Ethernet. The ETS also provides ARP replies for its SLIP hosts so that hosts on the Ethernet can resolve their IP addresses.

There are two restrictions on ETS SLIP support. First, there can be only one host at the end of the serial line. The ETS will only forward packets to and from the host registered on the SLIP line, it will not route packets to and from a SLIP network (multiple hosts). Second, all of the hosts connected via serial lines must be on the same network and subnet as the server.

The *SLIP* section of the *Server Configuration* chapter covers SLIP setup and other restrictions.

## 2.7.7 Simple Network Management Protocol (SNMP)

The ETS supports the SNMP network protocol, which allows hosts on the network to query nodes for counters and network statistics and change some parameters on those nodes. The form of these requests is documented by RFC 1098. The list of items that can be queried and/or set and the type of data used, such as integer and string, are both documented in various Management Information Bases (MIBs). MIBs cover a variety of things, such as parallel port status, counters, and IP address resolution tables.

The ETS supports the following MIBs:

**MIB-II (RFC 1213)** System, Interface, Address Translation, IP, ICMP, TCP, and UDP, but not the EGP group.

**Parallel MIB (RFC 1660)** All parallel devices.

**Serial MIB (RFC 1659)** All Serial devices.

**Character MIB (RFC 1318)** All character-oriented devices.

The ETS will respond to queries for unknown MIBs with a “not in MIB” error to the requesting host. RFC’s 1065, 1066, and 1098 offer additional information on SNMP queries and the structure of the MIBs. See **Set/ Define SNMP** on page 12-98 for more information about configuring MIB usage.

**Traps** are sent to a host when an abnormal event occurs on the ETS. The ETS can generate limited forms of three SNMP traps. It will generate a **Coldstart** trap when it first boots, and a **Linkup** trap when the startupfile (if any) has been read from a host and normal operation commences. If a startupfile has been configured but the download fails, the ETS will send an **Authentication** trap. In all three cases, the trap will be directed to the IP address of the ETS’s loadhost. The ETS will not generate traps for any other cases.

> **Note:** *To disable traps, define the Loadhost as “0.0.0.0” and reboot the server. See Set/ Define Server Loadhost on page 12-70 for syntax.*

The ETS has a local SNMP security table to restrict or prevent unauthorized SNMP configuration.

## 2.7.8 Reverse Telnet (RTEL)

When a server provides a service to a LAT host, the connection is often referred to as Reverse LAT. Reverse Telnet allows a UNIX host to initiate connections to the ETS in much the same way. It is called Reverse Telnet because “normal” connections are logins from a server to a host.

Your ETS comes with special software to add RTEL functionality to your UNIX host. RTEL connections can be made through a back-end program for a printer, or through a named pipe. For example, you can print files from your UNIX host to a printer attached to the ETS through your host’s **lp** or **lpr** print system. ETS services do not care what hosts are using them. Multiple jobs from any of the supported protocols can be queued simultaneously on any service.

## 2.7.9 LPR Support

The ETS and many UNIX systems implement the **lpr** (Berkeley remote printing) protocol, a protocol that makes it very easy to add print hosts to a system. To add the ETS as a print host, add the ETS's IP address to a host table and add the ETS's service name as a print queue. No special host software or other configuration is needed. ETS services can be accessed via the normal lpr commands on the host.

Print jobs can be forwarded multiple "hops" in the network. If you only want one host to know about ETS print queues, configure the other hosts to forward their print jobs to that host which will forward them to the ETS for printing.

**Note:** *See Chapter 7, TCP/IP Host Setup, for more information.*

## 2.7.10 UUCP Support

The UUCP (UNIX-UNIX Copy Protocol) utility allows UNIX hosts to transfer files between machines. It is most commonly used for electronic mail transfers and can be run over Ethernet, typically via TCP/IP or serial links. When run via TCP/IP, a handler for UUCP typically listens on port 540 of the host; when a connection to this port is made, a UUCP connection is assumed and the UUCP negotiation begins. The ETS provides support for incoming and outgoing UUCP connections.

Incoming UUCP can be accomplished with the server handling the serial line and creating a network connection to the UUCP machine. Since UUCP typically does not provide Telnet interpretation, the ETS Connect TCP command would be used to provide a raw TCP data stream to the UUCP host, and specifically to UUCP port (540).

Dedicated connections to the UUCP port can be made by adding the appropriate TCP parameters to the Port Dedicated command, or by adding an environment string to TCP/IP connection settings.

Outgoing UUCP connections can be made in a similar manner. The UUCP host must be configured such that outgoing UUCP network connections are made to the ETS UUCP port. If the ETS has been configured with the **Set/Define Server UUCP** command on page 12-84, it will attempt to connect to a specific service named UUCP. This service must map to one or more ETS serial ports, possibly ones with modems attached. A chat script (L.sys or Systems files) on the UUCP machine provides the commands needed to dial the modem and log into the remote UUCP machine. The chat script needs no knowledge of the ETS command set or service connection sequence.

## 2.7.11 TCP/IP Utilities and Commands

The following commands have been added to help TCP/IP usability:

**Finger** Displays users on local and remote hosts. The finger command by itself shows all users on the ETS. If given with a parameter, such as user@host, it shows information regarding the named user on the specified host. The username can be omitted, in which case all the users on the remote host will be displayed. If the host cannot be reached or accessed, the finger command fails.

**Note:** *To see a list of ETS processes, enter the command "finger finger."*

**Netstat** Displays the status of the routing tables and current network sessions.

| | |
|---|---|
| **Ping** | Sends a TCP/IP request for an echo packet to another network host to test network connections. |
| **Send** | Enables users on Telnet session to send explicit Telnet control characters, such as Abort Output (AO), Are You There (AYT), and more. |

# 2.8 LAT and TCP/IP Connectivity

The service capabilities of the ETS also allow translation between LAT and Telnet protocols. For example, a user on a LAT host might see and connect to an ETS offering service ernie as a LAT connection. This "service" might actually be a Telnet connection to host ernie. In the other direction, a TCP/IP user can use the UNIX Telnet or Rlogin command to connect to a LAT host through the ETS.

Both cases can take place transparently to the user. This implies that the TCP/IP host does not need LAT software, nor does the LAT host need additional TCP/IP software. The only difference between the connection types is their setup. One should keep in mind that each such connection consumes ETS memory and processing resources because each is treated as a connected "port" and user on the ETS. Chapter 7, *TCP/IP Host Setup*, explains how to set up Telnet to LAT and LAT to Telnet translations.

## 2.8.1 Connection Methods

The mechanics of the protocol translator add the ability to actually connect to the ETS from either a TCP/IP host (using Telnet or Rlogin) or a LAT host. For example, if the ETS's IP address is 192.0.1.92, a Telnet connection from an IP host to this address will return the local prompt just as if the user had logged in on a hardwired port. Also, the ETS can advertise itself as a "service" to LAT hosts. That is to say, LAT hosts can connect to the server and obtain the local prompt.

Once an incoming (LAT or Telnet) connection has been started, users can use the server as if they were connected on a local port. They can start outgoing connections, connect to local services, configure the server, and so on. TCP/IP users then have a convenient way to remotely "manage" the server: managers can simply log in and become the privileged user, change server parameters, and log out again.

## 2.8.2 Environment Strings

The ETS can be configured to set up sessions according to the host to which it is connected. These environment settings can be supplied via the **Connect** command, or can be saved either as part of the preferred or dedicated hostname or as part of a virtual translation service. Most of the environment options mimic the Set Session command options.

The environment string is a sequence of key letters, sometimes prefixed by a plus (+) or minus (-). The keys are added after the hostname and a colon for Telnet or Rlogin connections, and are specified via the EnvString parameter for LAT connections. The available key letters are explained in the **Connect** command on page 12-9.

Key letters are not case-sensitive, and no white space is allowed in the environment string. In addition, commands that oppose previously-configured settings will overwrite the previous setting, even if they appear on the same command line.

# 2.9 NetWare

Novell's NetWare software allows you to link computers together and provide file and printer sharing. It is typically used to network DOS-based PCs, but is starting to appear under UNIX and other operating systems. NetWare is built around file servers, which handle user logins, provide network resources, and control security. At least one file server, such as a PC or UNIX host, is required in any NetWare environment. NetWare users typically have to log into a file server to enjoy the networked (shared) benefits.

The ETS supports a significant subset of the NetWare functionality, most notably print spooling. Fileservers can be configured to send queued print jobs to printers attached to the ETS. No special software is required on the fileserver; configuration uses the EZWebCon Configuration software or the standard PCONSOLE utility. Any user or application that can use NetWare print queues can spool jobs to the ETS.

The ETS must periodically query the file servers for pending jobs. To do so, it logs into a file server to access the print spooler, and will try to connect to all file servers on the local network (subject to access lists, explained later) to check for such jobs. See **Set/Define Server NetWare Loadhost** on page 12-74 for more information.

NetWare support includes an IPX COM port redirector that allows users on IPX networks to share modems. For more information, see the Redirector Quick Installation Template that came with your ETS. NetWare support also allows logins from fileservers to the ETS (for configuration) and file downloading (to download the system software at boot time).

## 2.9.1 Networking

Each NetWare node uses its hardware address as its node ID. In addition, the ETS gets all the networking information it needs from periodic broadcasts sent by NetWare routers on the network. It will learn its own network number as well as routes to non-local file servers. No further configuration is needed.

The NetWare protocol can use all four Ethernet frame formats. It will listen for all frame formats, and then use the correct one for the connection. The different frame types are treated as different networks, and thus each frame type has a different network number. If there is only one frame format in use on the LAN, the ETS will use the network number for that frame type. If there are multiple frame types, limitations to the NetWare protocol require that the ETS use a different network number for each frame type on which it wants to advertise itself.

The ETS can use multiple frame types by creating a new, unique "internal network number" and advertising itself as a router to the internal network. Any nodes or fileservers that need to communicate with the ETS use this new network number, and treat the ETS as a router to that network. If this behavior is not desired, the ETS can be forced to use only one frame type (and thus not need an internal network number).

## 2.9.2 Access Lists

Since NetWare networks can have hundreds of fileservers, the network needs a way to reduce the number of ETS queries, both to reduce network traffic and to prevent long delays in servicing active queues. By using access lists (created with the **Set/Define Protocols NetWare Access** command on page 12-59) you can control which file servers the ETS will and won't poll for print jobs.

The file servers have no control over the ETS access lists, so they will never know if a misconfiguration of the access list prevents them from spooling print jobs to the ETS.

# 2.10 Sessions

When a user connects to a service on the network (LAT, Telnet, or Rlogin), he or she creates a session. A non-networked terminal with a dedicated line from the terminal to the CPU is typically limited to a single session—users must log out of the current session before they can connect to new host or service.

With the ETS, however, this restriction is eliminated. A user can have several open sessions at a time, although only one is displayed on the screen. Four important topics accompany our discussion of multiple session support:

- Leaving an active session and returning to the Local prompt.

  This is accomplished with the Break key. Pressing it will return the server to Local mode, leaving any sessions connected. In Local mode, users can issue server commands to perform various ETS functions.

  If your terminal device has no Break key, you can configure a local switch key with the **Set/Define Port Local** command.

- Moving between active sessions without returning to the Local prompt, or moving from the Local prompt to an active session.

  The **Backwards** and **Forwards** commands, entered in Local mode, move users backwards and forwards through sessions. In addition, the **Set/Define Port Backward** and **Set/Define Port Forward** commands allow users to define switch keys to move forwards and backwards through sessions without returning to Local mode.

- Setting session characteristics.

  The Set Session commands allow you to configure each session to perform various amounts of processing on the input character stream. For example, it is possible to configure the session so that it does not interpret and strip out flow control characters.

  It is also possible to redefine the Delete and Return keys for Telnet connections, depending on the host to which you are connecting. This is especially useful for TCP/IP hosts that expect both Carriage Return and Line Feed, for example, or only Line Feed. Note that you can only set the current session—you must move through the session list if you wish to change a non-current session.

- Disconnecting sessions from Local mode and Resuming them.

  If a session on a remote host freezes up or gets stuck executing code, you can Break out of the session and close it with the **Disconnect** command. You can also resume work on a session after you've returned to Local mode with the **Resume** command. Both commands can affect any of the active sessions, not just the current one. Logging out of the server closes all active connections.

For an example of how these functions work, see the *Using the ETS* chapter,

The number of active sessions a user can have on the server is limited by two factors: available server memory resources and software limits (including a server-wide session limit and a port-specific session limit). The absolute maximum number of sessions per port is eight.

See **Set/Define Server Session Limit** on page 12-80 and **Set/Define Port Session Limit** on page 12-50 for more information.

# 2.11 PostScript

Many printers (including all LaserWriters and other AppleTalk compatible laser printers) use a printing language called PostScript. Unlike other printer protocols, which typically accept ASCII characters and print them verbatim, PostScript is also a programming language. Shapes and fonts can be defined as routines and re-used on successive pages, multiple fonts and copies can be printed, and text and diagrams can be rotated and shifted on pages.

PostScript is also an interactive language, where the printing host can query the printer for its knowledge about fonts and software versions. If the host expects to receive data from the printer (as is the case for all AppleTalk printing), the printer must support Bitronics mode and be connected to a bidirectional port such as one on the ETS. PostScript printing from UNIX, LAT, and NetWare hosts, where bidirectional data flow is not a requirement, can generally use any parallel port.

PostScript is a verbose language; it is recommended that the printer and ETS use a baud rate of at least 9600 to communicate over serial lines. A baud rate of 38400 or better is strongly recommended for high-output duty; see the printer's documentation for information on changing the serial speed. Also, many PostScript jobs contain 8-bit characters. The ETS is configured for 8-bit characters, but if the printer is not (the default on many laser printers is 7-bit), some characters will be printed incorrectly. See your printer's documentation for details on how to change the character size setting.

Due to the interactive nature of PostScript, it is possible for the printer and host to get out of synch in their communication. Since the printer "interprets" the entire PostScript job and then prints the pages, it is possible for the ETS to complete the transfer and accept a new job while the printer is still digesting the last job. For this reason, an end-of-job character (ASCII 0x4 or Ctrl-D) is used to end all PostScript jobs. Typically the host will send one at the end of the job and the printer will reply with one when it is done processing the job. For information on end-of-job characters, see **Set/Define Service EOJ** command on page 12-86.

The ETS will force a Ctrl-D character when PostScript is enabled on the appropriate service and wait for one in return. Therefore, enabling PostScript is **strongly** recommended for all PostScript printer applications. It guarantees that the printer is ready to accept new data when the job actually starts. Job loss and printer hangs are the usual result if PostScript is not enabled on the service and the printer cannot keep up with the job rate. High-speed printers may happen to work if the PostScript attribute is not enabled, simply because they finish the current job in the time it takes for the ETS to accept the next one.

# 2.12 Modem Features

The ETS supports both incoming and outgoing modem connections. The ETS can be configured to offer a modem service to both LAT and Telnet users. Using the DSR and DTR signals from the serial lines (see the Serial Pinouts appendix in your Installation Guide) the ETS ports can both log out an attached modem after a connection exits and be logged out if the modem hangs up. Ports can also be configured to automatically detect the baud rate at login time allowing multi-speed modems to connect easily.

The ETS allows ports to be configured with the Dialup and/or DTRwait characteristics. Dialup will tell any LAT service that a port is connected to a modem; the remote node may decide to disallow the connection based on that flag for security reasons. The DTRwait characteristic will force the ETS to de-assert DTR on a port until a user actually connects to the port. This connection can be either an interactive login from a device on the network or a LAT or Telnet service connection. For some modems, de-asserting DTR will prevent the modem from answering an incoming call unless someone is already connected to the port.

The ETS also provides Dialback support, which requires port users to enter a trusted username and then allow the ETS to close the connection and attempt to reconnect via a specified modem command string. This ensures that only trusted usernames are used, and that the usernames only log in from a particular phone number. If an invalid username is entered or the reconnect attempt fails, the connection is assumed to be non-secure and the port is logged out. Ports configured for Dialback have a 30-second time limit for entering a username at login time to prevent unauthorized users from denying access to others. Dialback does not interfere with outgoing modem connections, so a modem can be restricted for incoming logins but still allow network users full outgoing access.

### 2.12.1 Remote Configuration

There are three ways to remotely configure the ETS: the Telnet console port, the NCP and TSM utilities, and SNMP.

TCP/IP users connecting to the Telnet console port (port 7000) will be prompted for the ETS's login password. After entering the login password, the user can issue normal configuration commands, but will still have to enter the privileged password to issue privileged commands. Connections to this port are not subject to the **Set/Define Server Incoming** command, and thus managers can log into this port regardless of whether regular TCP logins are enabled.

VMS users can use the NCP utility to signal remote hosts to perform specific operations across the network or form connections to the ETS. This is especially useful for Flash-ROM ETS's, which might not be placed in easily accessible locations. The TSM utility uses NCP to start login sessions with the ETS and allows files of ETS commands to be sent to the ETS. Access to remote control of the ETS can be protected by the maintenance password.

The Telnet console, NCP, and TSM all require the correct login password to be entered. The default password is **access**. It can be changed via the **Set/Define Server Login Password** command. See **Set/ Define Server Maintenance Password** on page 12-72 for information on remote access control.

SNMP allows network hosts to query other hosts for counters and network statistics. In general, one host on a network will run an SNMP application that queries the other hosts on the network to collect statistics and other information and signal error conditions. The ETS will not generate queries of its own; it can only respond to queries from other hosts. See the discussion of *Simple Network Management Protocol (SNMP)* on page 2-13 for more information.

## 2.13 Security

Several methods can be used to control access to the ETS and restrict user behavior once logged in. For example:

- Incoming logins can be selectively disabled and/or password protected via the **Set/Define Server Incoming** command.
- The IP security table can be used to restrict logins to the ETS.
- Ports used for network logins can be “preconfigured” with a standard set of characteristics for each login.

For more information about security measures and restriction options, including some ETS features that are used for more than security reasons, see the *Server Configuration* and *Ports* chapters.

## 2.13.1 Menu Mode

For added security or a uniform command interface, system managers can set some or all ports for Menu Mode. Users logging into a port in menu mode will have the following text displayed on their terminals instead of the local prompt:

Menu Mode Display

```
<Menu Name>
1. command1                    11. command11
2. command2                    12. command12
...                            ...
10. command 10                 20. command 20
Enter Selection:
```

The users will not be able to enter text commands; they will only be allowed to enter a numeric choice from the menu. Up to 36 commands can be provided for the users, including a command to exit menu mode and return to the interactive Local> prompt. Menu mode frees users from having to remember ETS syntax and generally prevents them from entering privileged configuration commands, although it can be configured to allow them privileged access.

Configuring the menu is a two step process:

1. The port is configured to use menu mode with the **Set/Define Port Menu** command.
2. The command entries themselves are configured with the **Set/Define Menu** command.

A menu command of Exit can be specified, in which case the user will be allowed to exit menu mode and return to the command line to enter normal ETS command lines. This might be useful, for users who prefer the ease of use of a menu but need to return to the command line occasionally. Menu mode can then be re-entered via the **Set/Define Port Menu** command, or by logging out and logging back in to a port that has menu mode enabled.

The current or saved menu tables can be displayed via the **Show/Monitor/List Menu** commands. Individual menu entries or entire menu tables can be cleared via the **Clear/Purge Menu** commands.

## 2.13.2 Event Reporting/Logging

The ETS can be configured to report various errors and events either to the serial console port or to a network host via TCP/IP (using the syslogd facility), LAT, or NetWare. Events that can be logged include user logins, modem events, printer state changes, system boots, system resets, and a full record of commands issued on the ETS. See **Set/Define Logging** on page 12-25 for more information.

# 3: Getting Started

This chapter provides background information to get you started using the ETS. Topics include methods used to initially set up the ETS as well as ongoing maintenance issues, such as rebooting and restoring factory default settings.

This chapter assumes the following:

- The ETS has booted properly and is running its operational code
- The ETS is connected to the Ethernet
- For IP network users, the ETS has been assigned a valid IP address.

If any of these conditions have not been met, refer to your *Installation Guide* for information on installing the ETS.

## 3.1 Configuration Methods

The ETS may be configured using one of two methods: the EZWebCon configuration software, or commands issued at the command line (Local> prompt).

> **Note:** *To configure the ETS when a problem has occurred, refer to the Troubleshooting appendix.*

### 3.1.1 EZWebCon

The EZWebCon software is the recommended way to configure the unit. EZWebCon guides you through configuration using a graphical interface. Its configurations take effect immediately, like Set commands, and are permanent, like Define commands.

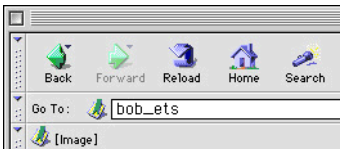
EZWebCon is shipped with the ETS on CD-ROM. It can be installed and used on any computer for which there is a Java Virtual Machine. To install EZWebCon, refer to the README file located in the EZWebCon directory. For assistance once EZWebCon is running, refer to the EZWebCon on-line help.

> **Note:** *There are problems with some implementations of the Java Virtual Machine. See the EZWebCon README file for more information.*

## 3.1.2 Using a Web Browser

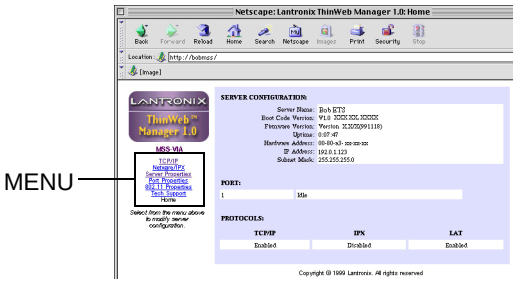
The ThinWeb Manager web browser interface allows you to log into and configure your ETS using a standard web browser with JavaScript enabled. Simply type the ETS IP address or resolvable text name into the browser's URL/Location field.

**Figure 3-1:** Sample Web Browser Login




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

**Figure 3-2:** ThinWeb Manager Interface




## 3.1.3 Command Line Interface

To configure the ETS without using the EZWebCon graphical user interface, you must enter configuration commands at the command line when a port is in **character mode**. In character mode, the Local> prompt is displayed.

There are four ways to enter character mode:

- Connect a terminal to the serial console port and press the **Return** key until the Local> prompt is displayed.
- Establish a Telnet or Rlogin connection to the ETS from a TCP/IP host.
- In EZWebCon, click the Terminal icon. The Local> prompt will be displayed in a terminal emulation window.
- Establish a TCP/IP remote console connection by Telnetting to port 7000:

**Figure 3-3:** Remote Console Connection

```
% Telnet 192.0.1.166 7000
```

**Note:** *Remote console logins are password protected via the server login password. See Login Password on page 3-9 for more information.*

# 3.2 Entering and Editing Commands

In examples throughout the manual, ETS commands and keywords are displayed in uppercase for clarity. They may be entered in upper, lower, or mixed case.

The *Command Reference* chapter displays the syntax of each command, and includes restrictions, known errors, and references to related commands. Optional parameters are enclosed in straight brackets **[ ]**. Multiple options in a set of brackets may be entered, or options can be omitted entirely. Required parameters are enclosed in curly braces **{ }**. One and only one of the parameters enclosed in each set of braces must be used. User-supplied parameters, such as a particular host name, are shown in italics or all lower case.

When entering a string, such as a username or filename, it is important to remember to **enclose the string in quotes** to preserve case and spacing. If a string is not enclosed in quotes, it will be automatically changed to all uppercase characters.

**Note:** *The privileged and login passwords are case-independent, even when entered in quotes.*

The ETS **command completion** feature, when enabled, will complete partially-typed commands for you. This can save time and reduce errors if you're entering a number of commands. To use command completion, type part of a command, then press the space bar; the ETS will automatically "type" the remainder of the command. If the partial command is ambiguous, the terminal will beep to prompt you for more information. See **Set/Define Port Command Completion** on page 12-33 for more information.

All keys used for entering and editing commands are listed in Table 3-1.

**Table 3-1:** Command Line Editing Keys

| Key | Purpose |
|---|---|
| Return | Executes the current command line |
| Delete | Deletes the character before the cursor |
| Ctrl-A | Toggles insert mode (insert or overstrike; overstrike is the default). |
| Ctrl-D | Logs the port out |
| Ctrl-E | Moves the cursor to the end of the line |
| Ctrl-H or Backspace | Moves the cursor to the beginning of the line |
| Ctrl-R | Redisplays the current command |
| Ctrl-U | Deletes the entire current line |
| Ctrl-Z | Logs out of the server |
| Left Arrow | Moves the cursor left |
| Right Arrow | Moves the cursor right |

**Table 3-1:** Command Line Editing Keys, cont.

| Key | Purpose |
|---|---|
| Up Arrow or Ctrl-P | Recalls the previous command |
| Down Arrow or Ctrl-N | Recalls the next command |
| !*text* | Recalls the last command starting with *text* |
| !! | Recalls the last command |

**Note:** *Line editing is disabled on hardcopy (printer) ports.*

# 3.3 Restricted Commands

To prevent unauthorized users from changing server-wide characteristics, some commands require privileged (superuser) status. To obtain privileged status, enter the privileged password. See *Privileged Password* on page 3-8 for more information about passwords, including the default passwords.

# 3.4 Command Types

The following commands appear frequently throughout this manual. There are subtle differences between each group of commands, as explained below.

## 3.4.1 Set and Define

**Set** Makes an immediate but not permanent change. To make the change permanent, use the **Save** command after configuration is complete.

**Save** Makes a group of commands entered with the Set command permanent. For example, users can enter several Set commands to configure a service, then Save the service.

**Note:** *Settings that are made with both Set and Save behave as if they were configured using Define commands. See Save on page 12-21 for more information.*

**Define** Makes a permanent change that generally doesn't take effect until the unit is rebooted. Define Port will take effect as soon as the port is logged out and Define SLIP will take effect once a new SLIP session is started.

## 3.4.2 Show, Monitor, and List

**Show** Displays the current settings. Current settings include those made using the Set command but not yet Saved as permanent changes.

**Monitor** Displays the current settings at regular intervals; information is updated every three seconds.

**List** Displays the unit's permanent settings. Note that some settings that are Listed will not take effect until the unit is rebooted.

### 3.4.3 Clear and Purge

**Clear** Removes an item immediately, but not permanently. When the unit is rebooted, the old setting will again be in effect.

**Purge** Removes an item permanently, but generally does not take effect until the unit is rebooted. Purge Port will take effect as soon as the port is logged out and Purge SLIP will take effect as soon as the current SLIP session (if any) ends.

## 3.5 Abbreviating Keywords

When configuring the ETS via the command line, it is only necessary to type as many characters as are needed to distinguish the keywords from one another. For example, the following two commands are equivalent:

**Figure 3-4:** Full and Abbreviated Commands

```
Local>> DEFINE PORT 2 BROADCAST ENABLED AUTOCONNECT ENABLED PARITY EVEN
SPEED 4800
Local>> DEF PO 2 BRO EN AUTOC EN PAR E SP 4800
```

**Note:** *Extra white space (more than one consecutive space between keywords) is ignored.*

## 3.6 Maintenance Issues

The following sections detail configuration that is required on a sporadic or ongoing basis.

### 3.6.1 Changing the Server Name

The ETS is initially configured with a server name. However, you can give the ETS a custom name of up to 16 alphanumeric characters using the following command:

**Figure 3-5:** Changing the Server Name

```
Local>> DEFINE SERVER NAME “PrintServer”
```

The ETS name string must be enclosed in quotes if lowercase letters are used.

## 3.6.2 Changing the Server Prompt

The prompt each user receives (the Local> prompt) is configurable in a variety of ways. For a basic prompt, enter a command similar to the following. The resulting prompt is shown on the next line.

**Figure 3-6:** Configuring User Prompt

```
Local> SET SERVER PROMPT “Server>”
Server>
```

**Note:** *The remote console port prompt cannot be changed.*

For a customized prompt, the options listed under **Set/Define Server Prompt** on page 12-76 can be included in the prompt string. Placing a space after the end of the prompt is recommended, as it makes reading and editing the command line much easier.

Figure 3-7 displays a few examples of commands used to change prompts. In the examples, the first command line results in the prompt used in the second command line, and so on.

**Figure 3-7:** Prompt Examples

```
Local> SET SERVER PROMPT “Port %n: “
Port 5: SET SERVER PROMPT “%D:%s! “
ETS-8:LabServ! SET SERVER PROMPT “%p%S_%n%P%% “
Port_5[NoSession]_5>%
```

## 3.6.3 Rebooting the Server

There are two ways to reboot the ETS: pressing the Reset button while using EZWebCon, or entering the **Initialize** command at the Local> prompt.

Options to the Initialize command include rebooting the server, reloading the Flash-ROM code, and restoring the unit’s factory default settings. The example below shows a simple, immediate reboot. See **Initialize** on page 12-14 for more information.

**Figure 3-8:** Rebooting the Server

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

If possible, any current user sessions should be logged out before rebooting the ETS. Disconnecting sessions may prevent connection problems after the ETS is rebooted.

It is courteous to warn users that the server will be “going down;” this can be done using the Broadcast command. The complete syntax of Broadcast is listed on page 12-4 in the *Command Reference*.

**Figure 3-9:** Broadcast Command

```
Local>> BROADCAST ALL “Server shutdown in 5 minutes.”
```

### 3.6.4 Restoring Factory Defaults

Should it become necessary, the ETS can be restored to the default settings installed at the factory. This will restore **everything**—the ETS will function as though it just came out of the box. Be certain you wish to do this before you start. As mentioned in Section 3.6.3, you can use the **Initialize** command to reboot the server to its factory default settings.

**Figure 3-10:** Restoring Factory Defaults

```
Local>> INITIALIZE FACTORY
```

### 3.6.5 Reloading Operational Software

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

Reloading the code into the Flash ROMs is a straightforward process. The operational code is downloaded from a network host via TFTP or MOP and then programmed into the Flash ROMs. To force the unit to re-download and reprogram its stored code, enter the **Initialize Reload** command from the command line.

Compressing the code and loading it into the Flash-ROM takes approximately 30 secondst, during which time the console port is unusable. However, the ETS LEDs will indicate continuing activity. If the ETS is powered off or otherwise interrupted during the ROM programming phase, the code in the ROMs will be invalid and the ETS will have to be reloaded again from the network host the next time it is turned on.

## 3.7 Editing the Boot Parameters

If the information that the ETS uses at boot time changes, you must edit the ETS **boot parameters**, including:

- Loadhost (TCP/IP or NetWare)

  The **loadhost** is the host from which the ETS operational software is downloaded at boot time.

- Backup loadhost (optional)

  Software is downloaded from a backup loadhost when the primary loadhost is unavailable.

- Software filename
- DHCP (may be enabled or disabled)
- BOOTP (may be enabled or disabled)
- RARP (may be enabled or disabled)
- Boot Gateway

  At boot time, packets are addressed to the loadhost but are sent to a boot gateway host. This eliminates the need for proxy-arp on the router.

- NetWare fileserver name

Boot parameters are edited with **Set/Define Server** commands.

**Figure 3-11:** Editing Boot Parameters

```
Local>> DEFINE SERVER LOADHOST 192.0.1.8 SOFTWARE “newload”
```

**Note:** *The loadfile name must be placed in quotes to preserve case.*

# 3.8 System Passwords

There are three important passwords for the ETS: the privileged password, the login password, and the maintenance password. All three are discussed in the following sections.

## 3.8.1 Privileged Password

Changing any server or port setting (and issuing certain other commands) requires privileged user status. When using EZWebCon, you will be prompted for the privileged password when it is needed. If you are not using EZWebCon, you must enter the Set Privileged command at the Local> prompt to become the privileged user.

**Figure 3-12:** Set Privileged Command

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

**Note:** *The prompt may change to reflect privileged user status, if configured to do so.*

If another user is currently logged into the ETS as the privileged user, you can use the Set Privileged Override command to forcibly become the privileged user.

The default privileged password for the ETS is system. To change the privileged password, use the **Set/Define Server Privileged Password** command on page 12-76 to enter a new password of up to six alphanumeric characters. It is not necessary to enclose the password string in quotes; the privileged password is not case-sensitive.

**Figure 3-13:** Changing Privileged Password

```
Local> SET PRIVILEGED
Password> system (not echoed)
Local>> SET SERVER PRIVILEGED PASSWORD hippo
Local>> SAVE SERVER PRIVILEGED PASSWORD hippo
```

If you do not provide the password on the command line, you will be prompted to enter it and then verify your entry. The password will not be displayed on the terminal.

**Note:** *You can abort the password-entering process by pressing Ctrl-Z at the password prompt.*

When you are finished entering the privileged commands, it is a good idea to turn off privileged status with the **Set Noprivileged** command so that you do not inadvertently change settings.

## 3.8.2 Login Password

Each port can be configured to require a login password when in character mode. Users will be prompted for this password when attempting to log into the port.The Local> prompt will not be displayed until the correct password is entered.

The default login password is **access**. To change this password, use the **Set/Define Server Login Password** command on page 12-71. You may enter a new password of up to six alphanumeric characters. It is not necessary to enclose the password string in quotes; the login password is not case-sensitive.

**Figure 3-14:** Defining Login Password

```
Local>> DEFINE SERVER LOGIN PASSWORD badger
```

If you do not provide the password on the command line, you will be prompted to enter it and then verify your entry. The password will not be displayed on the terminal.

To enable the use of the login password on the appropriate port(s), enter the following command.

**Figure 3-15:** Enabling Login Password

```
Local>> DEFINE PORT num PASSWORD ENABLED
```

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

## 3.8.3 Maintenance Password

The maintenance password is used for MOP/TSM access to the server. Unlike the other passwords, the maintenance password is a string of up to 16 hexadecimal digits (0-9,A-F).

The default server maintenance password is a string of 16 zeroes. To change the password, become the privileged user and enter the following command.

**Figure 3-16:** Defining a Maintenance Password

```
Local> DEFINE SERVER MAINTENANCE PASSWORD newpass
```

# 3.9 Configuration Files

A configuration file is a series of ETS commands used for automatic configuration of one or more servers. It may be used by the system administrator when necessary or downloaded automatically from a TCP/IP host (via TFTP), from a VMS host (via LAT), or from a NetWare fileserver when the ETS boots.

Using a configuration file can reduce the time required to configure the ETS. Options that would need to be manually set using EZWebCon or the command line can be automatically executed.

## 3.9.1 Using EZWebCon

EZWebCon will examine the current configuration of your ETS, translate this information into a series of commands, and save the commands in a file. This file can be downloaded to configure the ETS. Refer to EZWebCon's on-line help for more information.

## 3.9.2 Without EZWebCon

To use a configuration file without EZWebCon, first create a configuration file, then configure the host so that you can download the file, then configure the ETS to use the configuration file.

### 3.9.2.1 Creating the File

The configuration file contains ETS commands, one per line, that will be executed by the ETS in sequence. Privileged commands can be used because the startupfile is run in privileged mode on the server.

Capitalization of commands is optional. If a string (such as a password or filename) is entered, it must be enclosed in quotes to preserve case or non-alphabetic characters. To include a comment, preface each line of text with a pound character (#); these lines will be ignored.

If Define Server commands are included in the file, they will not take effect until the next reboot. Similarly, Define Port commands will not take effect until the port(s) are logged out. All other Define commands will take effect for the current boot.

The download file is re-read at every boot unless it is re-configured, so do not put commands like **Initialize** or **Crash 451** in the file. Unless the startup filename has been changed, an Initialize command will cause the ETS to boot perpetually, and recovery will require that you flush the unit's NVR.

Managers can use the **Source** command to test the file, in effect causing the ETS to attempt to download a configuration file before making it a part of the server's boot routine. This test is strongly recommended as it helps eliminate errors that might prevent the ETS from booting.

**Figure 3-17:** Configuration File

```
#setting up the ports
DEFINE PORT ALL BITRONICS ENABLED
DEFINE PORT ALL DSRLOGOUT ENABLED
#setting up a print service
DEFINE SERVICE print1 IDENT "Printer on lab ETS port 1"
```

It is assumed that the console port executes the configuration file; if you use a command without a port designation, like **Set Port Speed 9600**, it will affect the console port's settings. Use the Show Server Status command to see which port is currently the console (the default is port 1).

### 3.9.2.2 Configuring the Host

The configuration file can be downloaded from a TCP/IP host (via TFTP), from a VMS host (via LAT), or from a NetWare fileserver. In any case, some host configuration will be necessary.

- For TFTP loading, enable TFTP loading on your host and place the configuration file in a download directory.
- For LAT downloading, install the ets$configd service handler on your VMS hosts. The service handler code is included on the distribution CD-ROM.
- For NetWare, put the configuration file in the fileserver's login directory.

### 3.9.2.3 Configuring the Server

To configure the ETS to use the commands in the configuration file, use the **Source** command. If the configuration file must be downloaded each time the ETS boots, the filename must be specified using the **Set/Define Server Startupfile** command.

The configuration filename is generally of the form "host*filename", where host can be a TCP/IP, VMS, or NetWare node name. The asterisk should be replaced with colons or a backslash as follows: use one colon (:) for a TCP/IP host, two colons (::) for a LAT host, or one backslash (\) for a NetWare host.

For example, to download the file **config.cmd** from TCP/IP host TROUT at IP address 192.0.1.5, the following command would be used.

**Figure 3-18:** Downloading from a TCP/IP Host

```
Local> DEFINE SERVER STARTUP "192.0.1.5:config.cmd"
```

**Note:** *You must define a nameserver if you wish to use a text TCP/IP hostname. The ETS will attempt to resolve the name at boot time; if it cannot resolve the name, the download will fail.*

Figure 3-19 displays the command needed to download the same startup file from NetWare host BASS. Notice that the host name is now Bass\Sys, and the filename is now \Login\config.cmd to reflect that the file resides in the login directory.

**Figure 3-19:** Downloading from a NetWare Fileserver

```
Local> DEFINE SERVER STARTUP "BASS\SYS:\LOGIN\config.cmd"
```

Figure 3-20 displays the command needed to download the same startup file from VMS host PIKE.

**Figure 3-20:** Downloading from a VMS Host

```
Local> DEFINE SERVER STARTUP "PIKE::config.cmd"
```

### 3.9.2.4 Download Sequence

If the configuration file cannot be downloaded at boot time, the server will retry the download if configured to do so. This behavior is governed by the Startupfile Retry limit. A Retry limit of zero means the ETS will retry forever until it can download the file. Otherwise it will try a specific number of times, then continue booting.

**Figure 3-21:** Defining the Startupfile

```
Local> DEFINE SERVER STARTUPFILE “filename” RETRY 10
```

**Note:** *The ETS is not usable while retrying a download.*

If the startupfile is not readable, or if there is a problem with the file and the ETS cannot boot fully, you will still be able to access the ETS via the NCP/TSM and Telnet console ports.

Scripts written for TSM should work unchanged, with the possible exception of privileged mode. Set Privileged cannot be used in either a Source or Startupfile file, so the command must be removed from any TSM scripts that are to be used with Startupfile.

# 4: Server Configuration

After powering up the ETS for the first time, you will want to configure it for everyday use. Most of the parameters discussed in this chapter only need to be set once and can be left alone until a major change is needed. Please refer to the *Glossary* for more information about unfamiliar terms.

**Note:** *IP parameters must be specified before Telnet can be used, and an IP address must be configured before EZWebCon can be used. See your Installation Guide or the Set/Define Server IPaddress command on page 12-69 for instructions.*

After configuring server-wide parameters for your ETS, proceed to Chapter 5 for port-specific configuration. In addition, be sure to read the appropriate host setup chapter(s) to configure your host machine(s) to take advantage of available ETS features.

## 4.1 General Server Parameters

### 4.1.1 Enabling Incoming Connections

By default, incoming LAT connections are disabled and incoming Telnet connections are enabled. To allow LAT users to log into the ETS, you must enable incoming connections using the **Set/Define Server Incoming** command. The following command allows both LAT and Telnet users to log into the ETS.

**Figure 4-1:** Allowing Incoming Connections

```
Local> DEFINE SERVER INCOMING BOTH
```

**Note:** *For full command syntax and options, see Set/Define Server Incoming on page 12-68.*

### 4.1.2 Enabling Server-Wide Port Characteristics

You can set up server-wide port characteristics, such as enabling locking and broadcasting and setting users session limits. The following commands allows port users to lock their ports, send broadcast messages to other ports, and set the maximum number of sessions per port to three.

**Figure 4-2:** Defining Server Characteristics

```
Local> DEFINE SERVER LOCK ENABLED BROADCAST ENABLED
Local> DEFINE SERVER SESSION LIMIT 3
```

Individual port users can then lock their own ports as desired, send and receive broadcasts, and start up to three simultaneous sessions. For more information about port characteristics, see Chapter 5, *Ports*.

#### 4.1.2.1 Preconfiguring Virtual Ports

Incoming LAT or Telnet/Rlogin logins to the ETS do not have a physical port associated with them, since they can appear and disappear at random. Therefore, each such connection receives a **virtual port** at the time of connection which disappears after logout. These virtual ports are created from a **template port**, which is the set of characteristics that every network login receives. Each user can use the Set Port commands to customize his or her own port during that connection, but cannot save the individual port settings. A recommended use for the template port is to provide local switches to network logins, as they typically do not have any Break key to use after they connect.

The ETS provides a way to preconfigure virtual ports. If a parameter is Defined on port zero, it will set up default parameters to be provided for all of the network logins. If, for example, `Define Port 0 Preferred "Albert"` is entered, the preferred service for all network logins becomes service **Albert**. Users can change or clear these characteristics on their own ports with their own Set Port command after login.

NCP and Telnet remote consoles are considered virtual logins, so they will also receive the template port's setup. They will, however, ignore many of the configuration options, such as Dedicated and Access settings. Otherwise, the console could be rendered useless.

### 4.1.3 Enabling Announcements

The **Announcements** flag tells the ETS whether to broadcast local service advertisements and MOP remote console announcements to the network. Normally enabled, Announcements can be disabled if you don't want network users to see or connect to the local services. If no services are defined, the ETS does not broadcast announcements.

**Note:** *For command syntax, see Set/Define Server Announcements on page 12-62.*

## 4.2 AppleTalk Server Parameters

The only configurable AppleTalk parameter is the zone to which the ETS will belong. If there is no AppleTalk router on the network, all devices will pick the same zone ("*"). If a router is present, the ETS will use the network's default zone unless **Define Protocols AppleTalk** is used to specify a different zone name.

**Figure 4-3:** Specifying AppleTalk Zone

```
Local> SET PROTOCOL APPLETALK ZONE "AcctZone"
```

The above command places the ETS in an AppleTalk zone called "AcctZone." An error will be returned (and the default zone used) if the specified zone cannot be confirmed with a router.

**Note:** *Zone names are case-sensitive; if lowercase letters are used in the name, the string must be enclosed in quotation marks.*

The current zone name can be viewed on the **Show Protocols** display. The Show Protocols AppleTalk screen and its subscreens give even more detail, including the current network range and packet counts. A node will only show up in the display if it is a router or is in direct contact with the ETS for printing or configuration.

# 4.3 LAT Server Parameters

Two groups of LAT parameters can be specified in order for the ETS to communicate on the network: the ETS's identification information (its identification string and name) and network timers. In addition, a node limit can be set if desired.

## 4.3.1 Server Identification

Select a short, unique and descriptive name for the ETS, as well as a more descriptive string to be used as the identification string. The name may contain up to 16 characters and the identification string may contain up to 40 characters.

**Figure 4-4:** Defining Server Name

```
Local> DEFINE SERVER NAME "Server_1"
Local> DEFINE SERVER IDENT "Biolab Server: Modem Available"
```

**Note:** *If you change the ETS name, be sure to echo the change in any existing NetWare print setups.*

## 4.3.2 Network Timers

The LAT network timers (Circuit, Keepalive, and Multicast) as well as the Retransmit Limit are set to default values at the factory and are correct for most networks. They should be changed only if you are sure the change is necessary.

**Figure 4-5:** Changing LAT Parameters

```
Local> DEFINE SERVER CIRCUIT 60
Local> DEFINE SERVER RETRANSMIT LIMIT 100
```

## 4.3.3 Node Limit

The **Set/Define Server Node Limit** command is used to set the number of remote LAT service nodes for which the ETS will store information. This limit can be set in large network environments to keep ETS network overhead down.

**Figure 4-6:** Setting a Node Limit

```
Local> DEFINE SERVER NODE LIMIT 5
```

# 4.4 NetWare Server Parameters

Several NetWare parameters can be configured to ensure that your ETS functions properly on an IPX network. First, **Set/Define Server NetWare Loadhost** can be used to specify the fileserver from which to download operational code.

**Figure 4-7:** Defining a NetWare Loadhost

```
Local> DEFINE PROTOCOLS NETWARE LOADHOST “loadserv”
```

Other configurable parameters are discussed in the following sections.

## 4.4.1 Routing and Encapsulation

The ETS will listen to all NetWare frame types by creating an internal network number and advertising itself as a router to this network. In general, this will allow all nodes and fileservers to access the ETS regardless of frame type. If this behavior is not desired, the ETS can be restricted to only one frame format (and thus will not need the internal network and routing support). Three commands control this behavior:

- **Set/Define Protocols NetWare Routing** enables or disables the creation and use of an internal network number.
- **Set/Define Protocols NetWare** Internal Network Number allows you to set the internal network number if the preconfigured internal network number does not meet your requirements.
- **Set/Define Protocols NetWare Encapsulation** controls which frame type to use when routing is disabled. The choices are ETHER_II, NATIVE, 802_2, and SNAP, which provide for Ethernet v2, Native mode, 802.2, and 802.2 SNAP, respectively.

**Figure 4-8:** Setting Frame Types

```
Local> DEFINE PROTOCOL NETWARE ENCAPSULATION SNAP
```

By default, Routing is enabled and all applicable encapsulation types are supported. See *Network Protocols* on page 2-2 for more information on the various frame types.

## 4.4.2 NetWare Access Lists

The NetWare access lists are used to control which fileservers the ETS will query for print requests. By default, the ETS will query all fileservers on the local network.

The access list contains the names of the fileservers to query, and/or the keywords **All** (no restriction) and **Local** (restricts queries to fileservers that are on the same network as the ETS). For example, the following commands allow the ETS to query all fileservers on the local network, as well as a single non-local server named RFS2.

**Figure 4-9:** Setting NetWare Access

```
Local> DEFINE PROTOCOL NETWARE ACCESS LOCAL
Local> DEFINE PROTOCOL NETWARE ACCESS RFS2
```

By default, the ETS will only query local fileservers, but this may still be too many in a large network. The **Clear/Purge Protocol NetWare Access** command allows you to remove items from the access list.

The **Set/Define Protocols NetWare Reset** command can be used if necessary to force the ETS to rescan all fileservers for pending jobs. This is useful after rebooting or after configuring new queues on the fileservers to ensure that the ETS recognizes queues directed to it.

Keep in mind that fileservers cannot tell if the ETS is not polling them due to access restrictions. There will be no error messages if a valid fileserver cannot print to the ETS due to the access list.

# 4.5 TCP/IP Server Parameters

If you want TCP/IP connectivity (Telnet, Rlogin, LPR, and RTEL support), you must configure IP parameters on the ETS. First and foremost, the ETS must have a unique IP address. If this was set at boot time (by BOOTP, DHCP, or RARP), it does not need to be reset. Other parameters are explained in this section.

**Note:** *An IP address is also required for EZWebCon use.*

## 4.5.1 IP Address

To configure the ETS's IP address, use a command of the following form.

**Figure 4-10:** Setting the IP address

```
Local> DEFINE SERVER IPADDRESS 192.0.1.228
```

One of the most common problems is that of duplicate IP addresses on the network. Signs of this problem are Telnet/Rlogin connections that fail soon after connecting and ARP requests that do not find a known host. If the server either loses its IP address when booting or will not allow a new IP address to be configured, another host might be using the same address. If any of these problems occur, double check to make sure that your ETS has a unique IP address on the network.

**Note:** *See your Installation Guide for more information on configuring the IP address.*

## 4.5.2 Other TCP/IP Parameters

Users can define a nameserver host if you want text TCP/IP host names to be resolved, and a default domain name to use in case a domain is not specified. You can also set a gateway host, which allows TCP/IP connections to other connected network segments. Finally, you can set a loadhost (if not done already) so that TCP/IP boots will be attempted.

**Figure 4-11:** Setting TCP/IP Parameters

```
Local> DEFINE SERVER NAMESERVER 192.0.1.29
Local> DEFINE SERVER DOMAIN "weasel.ctcorp.com"
Local> DEFINE SERVER GATEWAY 192.0.1.188
Local> DEFINE SERVER LOADHOST 192.0.1.33
```

You can also configure a backup host in case the primary one fails.

**Figure 4-12:** Configuring Backup Hosts

```
Local> DEFINE SERVER SECONDARY NAMESERVER 192.0.1.193
Local> DEFINE SERVER SECONDARY GATEWAY 192.0.1.195
```

## 4.5.3 Local Host Table

If your environment uses a few TCP/IP hosts regularly, you may wish to add hosts to the local host table so that nameserving text names is not necessary (and numeric addresses do not have to be used). The **Set/ Define Telnet Hosts** command adds entries to the local host table.

**Figure 4-13:** Define Telnet Hosts Command

```
Local> DEFINE TELNET HOST beeny 192.0.1.23
```

TCP/IP host names are case-independent, whether used with the host table or with a nameserving host.Users who Telnet or Rlogin to host beeny will be connected to address 192.0.1.23 without needing network nameserving support.

In addition to the Local Host table, the ETS has a TCP/IP security table that 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 *IP Security Table* on page 4-16 for more information on using the security table.

## 4.5.4 Host Limit

The **Set/Define Server Host Limit** command is used to set the number of remote TCP/IP hosts for which the ETS will store information. In large network environments, this will keep ETS network overhead down. The host limit applies only to hosts that were not explicitly set in the host table (for example, hosts seen using rwho).

**Figure 4-14:** Setting a Host Limit

```
Local> DEFINE SERVER HOST LIMIT NONE
```

## 4.5.5 SLIP

SLIP allows hosts to establish TCP/IP connections over serial lines to the ETS, and then onto the network attached to the ETS. The ETS will route packets among the serial and Ethernet lines transparently to the user. This allows hosts to dial in via modems and run TCP/IP sessions directly to the net without having to go through the ETS command line. SLIP sessions can be configured to Autostart, or can be manually started with the **Set/Define SLIP** command.

Although SLIP configuration involves setting specific port characteristics, it is covered in this chapter instead of the Ports chapter due to its complexity. Configuring a serial line for SLIP access involves two steps: the manager must enable SLIP access on the port (see the **Set/Define Port SLIP** command) and a user must explicitly start a SLIP session after logging into the serial port (see **Set/Define SLIP**).

There are a few things to note about SLIP access:

- Until the port is actively running SLIP, it can be used normally as a service port or a login port. If a modem is attached to the port, users can connect to the port and dial out. The port changes to SLIP interpretation only after receiving the Set SLIP command.

- After the SLIP session is started, the Local mode of the ETS is not reachable again until the port is logged out, thus terminating the SLIP session. The port can be logged out via the Logout Port command or via de-assertion of DSR on the serial line.

- A SLIP session's characteristics, such as IP address and MTU, cannot be modified once SLIP is started.

- Modem control has to be enabled (see **Define Port Modem Control**) for SLIP connections running across a modem. Otherwise the SLIP session will not be terminated even though the user might have hung up the phone line. When modem control is enabled, the SLIP session will be terminated when the locally-attached modem hangs up.

- SLIP data is "binary" in the sense that any 8-bit character can occur in the SLIP data stream. Because of this, attached modems cannot be set to use XON/XOFF or any other character-based flow control method. If they do, the session will hang and/or lose data.

- All devices between the SLIP host and the ETS must pass characters unchanged, including XON/XOFF flow control characters. Many devices can be configured turn flow control off, but will still strip XON/XOFF characters out of the data stream. This is not acceptable.

- The ETS will force the serial port's flow control to None for the duration of the SLIP session, and will restore it when the SLIP session ends.

- Hardware flow control is unaffected by SLIP operation.

- Seven-bit characters cannot be used; the SLIP session will force 8-bit mode.

- MTU is the size of the largest packet that can be sent unfragmented on a particular media. Packets larger than that size must be fragmented into two or more packets and then reassembled by the remote host. The MTU value and IP fragmentation can have a large effect on both the interoperability and performance of SLIP connections.

  In general, the ETS MTU for SLIP should be as high as possible without exceeding the remote host's MTU values. If the remote SLIP device does not support IP packet reassembly, the MTU should be set as high as possible to prevent any fragmentation.

- The Ethernet MTU is 1536 bytes. The SLIP guidelines (RFC 1055) suggest an MTU of 1006 bytes for SLIP connections. Some SLIP implementations, however, have a lower MTU. In those cases the SLIP MTU on the ETS must be set lower, which increases IP fragmentation, which in turn decreases performance and can increase network traffic as more packet headers are needed for the fragmented packets.

- Maximum packet size (MTU) and whether or not to pass IP broadcast packets to the SLIP lines can be configured via the **Set/Define SLIP** commands.

- The remote SLIP hosts should not need extra routing configuration. The only possible change needed is to make the default route point to the ETS as shown below. You may also wish to configure gateway hosts on the ETS if non-local TCP/IP sessions will be started.

**Figure 4-15:** Specifying Default Route

```
% su
# route add default ETSname metric
```

- SLIP connections can be restricted via the **Set/Define Server SLIP Password** and **Set/Define IPsecurity** commands.

### 4.5.5.1 Configuring Necessary SLIP Parameters

No SLIP session can be started until the ETS knows the IP address of the remote SLIP host, the MTU to use for the SLIP connection, and whether to forward Broadcast IP packets onto the SLIP line. Each of these parameters can be set in one of three places: as a default for the entire server, as a default for a particular port, or when the SLIP session is initiated. The command below specifies a server-wide default MTU.

**Figure 4-16:** Specifying Defaults

```
Local> DEFINE SLIP DEFAULT MTU 512 BROADCAST DISABLED
```

Defaults for a specific port always take precedence over server-wide defaults. A configuration that applies to one port in particular might look like the following:

**Figure 4-17:** Configuration of One Port

```
Local> DEFINE SLIP PORT 5 MTU 640 BROADCAST ENABLED
```

An IP address can also be specified for a particular port if only one IP address will ever connect to that serial port.

**Figure 4-18:** Specifying an IP Address

```
Local> DEFINE SLIP PORT 5 IPADDRESS 192.0.1.100
```

Default entries can be forced on new sessions so that users cannot override one or more of the port settings or server defaults. Options enabled in the Define SLIP Port or Define SLIP Default commands, such as Force, will take precedence over the user's options entered on the **Set/Define SLIP** command line.

If Force is enabled, the port's options will take first precedence, then the server default settings, then the user-entered options. If Force is disabled, the user-entered options take first precedence, then the port's settings, then the default settings. For example, the following series of commands result in an MTU of 1000 because the Force option takes precedence over the user's request.

**Figure 4-19:** Forced MTU Value Taking Precedence

```
Local> DEFINE SLIP DEFAULT MTU 1000 FORCE ENABLED
Local> SET SLIP ADDRESS 192.0.1.20 MTU 500
```

Conversely, the command sequence below will result in a SLIP session that uses the user's MTU value of 500.

**Figure 4-20:** User's Settings Taking Precedence

```
Local> DEFINE SLIP DEFAULT MTU 1000 FORCE DISABLED
Local> SET SLIP ADDRESS 192.0.1.20 MTU 500
```

The Force option applies only to the IPaddress, MTU, and Broadcast options. If no IP address is configured (either as a port setting or server default) or specified by the user, the connection will fail. If no MTU is configured or specified by the user, the connection will use the RFC value of 1006 bytes. If no Broadcast value is configured or specified by the user, Broadcast will remain disabled.

### 4.5.5.2 Starting a SLIP Session

Three things are needed to start a SLIP session:

- SLIP must be enabled on any ports that might want to start a SLIP session in the future. `Define SLIP Port n` enables SLIP on the port automatically.

**Figure 4-21:** Enabling SLIP

```
Local> DEFINE PORT 5 SLIP ENABLED
```

- Values for the IPaddress, MTU, and Broadcast options must be set. They can be specified on the command line or configured as server-wide or per-port defaults.

  As discussed in *Configuring Necessary SLIP Parameters* on page 4-8, port settings and server defaults can be forced on any SLIP session started. If Force is disabled, the user can enter desired SLIP parameters on the command line provided the port is not dedicated to SLIP or configured for Autostart SLIP (see below).

- A SLIP session must be started.The first command in the example below is used when a default SLIP address has been configured for the port. If no default address has been configured for the port, the target IP address must be entered on the command line.

**Figure 4-22:** Starting a SLIP Session

```
Local> SET SLIP
OR
Local> SET SLIP IPADDRESS 192.0.1.50
```

After entering the Set SLIP command, the user will be logged out and the ETS will begin treating all input from the serial line as SLIP packets. The Local> prompt cannot be reached again unless the SLIP session is terminated (via the Logout Port command) and the user logs back into the ETS.

If you want a particular port to always run SLIP, use the Autostart option, in which case it is not necessary for the user to enter a command to start the SLIP session.

**Figure 4-23:** Enabling Autostart

```
Local> DEFINE SLIP PORT 4 MTU 1000 AUTOSTART ENABLED
```

Port 4 will treat all serial data as SLIP packets until the Autostart option is removed and the port is logged out. The exception to this case is if the port also has Modem Control enabled. If so, a drop in the DSR signal will terminate the SLIP session, and the session will not restart until DSR is re-asserted.

A password can be configured to restrict access to SLIP sessions.

**Figure 4-24:** Setting SLIP Password

```
Local> SET SERVER SLIP PASSWORD slpass
```

If a SLIP password has been set on the ETS, the server will prompt for it after the Set SLIP command has been entered. If the password is not entered correctly, SLIP will not be started on that port; the user will remain at the Local> prompt.

Ports with SLIP Autostart enabled will not have to enter the password—they will always be in SLIP mode. If you are concerned about SLIP security, disable Autostart and require that all SLIP users enter the SLIP password before starting.

### 4.5.5.3 Tips for Increasing SLIP Performance

- Disable broadcasts; the extra packet traffic can be surprisingly heavy.
- Set the MTU as high as possible on the ETS and on the remote SLIP device. This lowers the ratio of header information to useful data and reduces time-consuming IP fragmentation.
- Be sure that characters aren't being lost or altered by any communications equipment between the SLIP hosts. Flow control between modems is particularly troublesome.
- When Telnetting with SLIP, Telnet directly to the desired host, not to the ETS and then to the final destination.
- Be sure that all IP hosts that send and receive packets over the SLIP line use UDP checksumming and don't blindly set the checksums to zero. Hosts that do not check UDP checksums may send and receive corrupted packets, but may accept the corrupted data as valid. At least one major UNIX implementation does not check or set the UDP checksum by default.
- See your host documentation for information on enabling UDP checksumming.

### 4.5.5.4 Tips for Increasing SLIP Network Security

- If possible, restrict the IP addresses that the user can select, either via the Force option or the IP security tables. This will help prevent the remote SLIP host from "impersonating" a legitimate host on your network.
- Be very careful with .rhosts and /etc/hosts.equiv files on UNIX machines. Improper setup of these files may allow unauthorized users to access the host.
- Disable broadcasts; it is possible that the remote user can learn important information from packets being broadcast from your network onto the SLIP line.
- Counters are available for each SLIP session via the Show SLIP Port command. The displays will show both forwarded and discarded packets for both directions of the session, and may be useful for debugging SLIP connections.

- The display also shows counters for fragmentation, reassembly, and packets dropped due to congestion on the SLIP line. The IP errors field shows incoming packets that were discarded due to protocol problems including checksums errors, header problems, and incorrect source hosts. The ETS will discard any packets from the SLIP session that are not from the initially-configured host.

### 4.5.5.5 SLIP Setup Example

Figure 4-25 shows a possible setup to use SLIP with modems. The example shows many of the options; your situation may not require them all.

**Figure 4-25:** SLIP Setup Example

```
Local> DEFINE PORT 4,5 SLIP ENABLED MODEM ENABLED FLOW NONE
Local> DEFINE SERVER SLIP PASSWORD “slipag”
Local> DEFINE SLIP PORT 4 IPADDRESS 192.0.1.1 AUTOSTART ENABLED
Local> DEFINE SLIP PORT 5 MTU 512
Local> LOGOUT PORT 4
Local> LOGOUT PORT 5
```

**1** In order, these commands:

**2** Allow ports 4 and 5 to run SLIP, and set them for modem control without flow control. XON/XOFF flow control cannot be used for SLIP.

**3** Set a SLIP password that must be entered by ports issuing a Set SLIP command.

**4** Set the server-wide SLIP defaults to disable broadcast IP packets across SLIP sessions, and set an MTU based on the SLIP specification.

**5** Configure port 4 to autostart SLIP to one IP address. Whenever port 4’s serial connection is active (DSR asserted), it will interpret SLIP packets. The Local> prompt will not be available in this case until Autostart is disabled.

**6** Give port 5 a different MTU than the server default; since no IP address is specified for port 5, it will have to be specified in the Set SLIP command.

**7** Logout both ports so that the Define Port and SLIP commands take effect.

### 4.5.5.6 Modems with SLIP

If Modem Control is defined on a port set for SLIP Autostart, SLIP is handled slightly differently. In this case, SLIP will not be started until the port sees assertion of the DSR signal, which generally occurs when the attached local modem has formed a connection with a remote modem.

Until DSR is asserted, the port will remain idle in non-SLIP mode. It is usable as a service port in this state until SLIP is started. After SLIP is started, the SLIP session will be closed if the attached modem device de-asserts the DSR signal.

# 4.6 Creating Services

A **service** is any resource that can be accessed locally or via the network. For example, a host is a service to which terminals can connect. The ETS can offer its attached devices to the network as services.A Lantronix service is also known as a remote printer name or remote queue name on many operating systems.

Autobaud should not be enabled for any port that offers a service. Also, recall that a port's access must be set to Dynamic or Remote to allow service connections.

When you try to modify a service that already exists, the command will simply change its characteristics. If the service does not exist yet, the server assumes you want to create that service. The ETS will only print an error message if you try to remove a service that does not exist. Connections and queueing are enabled by default whenever you create a service.

If you are new to setting up services, you might want to try using the simple service in Figure 4-26 using a terminal as the print device. You can then connect locally to the service and see if typed characters are displayed on the terminal. Characters typed on the service terminal should also be sent to the original port. If it seems to be working properly, you can try using a real print device and configure the port accordingly. Recall that you will need to use the <Break> key or your port's local key (see the **Set/Define Port Local** command) to return to the command line from a service connection.

If you are new to setting up services, you might want to try using the simple service in Figure 4-26 using a terminal as the print device.

## 4.6.1 Creating a Simple Service (A Line Printer)

Connections, queueing, banner, and formfeed options are enabled by default when you enter a Set Service command, so it is not necessary to configure them explicitly. NetWare, and RTEL access are provided by default, but LAT and AppleTalk access have to be explicitly enabled. The port providing the service must also allow remote access, so it must have access set to Dynamic or Remote.

Figure 4-26 shows the command needed to create a service called *dump_port* on port 2.

**Figure 4-26:** Set Service Command

```
Local> SET SERVICE dump_port PORT 2 LAT ENABLED
Local> LOGOUT PORT 2
```

If the device connected to port 2 is a physical print device, the port's baud rate should be set to reflect the highest speed at which the printer is capable of printing. Parity, character size, and flow control might have to be adjusted to match the printer's settings.

Enter a **Show Services** command to verify that the service was created and usable.

**Figure 4-27:** Show Service Command

```
Local> SHOW SERVICE LOCAL CHARACTERISTICS

Service: DUMP_PORT     Ident:
Rating: 255            Ports: 2
Characteristics:       Queuing Banner RTEL Formfeed NetWare
                       LAT Connections
Enabled Groups: 0
```

In Figure 4-27, the service rating is non-zero, indicating that the service is available for connections. If the service rating were zero, the service would not be available. This can happen if the port is not configured for Dynamic or Remote access, if connections are disabled, or if the service/port is in use. The **Show Ports All** command is useful for finding out why a service is unavailable; it shows port access modes, login statuses, and the services currently being offered.

After setting up a service, you should be able to connect to it locally or from other protocol-compatible nodes. To connect to service dump_port, use the following command:

**Figure 4-28:** Connecting to a Service

```
Local> connect dump_port
%Info: connecting to service dump_port at node...
```

**Note:** *Output will be displayed on port 4. If there is a terminal device on port 4, it will echo keystrokes to the port.*

To disconnect from the service, press the Break key to return to the Local> prompt, then type Disconnect. Your session will be closed and the dump_port service will again be available for connections. Enter the Show Services command to make sure.

## 4.6.2 Setting Up a Service With Group Codes

Local ports can be given a list of LAT service groups that they are authorized to use. The access list will deny the ports access to services that do not belong to any matching authorized groups. For example, you may wish to limit connections to a printer or to a certain set of ports on a server.

**Figure 4-29:** Service Configuration Example

```
Local> DEFINE SERVER GROUPS 1,2-5 ENABLED
Local> DEFINE PORT 2 AUTHORIZED 1,4,7 ENABLED
Local> DEFINE PORT 2 SPEED 2400 BROADCAST DISABLED
Local> DEFINE PORT 2 ACCESS REMOTE NAME “printer” BREAK DISABLED
Local> LOGOUT PORT 2
Local> SET SERVICE “printer” PORT 2 IDENTIFICATION “LocalPrint”
Local> SAVE SERVICE “printer”
```

In order, the commands in Figure 4-29:

- Enable group 1 and groups 2 through 5 on the server and assign them to any local services.
- Define all local ports so they can access groups 1, 4, and 7. When a port logs in, all of its authorized groups are usable. Since groups 1 and 4 are common to both the ports and local services, all the local ports will be able to connect to any local service.

  **Note:** *Group codes only apply to LAT connections. They have no effect on the other protocols supported by the ETS (AppleTalk, LAN Manager, NetWare, and TCP/IP).*

- Set up port 2 to which the printer will be connected, reset the speed to 2400 baud, and disable broadcasts to the port. For more information on port settings, see Chapter 5.
- Define remote access for port 2 (since the printer will not need to log in, and set the port’s name, and disable any Break key processing.

- Log the port out so that the Define commands take effect.
- Create a print service on the port that allows connections and queueing by default, and enable the server send out an identification string in network multicasts.Create a print service on port 2, and enable the ETS to send out an identification string in network multicasts.
- Save the service so that it will be enabled after the next server reboot.

## 4.6.3 TCP/Telnet Service Sockets

The TCPport and Telnetport service options allow you to configure a TCP socket associated with a service. Connections to that socket number are mapped to the service. This allows you to create a TCP “rotary” that can apply to multiple physical ports. As long as the service rating is non-zero, TCP connections to the socket are accepted (provided a port is available to handle the TCP connection).

The Telnetport and TCPport options are similar, with the one exception that Telnetport will perform Telnet IAC interpretation on the data stream while TCPport treats the connection as a raw data pipe. Neither provides for queueing—if the service is unavailable, the TCP connection is rejected.

## 4.6.4 Enabling Other Service Options

In addition to TCPport and Telnetport, several other service options can be enabled on a service:

**Table 4-1:** Service Options

| Option | Function |
|---|---|
| AppleTalk | Enables or disables AppleTalk access to the service. Macintosh computers, for example, will see the service name in their Choosers if they are on the same zone/network as the ETS. Note that all AppleTalk enabled services on the ETS are assumed to be LaserWriter printers running PostScript. There is no way to support non-PostScript devices (such as ImageWriters and modems). |
| Banner | If enabled, provides a banner page before service data is sent to the port. The host software may still provide its own banner page regardless of the ETS service setting. This option should not be used with PostScript. |
| Binary | If enabled, prevents the ETS from processing the data stream. Disabling this feature (the default), allows the ETS to convert <LF> to <CR><LF> and possibly perform tab expansion. PostScript (below) implies binary mode. Binary should be enabled for PCL jobs. |
| DLC | If enabled, handles NT DLC print connections. |
| EOJ | If enabled, appends a user-configurable end-of-job string to every job. |
| Formfeed | If enabled, appends a Formfeed to print jobs. |
| LANManager | Enables or disables LAN Manager access to the service. |
| LAT | Enables or disables LAT access to the service. |
| NetWare | Enables or disables NetWare access to the service. If NetWare is not enabled on any ETS services, the ETS will not poll the fileservers. |

**Table 4-1:** Service Options, cont.

| Option | Function |
|---|---|
| Postscript | If enabled, queries the printer (via Ctrl-D exchanges) to make sure it is ready for a new job before starting any job. Any service supporting only a Post-Script printer should also have this flag enabled. |
| PSConvert | If enabled, encapsulates text sent to the service in a PostScript wrapper. This allows text-only queues to print to PostScript devices. |
| RTEL | Enables or disables RTEL access to the service. |
| SOJ | If enabled, sends a user-configurable start-of-job string to the attached device at the beginning of every access. |

## 4.6.5 Setting Up a Modem Service

The example displayed in Figure 4-30 is rather detailed, but once you have created a service or two, the process should become largely intuitive. Remember that the **Show/Monitor/List Services** commands are available to show you exactly what has been set up so far. If you are unsure or think you may have made a mistake, delete the service (using **Clear/Purge Service**) and start from scratch. Refer to the upcoming section for modem-specific configuration issues.

**Figure 4-30:** Modem Service Setup

```
Local> DEFINE PORT 2 PARITY NONE FLOW XON SPEED 19200
Local> DEFINE PORT 2 BROADCAST DISABLED
Local> DEFINE PORT 2 ACCESS DYNAMIC
Local> DEFINE PORT 2 NAME “modem” BREAK DISABLED
Local> DEFINE PORT 2 MODEM ENABLED PASSWORD ENABLED
Local> LOGOUT PORT 2
Local> SET SERVICE MODEM PORT 2 IDENTIFICATION “19200 BPS Modem”
Local> SET SERVICE MODEM PASSWORD “loco”
Local> SAVE SERVICE MODEM
```

Because many of the commands shown are similar to the ones in the previous example, only those that differ will be explained:

The port is configured in much the same way as in the simple service example. XON/XOFF flow control has been enabled for the modem. Access to the port is now dynamic so that both remote and local users can access the modem to dial in or out. Modem control and password protection are both enabled.

Users who dial into the modem and connect to the ETS’s serial port will have to enter the login password due to the Define Port Password Enabled entry. This option can be omitted if not desired.

The service is set up as with the previous example, but a password has been enabled for both the service and the port. Users who connect to the service locally or from another host on the network will have to enter the service password (loco) to use the service to connect to the modem and dial out. This option can be omitted if not desired.

**Note:** *For more information on port settings, see Chapter 5.*

Since modems do not log the user out when a connection is finished, you will probably want to have the Break or Local key available so you can return to the ETS command line; see **Set/Define Port Local** for more information. If you wish to disconnect from the modem session, use the **Disconnect** or **Logout** command.

If a port and modem are to be used to allow dial in connections, you may wish to make the port Secure. Secure status prevents dial-in users from changing the port characteristics and preventing other users from being able to dial in properly.

# 4.7 Security

Security measures are available to monitor users and to restrict users from unwanted activity. Security can be implemented server-wide, or it can be configured for individual ports as desired. The following section discusses server-wide security measures; for port security measures, see Chapter 5, *Ports*.

## 4.7.1 Controlling Incoming Sessions

The **Set/Define Server Incoming** command allows or denies incoming LAT or Telnet connections. It can also require incoming users to enter the ETS login password to log in from the network. The following commands allow LAT and Telnet users to log into the ETS without having to enter a password.

**Figure 4-31:** Allowing Unrestricted Incoming Connections

```
Local> SET SERVER INCOMING BOTH
Local> SET SERVER INCOMING NOPASSWORD
```

For security-conscious systems, the following commands can be used to only allow authenticated logins. That is, login attempts are subject to password verification.

**Figure 4-32:** Configuring Password for Incoming Connections

```
Local> SET SERVER INCOMING PASSWORD
Local> SET SERVER LOGIN PASSWORD “8ball”
```

*Connection Methods* on page 2-15 explains in detail the mechanics of setting up incoming sessions. Note that users logging in from the network are much harder to trace and monitor than those on attached physical ports.

Make sure your ETS and network environment are reasonably secure if you allow network logins. Also, refer to *Enabling Server-Wide Port Characteristics* on page 4-1 for details on configuring ports for network logins. Note that you can configure the TCP/IP security table to enable or disable network connections from certain hosts—see *IP Security Table* on page 4-16 for more information.

## 4.7.2 IP Security Table

The ETS provides an IP Security Table as a mechanism for restricting incoming and outgoing TCP/IP sessions (including Telnet, Rlogin, SLIP, and RTEL). The security table allows the manager to enable or disable access to and from the ETS based on port number as well as IP address. The IP security table does not apply to print connections via RTEL.

Like other configurations, security table entries can be Set or Defined. To add an entry to the table, specify an IP address (or range), which direction(s) to restrict, and a list of affected ports.

**Figure 4-33:** Setting Server Access

```
Local> SET IPSECURITY 192.0.1.255 OUTGOING DISABLED PORT 4-7
```

In order, the command in Figure 4-33:

1. Affects addresses from 192.0.1.1 through 192.0.1.254 using the 255 “wildcard” network address segment.

2. Prevents ports 4, 5, 6, and 7 from beginning sessions **to** hosts with these addresses using the **Outgoing Disabled** keywords.

The IP address must be four segments of 0-255 each. A 255 in any segment applies to all numbers in that range such that 192.0.1.255 includes all addresses of 192.0.1.*n*. A trailing zero in any address is shorthand for “all addresses in this range are disabled, for both directions and for all ports.” The following two commands are equal.

**Figure 4-34:** Set IPsecurity Command

```
Local> SET IPSECURITY 192.0.1.0
Local> SET IPSECURITY 192.0.1.255 OUT DISABLED IN DISABLED
```

Parameters can be added after the address term to change the defaults. Incoming and Outgoing Disabled are the default settings for any **Set/Define IPsecurity** command. Incoming refers to users on other hosts attempting to log into the ETS. Outgoing refers to local users connecting to other TCP/IP hosts.

Port number 0 corresponds to the virtual ports (that is, users who log into the ETS from the network). If no ports are specified on the command line, all ports, both physical and virtual, are included by default.

**Note:** *SLIP is disabled by default for Set/Define IPsecurity commands.*

Individual entries can be removed by entering **Clear/Purge IPsecurity** with no parameters other than the address. This command form is not valid for any addresses with zeros in any segment.

**Figure 4-35:** Clear IPsecurity Command

```
Local> CLEAR IPSECURITY 192.1.1.102
```

The entire security table can be cleared with one command:

**Figure 4-36:** Clearing Security Table

```
Local> CLEAR IPSECURITY ALL
```

### 4.7.2.1 Using the Security Table

There are two basic rules for checking a TCP/IP connection for legality. First, a more specific rule takes precedence over a less specific one. For example, if connections to 192.0.1.255. are disabled but connections to 192.0.1.78 are enabled, a connection to 192.0.1.78 will succeed. Second, in the absence of any rule that restricts a connection, access is allowed. If this behavior is not desired, include an entry of the following form:

**Figure 4-37:** Setting IPsecurity

```
Local> SET IPSECURITY 255.255.255.255 IN DISABLED OUT DISABLED
```

This is the least specific rule in the table, and will ensure that connections fail unless otherwise allowed by another entry (recall that all ports are included in the rule by default).

If no entries are defined in the table, all connection attempts will succeed. Also, if the connecting user has privileged status, the connection will be allowed regardless of the entries in the table.

**Note:** *Managers should try enabling and disabling certain addresses on their local network to see what they can and cannot do if they are unclear as to the rules on the use of the security table.*

## 4.7.3 SNMP Security

Since SNMP can be used to change ETS settings, a way to prevent unauthorized Set commands is needed. The ETS provides a security mechanism for restricting SNMP access to the unit that is linked to the SNMP community name used. To prevent easy access to the allowed community names, the Show SNMP and List SNMP commands are restricted to privileged users.

SNMP configuration requires a community name and an access type: Readonly, Both (read and write), or None. Clearing an SNMP entry requires that you enter either a community name to remove or the **All** parameter to clear the entire table. SNMP queries or Set requests that are not permitted are sent an error reply specifying the problem. See **Set/Define SNMP** on page 12-98 for more information.

# 4.8 Event Logging

The ETS can be configured to report various events either to a serial port on the ETS or to a remote host. The latter can be done within the TCP/IP, LAT, or NetWare protocols. TCP/IP messages will be sent to the syslogd daemon on the host, while LAT and NetWare messages will be echoed to the console of the host/ fileserver. LAT logging requires installing the Lantronix-supplied logging program on the LAT host.

Configuring event logging requires three steps—configuring the host types, setting the host to which the information will be reported, and configuring which class(es) of events will be logged.

**Note:** *Classes can be individually enabled and disabled, and multiple classes of events can be logged.*

## 4.8.1 Configuring Host Types

Host types must be configured as follows:

| | |
|---|---|
| **VMS** | Ensure that the **ets$configd** process is running. Ensure that the priority level ***.notice** is defined in the **syslog.conf** file. |
| **UNIX** | Set up the logging facility on the host. See the syslog man pages for more information. |
| **Novell** | Using the PCONSOLE utility, add the ETS name as a printserver. |

**Note:** *See Chapter 8 for more information on NetWare and PCONSOLE.*

## 4.8.2 Host Name Formats

The following formats distinguish the host to which logging information is sent:

| | |
|---|---|
| **hostname::** | Indicates a LAT host. |
| **hostname:** | Indicates a TCP/IP host, specified as either an IP address or text host name. |
| **hostname** | Indicates a NetWare fileserver. |
| **CONSOLE** | Indicates events should be logged to the ETS serial console port (designated as port 1). |

## 4.8.3 Event Classes

The event classes that can be logged are:

| | |
|---|---|
| **Commands** | All commands issued on the ETS will be reported (verbose output). |
| **Network** | All users logging in from or out to the network will be reported. |
| **Printer** | Changes in printer status lines will be reported. |
| **Security** | All logins and Set Privileged events are reported, as well as any password failures. |
| **System** | Booting and Initialize events are reported. |
| **Modem** | All modem activity is reported, including incoming and outgoing jobs. |

The following example sends login and security events to a TCP/IP host.

**Figure 4-38:** Set Logging Command

```
Local> SET LOGGING HOST 192.1.2.0: NETWORK ENABLED SECURITY ENABLED
```

To clear logging, specify **None** in place of the host designation and event class.

**Figure 4-39:** None Option

```
Local> SET LOGGING NONE
```

To display current logging status, use the **Show Logging** command.

# 5: Ports

All Lantronix products have two types of ports: physical and virtual.

- There is one physical port for every serial or parallel connector on the ETS. Physical ports are numbered starting with 1. Devices connected to the physical ports are governed by characteristics set up for the individual ports with the Set/Define Ports commands explained in this chapter.
- There is one virtual port on every ETS. Referred to as port 0, it governs all incoming Telnet and Rlogin connections (those that are not associated with a physical port). Virtual ports are configured the same way as physical ports, the only difference being that all incoming connections get the same set of port characteristics.

**Note:** *Virtual ports are explained further in Section 5.1.3 on page 5-5.*

## 5.1 Port Commands

Initial port configuration should be straightforward; the majority of the ports will probably be used for local terminal connections. If so, commands in the following format should be sufficient.

**Figure 5-1:** Configuration Command

```
Local>> DEFINE PORT ALL AUTOSTART ENABLED
```

Most port commands require you to be the privileged user. Also, many port commands require that the Define command be used rather than the Set command. For a comparison of the Set, Save, and Define commands, see *Command Types* on page 3-4.

If you're entering a number of commands at once, you may wish to enable the **Command Completion** characteristic. When command completion is enabled, the ETS will complete partially-typed commands when either the Space or Tab key is pressed. This can save time and reduce errors if you're entering several commands at a time. To enable command completion, use the following command:

**Figure 5-2:** Enabling Command Completion

```
Local>> DEFINE PORT 2 COMMAND COMPLETION ENABLED
```

### 5.1.1 Port Access

A port's access may be set to one of the following: Dynamic, Local, Remote, or None. **Dynamic** permits both local and remote logins. **Local** permits only local logins and allows the port to initiate connections to services, while **Remote** permits only network connection requests. **None** prevents all incoming and outgoing connections, rendering the port unusable. The default setting is Local access for all ports.

Before a user can Telnet from the network to a ETS port and dial out using an attached modem, the port must be set for dynamic or remote access. To log into a port locally and Telnet to a remote host, set the port for local or dynamic access. To configure port access, use the **Define Port Access** command. Access must be configured with Define commands since the configuration is reset to the saved values every time a user logs in or connects to a service on that port.

**Figure 5-3:** Configuring Connection Type

```
Local>> DEFINE PORT 2 ACCESS DYNAMIC
```

If a connection to a service is failing, check the port's access mode first.

# 5.1.2 Serial Configuration

## 5.1.2.1 Baud Rate

The ETS and attached serial device, such as a modem, must agree on a speed or baud rate to use for the serial connection. The default speed is 9600 baud. Other baud rates can be set with the **Set/Define Port Speed** command followed by a baud rate number.

**Figure 5-4:** Changing the Baud Rate

```
Local>> DEFINE PORT 4 SPEED 2400
```

The ETS also supports Autobaud, which attempts to configure the port's speed and parity by analyzing the first <Return> keys typed at login. To enable this feature, type the following command.

**Figure 5-5:** Enabling Autobaud

```
Local> DEFINE PORT ALL AUTOBAUD ENABLED
```

Autobaud will not work for devices that do not "log in" (such as printers and modems) and will not function for baud rates less than 1200 or for certain parity and character size settings (8-bit, no parity and 8-bit, even parity are acceptable). If the attached devices will be using one speed permanently, Autobaud can remain disabled. See the **Set/Define Port Autobaud** command on page 12-28.

Terminal devices that will be running at 9600 baud will not need the autobaud feature, and can generally be used with the factory-set configuration. Ports that will be used for non-terminals (for example, printers) will probably have to be configured separately, as will terminals that won't work with autobaud. Other than these cases, terminal-dedicated ports should need no special configuration.

The ETS's parity, character size, and stop bits should be configured as shown in the following sections.

## 5.1.2.2 Flow Control

Flow control enables two connected devices to control the amount of data transmitted between them. When flow control is enabled on a ETS port and a connected device (for example, a modem), it ensures that data sent from the sending device will not overflow the receiving device's buffers.

The ETS supports both hardware (RTS/CTS) and software (XON/XOFF) flow control. Hardware flow control is recommended. The two methods are described in the following sections.

**Note:** *The ETS and the device with which it is communicating must agree on the type of flow control used.*

#### 5.1.2.2.1 Hardware Flow Control (RTS/CTS)

When hardware flow control is used, the flow of data is controlled by two serial port signals (typically RTS and CTS). Two connected devices will assert and de-assert RTS and CTS to indicate when they are ready to accept data.

For example, the ETS will assert RTS when it is ready to accept data. When it can no longer accept data (its buffers are full) it will de-assert RTS. A connected device will monitor the assertion and de-assertion of this signal and will only send data when RTS is asserted. Along the same lines, a device will assert CTS when it is ready to accept data. When its buffers are full, it will de-assert CTS to tell the ETS to stop sending.

**Note:** *Modem control only works with CTS/RTS flow control on the ETS8P, ETS16P, and MSS. If you wish to use modem control on other models, you must use XON/XOFF flow control.*

#### 5.1.2.2.2 Software Flow Control (XON/XOFF)

XON/XOFF controls the flow of data by sending particular characters through the data stream. The characters sent to signify the ability or inability to accept data are Ctrl-Q (XON) and Ctrl-S (XOFF). To enable XON/XOFF flow control, enter the following command:

**Figure 5-6:** Enabling Software Flow Control

```
Local> DEFINE PORTS ALL FLOW CONTROL XON
```

Applications that use the Ctrl-Q and Ctrl-S characters (for example, certain text editors) will conflict with XON/XOFF flow control and therefore an alternative method of flow control should be used. If a user enters a Ctrl-Q or Ctrl-S, these characters will be interpreted as flow control characters and removed from the data stream. In addition, protocols that require an 8-bit clean data path (such as SLIP and UUCP) cannot use XON/XOFF flow control.

**Note:** *An 8-bit clean data path is one that data passes through completely unchanged.*

#### 5.1.2.2.3 Setting up Flow Control

To configure flow control on a port, complete the following steps.

**1** Set the Appropriate Line/Serial Speeds

Consider the line speed and the serial speed of the modem; if data is to be compressed, the serial speed should be slightly higher than the line speed. When connecting a terminal to the port, ensure that the speed of the terminal matches the port speed.

**2** Disable Autobaud

To ensure that the set speeds are always used, disable any automatic speed selection or autobaud options on your modem. In addition, disable Autobaud on the ETS port you're configuring. Use the Set/Define Port Autobaud command.

**Figure 5-7:** Disabling Autobaud

```
Local>> DEFINE PORT 2 AUTOBAUD DISABLED
```

**3** Determine the Appropriate Flow Control Method

Refer to Flow Control on page 5-2 for a description of the different flow control methods. Choose the method that's most compatible with the serial device and applications you'll be using.

**4** Configure Flow Control

Configure your serial device to use the selected method of flow control. Refer tothe device's documentation for instructions.

Configure flow control on the ETS using the **Set/Define Port Flow Control** command. Figure 5-8 displays an example.

**Figure 5-8:** Configuring RTS/CTS Flow Control

```
Local>> DEFINE PORT 2 FLOW CONTROL CTS
```

For more information about flow control command syntax, see **Set/Define Port Flow Control** on page 12-39.

## 5.1.2.3 Parity, Character Size, and Stop Bits

The default character size of 8 data bits can be changed to 7 data bits. Similarly, the default stop bit count of 1 bit can be changed to 2 bits. Parity is normally None, but can also be Even, Mark, Odd, or Space.

**Figure 5-9:** Configuring Parity, Character Size, and Stop Bits

```
Local>> DEFINE PORT 4 PARITY EVEN
Local>> DEFINE PORT 4 CHARSIZE 7 STOP 2
```

## 5.1.2.4 Preferred and Dedicated Connections

A preferred service or host is the default service (Telnet or Rlogin) or Telnet host used for a particular port. If you enter the **Connect**, **Telnet**, or **Rlogin** command without specifying a service or host, you are connected to the preferred service or host. A dedicated service or host is the one a port will always connect to when logged in. A port can also be configured for dedicated SLIP; no other protocol can be run on the port. The following sections show how to configure preferred and dedicated connections.

When a port is dedicated, the local prompt cannot be accessed. Therefore, commands cannot be entered to disable the dedicated characteristic. If you plan to dedicate all of the ETS's ports, be sure that you have another way to log into the ETS (for example, via Telnet), or else you will have to initialize the ETS to its factory default settings.

### 5.1.2.4.1 Preferred Services and Hosts

To specify a preferred service, use the **Set/Define Port Preferred** command.

**Figure 5-10:** Specifying a Preferred Service

```
Local>> DEFINE PORT 2 PREFERRED SERVICE ets_modem
```

To automatically connect to the preferred service upon login, the Autoconnect characteristic must be enabled for the service.

**Figure 5-11:** Enabling Autoconnect

```
Local>> DEFINE PORT 2 AUTOCONNECT ENABLED
```

To specify a preferred Telnet host, use the **Set/Define Port Preferred Telnet** command.

**Figure 5-12:** Specifying a Preferred Telnet Host

```
Local>> DEFINE PORT 2 PREFERRED TELNET 192.75.1.0
```

Environment strings can be added to the commands to specify additional connection information for a preferred connection. The following example tells the ETS to use the remote host's FTP port (port 21) for the connection, and to use Passall mode.

**Figure 5-13:** Specifying Environment

```
Local>> DEFINE PORT 5 PREFERRED "billvax" ENVIRONMENT 21+P
```

Environment for LAT and TCP/IP connections is described in *Environment Strings* on page 2-15. The key letters are described in **Set/Define Port Preferred** on page 12-46.

#### 5.1.2.4.2 Dedicated Services and Hosts

To specify a dedicated service, use the **Set/Define Port Dedicated** command.

**Figure 5-14:** Specifying a Dedicated Service

```
Local>> DEFINE PORT 2 DEDICATED lrs_modem
```

To specify a dedicated Telnet host, use the **Set/Define Port Dedicated** Telnet command.

**Figure 5-15:** Specifying a Preferred Telnet Host

```
Local>> DEFINE PORT 3 DEDICATED TELNET 192.0.1.221
```

When the user logs off the service or out of the Telnet host, or when the service or host cannot be reached for some reason, the user will be logged out of the ETS.

As with preferred connections, environment strings can be added to the commands to specify additional connection information.

#### 5.1.2.4.3 Dedicated SLIP

A port can be configured to automatically run SLIP when the port is started. No other protocol can run on the port; it will continue to run SLIP until it is logged out. To dedicate a port to SLIP, use the following command:

**Figure 5-16:** Dedicating a Port to SLIP

```
Local>> DEFINE PORT 3 SLIP DEDICATED
```

## 5.1.3 Virtual Ports

Incoming Telnet and Rlogin connections are not associated with a physical port. Instead, they are associated with a **virtual port**, port 0, which serves for the duration of the connection.

Each virtual port is created with a default set of characteristics. The **Set/Define Port** commands (starting with **Define Port Access** on page 12-27) can be used to customize a virtual port during the Telnet/Rlogin session; however, these customizations cannot be saved. The port reverts to the default set of characteristics once the session is closed.

To make configurations that apply to all virtual ports (all future Telnet/Rlogin connections), use Define Port commands and specify zero as the port number. All port settings can be configured for virtual ports except those that don't make sense for virtual ports, (i.e., Autobaud, Dedicated, Dialback, DSRLogout, DTRWait, Modem Control, and SLIP).

For example, the command in Figure 5-17 makes all ports process the Break key locally rather than passing it on to the remote service.

**Figure 5-17:** Configuring Virtual Ports

```
Local>> DEFINE PORT 0 LOCAL SWITCH ^F
```

**Note:** *Virtual ports cannot be configured with Set commands, they can only be configured with Define commands.*

Because NCP and Telnet remote console sessions are considered virtual logins, configurations made with Define Port 0 commands will apply to them as well. Virtual port settings are often used to provide local switches to network logins, as they typically do not have a Break key to use after the connection is made.

**Note:** *Use the List Port command to view virtual port characteristics.*

# 5.2 Modems

Modems are usually connected to data equipment (such as terminals or servers) with a 25 pin DB-25 connector that allows the equipment to see all the signals the modem provides. These signals include Ring (RI), Carrier Detect (CD), and Data Set Ready (DSR).

Although modems are sometimes difficult to set up, the following points should help you connect one to your ETS. Refer to the cable pinouts in your Installation Guide for more details as you read these instructions. Keep in mind two things:

The special handling for modem connections is only done if the port in question has Modem Control enabled. See the **Define Port Modem Control** command for details.

The way the ETS handles modem ports is rather simple and straightforward. Most modem problems are caused by cabling mistakes or by an incorrect modem configuration.

## 5.2.1 Modem Basics

When Modem Control is enabled on a port, the ETS uses the DSR input signal on the serial port to decide when there is a valid modem connection and the Data Transmit Ready (DTR) output line to signal the modem that a connection is possible or acceptable. The attached modem may not be using these signals as the ETS expects, however.

For a sample incoming call, the signal sequence might be:

1. The modem and ETS wait for a connection. The ETS provides DTR to the modem so that the modem will accept any incoming calls. The modem does not provide DSR to the ETS since it is not connected via the phone line.

2. The modem receives a call, asserts the Ring signal, and then asserts Carrier Detect (CD) to signal it accepted the connection.

3. The ETS sees its DSR input signal go high when the modem asserts DSR and/or CD.

4. The ETS logs the port in, after which the remote caller presses Return and gets a login prompt or autoconnect from the ETS.

5. The user works for a while, then decides to log out and exit.

6. If the user logs off the ETS locally, the ETS drops the DTR line long enough to signal the modem to hang up the remote connection (roughly 3 seconds).

7. If instead the remote modem hangs up before the user logs out, CD (the ETS's DSR) is de-asserted, and the ETS closes the local session.

For outgoing calls, the sequence might be:

1. A local user connects to the modem service. The ETS keeps DTR high for the modem and pays no attention to incoming DSR yet.

2. The user dials out and connects to a remote service.

3. The modem now raises CD (and therefore the DSR signal on the ETS) as a sign that it is connected. The ETS now begins monitoring the DSR line while the session progresses.

4. If the user logs out of the remote connection, the remote modem hangs up and the local modem de-asserts DSR. The ETS then logs the user off the service and makes the service available again.

5. If the local connection is closed (for example, by a Disconnect), the ETS drops DTR to signal the modem to hang up the remote end and closes the session.

## 5.2.2 Modem Wiring

There are two fundamental wiring issues to address: Data Terminal Ready (DTR), and Data Set Ready (DSR). Both issues, along with Carrier Detect (CD), are discussed in this section.

The ETS normally asserts DTR. When Modem Control is enabled, the ETS will drop DTR for three seconds each time the port is logged out and each time a network user disconnects from a modem service. The modem must be configured to hang up and recycle when DTR is dropped. Security problems may result if the modem is not configured in this way.

The ETS must know when a connection is lost so it can log out the port and close any sessions. Otherwise security problems will result when the next user logs into the port. The ETS also needs to know when a valid connection does not exist so it can ignore spurious characters from the modem. Otherwise the ETS may interpret the characters from the modem as a user logging in, causing the port to be unavailable.

#### 5.2.2.1 DSR (Data Set Ready) for Automatic Logouts

An ETS port can be configured to automatically log itself out when DSR is no longer asserted; in other words, the port logs out when the modem is disconnected. This can help ensure port security because users are prevented from unplugging terminal lines and using sessions that are still active.

#### 5.2.2.2 DSR for Controlling Remote Logins

The DSR signal can also be used to determine whether or not a remote login to a port will be permitted. DSRlogout can be used to automatically log a port out when the DSR signal is deasserted. See *DSRlogout* on page 5-16 for more information.

The Signal Check characteristic requires the assertion of the DSR signal before a remote login is permitted on a particular port. Signal Check is generally enabled for use with printers; if the printer doesn't assert the DSR signal, it's assumed to be disconnected or powered off. In this case, the remote login isn't permitted, and print jobs are not sent from the ETS to the printer. See *Preventing Access Until DSR Is Asserted* on page 5-15 for more information.

#### 5.2.2.3 DCD (Data Carrier Detect)

The DCD signal is asserted by the local modem when it detects a connection from a remote modem. If you're using a DB25 port, no wiring is required in order to use the DCD signal.

RJ45 ports have one pin that can be used for either DSR or DCD. If you are using modems, this pin must be wired to the modem's DCD pin. If you are using another type of device (such as a terminal or printer), this pin should be wired to the device's DSR pin. Refer to the Pinouts appendix of your *Installation Guide* for instructions.

#### 5.2.2.4 DTR (Data Terminal Ready)

The ETS asserts DTR when it is ready to accept incoming data or connections. It also uses DTR to cycle the modem when modem control is enabled by temporarily dropping the signal.

ETS ports can be configured to assert DTR only when a user logs into the port by enabling the DTRWait characteristic. See *DTRwait* on page 5-12 for more information.

### 5.2.3 Baud Rates

The ETS and modem must agree on the baud rate used for the serial interface. However, the modem attached to the ETS may be communicating with the remote modem at a different speed due to the use of compression and error correction techniques. The ETS and modem can be configured in one of three basic ways:

1. Set the baud rate of the ETS and the modem to the highest expected rate, disable autobaud on the ETS and on the modem, and use flow control to handle connections at all slower rates.

   On some modems disabling Autobaud is known as "locking the serial speed" or "locking the DTE speed." This method allows nonstandard transmission rates such as those found in V.32bis (14,400 baud), error correction, and data compression. This method is generally the most reliable as the modem and the ETS always use the same baud rate.

Ports that support V.32bis should be set to 19200 baud. Also, ports that use compression should be set one or two speeds higher than the modem's speed. For example, a port supporting a 2400 baud modem with compression should be set to 4800 or 9600 baud.

2 Use the autobaud feature of the ETS; the ETS will adjust its speed to that of the modem.

Flow control isn't strictly required in this configuration. Applications that cannot use flow control due to limitations listed in the *Parity, Character Size, and Stop Bits* section on page 5-4 may still function correctly, but if at all possible, flow control is still recommended.

Nonstandard transmission rates such as V.32bis (14,400 baud), error correction, and data compression cannot be supported with this method. During a long data transfer, eventually either the ETS or the modem will run out of buffer space and overflow the other, resulting in data loss.

3 If only one standard baud rate is to be supported, set the ETS to that rate and disable autobaud. Flow control may be disabled, subject to the same caveats discussed above.

## 5.2.4 Modem Configuration

In dialout situations, it is possible for users to reconfigure the modem with normal "at" commands. It is also possible for a user to misconfigure a modem such that it will be unavailable, unusable, or cause security problems. Fortunately, many modems can reload their saved configuration each time DTR is dropped by the ETS. The modem will always be configured correctly after each use provided the user doesn't modify the saved settings.

## 5.2.5 Modem Result Codes

If the modem is configured to return result codes or status messages, the ETS and the modem may start to "babble." A message from the modem will be interpreted as a user logging into the ETS, and the ETS will send a prompt to the modem. The modem will interpret this prompt as a command and send an error message to the ETS. This process causes the port and modem to become unavailable, and can be cleared temporarily by logging the port out.

The best solution to this potential problem is to configure the modem so that it never returns result codes. Unfortunately, the lack of status messages may make outgoing connections inconvenient. If the modem supports displaying messages only during outbound connections, babbling can usually be avoided.

## 5.2.6 Modems with SLIP

If Modem Control is defined on a port set for SLIP autostart, SLIP is handled slightly differently. In this case, SLIP does not start until the port sees assertion of the DSR signal, which generally occurs when the attached local modem has formed a connection with a remote modem.

Until DSR is asserted, the port remains idle (in non-SLIP mode). It can be used as a service port until SLIP is started. After SLIP is started, the SLIP session closes if the attached modem device de-asserts the DSR signal. For more information on SLIP configuration, see *SLIP* on page 4-6.

## 5.2.7 Modem Configuration Checklist

These items should be verified after any modem configuration. Note that some options might not be provided on the modem in question.

- The modem must disconnect immediately when DTR is dropped.
- The modem must assert CD (or DSR, if connected) when connected to another modem and must not assert CD when disconnected. The modem may optionally assert CD during outbound dialing.
- The modem and ETS must agree on the flow control method and baud rate scheme.
- The modem must not send result codes or messages to the ETS except optionally during outgoing calls.
- Configuration information should be saved in non-volatile memory (NVRAM) so that it will be retained during power outages.
- The modem should restore its configuration from non-volatile memory when DTR is dropped.
- The modem should be configured to answer the phone if incoming connections are to be supported. Generally this is done with the ats0=1 command.
- The modem should not answer the phone unless DTR is asserted by the ETS.

These items should also be verified after any ETS port configuration:

- Modem Control must be enabled. Using modems on ports without Modem Control enabled will lead to security problems. See the **Define Port Modem Control** command on page 12-43 for syntax and details
- Baud, parity, and flow control settings should be verified with the modem setup.
- Autobaud should only be enabled if required.

## 5.2.8 Testing the Modem Configuration

The example tests in this section assume that the modem is attached to port 4 and the modem and ETS checklists have been followed.

Dial into the ETS and issue the **Test Port** command. A regular cascading pattern should be printed. If characters are lost after a few dozen lines, there is a flow control problem.

On another port, issue the **Logout Port 4** command. The modem should immediately hang up and be ready for the next call in a few seconds. If not, the modem is ignoring DTR, or there is a wiring problem. Repeat this procedure with all expected modem speeds and options.

Dial into the ETS, connect to a network host, and log in. Hang up the remote modem without logging out of the ETS. After the ETS's modem hangs up, issue the Show Port 4 command from another port. The port should be in the Idle state.

Dial into the ETS again. The port should have been reset, and should no longer be connected to the network host. If not, the modem is incorrectly asserting DSR/CD, or there is a wiring problem.

If outbound calls are to be supported, connect to the modem's service with the Connect command. In many cases the **Connect Local** command is a quick shortcut: dial a remote modem. After the modem connects, log into the remote system.

In some configurations, it may not be possible to see the dial commands or the modem's status messages.

If a modem fails to pick up the phone, DTR may not be wired correctly, or the modem may be configured to ignore incoming calls. If modems fail to connect to each other, there could be a modem compatibility problem. For example one modem's configuration might require a special feature such as error correction to complete connections. Verify both modem configurations, or try swapping one or both modems with different models or different brands.

# 5.3 Other Port Characteristics

## 5.3.1 Dialback

Dialback allows a system manager to set up a dialback list of authorized users for incoming modem connections. When a username matching one in the list is entered, the port will be logged out and the user will be called back at the predefined number.

The Dialback system may be used for security purposes as well, but does not absolutely guarantee security. See *Dialback Security* on page 5-16 for more information.

## 5.3.2 Dialup

It is frequently useful (or essential) for a LAT host to know whether a connection attempt is coming from a modem or not. The LAT host will inquire about modem status when any connect is made, but you can explicitly inform the host about modem status with the Dialup flag. When Dialup is enabled on a port, the port will report that it is used for a dial-in modem if the LAT host asks. If you have any ports that will be used exclusively for modem access, define this parameter.

**Note:** *The Dialup characteristic has no effect on non-LAT connections (Telnet, Rlogin, and so on).*

Some services or nodes may reject a connection because of its Dialup status due to the inherent security concerns with modem connections. While this may seem like an annoyance, it is a security feature and should be implemented if possible via the Dialup flag.

**Figure 5-18:** Setting the Dialup Flag

```
Local>> DEFINE PORT 4 DIALUP ENABLED
```

## 5.3.3 Device Type

The Type characteristic specifies the device types compatible with a particular port. Type can be one of the following: ANSI, Hardcopy, or Softcopy. To set a type, use the following command:

**Figure 5-19:** Configuring the Device Type

```
Local> SET PORT 3 TYPE ANSI
```

The command above specifies that the port is compatible with VT100-type devices. For further explanation, see **Set/Define Port Type** on page 12-54.

## 5.3.4 DTRwait

The DTRwait flag governs whether a port provides DTR when idle. [[[Normally DTR is always asserted. In general, this allows modems to answer an incoming call, as many modems will not answer a call unless DTR is asserted.]]] If you enable DTRWait, the ETS will deassert DTR until the port receives a connection request. When such a connection begins, the ETS will assert DTR; when the connection is closed, DTR will be de-asserted.

**Figure 5-20:** Enabling Dtrwait

```
Local> SET PORT 2 DTRWAIT ENABLED
```

## 5.3.5 Group Numbers

Each port can be given one or more authorized LAT group numbers. By default, only group zero is authorized, which restricts a port's access to only those nodes that offer services in group zero. The ETS is also configured for group zero, so by default, all ports can access any services local to this ETS. To allow port access to specific groups, enter the **Set/Define Port Authorized Groups** command.

**Figure 5-21:** Defining Port Authorized Group

```
Local>> DEFINE PORT 2 AUTHORIZED GROUPS 0,77,122-178
```

For information on server-wide enabling of LAT groups, see **Set/Define Server Service Groups** on page 12-80.

## 5.3.6 Interrupts

When a port is being used for a network connection, the port will be busy; in other words, local users cannot use the port at that time. To permit local logins when a network connection is running, the port must have dynamic access configured and the Interrupts characteristic must be enabled.

**Figure 5-22:** Enabling Interrupts

```
Local>> DEFINE PORT 2 ACCESS DYNAMIC
Local>> DEFINE PORT 2 INTERRUPTS ENABLED
```

## 5.3.7 Port Messages

Various degrees of “verbosity” are available for ports receiving ETS messages. Messages from other users on the ETS can be enabled or disabled with the Broadcast flag. If the serial line connecting a terminal to the ETS is an unsure connection, setting Loss Notification will cause an audible beep if a character is lost. Finally, Verification will allow or prohibit the printing of informational messages as session connections are started, exited, or switched.

These parameters are all enabled by default. If you would like to disable them (for example, if you wish to decrease packet traffic), enter the following commands:

**Figure 5-23:** Disabling Port Messages

```
DEFINE PORT 3 BROADCAST DISABLED
DEFINE PORT 3 LOSS NOTIFICATION DISABLED
DEFINE PORT 3 VERIFICATION DISABLED
```

## 5.3.8 Port Names

The default name for each port is Port_*n*, where *n* denotes the port number. To assign a new name to a port, use the **Set/Define Port Name** command.

**Figure 5-24:** Assigning Port Name

```
Local>> DEFINE PORT 3 NAME “highspeed_modem”
```

A default username can also be specified for a port using the **Set/Define Port Username** command. When the username is specified with the this command, users will not be prompted for a username upon login. Figure 5-25 displays an example.

**Figure 5-25:** Specifying a Username

```
Local>> DEFINE PORT 2 USERNAME “fred”
```

## 5.3.9 Terminal Type

Termtype information is used for outgoing Telnet and Rlogin sessions. For example, it can be used to tell a remote host how to configure your terminal to run a particular application. The termtype should be entered as a string, as shown in the command below:

**Figure 5-26:** Configuring the Terminal Type

```
Local> SET PORT 3 TERMTYPE VT100
```

No terminal type is specified by default.

# 5.4 Security

Between the various password protections on the ETS and the access control provided by service groups, security should not be a problem; almost any access restriction can be enforced. For ports that need a higher level of security, the **Set/Define Port Security** command allows the ETS manager to restrict a port user's actions on the ETS. Ports set this way are called secure ports. If a port is set secure, it cannot see or affect other ports on the system, nor can it use the Set Privileged command. The secure option is useful for terminal connections that need to be restricted but still have access to the command line.

Due to the sequence of security checks (see Table 5-1), multiple security features can be enabled on any port. For example, a port can be configured to require a login password, enter a dialback username, and then be placed in menu mode.

**Table 5-1:** Security Checks

| Server Area to Check | Determines |
|---|---|
| Access is set to None | User cannot obtain any prompt or log in. |
| Port password is enabled | User must enter login password. |
| Port Dedicated is enabled | Port is forcibly autoconnected; user cannot access command line. |
| Port Dialback is enabled | Username must be an authorized name; reconnect attempt must succeed. |
| Port Security is enabled | Command set is restricted. |
| Port Menu is enabled | Port is forced into menu command mode. |

## 5.4.1 Password Restrictions

Users can be required to enter the ETS login password before they are allowed to connect to specific ports. By default, incoming Telnet and Rlogin connections are not required to enter the login password. To configure the ETS to require the login password, enter the **Set/Define Port Password** command.

**Figure 5-27:** Requiring the Login Password

```
Local>> DEFINE PORT 2 PASSWORD ENABLED
```

## 5.4.2 Menu Mode

Ports that don't need (or due to security concerns, should not have) access to the ETS command line can be put into menu mode. In menu mode, users are given a preset menu of up to 36 commands to choose from when they log in, but are not given automatic access to the command line. Individual ports are configured for menu mode with the **Set/Define Port Menu** command. The commands that users see in the menu system are configured via the **Set/Define Menu** command.

Each Set Menu command takes three parameters: an entry number to determine its place in the menu, an option name that the user will see in that command slot, and the command string that will be executed if the user selects that entry. For example, the command displayed in Figure 5-28 will put an entry in menu position five.

**Figure 5-28:** Set Menu Command

```
Local> SET MENU 5 “Show net TCP hosts” “SHOW HOSTS”
```

Menu users will see the string Show network TCP hosts; if they select this entry, the command Show Hosts will be executed for them.

The Exit command can be assigned to one of the menu slots to return users to the command line. The Logout command can be added to log the user out and reset the port. Typing Ctrl-D or Ctrl-Z at the menu prompt will also log out a menu mode user.

Menu commands are subject to the current user’s privilege level. Enabling Security on the port may restrict the user from selecting some of the menu entries.

## 5.4.3 Locking a Port

The **Lock** command may be used to secure a port without disconnecting sessions. When Lock is entered, the user will be prompted to enter a password. The port will then be locked until this password is used again to unlock it. Figure 5-29 displays an example.

**Figure 5-29:** Locking and Unlocking a Port

```
Local> LOCK
Password> donut (not echoed)
Verification> donut (not echoed)
Unlock password> donut (not echoed)
Local>
```

For information on enabling the ETS Lock feature, see *Enabling Server-Wide Port Characteristics* on page 4-1.

To unlock a port without the Lock password, a privileged user must use the **Unlock Port** command, or log out the port using the **Logout** command. **Logout** will disconnect all sessions. **Unlock Port** and **Logout** are discussed in the *Command Reference.*

## 5.4.4 Preventing Access Until DSR Is Asserted

The Signal Check characteristic can be used to prevent remote connections to a port unless DSR is asserted. This is often used to prevent Telnet logins to a port until the device attached to the port (for example, a terminal) asserts the DSR signal, indicating that it is connected and powered on.

**Figure 5-30:** Enabling Signal Check

```
Local>> DEFINE PORT 3 SIGNAL CHECK ENABLED
```

## 5.4.5 Automatic Logouts

Ports can be configured to log out automatically when the DSR signal is dropped to prevent users from accessing other sessions by switching physical terminal lines. Ports can also be configured to log out automatically or when they've been inactive for a specified period of time.

### 5.4.5.1 DSRlogout

When a device connected to the ETS is disconnected or powered off, the DSR signal is dropped. To configure a port to log out when this happens, use the **Set/Define Port DSRlogout** command.

**Figure 5-31:** Enabling Dsrlogout

```
Local>> DEFINE PORT 1 DSRLOGOUT ENABLED
```

Normally, DSR must be enabled on a port for it to automatically log out when the device it is attached to is turned off or disconnected. When DSRlogout is enabled, the ETS will log out the port's user if *either* of these cases occurs to prevent unauthorized users from unplugging physical terminal cables and gaining access through other users' still-active sessions.

DSRlogout is also useful with incoming modems. When the modem hangs up, it will log the user out and thus force the host to prompt subsequent users to log in. For this reason, Modem Control implicitly enables DSRlogout (although it will not show up as enabled), as well as other features. DSRlogout does not implicitly enable Modem Control, however. DSRlogout and Modem Control are mutually exclusive features; the same physical serial line signals are used for both features.

### 5.4.5.2 Inactivity Logout

To configure a port to log out after a specified period of inactivity, use the **Set/Define Port Inactivity Logout** command. This command works in conjunction with the **Set/Define Server Inactivity Timer** command, which defines an inactivity limit as a particular number of minutes. After the timer period has elapsed, a port with Inactivity Logout enabled will be considered inactive and automatically logged out.

**Figure 5-32:** Enabling Inactivity Logout

```
Local>> DEFINE PORT 1 INACTIVITY LOGOUT ENABLED
Local>> DEFINE SERVER INACTIVITY TIMER 500
```

## 5.4.6 Dialback Security

Depending upon the modem and its configuration, it may be possible for a determined attacker to penetrate the system. There are two windows of vulnerability where an attacker could gain unauthorized access to the ETS: the first exists after the ETS hangs up the modem but before the modem dials the user back, and the second exists after a dialback attempt fails but before the ETS reaches the end of its 80-second timeout period. Careful configuration and testing of the system during these short vulnerable periods is required to ensure a high level of security.

To minimize potential security problems when using Dialback, configure your modem carefully. The modem should not answer the line until the second or third ring, and never until the DTR signal is asserted. The modem should also be configured to dial only after detecting a dial tone, and hang up otherwise.

If the Dialback call should fail for any other reason before the 80-second timeout (for example, if the number dialed is busy), a second caller may be able to log into the ETS. This possibility can be virtually eliminated by two steps:

1. In the Dialback string itself, issue a command to ignore incoming calls. An example of this command is ats0=0dt555-1234.

2. Re-enable incoming call answering after the DTR signal is dropped (that is, after the dialback session has ended). To accomplish this, the modem should be configured to reload its normal configuration each time DTR is dropped.

When dialback is used, the ETS will verify the identity of incoming users by logging the port out and dialing the user back at a specified number. Dialback may be configured to

1. Permit connections without dialback,

2. Log out a port and call the user back,

3. Terminate the connection when unauthorized users attempt to connect,

4. Any combination of the first three.

To use dialback for character logins, you must configure a list of authorized users. First enable Modem Control using the **Define Port Modem Control Enabled** command. Then enable dialback using the **Set/ Define Port Dialback** Enabled command.

**Figure 5-33:** Define Dialback Enabled

```
Local>> DEFINE PORT 3 DIALBACK ENABLED
```

# 6: Using the ETS

A connection to a service or host is called a session on that host. One of the most useful features of the ETS is that it allows you to have multiple sessions on different hosts, and gives you easy access to all of them. Active sessions can include LAT, Telnet, or Rlogin connections, or any combination of the three.

This chapter explains interactive sessions on the ETS. After reading this chapter, you should know how to log into the ETS, configure the ETS for session activity, form connections to services, and manipulate active sessions. In addition, you will be able to view and interpret various ETS status displays.

## 6.1 Logging In and Out

### 6.1.1 Logging In

Each port on the ETS can support an interactive user or other device such as a printer. If you are using the ETS from a terminal, you will generally log into the ETS frequently. Use the following steps to log into the ETS:

1. Press the Return key on your terminal until the ETS responds. If you see garbled characters or get no response after four or five returns, check cable connections and the terminal's baud rate, parity, and character size settings. Both the terminal and the ETS port must agree on these settings. If the ETS manager has enabled password protection you will see the words `Login Password>`. Type the login password and press the **Return** key.

2. If this port has no permanent username associated with it, the ETS will respond with `Username>`. You can enter up to 16 characters as a username, or type **Ctrl-Z** to use the port name as your user name.

The ETS will respond in one of three ways:

- If you see the Local_x> prompt, where x is your port number, you are now in the ETS's Local mode. When in Local mode, you can enter only the ETS commands for which you are privileged. Type Help if you need information about the ETS's command set.

- If you receive a menu screen, you are in menu mode, and you can only enter the commands listed in the menu screen.

- If the ETS logs you out and attempts to reconnect, your port is in dialback mode and the ETS is attempting to verify your username and connection location.

### 6.1.2 Logging Out

When you're through using the ETS, type **Logout** at the Local> prompt. You can also type either **Ctrl-D** or **Ctrl-Z** at the local prompt to log out. If you have connected sessions, they will be closed before you log out. The ETS will then await another login.

You may remain logged into the ETS (with or without active sessions) perpetually, with a few possible exceptions.

- If you leave connected sessions for long periods of time, a host may log you out. Many hosts are set to log off users after a set period of inactivity; this will not affect your login to the ETS, but you will have to log into the remote host again.
- The ETS supports an inactivity logout timer of its own. If the ETS manager has enabled this feature, you will be logged out of the ETS after a preset period of inactivity, usually ranging from 15 to 120 minutes.
- If the DSRLogout option is enabled, you may be logged out automatically whenever your terminal is turned off or your connection is disrupted.

# 6.2 Configuring Your Port

## 6.2.1 Unsecure Port Commands

A variety of options can be set to customize your port. Refer to the *Command Reference* chapter for a full description of the following **Set Port** and **Define Port** command options:

- **Autoconnect** and **Preferred Services** cause your port to try to connect to any configured Preferred service as soon as you log in.
- **Autoprompt** determines whether a login prompt is sent back immediately when your port connects to a LAT service. No Autoprompt means that you will have to press Return to obtain the login prompt. Telnet and Rlogin sessions always return a login prompt upon connection.
- **Groups** controls which of the port's Authorized Groups are enabled. Authorized Groups are set by the ETS manager.
- **Loss Notification** causes your terminal to beep if characters are dropped on the connection with the ETS.
- **Username** sets up a default username for your port. Note that if you configure a username, you will not be prompted for it at login time.
- **Verification** enables status messages when you connect, disconnect, or switch sessions.
- **Newline Character** controls whether a carriage return, line feed, or both are sent as the newline character.

### 6.2.1.1 Privileged Port Commands

There are several **Set Port** options that the manager (or privileged user) can set. These usually are used when configuring the port for the first time, and are rarely changed.

- **Access** controls whether the port is accessible to local equipment (Local), remote users such as a local printer or dial-out modem (Remote), or both (Dynamic). Dynamic access is used for dial-in/dial-out modems, or for devices such as teletypes that can be used both interactively and as print devices.

- **Authorized Groups** configures all the service groups the port can possibly use. Use the **Set/Define Port Authorized Groups** command to specify which of the Authorized groups are actually enabled.
- **Autobaud** lets the ETS attempt to automatically set the port's speed and parity based on the first characters typed at login (they must be Returns). Autobaud works if the port is at least 1200 baud and is using eight bit characters, or seven bit characters with even parity.
- **Autostart** forces the ETS to log itself in immediately upon booting rather than wait for the input of a carriage return. If modem control is enabled, the connection will be established when the DSR signal is asserted. If there is a dedicated host or service, the ETSwill connect to it; if not, it will display the Local> prompt.

  **Note:** *Autostart should remain disabled (the default) if network connections are desired.*

- **Dedicated** sets up the port so that it can only connect to one specific service and nothing else. When a user logs in on the port, he will be connected to the service; when he logs out of the remote service, he will be logged out of the ETS.
- **Name** sets the port's name for identification purposes (not to be confused with the username, which identifies *who* is using the port).
- **Password**, governs whether the ETS password is required for logins.
- **Security** controls whether the port can execute restricted commands.
- **Session Limit** sets the maximum number of open sessions the port can have at a given time. The port session limit must be less than or equal to the ETS's session limit.

# 6.3 Connecting to Services

After configuring and using the ETS in Local mode, you will probably want to connect to remote hosts. A remote host is any host beyond your ETS, whether it is in another country or in the same office as you are. In addition to connecting to remote hosts, you can access the ETS from within your UNIX or VMS session using LAT, Telnet, or Rlogin. This means that you can remotely connect to the ETS to access its services just as if you had logged in locally. You can also access remote printers that are not directly connected to your system. The following section explains how to make these connections.

## 6.3.1 Connecting to LAT Services

To connect to a LAT service, use the **Connect** command and give the service name, for example:

**Figure 6-1:** Connecting to a LAT Service

```
Local> CONNECT HARVEY
```

This will connect you with the highest rated service named Harvey on the network (see the discussion of ratings in the Concepts chapter for more information about ratings).

You can also force a connection to an explicit host and specify exactly which port (if applicable) to use on that host. This may be necessary because more than one host on a local network can provide a service. For example, the following command will attempt to connect to the printer service on a specific port of host vax8.

**Figure 6-2:** Connecting to a Specific Host

```
Local> CONNECT PRINTER NODE vax8 DESTINATION port_5
```

This may or may not be possible, and you will be told if the ETS cannot locate or connect to the specified service.

If your ETS has been configured to allow incoming logins (see **Set/Define Server Incoming** on page 12-68), the ETS will show up as a service on the network. You can then connect to the ETS from another LAT-based ETS. After connecting to the ETS, you will see either the ETS Local> prompt or a prompt for a login password. You can then use the ETS as if you had logged in to the host directly. To exit the ETS and return to your local session, type `logout` or **Ctrl-Z**.

Keep in mind that many LAT-supporting terminals and hosts do not have provisions for a Break key that can be used by the ETS. If you plan to connect to a remote host from the ETS and will need to return to Local mode, be sure to set a Local Switch character (see *Break* on page 6-7).

Once the ETS has been defined as a service by your system manager, you can connect to it from a VMS host using one of the following VMS commands.

**Figure 6-3:** Connecting From a VMS Host

```
$ set host/lat ETSname
OR
$ Kermit
Kermit-32> set line LTAnnnn
Kermit-32> connect
```

In the example above, LTAnnnn is a LAT application port that your system manager has assigned for the ETS service.

## 6.3.2 Connecting to Telnet Hosts

To connect to Telnet hosts, type either of the following commands:

**Figure 6-4:** Connecting to a Telnet Host

```
Local> CONNECT TELNET LABSUN
Local> TELNET LABSUN
```

In both cases, you can use a “text” host name (such as labsun) or the numeric IP address of the host (such as 192.0.1.88). See the *IP Addresses* and *Name Resolution* sections of the *Concepts* chapter for more information on using text host names.

If necessary, you can specify a login to an explicit port on the remote host by adding :xxxx to the end of the hostname or IP address. For example, the following command attempts a Telnet connection to TCP port 2005 on the specified host, rather than the default Telnet port.

**Figure 6-5:** Specifying a Port Number

```
Local> TELNET 192.0.1.90:2005
```

On some Telnet connections, padding of Newline characters may be a problem. By default, the ETS will pad newlines with a Null character (ASCII 0x0) as part of the Telnet specification. Two commands are provided to override this default: **Set/Define Port Telnet Pad** and **Set Session Newline**. Set Port Telnet Pad controls whether a null character is sent after the newlines in an interactive session; Set Session controls which character is actually sent as the newline character (usually a carriage return).

## 6.3.3 Connecting to Local Ports

Users can connect to local ETS ports. This is useful, for example, when configuring the unit from a serial port. To connect to a local port from an ETS login, use the **Connect Local** command at the Local> prompt.

**Figure 6-6:** Connecting Locally

```
Local> CONNECT LOCAL port_2
```

The connection will be made to the specified port provided that the port is available. Once the connection is established, commands may be issued to the device attached to the serial port (such as a modem or printer).

## 6.3.4 Connecting to Remote Hosts Via Rlogin

If Rlogin connections are enabled on both the ETS and the remote UNIX or VMS hosts, you can use the Rlogin command to connect from the ETS to these hosts. Because Rlogin can bypass the normal password/ login sequence, it is a potential security problem and might not be enabled. The format of the Rlogin command is identical to the Telnet command.

**Figure 6-7:** Rlogin Command

```
Local> CONNECT RLOGIN HARVEY
Local> RLOGIN HARVEY
```

If Rlogin is enabled, your ETS username is used for the remote login. If the username is unknown or is password protected, you will still be prompted for a login password on the UNIX host. If password protection is turned off for the username entered, you will be logged in normally.

You can optionally specify a username to be used instead of the current one for your port.

**Figure 6-8:** Specifying an Alternate Username

```
Local> RLOGIN HARVEY ROBERT
```

### 6.3.5 Connecting to the Server from UNIX Hosts

If incoming TCP/IP logins are enabled (again, see the **Set/Define Server Incoming** command), users can log into the ETS from another UNIX host. They can also use Rlogin to connect to a LAT or TCP/IP service offered by the ETS. To log into the ETS using Telnet, type either of the following commands at the UNIX prompt where *IP_address* is the address of the ETS and *etsname* is the name of your ETS.

**Figure 6-9:** Logging in Using Telnet

```
% telnet etsname
% telnet IP_address
```

The previous example assumes your system manager has set up the host's /etc/hosts file to include the ETS. After you enter the command, you will be connected to the ETS and will either see the ETS Local> prompt, see the ETS menu (if menu mode is configured), or be prompted for a login password. You can then use the ETS as if you had logged in directly to the machine. Type `logout` or **Ctrl-D** to exit the ETS and return to your UNIX session.

You can use Rlogin instead of Telnet to connect to remote services that the ETS can see. The following command should be used for a normal login:

**Figure 6-10:** Rlogin Command

```
% rlogin etsname
```

The command displayed below will attempt a connection through the ETS to service *etsname*. The service can be local to the ETS or on another host on the network. Either a LAT or a Telnet service can be used; LAT will be tried first.

**Figure 6-11:** Connecting to a Service

```
% rlogin etsname -l serv_name
```

## 6.4 Default Services

You can set a default service to be used for connections rather than having to specify the remote host or service in the Connect command. This is useful if you usually use one host or service regularly. You can specify this default service using the **Set/Define Port Preferred** command.

**Figure 6-12:** Define Port Preferred Command

```
Local> DEFINE PORT PREFERRED vax8
```

The example above defines vax8 as the service to which the connection attempt will be made whenever the basic Connect command is entered. For a Telnet service, the command might look like the following example.

**Figure 6-13:** Set Port Preferred Command

```
Local> DEFINE PORT PREFERRED TELNET vax8.divc.mgmt.com
```

You can specify Telnet services as either text names or numeric IP addresses. TCP/IP hosts on a network are unique across the network, so there is no need to differentiate Telnet nodes with the Node and Destination parameters.

A default Telnet service is different from a default LAT service. If you have only a default Telnet service set up but type Connect, you will get an error because there is no default LAT host set up (the ETS will attempt a connection to a LAT host first, but will not find one).

# 6.5 Session Management

While in Local mode, you can switch to a different session, list which sessions you have open, change your port characteristics, and more. To list your active sessions, enter the Show Sessions command. You will see the type of connection, the host name, and any Node or Destination information. The current service will be labeled. You can use the Set Session command to change the characteristics of your connections, and other commands to manipulate sessions.

## 6.5.1 Break

It is necessary to have a way to leave an active session and return to the ETS Local> prompt. This is accomplished with the **Break** key. Pressing it will return the ETS to Local mode, leaving any sessions connected.

In Local mode, users can issue ETS commands to perform various ETS functions. If your terminal device has no Break key, you can configure a local switch key with the **Set/Define Port Local** command. You can also enter the **Set/Define Port Break** command to change where the Break key is actually processed: by the ETS, the remote host, or neither. By default, the ETS handles the **Break** key and does not pass it to the remote service.

Not all keyboard Break keys function alike; some dedicated keyboard Break keys will not be recognized as such by the ETS.

The ETS Break setting only affects Breaks coming into a port, it does not affect network or Connect Local attempts to send a Break out of the port.

## 6.5.2 Backwards and Forwards

You can think of all of the user's open sessions as a list from the first created to the most recently created. The **Backwards** and **Forwards** commands, entered in Local mode, move users backwards and forwards through sessions. **Backwards** refers to a session started earlier, and **Forwards** refers to a more recent session. The session list is circular, so going forward from the most recent session takes you to the earliest, and going backward from the first session resumes the most recent session.

## 6.5.3 Backward and Forward Switch Keys

As with the Break key, Backwards and Forwards can be bound to specific keys (see the **Set/Define Port Backward** and **Set/Define Port Forward** commands), so long as the specified keys are not typed in normal use. The switch keys are interpreted by the ETS and the current session is changed appropriately.

Pressing the Backward or Forward switch key is identical to going back to Local mode and typing the command explicitly. However, the switch keys also function in Local mode—if you press the defined Forward key from the local prompt, it is the same as typing Forwards as a command. Unlike the Break key, Forwards and Backwards are not assigned to any particular key by default. They must be explicitly configured.

At this point, an example may help to clarify working with sessions. Suppose user Bob connects to host Irvine. He works for a while, then presses the **Break** key to return to Local mode and forms a new connection to host Dayton. He works some more, then he decides to break and connect to host Sanfran.

If he presses **Break** and types `Show Sessions`, his session list will look like this:

- Irvine
- Dayton
- Sanfran (where Sanfran is the current session)

If Bob presses his **Backward** key or enters the **Backward** command, he will resume the session on Dayton. Pressing it again puts him in the Irvine session. Pressing the **Forward** key twice from the Irvine session will move him forward in the list to the Dayton session and then to the Sanfran session. Pressing the **Forward** Key once more from Sanfran moves him to the other end of the list, to Irvine.

### 6.5.4 Disconnect and Resume

Two other useful session management commands are **Disconnect** and **Resume**. The Disconnect command terminates the current session, a specified session, or all of your sessions. In our example above, Bob could type Disconnect 1 to terminate the Irvine session.

From the local prompt, Resume returns you to a specified session or the current session. If you do not specify a valid session number, Resume will put you back in the last active session. In our example above, Bob could type Resume 2 to go back to Dayton.

## 6.6 Local Server Commands

Each local port can use the following Local mode commands: **Broadcast**, **Lock**, **Logout**, and **Test Port**.

### 6.6.1 Broadcast

When the Broadcast feature is enabled by your system manager, you can use the Broadcast command to send messages to other users on your ETS by specifying either a port number or a username. If a user is specified, the message will go the user with that name. If there are multiple users with the same name, the message will go to the one with the lowest port number. Typical broadcast commands are shown in Figure 6-14.

**Figure 6-14:** Broadcast Command Examples

```
Local> BROADCAST 8 “Host Vax5 is down - use vax9”
Local> BROADCAST Bob “This server will reboot in 5 minutes”
```

**Note:** *The message must be enclosed in quotation marks.*

If you do not want to receive broadcast messages, you can enter Set Port Broadcast Disabled to refuse them on your own port.

### 6.6.2 Lock

The Lock command can be used to disable access to your port without actually logging out. If you Lock your port, you will be asked for a password and a verification of the password; the latter is used to ensure that you typed the password correctly. Once a port is locked, it is unusable until the password is again entered or until your ETS manager unlocks the port (which is useful when you forget the password). Like Broadcast, locking can be disabled server-wide by the manager.

### 6.6.3 Logout

Obviously, **Logout** logs out the current port. Any connections to session or services will be disconnected.

### 6.6.4 Test Port

This command may be used to verify wiring and flow control setup problems with your serial port. The command sends an identical stream of characters to the terminal, either continuously or for a specified number of lines. If your connection is regularly dropping characters, you may be able to identify the problem.

**Note:** *If multisessions are enabled on a port, only that port can issue a Test Port for itself.*

## 6.7 Status Displays

Three sets of commands can be used to view ETS status displays. The **Show** commands show the current availability of hosts and services as well as the state of the ETS, its ports, and the local services. **Monitor** commands provide a continuous display rather than a one-time look. **List** commands are provided to show the current setup in permanent memory (that is, the settings that will take effect after the next reboot or logout).

The **List** command is a special case, as some displays make no sense to list. Sessions and Users, for example, have no meaning in the permanent configuration data. List Nodes also has no meaning, as it only refers to the remote nodes.

**Note:** *Additional keywords apply to some commands; see the Command Reference for full syntax.*

**Netstat** Shows currently active UDP/TCP/IP and LAT sessions.

**Show Dialback** Shows the currently configured dialback strings, if any.

**Show Hosts** Displays the TCP/IP hosts known to the ETS. These are hosts that were resolved with a connect attempt, seen with rwho broadcasts, or explicitly added to the host table with the **Set/Define Telnet Hosts** command.

The Host, Node, and Service displays allow you to use “wildcards” in place of host names. Wildcards are characters that can be substituted for a single character or a series of characters.

**Show IPsecurity** Shows any restriction on incoming or outgoing TCP/IP sessions and the ports to which those restrictions apply.

**Show Logging** Shows the device to which logging information is directed for output, such as a console or a specific host.

**Show Menu** Shows the currently configured menu strings, if any.

**Show Nodes** Shows the LAT nodes on the network offering services, and their LAT protocol version. The Status sub-option shows hardware addresses and any services offered by the node.

**Show Ports** Shows the current setup of your port. Settings such as flow control, parity, default preferred hosts, and username are shown, as well as enabled settings such as **Broadcast**, **Lock**, and **Messages**. The display will also show printer status: either on-line and ready to accept jobs, or in a non-ready state such as ACK, Busy, or Error.

**Show Protocols** Shows an overall view of the network protocol counters, unless a parameter is added to the command. Specifying one of the following protocols shows detailed information on that protocol: AppleTalk, LAN Manager, LAT, NetWare, or TCP/IP. Users can also display which protocols are currently enabled using the Enabled keyword. In addition, users can request information on Counters and Queues.

**Show Queue** Shows the jobs currently waiting in the ETS’s print queue(s).

**Show Server** Shows the state of the ETS, including hardware and software addresses, LAT timers, session and queue limits, and so on. There are also available counters (network events), status (active users, ports, and services), and boot (reloading information) displays.

**Show Services** Shows the local and remote services that are available to your port, subject to any group restrictions that are in place (that is, you cannot see services that you are not eligible to connect to). Using the Local option instead of a service name shows only the services provided by this ETS.

The **Characteristics** option displays more detailed information on the service, such as its rating and groups. The Status option shows availability as well as the offering node.

**Show Sessions** Displays your active sessions (if any). The command displays the host/service you are connected to as well as the session number and type of connection.

| | |
|---|---|
| **Show SLIP** | Shows current and default SLIP connection information, and packet counters for current SLIP sessions. |
| **Show SNMP** | Shows the SNMP community names and access types. |
| **Show Telnet** | Shows all of the current TCP/IP nodes that the ETS can see, including hosts listed in the host table, hosts learned through rwho broadcasts, and hosts resolved after Connect/Telnet requests. |
| **Show Users** | Displays the users on the ETS. Each user is shown by name, along with his/her port number and current connection status. |
| **Show Version** | Shows current operating characteristics of the targets. |

# 7: TCP/IP Host Setup

The EZWebCon configuration software is the easiest way to configure teh Server. See your *Installation Guide* for more information on using the EZWebCon software.

Servers servicing TCP/IP print queues must have the TCP/IP protocol enabled (the default). To verify that TCP/IP is enabled, enter the **List Protocols** command.

The server **must** have an IP address before configuration; see your *Installation Guide* for more information. Any host wishing to access the ETSwill have to be informed of this IP address, which is typically configured in the UNIX **/etc/hosts** file or via a nameserver.

**Note:** *One of the most common causes of IP network problems is duplicate IP addresses. Please make sure that your ETS has a unique IP address.*

## 7.1 Selecting A Printing Method

The ETS provides three major TCP/IP printing methods: Berkeley remote LPR and Reverse Telnet (RTEL) host software and sockets. All methods provide queueing of jobs if the ETS is busy with another job. If custom queueing software has been designed, raw TCP/IP or Telnet socket connections can be made directly to the ETS ports. Instructions for all three methods are provided in the following sections. Please read through the entire configuration procedure before beginning.

**Note:** *See the man pages included with the distribution CD-ROM for a full discussion of RTEL functionality and configuration.*

**LPR**

LPR allows the ETS to look like a UNIX host that can print files. It is the recommended way of printing because it is easy to set up and requires no additional host software. However, not all machines support the lpr system (notably machines running UNIX based on System V instead of BSD).

**Note:** *The ETS cannot implement all lpr options; the print job information is not available until the print job is completed.*

Printing with LPD is also easy to set up, but LPD has a few significant restrictions. First, control information about the print job is sent after the print data has been sent, so options like binary characteristics and formatting cannot be applied. Second, the banner page is printed after the job instead of before it. Finally, because the Server is not actually spooling the print data locally, only one copy of the job will be printed regardless of the number of copies requested.

**RTEL**

Lantronix supplies RTEL host software, which requires installation and configuration on the host but provides more functionality than remote-LPR. It allows the host's lp or lpr printing system to transparently use the ETS print devices, and also allows the creation of named pipe devices on the host that map to the ETS's ports.

The **RTEL backend filter** interfaces with the host-based spooling system. It receives data from the spooling system and sends the data to the ETS. The advantages of the backend filter are that the banner page is printed at the front of a job, multiple copies can be printed, and simple reformatting such as <LF> to <CR><LF> conversion and tab expansion can be performed. However, the backend filter does not support any complicated output filtering or conversions.

The **RTEL Pipe Daemon** process (RTELPD) uses a UNIX named pipe as its interface to the host. This allows any host-supplied or user-supplied backend filter to be used for printing. Any data that is sent into the pipe is simply moved to the ETS. However, the data flow is one-way from the host system to the ETS and this approach does require one RTELPD daemon process for each print queue configured.

**TCP Socket Connects**

The ETS supports direct TCP connections to its ports. These connections provide 8-bit clean full-duplex data communication, but they do require that the user provide his or her own software. The RTEL software includes an example program showing how to form these connections.

The TCP Socket interface does not support queueing. If the resource is busy when a connection attempt is made, the connection will be rejected.

# 7.2 LPR Printing

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

- Windows for Workgroups, Windows 95, Windows 98, and Windows 200 do not support LPR directly; however, Lantronix has provided a peer-to-peer printing solution on the distribution CD-ROM.
- Because of the way the LPR protocol is typically implemented on the host, the processing options and banner page are sent after the job data itself. The ETS will print a banner page at the end of a job, and cannot support most of the LPR options. If it is necessary to have the banner page at the beginning of the printout, install and use the RTEL software. If banners are not needed, they can be disabled.
- The ETS cannot print multiple copies of the print job when using the "-#n" lpr option.
- If two print queues on the host refer to two services on the same ETS, they must use separate spooling directories.
- No special purpose input or output filters can be used when printing via LPR. If this functionality is necessary, use the named pipe interface program in the RTEL print queue configuration software.

## 7.2.1 LPR Basics

LPR is supported on many machines. To create a print queue,

1. Add the host print queue name into **/etc/printcap**.
2. Specify the remote node name (the host name of the ETS) and the ETS service.

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

To add and use a print queue for a ETS,

1. Add the ETS name and IP address to the host's **/etc/hosts** file.
2. Edit the **/etc/printcap** file to add an entry of the following form:

**Figure 7-1:** Example printcap File Entry

```
ETS_PRT|Printer on LAB ETS:\
       :rm=ETS_xxxxxx:\
       :rp=ETS_xxxxxx_TEXT:\
       :sd=/usr/spool/lpdETS_PRT:
```

The punctuation shown in the above example is required, and whitespace should be avoided within each option. The example above 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 the directory used to hold temporary spooling files.

3. Create the spooling directory using the **mkdir** command, and make sure it is world-writable.

**Figure 7-2:** Creating a Spooling Directory

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

The **mx** option may be used to allow unlimited size files to be printed, and the **sh** (suppress header) 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.

4. Check the queue setup using the **lpc status** command.

**Figure 7-3:** lpc Status Display

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

5 Print to the queue using normal lpr commands.

**Figure 7-4:** Printing from a BSD system

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

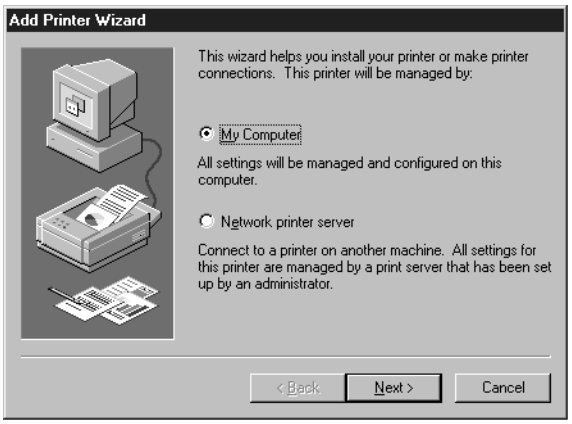
## 7.2.2 LPR on Windows NT 3.5.1 (and later)

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

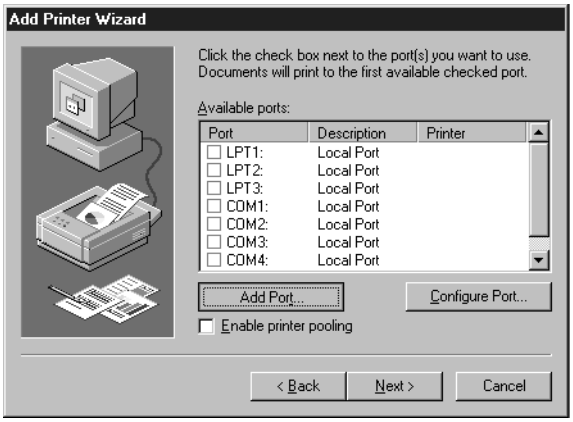
1 In the Control Panel, double-click the **Printers** icon.

2 Double-click the **Add Printer** icon.

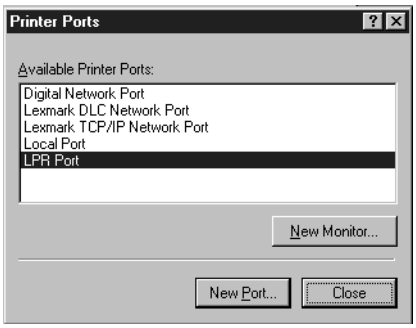
3 In the window that appears, choose **My computer** and click **Next**.




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



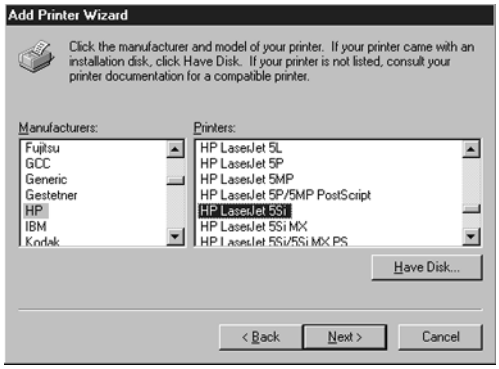
**5** Select **LPR Port**.



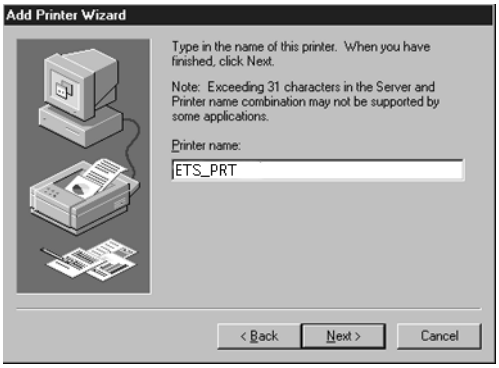

**Note:** *If LPR Port is not an option, refer to your Windows NT documentation for instructions on installing the Microsoft TCP/IP Printing service.*

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

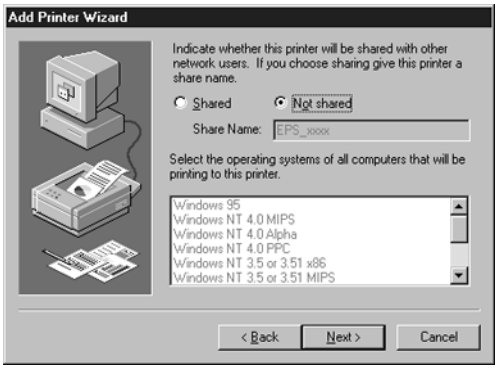
**7** Select the manufacturer and printer type.




**8** Enter the queue name.



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




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


# 7.2.3 LPR on AIX Hosts

LPR is available on machines running IBM's AIX operating system versions 3.2 and higher. Print queues on AIX hosts can be configured using either UNIX commands or the System Management Interface Tool (SMIT) application.

## 7.2.3.1 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, as shown in the example below. Note the lack of colons (:) and the required white space.

**Figure 7-5:** Example AIX qconfig entry

```
ETS_PRT:
        device = ETS_PRTd
        up = TRUE
        host = ETS_xxxxxx
        s_statfilter = /usr/lpd/bsdhort
        l_statfilter = /usr/lpd/bsdlong
        rq = ETS_xxxxxx_S1
ETS_PRTd:
        backend = /usr/lpd/rembak
```

The device name is simply the queue name with a “d” added. Print to the queue using normal lp syntax.

**Figure 7-6:** Printing to a Queue

```
% lp -dETS_PRT filename
```

### 7.2.3.2 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. 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**.
5. The message “The lpd subsystem has been started” will appear in the Output section of the next window. Click **Done**.

To add and use a print queue:

1. From the main window, choose **Print Spooling**.
2. Choose **Manage Print Server** and **Manage Print Queues**.
3. Choose **Add a print queue**.
4. From the dialog box that appears, choose **remote**.
5. From the next dialog box choose the desired type of remote printing.
6. Add the following information to the **Add a Standard Remote Print Queue** dialog box:
   - **A** The name of the print queue to add
   - **B** The name of the ETS unit
   - **C** The name of the ETS service
   - **D** The type of print spooler on the remote server, and
   - **E** A description of the printer on the remote server.

   A dialog box will appear with the message “Added print queue.”
7. Print to this queue using normal lp syntax (see Figure 7-6).

# 7.2.4 LPR on HP Hosts

LPR is supported in HP/UX versions 9.0 and greater. Print queues on HP hosts can be configured using either UNIX commands or the System Administration Manager (SAM) application.

## 7.2.4.1 Using UNIX Commands

To configure and use a print queue using LPR:

1. Become the superuser.
2. Issue the following commands:

**Figure 7-7:** Configuring a Print Queue Using UNIX Commands

```
# /usr/lib/lpshut
# /usr/lib/lpadmin -pETS_PRT -v/dev/null -mrmodel \
-ocmrcmodel -osmrsmodel -ormETS_xxxxxx -orpETS_xxxxxx_P1
# /usr/lib/accept ETS_PRT
# /usr/bin/enable ETS_PRT
# /usr/lib/lpsched
```

**Note:** *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 queuing system.

3. Print to this queue using normal lpr syntax (see Figure 7-6).

## 7.2.4.2 Using SAM

The System Administration Manager (SAM) application allows you to enable LPD printing and create print queues.

1. At the HP prompt, type **SAM**.
2. From the main application window, choose **Printers and Plotters**. Click **Open** and choose **Printers/ Plotters**.
3. In the Actions pull-down menu, select **Add Remote Printer/Plotter**.
4. Enter the name of the print queue to add, the name of the ETS unit, and the name of the ETS service
5. Print to this queue using normal lp syntax (see Figure 7-6).

# 7.2.5 LPR on SCO UNIX Hosts

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

1 Ensure that the Berkeley remote printing files and executable programs are installed on the host machine. If not, issue the **mkdev** command to install them.

**Figure 7-8:** Installing Print Files

```
# mkdev rlp
```

**Note:** *The mkdev rlp command should only be installed once. If it is used repeatedly, serious problems will result with the machine.*

2 Create the remote printer using the following command.

**Figure 7-9:** Creating the Remote Printer

```
# rlpconf
```

3 Configure the remote printer.

**Figure 7-10:** 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_P1
Is printer ETS_xxxxxx_P1 a remote printer or a local printer? (r/l) r
Please enter the name of the remote host that ETS_xxxxxx_P1 is attached
to: host_name
The ETS_xxxxxx_P1 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 host_name's /etc/hosts.equivor or
/etc/hosts:lpd file.
Make sure ETS_xxxxxx_P1 appears in /etc/printcap (in BSD format).
Make sure ETS_xxxxxx_P1 has a spool directory on ETS_PRT.
Putting the_printer in printer description file and creating spool
directory... done
Updating LP information... done
```

4 When prompted for the queue name, enter the name of the service on your print server. To change the queue name at a later time, manually edit the printcap file.

5 Print to this queue using normal lp syntax (see Figure 7-6).

## 7.2.6 LPR on Sun Solaris Hosts

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 7-11:** Creating a BSD Print Queue

```
# /usr/lib/lpsystem -t bsd ETS_xxxxxx_P1
# /usr/lib/lpadmin -p ETS_PRT _s ETS_xxxxxx_P1!ETS_serv
# /usr/lib/accept ETS_PRT
# enable ETS_PRT
```

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

# 7.3 Reverse Telnet (RTEL)

If LPR is not adequate for an application (for example, if banners are needed before jobs or more flexibility is needed in printing), the supplied RTEL software can be configured on the host.

RTEL is a set of programs designed to allow host-initiated connections to devices attached to your terminal/print server. The RTEL software is simply a transport mechanism, and as such, it makes no assumptions about the actual devices attached to the server. 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.

The RTEL software is supported on seven platforms: AIX on IBM RS6000's, HP/UX on HP platforms, RISC/OS on MIPS workstations, SCO on PC platforms, IRIX on SGI machines, Solaris on SUN workstations, and SUN/OS on SUN workstations. If the target machine is not one of these platforms, some modification may be necessary to make the RTEL software compile, link, and run properly. See the RTEL-build man page for hints on building on unsupported platforms.

**Note:** *RTEL Binaries are provided for many systems and source code is provided for use on non-supported systems. See the Lantronix web site at http://www.lantronix.com.*

## 7.3.1 Components of RTEL

RTEL provides two main types of interfaces to the server. The first is a printer backend filter for BSD, SYSV, and AIX type printing subsystems. The second method of printing with RTEL uses a UNIX named pipe as the actual interface to the host system.

The backend filter simply accepts data from the queue manager (LPD for BSD, lpsched for SYSV, and qdaemon on AIX) and moves that data over the network to the terminal/print server. The backend filter can perform simple reformatting of the job, such as tab expansion, <CR> to <CR><LF> expansion, and banner pages. It cannot, however, perform complicated tasks such as PostScript conversion. See the RTEL-backend man page for more information.

The named pipe interface allows host-supplied or third party software to send output to a device (the pipe) after which the RTELPD daemon process sends the data to the server. See the RTELPD man page for more information.

## 7.3.2 Installing Reverse Telnet Software

RTEL software is provided on the distribution CD-ROM in tar format and can be restored into a local directory. To set up the RTEL Software,

1 Install the RTEL software.

2 Set your current directory to the RTEL directory.

**Figure 7-12:** Restoring RTEL software

```
# mkdir /tmp/rtel
# cd /tmp/rtel
# tar xvf /cdrom/products/servers/rtelv4_2_2/rtel_src.tar
```

**Note:** *The word "cdrom" in the example above should be replaced with the name of the current distribution CD-ROM.*

For MS-DOS, the source code will be in a single tar archive file (rtel_src.tar). This file contains all of the source code, but does not contain any executables.

3 Copy the tar archive file onto the host system, remembering to use binary mode during the copy.

4 Untar the archive.

5 Recompile the software on the target machine. This will be done automatically for supported systems.

6 Once all the files are in place, issue the command **./lpinstall**. This script moves everything necessary to run the RTEL software into the /usr/spool/rtel directory tree.

**Figure 7-13:** RTEL Installation

```
# ./lpinstall
Installing the RTEL software package requires root privi-
leges. Do you want to continue the installation [yes]
The RTEL binaries are provided for the following machines:
      AIX ---- IBM RS6000 based machines
      HP ----- HP/UX HP/PA based machines
      MIPS --- RISC/OS
      SCO ---- SCO UNIX
      SGI ---- IRIX
      SOL ---- Solaris Sparc machines
      SPARC -- Sun/OS Sparc machines
      other -- (input file extension of other)
Please select your machine type: sparc
Please select type of spooling system to install [lpr]
Installation of RTEL software package complete.
#
```

**Note:** *At this point, the source code can be removed from the system.*

7 Create and install backend filter program, or set up a named pipe and start the RTELPD daemon process. For instructions on how to do this, consult the README files in the newly-installed RTEL directory.

## 7.3.3 Queueing with the RTEL Software

A job can be queued by the host's print system (lp, lpr, and others) or by the ETS itself. If you are only printing to one queue from one host to one ETS service, the queueing is provided by the host; it will not release a new job to the ETS until the previous job has completed.

When multiple print queues (possibly on more than one host) point to the same ETS queue, the hosts will provide local queueing, but you may still have multiple jobs attempting to access the ETS. In this case, the ETS will provide queueing among the hosts. Jobs from multiple hosts are handled in order, regardless of size or priority. This may explain why a particular host's queue seems to stop for an extended time.

The **Show Queue** display on the ETS will show the order of jobs pending on the ETS. The host's lp or lpr utilities must be used to show jobs queued by the host.

## 7.3.4 Setting up the RTEL Backend Filter

RTEL backend filters are designed to work with BSD, SYSV, and AIX type printing subsystems. The backend filter simply accepts data from the queue manager and moves that data over the network to the terminal/print server.

To set up the RTEL backend filter,

1. Become superuser.
2. Install the RTEL software according to Figure 7-13.
3. Execute the **mkprt** script.

The following example illustrates the process on a BSD-type system. When it is completed, the queue (hp4) should be able to process requests.

**Figure 7-14:** Installing the Backend Filter

```
# cd /usr/spool/rtel
# ./mkprt
Installing a print queue requires root privileged. Do you want to con-
tinue the installation [yes]
Please enter the name of the print queue to create: hp4
A printcap entry for hp4 needs to be created.
hp4|RTEL printer:\
       :lp=/usr/spool/rtel/hp4_dev:\
       :of=/usr/spool/rtel/hp4:\
       :sd=/usr/spool/rtel/hp4_sd:
Should this entry be added to your printcap file [y]: yes
In order to establish RTEL connections, an IP address and a host name
must be assigned to the terminal server.
Please enter the server's host name []: ps3
A connection on the server can be specified by either a port number or a
service name. A port number is simpler, but a service allows more
flexibility.
Would you like to specify a (p)ort number or a (s)ervice name [p]: p
Please enter the port number []: 2
By default, a password is not needed to connect to a service or a port.
(Note that the word null actually means no password.)
Please enter the password [null]:
The following options are available:
       banner ------- Print a banner page before every job
       binary ------- Do not format data for printing
       expandtabs --- Expand tabs into spaces
       formfeed ----- Append formfeed to end of job
       none --------- No options are to be used
       postscript --- Append <ctrl-d> to postscript job
Please enter a comma separated option string [none]: none
The following entry has been added to the server_host file
queue  server  service  password  option
hp4    ps3     :2       null      none
Installation of queue hp4 complete
```

The options area specifies which if any of the print options are enabled. The available choices are listed in Table 7-1.

**Table 7-1:** Print Options

| Option | Functionality |
|---|---|
| Banner | A banner page is printed before each job. The banner will show the date, name of the job, and name of the user who requested it. |
| Binary | No Line Feed processing is performed. This is useful for non-text files (such as plotter or graphics files). |
| Expandtabs | Tabs are changed into space characters. Eight space tabs are assumed. |

**Table 7-1:** Print Options, cont.

| Option | Functionality |
|---|---|
| Formfeed | Formfeeds (ASCII 0xC, Ctrl-L) are appended to the end of the job. This option should not be used with the PostScript or Binary options. |
| None | No options are enabled |
| Postscript | A Ctrl-D (ASCII 4) is used to terminate a print job, rather than the standard formfeed (ASCII 12). |

**Note:** *Options must be specified in lowercase characters; multiple options can be specified separated by commas.*

There must be an entry in the options field; use the word “None” if no options are desired. There must also be an entry in the server_hosts file for each ETS print queue you wish to use. You may have multiple UNIX print queues using the same ETS print queue (for example, when you want to use different sets of options) but a UNIX print queue cannot use multiple ETS queues.

Use the **lpstat -t** command for lp spooling systems or the **lpc status** command for lpr spooling systems to make sure the printer was created correctly. For example, if we created printer **hp4** on our lp spooling system, entering the lpstat -t command might display the following information:

**Figure 7-15:** lpstat -t Information

```
% lpstat -t
scheduler is running
device for hp4: /usr/spool/rtel/hp4_dev
hp4 accepting requests since Apr 18 15:44
printer hp4 is idle. enabled since Apr 18 15:44
```

For an LPR type spooling system, the corresponding output would look like this:

**Figure 7-16:** lpc status Information

```
% lpc status hp4
hp4:
       queueing is enabled
       printing is enabled
       no entries
       no daemons present
```

## 7.3.5 Setting up the RTEL Named Pipe Daemon

The basic concept behind the RTELPD daemon is to allow a UNIX system to use its own output filter programs that provide special purpose post-processing and then write the data into a named pipe device. The RTELPD daemon will read the data from the pipe and send it out over the network to a terminal or print server port.

**Note:** *The output filter in this case is either provided by the host system or is custom software. It is not provided as part of the RTEL software package.*

The command line parameters will be verified when the RTELPD daemon is started. The daemon process will then wait for input to arrive on the pipe device. When input data is detected, a connection attempt will be made to the target terminal server port, and if it is successful, data will start moving through the path.

If the specified service or port is currently busy, the daemon process will wait until the service or port is available and then try again to connect. To the process dumping data into the pipe device, this waiting looks like flow control. Eventually, the connection attempt should succeed, and the user data will flow through the path. When the user process closes the pipe device, the RTELPD daemon will detect the end-of-file, close the network connection, then restart the job cycle by waiting for input to arrive on the pipe.

It is important to remember that data will only move in one direction through a pipe. That is, data will flow from the host to the printer, but not from the printer back to the host. Host application packages like NewsPrint should be configured as if they were talking to parallel attached devices to ensure that the software is not expecting a response from the printer.

To install the RTELPD daemon process and create a named pipe,

**1** Create the named pipe and set up the server_hosts file using the mkpipe script. The process is shown in Figure 7-17.

This example does not actually set up a print queue. It simply creates the named pipe and puts an entry in the server_hosts file that says how to start up the RTELPD daemon process.

**Note:** *See the supplied RTELPD man page for a complete list and description of the RTELPD options.*

**Figure 7-17:** Installing the RTELPD Daemon Process

```
# cd /usr/spool/rtel
# ./mkpipe
Installing a pipe device requires root privileges.
Do you want to continue the installation [yes]
This install script will create a named pipe as the interface to
the RTEL software. This pipe will be used as the output device for
your printing system.
Note that the full directory path must be specified for the pipe
name, i.e. /dev/rtelp1.
Please enter a pipe name: /dev/rtp1
Created pipe /dev/rtp1 with root ownership and world read/write
privileges. If this is not appropriate for your application,
please change these characteristics.
In order to establish RTEL connections, an IP address and a host
name must be assigned to the terminal server.
Please enter the server's host name []: ps3
A connection on the server can be specified by either a port num-
ber or a service name. A port number is simpler, but a service
allows more flexibility.
Would you like to specify a (p)ort number or a (s)ervice name [p]:
p
Please enter the port number []: 2

By default, a password is not needed to connect to a service or a
port. (Note that the word null actually means no password.)
Please enter the password [null]:
The following entry has been added to the server_host file
     queue        server     service    password    option
     /dev/rtp1    ps3        :2         null        -b
Installation of pip /dev/rtp1 complete.
#
```

**2** Start the RTELPD daemon process.

**3** Issue the command **/usr/spool/rtel/rtelpd -s** from a shell prompt.

**4** Check the RTEL setup by sending data into the named pipe and seeing if it appears at the printer.

**Figure 7-18:** Checking RTEL Setup

```
# cat /etc/hosts > /dev/rtp1
```

Obviously, if the printer is a PostScript printer, a PostScript job should be sent to the pipe. Remember to add the `/usr/spool/rtel/rtelpd -s` command to the host startup files so that the RTELPD daemon will be started automatically each time the system boots.

**5** Once the RTELPD daemon is running, configure a UNIX print queue using the named pipe as its output device. This allows all the normal option processing associated with host-supplied or third-party backend programs.

## 7.3.6 Creating a BSD Print Queue Using RTELPD

To create a generic BSD print queue using the RTELPD pipe daemon,

1. Create a named pipe as shown in Figure 7-17.
2. Edit the **/etc/printcap** file and insert an entry in the following form to create a simple queue.

**Figure 7-19:** Editing the /etc/printcap File

```
rtel_prt:\
      :lp=/dev/rtp1:|
      :sd=/usr/spool/lpd:
```

**Note:** *See the RTELPD man pages for specific examples of configuring a print queue for each supported system type.*

3. Test the queue. Ensure that the RTELPD daemon is running and print a job; the output should appear on the printer.

## 7.3.7 Creating a SYSV Print Queue Using RTELPD

To create a generic SYSV print queue using the RTEL pipe daemon,

1. Create a named pipe as shown in Figure 7-17.
2. Issue the following commands to create a simple queue.

**Figure 7-20:** Creating a SYSV Print Queue

```
# /usr/lib/lpshut
# /usr/lib/lpadmin -prtel_prt \
        -i/usr/spool/lp/model/dumb \
        -v/dev/rtp1
# /usr/bin/enable rtel_prt
# /usr/lib/accept rtel_prt
# /usr/lib/lpsched
```

3. Test the queue. Ensure that the RTELPD daemon is running and print a job; the output should appear on the printer.

**Note:** *See the RTELPD man pages for specific examples of configuring a print queue for each supported system type.*

### 7.3.8 RTEL Troubleshooting

The **job_status** diagnostic file in the /usr/spool/rtel directory may help locate problems. The file contains any errors that occurred on a particular print job, such as job aborted, invalid service name, and so on. This file should be examined if the RTEL queue is not performing correctly. Entries are time-stamped to indicate when the error(s) took place; make sure when looking at these error logs that the errors shown are for roughly the same time as the problem(s) occurred. In addition, each error name in the log files has a name that identifies roughly where the error took place, as shown in Table 7-2.

**Table 7-2:** RTEL Errors

| Error Name | Error |
|---|---|
| %Exxxxxx | Error reported by the host operating system itself. Error names generally correspond to values for errno. |
| %LAT_xxxx | A reject code from the server. Generally indicates a problem with the ETS setup or the **server_hosts** file. |
| %RTEL_xxxxx | The host system could not initiate the connection to the server properly. The message should indicate the reason. |

## 7.4 TCP Socket Connections

If custom queueing software has been designed, raw TCP/IP (or Telnet) connections can be made directly to the ETS ports. Opening a TCP session to port 30*nn* will attempt a direct connection to port *nn* on the Server.

**Note:** *The 30nn range of ports is 8-bit clean. If Telnet IAC interpretation is needed, form a connection to the 20nn range of ports.*

If the port is busy or unavailable when the TCP connection attempt is made, a TCP RST will be sent back to the host and the connection attempt will be rejected. It is up to the application software to detect this condition and retry the connection.

Connections can also be formed to a specific port on the Server with the Telnet command's port number parameter. For example, to connect to serial port 3 on the Server, first make sure the port is set to either Dynamic Access or Remote Access, then issue the following command:

**Figure 7-21:** Telnet Command to Connect to Specific Port

```
% telnet server_name 2003
```

A TCP socket number can also be associated with a multi-port service using the **Set/Define Service TCPport** command. This allows an application program to request a connection to a single socket and be given the next available port.

**Note:** *See **Set/Define Service TCPport** on page 12-91 or **Set/Define Service Telnetport** on page 12-92 for more information on socket connections.*

# 7.5 PostScript Configuration

To print PostScript jobs, you must enable the PostScript attribute on the service being used.

**Figure 7-22:** Enabling the PostScript Attribute

```
Local>> DEFINE SERVICE ETS_P1 POSTSCRIPT ENABLED
```

A very common problem when printing PostScript jobs from UNIX queues is including non-PostScript data, such as 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 your host's documentation for information on preventing header and trailer pages.

# 8: NetWare Host Setup

NetWare print queues may be configured using PCONSOLE or QINST, which are both provided on the distribution CD-ROM. The method that you use to set up print queues will be determined by the version of NetWare that you are using and whether you use Bindery Emulation or NetWare Directory Services (NDS). If you are running NetWare version 4.0 or greater, refer to the *Creating NDS Print Queues with PCONSOLE* section. If you are running versions 2.x, 3.x, or version 4.0 with Bindery Emulation, refer to the*Creating Bindery Print Queues with QINST* section.

**Note:** *To use EZWebCon, NetWare users must be running Windows version 3.1 or later with the NetWare VLM or a Winsock-compliant IP stack.*

ETS servers servicing NetWare print queues must have the NetWare protocol enabled (the default). To verify that NetWare is enabled, enter the **List Protocols** command.

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

## 8.1 Access Lists

By default, the ETS will only scan local file servers (file servers one hop away) for print queues to service. File servers on non-local Ethernets, such as those with an IPX router between themselves and the ETS, can be scanned for print queues using the following command:

**Figure 8-1:** Enabling Non-local File Servers

```
Local>> DEFINE PROTOCOL NETWARE ACCESS fileserver
Local>> INITIALIZE DELAY 0
```

To enable scanning for jobs on all file servers in the extended network, replace the file server name with the keyword **All**.

**Note:** *On an extended wide-area or local-area network with many file servers, specifying All can severely impact the time between jobs and the overall printing performance.*

## 8.2 Licensing NDS

NDS must be licensed on your ETS in order to use NetWare Directory Services.

1 Read and complete an NDS registration form via one of the following methods:

A If you have World Wide Web access and a forms-capable browser, navigate to the Lantronix World Wide Web site (located at URL http://www.lantronix.com) and find the **NDS Updates** link.

**B** If you have email access, send email to **nds-info@Lantronix.com**. You will receive a blank registration form that can be completed and returned to Lantronix.

**C** If you do not have Internet access, contact a Lantronix sales representative for assistance. Contact information is provided in *Appendix A*.

**2** Enable NDS on the ETS by entering the**Set/Define Protocols NetWare DSLicense** command along with the string that you received via step 1.

**Figure 8-2:** Enabling NDS on the ETS

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

# 8.3 Printing

The ETS can process NetWare print jobs either as a printserver (pserver) or via rprinter. When using the pserver method, the ETS logs into a file server and then queries the server for pending print jobs that it can service. When using the rprinter method, the ETS dedicates the printer to a particular file server; the printer is not usable by other file servers or protocols. The significant benefit of the rprinter method is that rprinter does not use a login slot on the file server (pserver does).

**Note:** *The pserver login uses the ETS name and login password to log into the file server. If the default login password is changed, NetWare print queue setups must also be changed to reflect the new password.*

Printing can be configured in one of five ways. The first four methods configure the ETS services as pserver devices, while the fourth covers rprinter setup.

Pserver configurations can be made via PCONSOLE's Quick Setup utility. To use PCONSOLE Quick Setup you must be running NetWare version 4.0 or greater with NDS enabled. Three basic steps are involved: NDS licensing, print server configuration, and print queue configuration.

Pserver configuration can also be made via the NetWare Administrator Quick Setup option. To use this option, you must be running NetWare version 4.0 or greater with NDS enabled.

The preferred pserver configuration method for Bindery print queues is to use the QINST utility. It will interactively prompt you for the names of the file server, the name of the print queue to create, and the ETS name and service names to use.

Pserver can also be configured manually via PCONSOLE on the file server(s). PCONSOLE is useful, for example, when you want to see exactly what is being configured by the QINST utility. Some basic familiarity with PCONSOLE is assumed in the examples.

Rprinter is set up via the PCONSOLE utility on the file server(s). Again, basic familiarity with PCONSOLE is assumed in the examples.

## 8.3.1 Creating NDS Print Queues with PCONSOLE

The Quick Setup option is the easiest way to create NDS print queues with PCONSOLE. The following steps refer to NetWare v4.x or greater.

License NDS on your ETS as explained in the *Licensing NDS* section on page 8-1.

**1** Configure the ETS.

**A** Use the **Set/Define Protocols NetWare DSTree** command to define the directory service tree in which the print server is located.

**Figure 8-3:** Defining the Directory Service Tree

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

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

**B** Use the **Set/Define Protocols NetWare DSContext** command to define the directory service context where the print server is located.

**Figure 8-4:** Defining the Directory Service Context

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

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

The access list is set to Local by default, which includes all file servers attached to a local Ethernet segment (not accessed through a router). To add to this list, enter the **Set/Define Protocols NetWare Access** command.

**Figure 8-5:** Adding to the Access List

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

**2** Reboot the ETS.

**Figure 8-6:** Rebooting the Server

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

**3** Set up the PCONSOLE print queue.

**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 Setup**. The Quick Setup window will appear. Enter the name of the ETS, the name of the service used for printing, the name of the print queue, and any other necessary information at the prompts.

**Figure 8-7:** Quick Setup

```
Print Server: ETS_xxxxxx
New Printer: ETS_xxxxxx_PCL
New Print Queue: printq
...
```

The print server name is the name of your ETS. The new printer name is the name of the ETS service. The new print queue can be any name. The print queue volume is the disk to be used to spool print jobs. The remaining fields can be left in their default settings.

**C** Press the **F10** key to save the print queue information.

**Note:** *You must complete step 3 for each file server that will need access to ETS queues.*

**4** Log into the ETS and enter the **NETSTAT** command.

This will display information about file servers, printers, and queues that the print server has found. If a queue appears in **JobPoll**, the print server has successfully attached to the queue. If the print server does not successfully attach to the print queue, see *NDS Print Queue Troubleshooting* on page 8-16.

## 8.3.2 Creating Print Queues with NetWare Administrator

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

**Note:** *NetWare Administrator can be used for both NDS and bindery print queues. See your NetWare documentation for more information.*

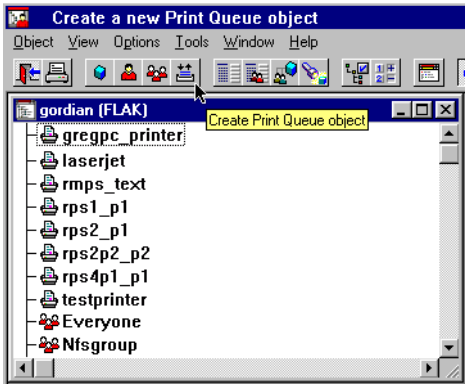
**Note:** *You must license NDS on your ETS as explained in Licensing NDS on page 8-1.*

To create a print queue using NetWare Administrator,

**1** Start NetWare Administrator.

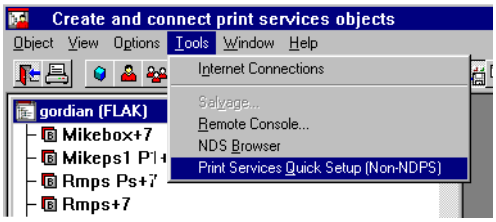
2 In the **Directory Tree** windows, navigate to and select the context in which you want to install the printer.

**Figure 8-8:** Context Window



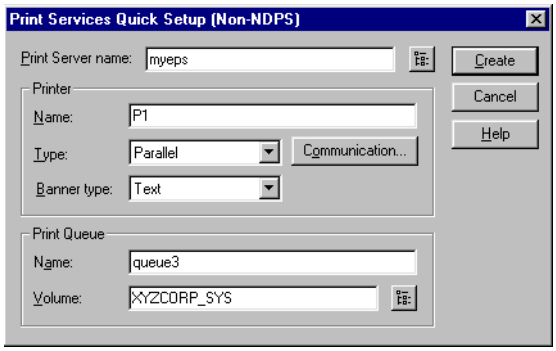

3 From the Menu Bar, select **Tools: Print Services Quick Setup**.

**Figure 8-9:** Quick Setup Menu Option




4 In the Quick Setup dialog box, enter the necessary information.

**Figure 8-10:** Quick Setup Dialog Box




**A** In the **Print Server Name** field, enter the name of your Lantronix server.

**B** In the **Printer Name** field, enter the name of the print service configured on your Lantronix server.

**C** In the **Print Queue Name** field, enter the name of the print queue to create. The name should be meaningful to your users, and will not affect any Lantronix server configuration.

**D** Leave all other defaults as-is.

5 Click **Create**.

6 Print a test document using the new print queue.

## 8.3.3 Creating Bindery Print Queues with QINST

The QINST utility is the recommended way to configure Bindery print queues.

> **Note:** *If you wish to enable Bindery emulation on a Novell 4.x file server, refer to your NetWare documentation.*

To create a bindery queue with QINST,

1 Log into the targer file server as **Supervisor** (NetWare 2.2/3.1x) or **Admin** (NetWare 4.x).

2 Copy the QINST.EXE file from the distribution CD-ROM into the **Public** directory on the file server.

3 Type `QINST` to start the utility.

> **Note:** *For NetWare version 4.0 and greater, the QINST program requires access to UNICODE tables to provide character translation. Copy QINST into the NetWare Public directory or ensure that the PATH variable includes the required UNICODE tables.*

4 Create a Novell print queue named TESTQ on the ETS. The following example uses an ETS named ETS_*xxxxxx* with a service named ETS_*xxxxxx*_PCL.

**Figure 8-11:** Creating Novell Print Queue

```
F:\> \Public\QINST
Q-Install
Logged in as ADMIN
Installing on GIZA, NetWare V3.xx
Volume number: 0 <CR>
Enter the name of the print server.
: ETS_xxxxxx <CR>
Enter the name of the queue to create.
: ETS_PRT <CR>
Adding print queue ETS_PRT on volume GIZA_SYS
Enter the service name on ETS_xxxxxx which will service this queue
: ETS_xxxxxx_TEXT <CR>
Adding print server ETS_xxxxxx. Please wait...
Attaching ETS_xxxxxx to ETS_PRT
Adding print server ETS_xxxxxx_TEXT. Please wait...
Attaching ETS_xxxxxx_TEXT to ETS_PRT

Print queue installed successfully. Resetting ETS_xxxxxx.
Resetting print server.
Install another queue [y/n]? n
F:\>
```

5 Use the **nprint** command to print a job to the ETS.

**Figure 8-12:** NPRINT Command

```
F:\> nprint C:\AUTOEXEC.BAT /queue=ETS_PRT
```

## 8.3.4 Installing a Print Queue Using PCONSOLE

The following detailed steps refer to NetWare v3.11, but are similar for v2.x. Be sure to note the name of the print server; it is located on the back or underside label.

1. Log in as **Supervisor** on the file server.

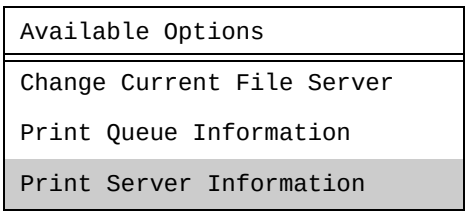
2. Type `PCONSOLE` at the F: prompt and press **Enter** to start the utility.

**Figure 8-13:** Starting PCONSOLE

```
F:> PCONSOLE
```

3. Using the cursor keys, select **Print Server Information** from the **Available Options** menu, then press **Enter**.

**Figure 8-14:** Print Server Information Option




You will see a list of current print servers.

4. Press **Insert** to create a new entry, add the ETS name, and press **Enter**.

**Figure 8-15:** Entering ETS Name

```
Enter Print Server Name: LAB_ETS
```

This is the name that the ETS will log in as when querying the file server's print queues. If you later change the ETS name, you will need to update the file server(s).

If you change the login password on the ETS, you will need to add a password for the entry you just added. Highlighting the ETS name and pressing **Enter** shows the **Print Server Information** menu, in which you can change the ETS password.

5. Use **Insert** to add the name of the service on the ETS which will service the queue, and press **Enter**. The example below adds a service named `LABPRT_S1`.

**Figure 8-16:** Entering Services

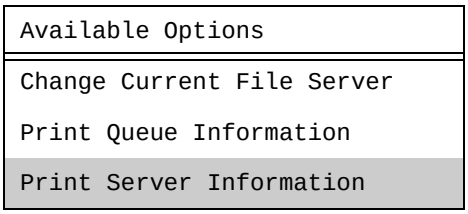
```
Enter Print Server Name: LABPRT_S1
```

6. Press **Escape** to return to the Available Options menu.

7. Repeat step 1 through step 5 for all necessary queues. When no other configuration is desired, the ETS must be told to rescan the file server queues so that it is aware of the modifications. This can be done with the following steps.

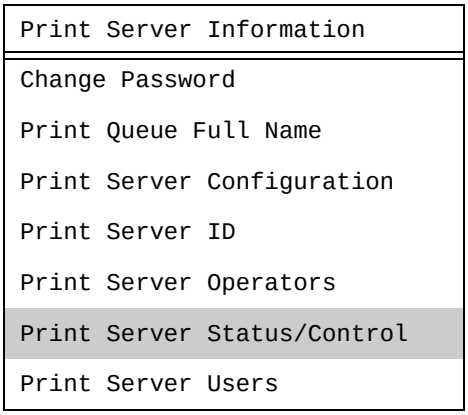
**8** In the **Available Options** menu, highlight **Print Server Information** and press **Enter**.

**Figure 8-17:** Available Options Menu




**9** Select the ETS name (LAB_ETS) and press **Enter**. The menu shown in Figure 8-18 appears.

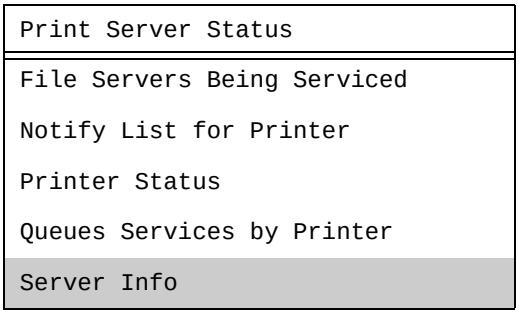
**Figure 8-18:** Print Server Information Menu




**10** Highlight **Print Server Status/Control** and press **Enter**.

**11** Highlight **Server Info** and press **Enter**.

**Figure 8-19:** Server Status Menu




**12** Highlight **Current Server Status: Running** and press **Enter**.

**Figure 8-20:** Print Server Info/Status Menu

```
Print Server Info/Status
Print server version    3 0xx
Print server type       Dedicated DOS
# of printers           n
Queue service nodes     0
Current server status   Running
Serial number           006497
```

**Note:** *If you don't get the menu above, the file server could not contact the ETS for some reason.*

**13** Select **Down** and press **Enter**.

**Figure 8-21:** Current Server Status

```
Current Server Info/Status
Down
Going down after current jobs
Running
```

This will not reboot the ETS—it will only force it to re-scan the available file servers for new queue entries.

**14** Select **Print Queue Information** from the **Available Options** screen.

Press **Escape** repeatedly to return to the **Available Options** menu and the PCONSOLE utility.

**15** Test the queue by using nprint.

**Figure 8-22:** Nprint Command

```
C:> nprint c:\autoexec.bat /queue=TESTQ
```

The file will be spooled to the ETS for printing and should appear on the proper physical port. If the print port is in use, the NetWare job should be visible via the ETS **Show Queue** display.

## 8.3.5 Configuring Rprinter

Configuring a ETS service as an rprinter device prevents any other users from using the service. It will be tied to the rprinter node for as long as the node is running and pserver is executing on the file server. Only one rprinter node can be configured on the ETS, but multiple ports on the ETS can be tied to queues on that node.

**Note:** *rprinter is also known as nprinter.*

Before beginning rprinter configuration, you will need to know the name of the printserver process you will be starting on the file server, and the name of the print service on the ETS.

**1** Set the rprinter printserver on the ETS.

**A** From the ETS local prompt, enter the **Set/Define Protocols NetWare Printserver** command, where *pserver_name* is the name with which the pserver NLM/VAP/standalone program will be started (under step 11 on page 8-14).

**Figure 8-23:** Setting the Printserver

```
Local>> SET PROTOCOL NETWARE PRINTSERVER pserver_name
Local>> DEFINE PROTOCOL NETWARE PRINTSERVER pserver_name
```

**B** Create a print queue on the file server and associate it with the ETS service.

**2** In the **Available Options** menu, select the **Print Queue Information** option and press **Enter**.

**Figure 8-24:** Print Server Information Option

```
Available Options
Change Current File Server
Print Queue Information
Print Server Information
```

You will see a list of configured print queues on the file server.

**3** Press **Insert** to create a new queue on the file server, type the new queue name, and press **Enter**.

**Figure 8-25:** Queue Name Example

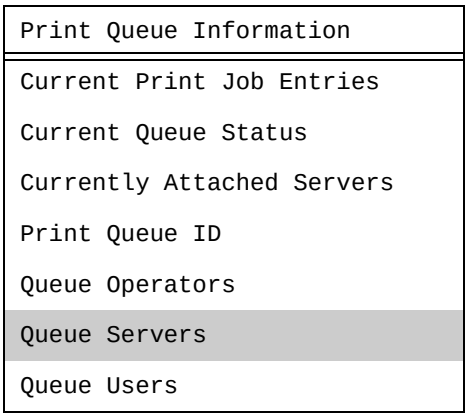
```
New Print Queue Name: TESTQ
```

The name does not have to be related to the name of the ETS resources, but should be short and easy to remember.

**4** Highlight the queue you just entered and press **Enter** to configure the queue itself.

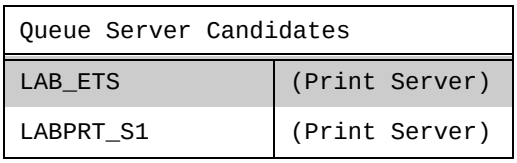
**A** From the menu that appears, select **Queue Servers** and press **Enter** to specify which network print servers can print jobs from this print queue. The list will be empty, as none have been selected yet.

**Figure 8-26:** Queue Servers Option




**B** Press **Insert**. The resources entered in the *Creating Bindery Print Queues with QINST* section should appear in a selection list:

**Figure 8-27:** Queue Options

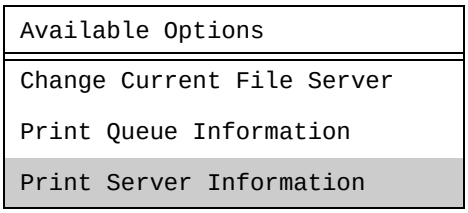



**5** Tell the file server about the ETS service that will be used.

**A** Press **Escape** three times to return to the main PCONSOLE menu (titled **Available Options**).

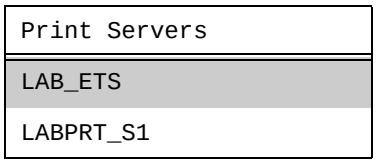
**B** Select **Print Server Information** and press **Enter**.

**Figure 8-28:** Print Server Information Option



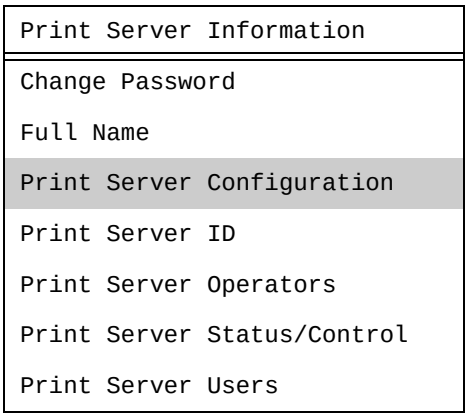

**C** Select the ETS name from the list of print servers and press **Enter**.

**Figure 8-29:** Available Print Servers



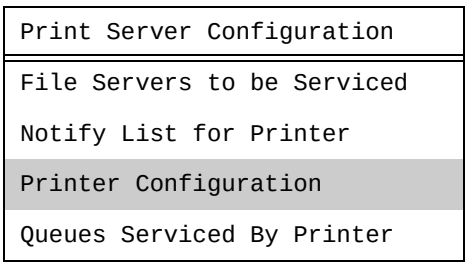
**D** Select **Print Server Configuration** and press **Enter**.

**Figure 8-30:** Print Server Configuration Option



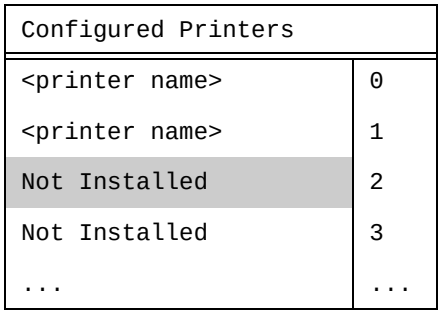

**E** Select **Printer Configuration** and press **Enter**.

**Figure 8-31:** Printer Configuration Option



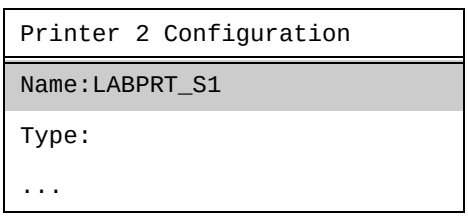

**F** Highlight the first printer entry called **Not Installed** and press **Enter**.

**Figure 8-32:** Configured Printers Menu




**G** Highlight the **Name** field and enter the printer name. Press **Enter**.

**Figure 8-33:** Name Field



**H** Highlight the **Type** field and press **Enter**. You should see the following menu:

**Figure 8-34:** Printer Types Menu

| Printer Types |
|---|
| Parallel, LPT1 |
| Parallel, LPT2 |
| Serial, COM 1 |
| Serial, COM 2 |
| Remote Parallel, LPT1 |
| Remote Parallel, LPT2 |
| Remote Serial, COM 1 |
| Remote Serial, COM 2 |

**I** Highlight **Remote Serial, Com 1** and press **Enter**. The printer ports under PCONSOLE are always configured as remote serial even if they are physically parallel ports.

**J** Press **Escape**.

**K** In the **Save Changes** menu, select **Yes** and press **Enter**.

**L** Press **Escape** to return to the **Print Server Configuration** menu.

**6** Select **Queues Serviced by Printer** and press **Enter**.

**Figure 8-35:** Print Server Configuration Menu

| Print Server Configuration |
|---|
| File Servers to be Serviced |
| Notify List for Printer |
| Printer Configuration |
| Queues Serviced By Printer |

**7** Highlight the desired rprinter from the list of configured rprinters and press **Enter.**

**Figure 8-36:** Defined Printers Menu

| Defined Printers | |
|---|---|
| TEST_S1 | 0 |
| LABPRT_S1 | 1 |
| ... | 2 |

**8** Select the name of this file server and press **Enter** (or just press Enter if no file servers appear).

**Figure 8-37:** Selecting the File Server

| File Server | Print Queue | Priority |
|---|---|---|
| eng_server | TESTQ | 1 |
| docserver | DOCQ | 1 |
| labserver | LABQ | 1 |

**9** Highlight the name of the queue created in step B and press **Enter** twice, leaving the priority at **+1**.

**10** Exit PCONSOLE by repeatedly pressing **Escape**.

**11** Restart the pserver VAP/NLM/process on the file server or PC.

**12** To connect the ETS port to the rprinter file server, complete **one** of the following steps, depending on how pserver is running:

**13** If pserver is running as a VAP, enter the following on the file server. The pserver name must match the name you entered on the ETS for the PRINTSERVER.

**Figure 8-38:** Restarting pserver as a VAP

```
: STOP pserver_name
: START pserver_name
```

If pserver is running as an NLM, enter the following:

**Figure 8-39:** Restarting pserver as an NLM

```
: UNLOAD PSERVER pserver_name
: LOAD PSERVER pserver_name
```

If pserver is running on a dedicated PC, start it by entering the following:

**Figure 8-40:** Restarting pserver on a Dedicated PC

```
F:> PSERVER pserver_name
```

At this point, the ETS will connect the port to the rprinter file server, and the port is ready to print from NetWare. The port will be unavailable for other protocols to use. If the ETS does not connect within one minute, use the **Set/Define Protocols NetWare Reset** command to force the ETS to re-scan the NetWare connections.

# 8.4 PCL

Printing PCL jobs requires an 8-bit clean data path between the NetWare file server and the printer. When printing via the serial port, use hardware flow control. In addition, enable the Binary attribute on the service being used.

**Figure 8-41:** Enabling Binary

```
Local>> DEFINE SERVICE ETS_xxxxxx_S1 BINARY ENABLED
```

# 8.5 PostScript

PostScript printing from NetWare requires that the PostScript attribute be enabled on the print service.

**Figure 8-42:** Enabling Postscript

```
Local>> DEFINE SERVICE ETS_xxxxxx_S1 POSTSCRIPT ENABLED
```

# 8.6 Troubleshooting

## 8.6.1 QINST Print Queue Troubleshooting

This troubleshooting section assumes the Novell queue was created using the QINST utility. If the queue was created manually using PCONSOLE, either delete the queue and re-create it using QINST or verify the steps in the *Creating Bindery Print Queues with QINST* section.

**Table 8-1:** NetWare Host Troubleshooting

| Things to Check | Suggestion |
|---|---|
| Verify that the server name appears and that it matches the server and service names. | Try PCONSOLE. (If you are using NetWare 4.0, use the F4 key to enter bindery emulation mode.) |
| 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 *Access Lists* on page 8-1 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 necessary, change the password on the ETS. Unless the passwords match, the ETS will not be able to log into file servers to scan for jobs. |
| Look for poor printing performance in general. | 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 *Access Lists* on page 8-1. |

## 8.6.2 NDS Print Queue Troubleshooting

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

1. To check that the print server has successfully attached to the queue, enter the **Netstat** command 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.

2. 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. Ensure that the tree and context are correct. The context should be where the print server object is located.

   The following are failure codes that may be displayed along with suggested remedies.

**Table 8-2:** NDS Printing Errors

| Bit | Failure Code Meaning | Remedy |
|---|---|---|
| 0 | OK. | None needed. |
| 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, 3 | Unexpected response from file 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 cannot attach to queue. | Check the NDS 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. |

The following errors may be received from the file server.

**Table 8-3:** NDS Errors from the File Server

| Code | Failure code meaning | Remedy |
|---|---|---|
| 0 | OK. | None needed. |
| fffffda7 | 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. |
| fffffda5 | 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. |
| fffffd69 | DS Database locked. | An administrator is probably updating the database. Wait a few minutes and issue the **Set Protocol NetWare Reset** command. |
| fffffd63 | Invalid password. | 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. |
| fffffd54 | Secure NCP violation. | The file server is probably requiring NCP packet signature, which is currently not supported. Turn down the NCP packet signature level so that it is not required from the server. |

**3** Reboot the print server to force it to rescan the NDS tree. If you have changed printer and queue setups, it may take a few minutes for the changes to propagate through the directory tree.

## 8.6.3 NetWare Host Troubleshooting

**Table 8-4:** NetWare Host Troubleshooting (Bindery Mode)

| Area to Check | Explanation |
|---|---|
| The server and queue names match the server and service name | Use PCONSOLE to check. |
| NetWare access table | Scanning too many file servers can cause a delay between jobs.Configure the access list to only scan for jobs on the file servers of interest. |

**Table 8-5:** NetWare Host Troubleshooting (NDS)

| Area to Check | Explanation |
|---|---|
| NetWare access table | By default, only local (non-routed) file servers are scanned for queues. |
| The login password on the Server and the queue password on the file server | The passwords must match or the Server will not be able to log into the file servers to scan for jobs. |
| The print server has successfully attached to the queue | Type **NETSTAT** at the Local> prompt. This will display information about fileservers, printers, and queues that the print server has found. If a queue is in JobPoll, the print server has successfully attached to the queue. |
| The DSTree, DSContext, and DSLicense | Type **Show Protocol NetWare NDS**. This command shows the tree and the context that you have configured, a failure code, and an NDS error code for each server.<br>DSTree is the directory service tree on which the print server is located. DSContext is the context where the print server is located; it must match the context on the file server (The DSContext must be of the following form: ou=fruit.0=exotic). DSLicensed should be *yes*. |
| Printer and queue changes have propagated through the NDS tree | It may take a few minutes for the changes to propagate. If the print server doesn't attach, reboot the server. |

**Table 8-6:** NDS Errors from the File Server

| Failure code | Failure code meaning | Remedy |
|---|---|---|
| 0 | Success | None. |
| 0xfffffda7 | 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. |
| 0xfffffda5 | 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. |
| 0xfffffd69 | DS Database is locked | An administrator is probably updating the database. Wait a few minutes and issue the **Set Protocol NetWare Reset** command. |
| 0xfffffd63 | The password is invalid | The password for the print server object under PCONSOLE must match the Server's login password. If the login password on the Server is left as the default (access), there should be no password for the print server object. |
| 0xfffffd54 | Secure NCP violation | Turn down the NCP packet signature level so that it is not required from the server. |

# 9: LAT Host Setup

The EZWebCon configuration software is the easiest way to configure the ETS. See your *Installation Guide* for more information on using the EZWebCon software.

**Note:** *A LAT license number, which can be obtained from your dealer or Lantronix, is required for all multi-port server units. You will not be able to use LAT functionality until you enter the license number and reboot the unit.*

Servers servicing LAT print queues must have the LAT protocol enabled (the default). To verify that LAT is enabled, enter the **List Protocols** command.

## 9.1 Printing from LAT

LAT print queues can print directly to a port or they can print to a service. Printing directly to a port requires no ETS configuration and is the recommended method. Refer to your LATCP documentation as you read the following sections. You will need system privileges to create and change LAT ports.

### 9.1.1 Printing to an Application Port

Most VMS applications that can use the ETS will require the setup of a LAT **application port**. This 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 2 on the ETS. The LAT port can be mapped to either a service or a specific port on the ETS.

To configure LAT on your VMS host machine so that users can connect to a remote port, use the LATCP program to create a new, unique port, then set it to the appropriate node and port name. Enter the following commands at the VMS system prompt:

**Figure 9-1:** Creating a LAT Application Port

```
$ RUN SYS$SYSTEM:LATCP
LCP> CREATE PORT LTAnnnn/APPLICATION
LCP> SET PORT LTAnnnn/node=servername/port=port_2
LCP> SHOW PORT LTAnnnn
LCP> EXIT
```

In the example above, the nnnn designation refers to any unused LAT port number; use the Show Ports command to see which port numbers are in use. Once the port has been created, VMS users can use port LTA*nnnn* to connect to the ETS. When the port is used as the target of an application, such as a print queue, a LAT connection with the service will be attempted.

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

To create and start a LAT queue using a LAT application port, enter the following command.

**Figure 9-2:** Creating and Starting the Queue

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

A print request would look like this:

**Figure 9-3:** Print Request

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

To connect to the Server service from the VMS host, use a command similar to the following:

**Figure 9-4:** Connecting From VMS Host

```
$ SET HOST/DTE lta45
```

#### 9.1.1.1 Other Setup Options

If heavy input or output loads are expected on the LTA port, you can set alternate type ahead to reduce flow control problems on the ports. Enter the following at the VMS prompt.

**Figure 9-5:** Set Term Command

```
$ SET TERM/PERM/ALTYPEAHD LTAnnnn
```

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 9-6:** Keeping Form Feeds

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

**Note:** *See your VMS documentation for more information about terminal characteristics.*

## 9.1.2 Printing to a Service

Printing using a LAT service requires the creation of three items: a LAT service on the ETS, a LAT device (application port) that references the print resource, and a print queue that uses the LAT application port

1. Set up the print service on the ETS as shown in the example below. See *Creating Services* on page 4-12 for an explanation of the ETS commands used to complete this task.

**Figure 9-7:** Sample Commands For Service

```
Local>> DEFINE SERVER NAME server1
Local>> DEFINE SERVICE printer1 LAT ENABLED
Local>> INIT DELAY 0
```

2. Create a LAT application port.

For example, if you want to create a new LAT device *LTA1234* that accesses print service **printer1** on the ETS named **server1** using VMS queue **remote_prq**, enter the commands shown in Figure 9-8.

**Figure 9-8:** Creating LAT Device

```
$ RUN SYS$SYSTEM:LATCP
LCP> CREATE PORT LTA1234/APPLICATION
LCP> SET PORT LTA1234/NODE=server1/SERVICE=printer1
LCP> EXIT
```

The ETS name must match the name in the **/Node** field in the LATCP **Set Port** command shown above. The service names specified must also match. In addition, you may want to use the following commands on the ETS to set up terminal characteristics for the print device.

**Figure 9-9:** Setting Up Terminal Characteristics

```
$ SET TERM/PERM/NOBROAD/FORM/WIDTH=132 LTA1234
```

**3** Create and start a VMS queue.

**Figure 9-10:** Creating and Starting VMS Queue

```
$ INIT/QUEUE/START/ON=LTA1234:/PROCESSOR=LATSYM/RETAIN=ERROR remote_prq
```

**4** Print to the queue.

**Figure 9-11:** Print Request

```
$ PRINT/QUE=remote_prq filename.txt
```

## 9.1.3 Printing PostScript

Using PostScript printers with LAT queues adds two extra steps to the host queue setup: creation of a PostScript form and a reset module. The reset module will contain the **Ctrl-D** (ASCII 0x4) that the printer needs to finish and eject the job.

**1** Create the PostScript form using the following commands where *formnum* is any unused form number.

**Figure 9-12:** Creating a PostScript Form

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

**Note:** *Use Show Queue/Form/All to see the form numbers that are currently in use.*

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

**2** Create the reset module (a file named a file named EOJ.TXT) using a text editor. Place a Ctrl-D in this file and insert it into the system device control library.

**Figure 9-13:** Creating Reset Module

```
$ library/replace sys$library:sysdevctl.tlb eoj.txt
```

3 If the system device control library does not exist, create it.

**Figure 9-14:** Creating a Control Library

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

4 Enter the **INIT/QUEUE** command to create the queue itself. Note the addition of the form specification and the reset module.

**Figure 9-15:** Creating a Print Queue

```
$ INIT/QUEUE/START/DEFAULT=(nofeed,noflag,form=POSTFORM)
/on=ltannn:/PROCessor=latsym/retain=error/separate=(reset=eoj) ETS_POST
```

5 Print to the queue.

**Figure 9-16:** Print Request

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

## 9.1.4 Printing Using DCPS Software

The DCPS software supplied by Digital requires a bidirectional data path. This is only available on the parallel port if the printer supports the Bitronics extensions to the Centronics interface.

**Note:** *Autoselecting printers must be locked into PostScript mode for DCPS to work correctly.*

## 9.1.5 Translating RLAT Jobs to RTEL

The ETS is able to translate RLAT jobs into RTEL jobs to another terminal server. The LAT host and local ETS should be on the same network, but the remote ETS to which the print device is attached needs only to be accessible via TCP/IP. This allows LAT print jobs to traverse a router-based network via TCP/IP that LAT itself would not otherwise be able to. The VMS host uses a print queue on a LAT device as usual, but the LAT device will have a destination port containing a capital “Q” followed by the name of the print service on the remote ETS. The destination port is really an environment string. See Environment Strings on page 2-15 for more information.

On the local ETS, create a virtual service mapping a LAT service to the remote ETS with the attached print device. When the VMS host forms an RLAT connection to this service on the local ETS, the local ETS will look at the destination port name and the service name and create an RTEL connection to the remote ETS. An example setup is displayed below.

**Figure 9-17:** Sample Service Setup

```
VMS> MCR LATCP CREATE PORT/APPL LTA5000
VMS> SET PORT LTA5000/NODE=LOCAL_ETS/SERVICE=REMOTE_ETS/PORT=QPRINTER
```

The above commands map the LAT application port LTA5000 on the VMS host so that it points to service remote_ets provided by the local ETS (local_ets), and tells the local ETS to connect to remote service printer. The “Q” preceding the service name tells the local ETS to use the RTEL protocol to connect to the remote service. On the local ETS, enter the following commands to create service remote_ets which will be used to connect to the remote ETS.

**Figure 9-18:** Creating the Service “remote_ets”

```
Local>> SET SERVICE “remote_ets” VIRTUAL ENABLED
```

On the remote ETS, enter the following commands:

**Figure 9-19:** Creating a Target Service

```
Local>> SET SERVICE printer PORT 2
Local>> DEFINE PORT 2 ACCESS DYNAMIC
Local>> LOGOUT PORT 2
```

Recall that service names are not case-sensitive.

The example above will create the target service on port 7 and configure it to accept network connections. The local ETS must be able to resolve the IP address of the remote ETS in order for the RTEL connection to work.

# 9.2 The ets$configd Download Server

The download server process must be installed if you plan to use the **Source** command or **Startupfile** option to download a configuration file into your ETS. It is also required for sending syslog information to a VMS host. The process runs on a VMS machine and waits for a download connection, then tries to download the requested file to the ETS.

Two steps are required to use the download server. First, the server code must be compiled on your VMS host. The code is written in C and should build on any VMS system. Second, the download process has to be started on the VMS machine either by hand or as part of the system startup.

To compile the download server, enter the following commands:

**Figure 9-20:** Compiling Download Server

```
VMS> cc ets$configd
VMS> link ets$configd,sys$input/opt
sys$share:vaxcrtl.exe/share <ctrl-z>
VMS> copy ets$configd.exe sys$startup
```

Then start the ets$configd server. The format for the command is shown in the following example.

**Figure 9-21:** Starting the ets$configd Server

```
VMS> @SYS$STARTUP:ETS$STARTUP cmd dir dev log
```

The parameters listed in the command are:

| | |
|---|---|
| **cmd** | Either Start, Show, or Stop. Start will create the server process, Show will show the process's current status, and Stop will kill the server process. |
| **dir** | The directory out of which the download files will be loaded. |
| **dev** | The LAT device, if different from the default LTA9777. |
| **log** | The name of the file to which status data from the server will be written. |

The configuration parameters must be specified in order, and cannot be left out unless you are ending the command line, as in the next example.

**Figure 9-22:** Syntax Example

```
VMS> @SYS$STARTUP:ETS$STARTUP START -
VMS>_ DUA0:[RAPIDPRINT] LTA5000:SYS$MANAGER:ETSLOG.DAT
```

You can use the VMS command Show System to ensure the download process started properly. To shut down the server process, enter the following command:

**Figure 9-23:** Shutting Down a Server Process

```
VMS> @SYS$STARTUP:ETS$STARTUP STOP
```

Managers can use the **Source** command on the ETS to attempt to download a configuration file and test the functionality of the download server before actually using the download file at boot time. See the Source entry in the Command Reference chapter for more details.

The ETS must be able to find the VMS host in order to utilize the download process. If the node limit on the ETS is set to zero, it may not be able to locate the VMS host. For downloading to work reliably, ensure that the ETS node limit is non-zero.

See **Set/Define Server Node Limit** on page 12-75 for more information on node limits.

# 9.3 Troubleshooting

## 9.3.1 VMS Printer Troubleshooting

If a remote print queue is not functioning properly, check the following items:

- Make sure that LAT is licensed on your ETS, if applicable. The LAT license number, obtained from your dealer or Lantronix, can be configured with the **Set/Define Protocols LAT License** command.
- Verify that the LTA*nnnn* device is mapped to the correct server and port/service name. Use the LATCP **Show Port LTAnnnn** command to see what server/service combination the LTA device is mapped to.
- Verify that the ETS name matches the information obtained via **Show Port LTAnnnn**.
- On your ETS, verify that the server and port/service names specified match the names obtained via **Show Port LTAnnnn**, and

- If using a service, verify that the service is available by issuing the following ETS command:

**Figure 9-24:** Show Service Command

```
Local> SHOW SERVICE service_name CHARACTERISTICS
```

The service port should be the port to which the printer is physically connected. The service rating should be non-zero to signal that the service is available. The ETS port should be configured for Remote or Dynamic access with the **Define Port Access** command.

- Verify that the LAT characteristic is enabled on the service.
- Verify that the port characteristics (such as baud rate, parity, and flow control) match the settings needed for the printer.
- Issue the following ETS command to see if the host is attempting to make a LAT connection:

**Figure 9-25:** Monitor Queue Command

```
Local> MONITOR QUEUE
```

When a job is active, a queue entry from the VMS host to the specified service should appear.

- As a last resort, connect a terminal to the port and see if data is appearing on the terminal when a print job is attempted. You can also try connecting to the service locally to see if the ETS is configured properly.

If the printer still does not function properly after verifying these conditions, contact Lantronix Technical Support for assistance.

## 9.3.2 VMS Host Troubleshooting

**Table 9-1:** VMS Host Troubleshooting

| Area to Check | Explanation |
|---|---|
| The ETS IP address and name are entered in the host file | Telnet to the ETS using the name in the host file and verify that the ETS name is resolvable and that the ETS is reachable via the network. |
| Jobs that appear in the host queue reach the ETS | From within the LPC administrative utility, enter the following commands to clear and reset the host queue: abort queue_name, clean queue_name, enable queue_name, and start queue_name.<br>Then kill the currently executing daemon, remove all old entries in the queue, enable the queue to accept new entries, and restart job processing. |

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 commands in Figure 9-26.

**Figure 9-26:** Translating LAT Error Codes to Text

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

**Table 9-2:** Configuring LAT on VMS Host Using Port Name

| Area to check | Explanation |
|---|---|
| The specified node name matches the server's node name | Use the Show Server command. |
| The specified port name matches the port's name | Use the **List Port 2** command. |

If a connection attempt has been unsuccessful when initially configuring a LTA device, the LAT host software may become confused. Deleting and re-creating the LTA port is often required to successfully connect to the ETS.

**Table 9-3:** Configuring LAT on VMS Host Using a Service

| Area to check | Explanation |
|---|---|
| The specified node name matches the server's node name | Use the Show Server command. |
| The service name used matches the configured service name | Use the Show Service Local Characteristics command. |
| The service is available | Use the Show Service Local Characteristics command from a network login. If the service rating is zero, the parallel port is in use. |

**Table 9-3:** Configuring LAT on VMS Host Using a Service, cont.

| Area to check | Explanation |
|---|---|
| The LAT characteristic has been enabled on the service | Use the Show Service Local Characteristics command from a network login. |
| LAT licensing | 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. |
| The LAT symbiont is specified as the queue process on the VMS host | Use the VMS command Show Queue/Full queue_name to see the queue characteristics. |
| For DCPS: there is a bidirectional path to the printer and 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. |

# 10: AppleTalk Host Setup

The EZWebCon configuration software is the easiest way to configure the ETS. See your Installation Guide for more information on using the EZWebCon software.

The following sections cover command line print configuration for AppleTalk hosts.

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

## 10.1 Configuration

An ETS servicing AppleTalk print queues must have the AppleTalk protocol enabled (the default). To verify that AppleTalk is enabled, enter the **List Protocols** command.

The ETS advertises its attached printers as LaserWriters. The ETS and its printers can be assigned to a specific zone with the **Define Protocols AppleTalk Zone** command.

**Figure 10-1:** Specifying a New AppleTalk Zone for the Printer

```
Local>> DEFINE PROTOCOLS APPLETALK ZONE “Accounting”
```

Since printers attached to the ETS aren’t directly connected to the network, any programs or utilities that attempt to modify their AppleTalk settings will fail. The ETS controls all AppleTalk parameters, such as zone name and job time-outs, so modifying these settings on the printer itself will have no effect. Changes to the printer’s serial port will need to be reflected in the ETS port settings as well.

### 10.1.1 Bitronics Interface

Printing from a Macintosh requires bidirectional PostScript data flow. Serial ports are inherently bidirectional, but not all parallel ports are. For that reason, Lantronix ETS units support the Bitronics interface created by Hewlett-Packard (IEEE 1284 nibble mode). This interface is an extension to the standard Centronics interface. Printers that support Bitronics allow bidirectional communication via the parallel port. To enable Bitronics on an ETS parallel port, use the following commands:

**Figure 10-2:** Enabling Bitronics Mode

```
Local>> DEFINE PORT 2 BITRONICS ENABLED
Local>> LOGOUT PORT 2
```

If the PostScript printer attached to the ETS can not provide interactive responses to the printing host, AppleTalk printing will fail. Macintoshes typically require responses to PostScript queries sent to the printer.

**Note:** *Bitronics mode must be supported by and enabled on the printer. For the HP LaserJet 5, enabled the ADV FNCTNS option in the parallel menu.*

### 10.1.2 Macintosh Service Configuration

To print from a Macintosh:

1. Create a service and enable both AppleTalk and PostScript. Figure 10-3 shows a parallel service named ets_prt.

**Figure 10-3:** Enabling AppleTalk and PostScript on a Service

```
Local>> DEFINE SERVICE ets_prt APPLETALK ENABLED POSTSCRIPT ENABLED
```

2. 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.
3. Locate your ETS printing service in the **Chooser**. Select it and complete the appropriate setup options.
4. Close the **Chooser** window.
5. Print a test page to verify that the print service is working.

## 10.2 Printing from a Macintosh

### 10.2.1 Using AppleTalk on UNIX or VMS

If you are using third-party software that provides AppleTalk for UNIX or VMS, the ETS services should be visible like any other AppleTalk printer, and print queues should be able to access the ETS as any other AppleTalk printer. Due to the variety of software packages and their configurations, setup details cannot be shown here—refer to your local documentation for details. Note that native UNIX and TCP/IP printing methods such as lp and lpr are generally easier to set up and administer than non-native AppleTalk printing methods, and should be used whenever possible.

### 10.2.2 Using LaserPrep

The LaserPrep application reduces the size of print jobs and therefore saves bandwidth. All Macintoshes printing to the ETS must be running the same version of LaserPrep, otherwise print jobs can be lost. Reloading the LaserPrep file repeatedly can prevent jobs from printing reliably.

### 10.2.3 Printing Bitmap Graphics

When printing bitmap graphics, ensure that the laser printer being used is configured to use 8-bit characters so that the bitmaps print legibly. Many printers are set to use 7-bit serial characters by default.

Files containing embedded bitmap graphics may not print correctly even if the text surrounding the graphics does. This is because the bitmaps are actually binary data in this case, and 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're using does not have this provision, contact the application vendor to see if there is an upgrade patch that adds this functionality.

# 10.3 Troubleshooting Macintosh Printing

AppleTalk printing is easy to set up, but can be hard to debug. Since the Macintosh is expecting PostScript replies from the print device, you cannot just attach a terminal to the ETS and watch the output. Also, there is no way to "connect" to the ETS port and talk to the printer via AppleTalk—you need to do so via LAT or Telnet.

## 10.3.1 General Troubleshooting

Table 10-1 shows a few common problems that you may encounter. When possible, try to get an error message from the printer to track down the problem (see *Error Messages* on page 10-4).

**Table 10-1:** Troubleshooting Macintosh Printing

| Problem | Possible Cause | Explanation/Remedy |
|---|---|---|
| Special characters or bitmaps don't print correctly. | The printer is configured for 7-bit characters rather than 8-bit. | Use the **Set/Define Port Character Size** command to change the character size to 8-bits. |
| The print job doesn't print. | The printer is listening to the wrong port (for example, it may be listening to the serial port when the job is coming from LocalTalk). | Examine the banner page printed at the start of the print job, if any. It will typically tell whether the printer is listening to LocalTalk or the serial port or both, and will show the serial settings. Also watch the input/output counters in the Show Port Counters display.<br><br>A printer set to LocalTalk will not send errors, replies, or acknowledgments to the ETS. However, a serial line analyzer could be used to view this information. Typically DIP switches are used to force the printer to use the serial port. |
| The print job doesn't print | The printer is not receiving data. | Most printers blink an LED as they receive data to show that they are getting something from the ETS/ Macintosh. If the LED is not blinking, try to get an error message from the printer (see *Error Messages* on page 10-4).<br><br>When the job is finished and the printer is idle, the LED is typically solidly lit. |

**Table 10-1:** Troubleshooting Macintosh Printing, cont.

| Problem | Possible Cause | Explanation/Remedy |
|---|---|---|
| Unreadable error message on the printer, or serial errors on the Show Port Counters display. | The baud/parity settings don't agree. | Many printers can be configured via PostScript as well as by switches on the printer itself. PostScript configuration takes precedence over the switches. If you are unsure of the current saved setup, check your printer manual for a way to force the printer to obey the switch settings. This typically involves switching the printer to LocalTalk mode for a minute and then back to serial mode. |
| A readable error that says something like "Unknown command <characters>." | There may be a flow control problem. | If the ETS never sees the printer flow control, it may overrun the printer buffer resulting in corrupt data.<br>Many printers can be configured via PostScript as well as by switches on the printer itself. If you are unsure of the current saved setup, check your printer manual for a way to force the printer to obey the switch settings. This typically involves switching the printer to LocalTalk mode for a minute and then back to serial mode. |
| The first print job prints fine, but other print jobs are garbled or lost. | The printer cannot distinguish between jobs. | Make sure PostScript is enabled on the ETS service—this ensures that the ETS will not start a new job before the last job is finished. It will force a Ctrl-D to the printer before beginning a new job, and wait for an acknowledgment before continuing. |

**Note:** *See your printer's documentation for more information on printer configuration and any printer-specific errors.*

### 10.3.1.1 Error Messages

Macintosh print spoolers (for example, PrintMonitor or LaserSpool) typically report errors, possibly via a "distressed printer" icon in the upper right part of the screen. If you see a similar indication on your screen, open the spooler window and check for an error message from the printer.

If you can connect to the printer service on the ETS via LAT or TCP/IP, try typing some keys to the printer and pressing Return. The printer will typically respond with a PostScript error message like that shown in the following figure.

**Figure 10-4:** PostScript Error Message

```
%% Unknown command <typed text>.
%% Flushing to end of job.
```

If the message is legible, the printer is apparently receiving and sending data correctly. Press **Ctrl-D** to signal the end of job (and clear the error condition), and then disconnect from the service without typing any more data.

**Note:** *Be sure to check that any serial adapters conform to the pinouts shown in your Installation Guide.*

It is also possible to connect to the service port via the Connect Local command.

**Figure 10-5:** Connecting to a Local Service Port

```
Local>> Connect Local
```

## 10.3.2 Host Troubleshooting

**Table 10-2:** AppleTalk Host Troubleshooting

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

# 11: LAN Manager Host Setup

The EZWebCon configuration software is the easiest way to configure the ETS. See your *Installation Guide* for more information on using the EZWebCon software.

**Note:** *The ETS must be added as a Windows NT printer before it can accept print jobs from a Windows NT host.*

An ETS servicing LAN Manager print queues must have the LAN Manager protocol enabled (the default). To verify that LAN Manager is enabled, enter the **List Protocols** command.

## 11.1 Printing Methods

Command line users can configure the ETS to use the Berkeley remote LPR software. See *LPR on Windows NT 3.5.1 (and later)* on page 7-4 for LPR configuration instructions. The following sections cover DLC and NetBIOS protocol configuration for Windows NT hosts.

**Note:** *There are also third-party LPR implementations; contact Lantronix Technical Support for more information.*

### 11.1.1 DLC

To use the DLC protocol, you must associate the DLC characteristic with a service.

**Figure 11-1:** Enabling DLC

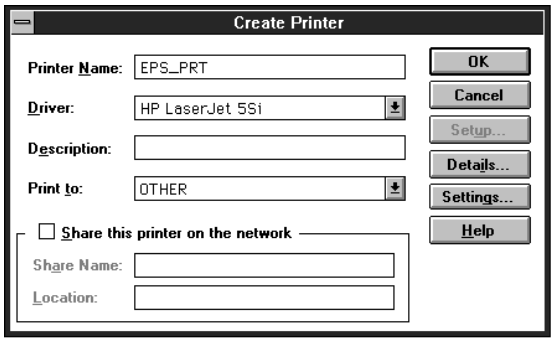
```
Local>> SET SERVICE NTX DLC ENABLED PORT 2
```

Open the NT Print Manager; its icon is located in the Main window of the Windows Program Manager. If the printer driver isn't already installed, you will need to install it from your Windows NT installation disks.

To create a printer to use with DLC, complete the following steps.

1 From the Printer menu, choose **Create Printer**.

**Figure 11-2:** Create Printer Dialog Box



2 In the **Printer Name** box, enter a printer name of up to 32 characters.

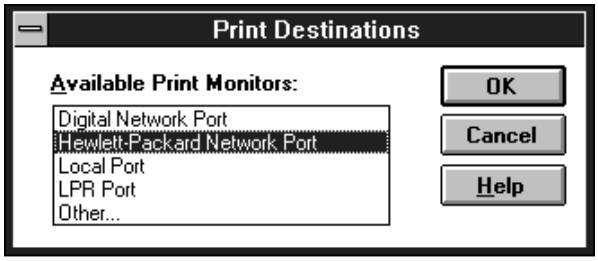
3 In the **Driver** box, select **Other** to install a printer driver, then select the desired printer driver from the pull-down menu.

4 Enter a description string in the **Description** box.

5 If applicable, choose the **Share this printer on the network** option. (This is not recommended until the print queue is confirmed to be running properly.)

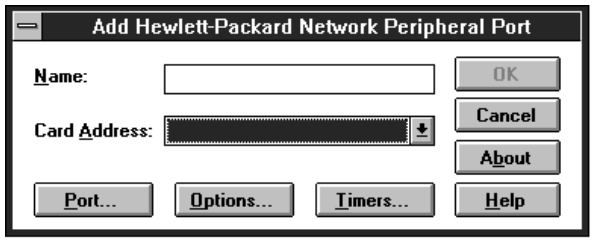
6 In the **Print To** box, scroll to the **Other** option. The following dialog box will appear:

**Figure 11-3:** Print Destinations Dialog Box




7 Choose **Hewlett Packard Network Port** and click **OK**. The following dialog box will appear:

**Figure 11-4:** Hewlett Packard Network Port Dialog Box

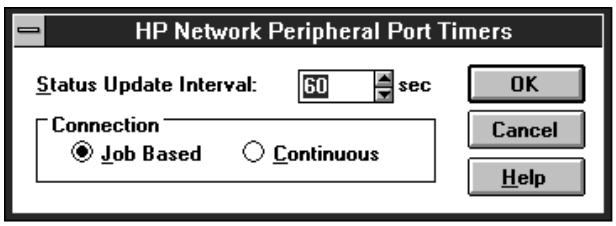



All known DLC nodes will be listed in the **Card Address** box.

8 Select the ETS hardware address. Enter a name to be associated with this address in the **Name** box.

9 Click the **Timers** button. The following dialog box will appear:

**Figure 11-5:** Timers Dialog Box

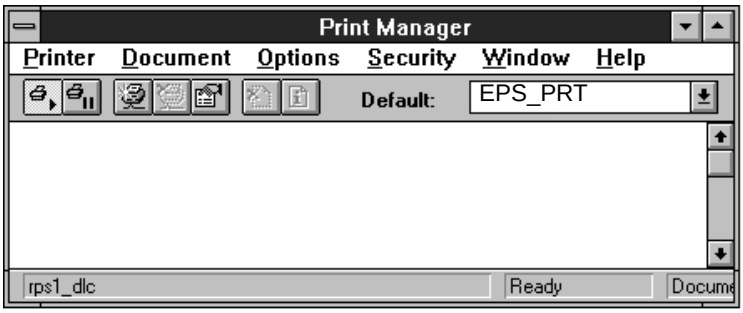



10 Click the **Job Based** radio button and click **OK**.

**11** Click the **OK** button in the remaining print dialog boxes to return to the **Print Manager** dialog.

**12** If you'd like this printer to be the default printer, click on the **Default** pop-up menu and scroll to the printer's name.

**Figure 11-6:** Print Manager Window




**13** The printer is now ready to accept jobs.

# 11.1.2 NetBIOS

To install NetBIOS, first create a service with LAN Manager enabled. In the example below, we've also used the **Set/Define Server Name** command to give the ETS a name.

**Figure 11-7:** Enabling LAN Manager

```
Local_1>> SET SERVER NAME GRAPHICSERVER
Local_1>> SET SERVICE NTX LANMANAGER ENABLED PORT 2
```

## 11.1.2.1 Redirecting a Port

Redirecting allows a user to use a service on the ETS as if the ETS serial or parallel port were on the host machine.

To print from NetBIOS, you will need to redirect a port:

**1** Choose one of the lpt ports to redirect (typically the ports to choose from will be lpt1 through lpt4). Make sure that the chosen port doesn't currently have a printer connected to it.

**2** Double-click the DOS Command Prompt icon to open a DOS session.

**3** At the DOS prompt, issue the **Net Use** command to indicate that the lpt port will be redirected to the ETS service. In the example below, **GRAPHICSERVER** is the name of the ETS and **NTX** is the name of the service.

**Figure 11-8:** Net Use Command

```
C:> NET USE LPTn: \\GRAPHICSERVER\NTX
```

**4** The Windows NT node will attempt to connect to the ETS; if it cannot do so, it will inform you of the problem. At this point, all references to LPT*n* (the port specified with the NET USE command above) will go to the service that you created. For testing purposes, you can try to use a copy command.

5 To make the lpt redirect permanent, enter the following command.

**Figure 11-9:** Making Redirect Permanent

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

When the host is rebooted, it will automatically attempt to connect to the ETS.

### 11.1.2.2 Printing from NetBIOS

Follow these steps to print from NetBIOS.

1 Exit the MS-DOS shell.

2 Open the NT Print Manager; its icon is located in the Main window on the desktop.

3 Choose **Create Printer** from the **Printer** menu (see Figure 11-2 on page 11-1).

4 In the **Printer Name** box, enter the name of the queue on the NT host.

5 Click the **Driver** menu arrow; select the required printer driver from the pull-down menu.

6 Enter a description string in the **Description** box.

7 Click the **Print To** menu arrow to view its pull-down menu, and select the lpt port you wish to redirect. Click the **OK** button in each print dialog displayed.

**Note:** *Windows NT versions prior to 3.51 do not ship with a basic text-only printer driver. If you wish to print to a terminal for testing purposes, you'll need to use some type of line printer driver and will see the embedded print codes.*

8 If you'd like this printer to be the default printer, click on the **Default** pop-up menu in the **Print Manager** dialog and scroll to the printer's name (see Figure 11-6 on page 11-3).

# 11.2 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 print jobs, forcing you to abort or retry.

  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.

  On some versions of Windows NT, editing the timeout period does not actually change the 45 second timeout period. If you are unable to change your timeout period, try using LPR instead.

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

# 12: Command Reference

## 12.1 Overview

This chapter describes the ETS command set. Each command and its syntax is shown, as well as whether or not the command is restricted to the privileged user.

> **Note:** *See Set Privileged/Noprivileged on page 12-56 for information on changing your port to privileged status.*

The following conventions are used in the syntax diagrams of this chapter:

- **Bold type** denotes command keywords, which may be entered in upper, lower, or mixed case.
- *Italics* signal a user-supplied parameter, such as a particular port number or host name. Replace the italicized word with an entry that corresponds to your setup.

  To preserve case and spaces, user-entered parameters must be enclosed in quotes.
- Brackets **[ ]** denote optional parameters. Multiple optional parameters from each set of brackets can be entered in any order or combination on a single command line, or items in brackets may be left out of the command entirely.
- Curly braces **{ }** indicate that one and only one of the items enclosed within each set of braces must be used to complete the command.

## 12.2 Command Line Interface

Command line entry is both simple and powerful. Users can enter up to 132 characters on a command line, or abbreviate commands to a sequence of the smallest unique keywords (sometimes single characters). Commands are executed when the Return key is pressed or when the command line exceeds 132 characters.

### 12.2.1 Command Completion

When the command completion feature is enabled, pressing the Tab key or the space bar will prompt the ETS to complete a partially-typed command for you, which can both save time and reduce errors. If the user-entered characters are ambiguous, the ETS will alert you with a beep. Command completion is disabled by default.

> **Note:** *See Set/Define Port Command Completion on page 12-33 for details.*

## 12.2.2 Command Line Editing

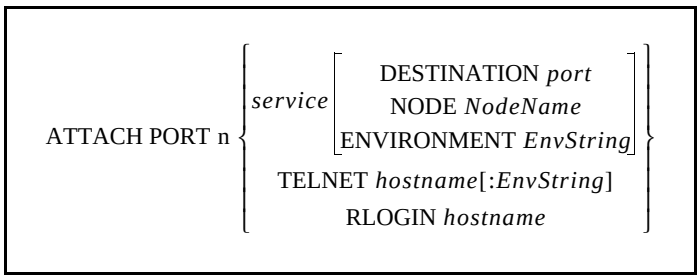
Table 12-1 lists the special keys used for command line editing.

**Table 12-1:** Line Editing Keys

| Key | Purpose |
|---|---|
| Return | Executes the current command line |
| Delete | Deletes the character before the cursor |
| Ctrl-A | Toggles insert/overstrike modes. Overstrike is on by default. |
| Ctrl-D | Logs out of the ETS |
| Ctrl-E | Moves cursor to end of line |
| Ctrl-H or Backspace | Moves cursor to the beginning of the line |
| Ctrl-R | Re-displays the current command |
| Ctrl-U | Deletes the entire current line |
| Ctrl-Z | Logs out of the ETS |
| Left Arrow | Moves cursor left |
| Right Arrow | Moves cursor right |
| Up Arrow or Ctrl-P | Recalls the previous command |
| Down Arrow or Ctrl-N | Recalls the next command |
| !*text* <Return> | Recalls command starting with text |
| !! <Return> | Recalls and executes the last command |

**Note:** *Line editing is disabled on Hardcopy ports.*

# 12.3 Attach Port




Forces a connection from a ETS port to a LAT or Telnet service. Attach is similar to the Connect command, except that Connect works with the port your terminal is attached to; Attach works with a different port.

**Applies To** EPS4, ETS4P, ETS8, ETS8P, ETS16, ETS16P

**Restrictions** You must be the privileged user to use this command.

**Parameters**

**n**
Specify which ETS port to use for the connection. Logged-in and virtual ports cannot be Attached.

**service**
Specifies a dedicated LAT service to be used for the connection. The optional parameters can be used in any combination, and multiple parameters can be included in one command line.

**Node NodeName**
Specifies a connection to a particular node on the dedicated host. This is desirable when more than one node offers the same service.

**Destination port**
Specifies a connection to a particular port on the dedicated host.

**Environment EnvString**
Sets up the connection environment before the session is started. The string is constructed with a sequence of key letters, some of which are prefaced by either "+" or "-." The generic key letters are:

**Table 12-2:** Environment Strings

| Letter | Action |
|---|---|
| D | Backspace Mode (+D) or Delete Mode (-D) |
| E | Local Echo Mode (+E) or Remote Echo Mode (-E) |
| I | Interactive Mode |
| P | Passall Mode (+P) or Passthru Mode (-P) |
| C | CR becomes CRLF (+C) or CR becomes LF (-C) |
| T | TCP Mode, raw uninterpreted data stream |
| R | Rlogin protocol, sets port number to 513 if not already set |
| U | UDP protocol |
| Q | Queued (RTEL) connection to the target |
| nnn | optional port number |

**Telnet hostname**
Specify a Telnet host to use for the connection. Either a text host name or an IP address can be used. Environment strings can be added.

**Rlogin hostname**
Specifies an Rlogin connection to the specified Telnet host.

**Examples**

```
Local> ATTACH PORT 2 fileserver NODE opus DES port_2
```

**See Also**

Connect, page 12-9; Set/Define Port Dedicated, page 12-34; *Environment Strings*, page 2-15.

# 12.4 Backwards

BACKWARDS

Switches from the current session to the last session accessed. Repeating the command will cycle you backward in time through the active sessions, which can be viewed with the Show Sessions command. If the Backwards command is issued from the first (earliest) session in the session list, the last (most recent) session is resumed.

**Applies To** EPS4, ETS4P, ETS8, ETS8P, ETS16, ETS16P

**Errors** Backward has no effect if there is only one session, and an error is displayed if no sessions are active.

**See Also** Forwards, page 12-13; Set/Define Port Break, page 12-31; Show/Monitor Sessions, page 12-111; *Session Management*, page 6-7.

# 12.5 Bg

BG

Bg is functionally equivalent to the Backwards command (see above). It is provided for UNIX compatibility.

# 12.6 Broadcast

BROADCAST { ALL | PORT *number* | username } message

Sends a message to one port, all ports, or a particular user on the ETS. This command can only be used if broadcasts have been enabled on the ETS. The sender will be notified if a message is not received.

**Applies To** EPS4, ETS4P, ETS8, ETS8P, ETS16, ETS16P

**Restrictions** You must be the privileged user to use the All parameter.

**Errors** An error will result if the destination port is flow controlled, the ETS does not have broadcast enabled, or the destination session is set to Passthru or Passall mode.

**Parameters**

**All**
The broadcast is sent to all ports.

**Port number**
The broadcast is sent to the single specified port.

**username**
The broadcast is sent to any port that is logged in with the specified username. If multiple users on different ports specify the same username, the message will be sent to all of them.

**message**
One word, or several words enclosed in quotes. If quotes are used, the message will be sent exactly as typed, otherwise it will be sent in uppercase. Message length is limited to the length of the command line (132 characters) minus the command keywords and spaces that are typed before the message.

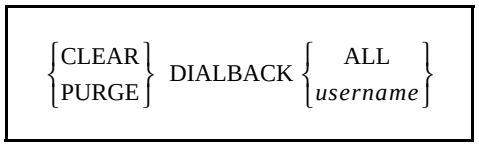
**Examples**

```
Local> BROADCAST PORT 7 “Ready for lunch?”

Local> BROADCAST Fred “Meeting in 10 min”
```

**See Also** Set/Define Port Broadcast, page 12-32; Set/Define Server Broadcast, page 12-63.

# 12.7 Clear/Purge Commands

## 12.7.1 Clear/Purge Dialback




Clears a dialback setting for a particular username, or for all usernames.

**Applies To** EPS4, ETS4P, ETS8, ETS8P, ETS16, ETS16P

**Restrictions** You must be the privileged user to use the All parameter.

**Errors** Clear Dialback will return an error if the specified username isn’t found, or if All is specified and no entries are configured.

**Examples**

```
Local> PURGE DIALBACK “robert”

Local> CLEAR DIALBACK ALL
```

**See Also** Set/Define Port Dialback, page 12-36; Show/Monitor/List Dialback, page 12-100; *Dialback*, page 5-11.

## 12.7.2 Clear/Purge Hosts

This is not a valid command. See Clear/Purge Telnet Hosts on page 12-8.

## 12.7.3 Clear/Purge IPsecurity


Removes an entry, or all entries, from the IP security table.

**Applies To** EPS4, ETS4P, ETS8, ETS8P, ETS16, ETS16P

**Restrictions** You must be the privileged user to use this command.

**Errors** Clear IPsecurity will return an error if the specified entry isn't found, or if All is specified and no IP security entries have been configured.

**Parameters**

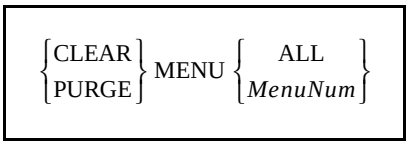
**IPaddress**
Clears a particular entry from the IPsecurity table.

**Examples**

```
Local> PURGE IPSECURITY 192.0.1.255

Local> CLEAR IPSECURITY ALL
```

**See Also** Set/Define IPsecurity, page 12-23; Show/Monitor/List IPsecurity, page 12-100; *IP Security Table*, page 4-16.

## 12.7.4 Clear/Purge Menu




Removes an entry, or entries, from the menu used in menu mode.

**Applies To** EPS4, ETS4P, ETS8, ETS8P, ETS16, ETS16P

**Restrictions** You must be the privileged user to use this command.

**Parameters**

**MenuNum**
Remove a specific menu entry by number. To view menu entries, enter the Show Menu command.

**Examples**

```
Local> CLEAR MENU ALL

Local> CLEAR MENU 2
```

**See Also** Set/Define Menu, page 12-26; Show/Monitor/List Menu, page 12-101; *Menu Mode*, page 5-14.

## 12.7.5 Clear/Purge Protocol NetWare Access


Clears one or more of the currently specified entries in the NetWare access list.

**Applies To** EPS4, ETS4P, ETS8, ETS8P, ETS16, ETS16P

**Restrictions** You must be the privileged user to use this command.

**Errors** An error is returned if the entry isn't found or if no entries are configured.

**Parameters**

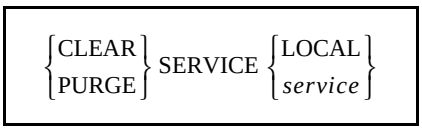
**fileserver**
Removes only the specified entry from the NetWare access list.

**Examples**

```
Local> PURGE PROTOCOL NETWARE ACCESS ALL

Local> CLEAR PROTO NET ACC LAB_FS4
```

**See Also** Set/Define Protocols NetWare Access, page 12-59; Show/Monitor/List Protocols, page 12-104; *NetWare Access Lists*, page 4-4; *Access Lists*, page 8-1.

## 12.7.6 Clear/Purge Service




Removes a defined service from the ETS. The login service can not be deleted via the Clear/Purge commands—you must use **Set/Define Server Incoming** to remove them.

**Applies To** EPS4, ETS4P, ETS8, ETS8P, ETS16, ETS16P

**Restrictions** You must be the privileged user to use this command.

**Errors** Clear Service fails when there are sessions connected to the service or when there are connect requests in the service's queue. These conditions can be eliminated with the **Logout Port** and **Remove Queue** commands.

**Parameters**

**Local**
Removes the definitions of all local services.

**service**
Removes the definition of the specified service.

**Examples**

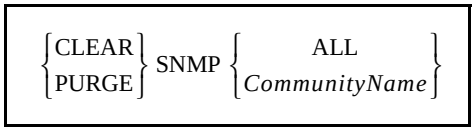
```
Local> CLEAR SERVICE LOCAL

Local> CLEAR SERVICE fileserver
```

**See Also** Set/Define Service Commands, starting on page 12-84; Show/Monitor/List Services, page 12-111; *Creating Services*, page 4-12.

## 12.7.7 Clear/Purge SLIP

Clear SLIP is not a valid command. See Purge SLIP on page 12-18.

## 12.7.8 Clear/Purge SNMP




Removes entries from the SNMP security table.

**Applies To** EPS4, ETS4P, ETS8, ETS8P, ETS16, ETS16P

**Restrictions** You must be the privileged user to use this command.

**Parameters**

**All**
Removes all table entries.

**CommunityName**
Enter a community name of up to 16 alphanumeric characters. The ETS generally allows multiple community names.

**Examples**

```
Local> CLEAR SNMP public
```

**See Also** Set/Define SNMP, page 12-98; Show/Monitor/List SNMP, page 12-112; *Simple Network Management Protocol (SNMP)*, page 2-13.

## 12.7.9 Clear/Purge Telnet Hosts


Removes a TCP/IP host entry from the ETS table of known hosts. If the cleared host was seen through the rwho facility, it will reappear as soon as that machine broadcasts again. A host will also reappear if a user connects to it.

**Applies To** EPS4, ETS4P, ETS8, ETS8P, ETS16, ETS16P

**Restrictions** You must be the privileged user to use this command.

**Errors** Clear Hosts will fail if there are active Telnet connections on the ETS.

**Parameters**

**HostName**
Removes only the specified host.

**All**
Removes all entries from the host table.

**Examples**

```
Local> CLEAR HOSTS "alex"
```

**See Also** Set/Define Telnet Hosts, page 12-99; Show/Monitor/List [Telnet] Hosts, page 12-113; *Telnet*, page 2-8.

# 12.8 Close

See Disconnect on page 12-12.

# 12.9 Cls

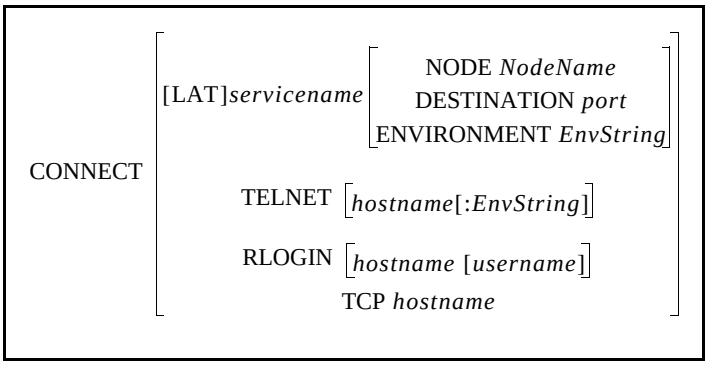
CLS

Clears the screen on your terminal device if the port is configured as Type ANSI.

**Applies To** ETS4P, ETS8, ETS8P, ETS16, ETS16P

**See Also** Set/Define Port Type, page 12-54.

# 12.10 Connect




Establishes a session with a LAT service or TCP/IP host. If no service or hostname is specified, a connection to any preferred service or host is attempted. A session environment string can be added to the connect request (refer to Environment Strings on page 2-15). A colon and port number can also be added to the hostname for TCP/Telnet/Rlogin sessions; in this case the specified port number will be used for the connection.

**Applies To** EPS4, ETS4P, ETS8, ETS8P, ETS16, ETS16P

**Parameters**

**[LAT] servicename**
The LAT option is provided for cases where a LAT service happens to be named Telnet or Rlogin. Otherwise, the service name would be used as a command keyword.

**Node NodeName**
In the case where more than one node offers the same LAT service, a particular node can be specified. Otherwise, the node offering the service with the highest rating will be accessed.

The optional LAT parameters can be used in any combination, and multiple parameters can be included in one command line.

**Destination port**
In the case where more than one port offers the same LAT service, a particular port name can be specified. Otherwise, the node offering the service with the highest rating will be accessed.

**Environment EnvString**
Sets up the connection environment before the session is started. The string is constructed with a sequence of key letters, some of which are prefaced by either "+" or "-." The generic key letters are:

**Table 12-3:** Environment Strings

| Letter | Action |
|---|---|
| D | Backspace Mode (+D) or Delete Mode (-D) |
| E | Local Echo Mode (+E) or Remote Echo Mode (-E) |
| I | Interactive Mode |
| P | Passall Mode (+P) or Passthru Mode (-P) |
| C | CR becomes CRLF (+C) or CR becomes LF (-C) |
| T | TCP Mode (raw uninterpreted data stream) |
| R | Rlogin protocol (sets port number to 513 if not already set) |
| U | UDP protocol |
| Q | Queued (RTEL) connection to the target |
| nnn | optional port number |

**Local**
A shorthand method for connecting to a local port without having to create a service. This method works only for local port connections. Check to make sure this is still valid.

**Telnet hostname**
Specify a Telnet host to use for the connection. Either a text host name or an IP address can be used. Note that environment strings can be added.

**Rlogin hostname**
Enter a text host name or IP address for the connection.

**TCP hostname**
Creates a raw TCP connection to the host (no Telnet data interpretation is performed).

**Examples**

```
Local> CONNECT

Local> CONNECT LOCAL

Local> CONNECT vax6 ENVIRON +e

Local> CONNECT wampum NODE opus DESTINATION port_2

Local> CONNECT RLOGIN 145.34.35.14

Local> CONNECT TELNET 145.34.35.11:245

Local> CONNECT TCP labsun
```

**See Also** Attach Port, page 12-2; Set/Define Port Preferred, page 12-46; *Environment Strings*, page 2-15.

# 12.11 Crash 451

CRASH 451

**Immediately** reboots the ETS. All users are logged off and sessions are disconnected. If upline dumping is enabled, the ETS generates a dump file on the VMS load host before rebooting.

**Applies To** EPS4, ETS4P, ETS8, ETS8P, ETS16, ETS16P

**Restrictions** You must be the privileged user to use this command.

**See Also** Initialize, page 12-14; *Rebooting the Server*, page 3-6.

# 12.12 Define

Define is equivalent to Set, but Define changes the permanent characteristics of ports, servers, and services. Define Port and Define SLIP settings do not take effect until after the current user logs out. Define Server, Define Telnet Host, and Define Service settings remain unchanged until the ETS is rebooted. To make a permanent change that takes effect immediately, you must enter both a Define and a Set command with the same parameters. All Define commands are documented together with their corresponding Set commands later in this chapter.

# 12.13 Disconnect


Terminates the current session (if no parameters are added), the specified session, or all sessions.

**Applies To** EPS4, ETS4P, ETS8, ETS8P, ETS16, ETS16P

**Examples**

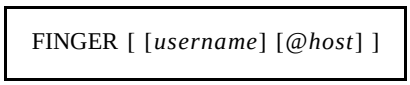
```
Local> DISCONNECT

Local> DISCONNECT SESSION 3
```

**See Also** Attach Port, page 12-2; *Session Management*, page 6-7.

# 12.14 Fg


Fg is functionally equivalent to the **Finger** command. It is provided for UNIX compatibility.

# 12.15 Finger




This command is an implementation of the UNIX Finger command that shows local and remote users. The finger command by itself will show the ports on the ETS.

**Applies To** EPS4, ETS4P, ETS8, ETS8P, ETS16, ETS16P

**Errors** An error is displayed if the host cannot be accessed.

**Parameters**

**username**
Shows information about user *username* on the ETS.

**username@host**
Shows information regarding user *username* on the specified TCP/IP host.

**@host**
Shows all users currently connected to the specified TCP/IP host.

**Note:** *To see a list of processes running on the ETS, use the command "finger finger."*

**Examples**

```
Local> FINGER

Local> FINGER bob

Local> FINGER @hydra

Local> FINGER bob@hydra

Local> FINGER FINGER
```

**See Also** Show/Monitor Users, page 12-113.

# 12.16 Forwards

FORWARDS

Switches from the current session to the next session in the session list. Repeating the command will cycle you forward in time through the active sessions, which can be viewed with the Show Sessions command. If the Forwards command is issued from the last (most recent) session in the session list, the first (earliest) session is resumed.

**Applies To** EPS4, ETS4P, ETS8, ETS8P, ETS16, ETS16P

**Errors** Forward has no effect if there is only one session, and an error is displayed if no sessions are active.

**See Also** Set/Define Port Break, page 12-31; Set/Define Port Forward, page 12-40; Set/Define Port Local, page 12-41; *Backwards and Forwards*, page 6-7.

# 12.17 Help

HELP [*command* [*parameter*] ]

Lets you access the online Help system. Enter **Help** with no parameters to see a list of all available commands.

**Applies To** EPS4, ETS4P, ETS8, ETS8P, ETS16, ETS16P

**Restrictions** The help processor only shows the help text for the commands that the user is privileged to use. To see all help text, become the privileged user.

**Parameters**

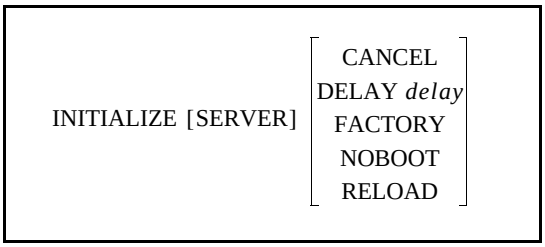
**command**
Gives general information about the command, and lists any parameters.

**parameter**
Gives more specific information about the command and parameter, and lists any sub-parameters. Several parameters can be specified, provided they are listed in the proper hierarchical order.

**Examples**

```
Local> HELP DEFINE SERVER BROADCAST
```

# 12.18 Initialize




Resets the ETS or cancels a pending Initialization. When reset, the ETS loses all changes made using Set commands unless corresponding Define or Save commands were also entered.

**Note:** *Initialization options can be used in any order or combination.*

**Applies To** EPS4, ETS4P, ETS8, ETS8P, ETS16, ETS16P

**Restrictions** You must be the privileged user to use this command.

**Parameters**

**Cancel**
Cancels any impending Initialize command. Cancel and Delay cannot be used together.

**Delay**

Schedules the Initialize after a specified number of minutes (the range is 0-120 minutes). Show Server Status will show the time pending until a scheduled reboot.

**Factory**
Causes the ETS to reload the factory settings. In addition to Set configurations, all Saved and Defined settings will be cleared.

**Note:** *A Factory Init clears all settings not enabled by default, including NDS and LAT licensing. After the initialization, you will have to re-enter the licenses.*

**Noboot**
Forces the ETS to remain in the Boot Configuration Program (BCP) instead of booting.

**Reload**
For flash-ROM units, this option forces the ETS to download operational code from a host machine and reprogram the flash-ROM.

**Examples**

```
Local> INITIALIZE DELAY 12

Local> INITIALIZE FACTORY

Local> INITIALIZE CANCEL
```

**See Also** Crash 451, page 12-11; Show/Monitor/List Server Status, page 12-108; *Rebooting the Server*, page 3-6.

# 12.19 Jobs

The Jobs command is functionally identical to the **Show/Monitor Sessions** command on page 12-111. It is provided for UNIX compatibility.

# 12.20 Kill

The Kill command is functionally identical to the **Disconnect** command on page 12-12. It is provided for UNIX compatibility.

# 12.21 LAT

LAT *ServiceName* [*parameters*]

LAT is a shorthand for the Connect LAT command on page 12-31, and is provided for simplicity. If a preferred service has been defined, the service parameter is optional. An environment string can also be added to the command.

**Applies To** EPS4, ETS4P, ETS8, ETS8P, ETS16, ETS16P

**See Also** Connect, page 12-9; Set/Define Port Preferred, page 12-46; *Environment Strings*, page 2-15.

# 12.22 List

List is similar to the Show command, except that List displays defined (permanent) characteristics, which may or may not be the same as those currently set (temporary). List shows settings that will take effect the next time the ETS is initialized. Each List command is documented together with its corresponding Show command.

# 12.23 Lock

LOCK

Locks a port without disconnecting sessions. The user is queried for a password (6 characters maximum, alphanumeric only), and will be asked to verify it. The password and verification are not displayed. The port is then locked until the correct password is used to unlock it.

If a user forgets his password, the privileged user must either log out the port (disconnecting all sessions) or use the Unlock Port command.

**Applies To** EPS4, ETS4P, ETS8, ETS8P, ETS16, ETS16P

**Restrictions** Secure users may not lock their ports.

**Examples**

```
Local> LOCK

Password> donut (not echoed)

Verification> donut

Unlock password> donut

Local>
```

**See Also** Set/Define Server Lock, page 12-71; Unlock Port, page 12-119; *Locking a Port*, page 5-15.

# 12.24 Logout

LOGOUT [PORT *PortNum*]

Logs out the current port, or another port if specified, disconnecting all of the port's open sessions.

**Applies To** EPS4, ETS4P, ETS8, ETS8P, ETS16, ETS16P

**Restrictions** You must be the privileged user to logout a port other than your own.

**Examples**

```
Local> LOGOUT

Local> LOGOUT PORT 2
```

# 12.25 Man

The Man command is functionally identical to the Help command on page 12-13. It is provided for UNIX compatibility.

# 12.26 Mode

MODE [COM *SerPort*:]*baudrate*[,*parity*[,*charsize*[,*stopbits*]]]

The Mode command is provided for DOS compatibility; it configures the serial port parameters with both a Set and a Define command. Note that there should be no spaces between parameters.

**Applies To** EPS4, ETS4P, ETS8, ETS8P, ETS16, ETS16P

**Restrictions** You must be the privileged user to use this command.

**Parameters**

**SerPort**
Configure the specified serial port instead of the current port.

**baudrate**
Enter the port's baud rate, which can range from 150 to 115,200 baud.

**parity**
Enter the port's parity, which can be Even, Odd, Mark, Space, or None.

**charsize**
Enter the character size, which can be either 7 or 8.

**stopbits**
Enter the desired stop bit count, which can be either 1 or 2.

**Examples**

```
Local> MODE COM4:9600,even,1,7
```

**See Also** Set/Define Port Commands, beginning on page 12-27.

# 12.27 Monitor

Monitor commands are the same as Show commands, except that the displayed information is continuously updated approximately every three seconds. The display can be stopped by pressing any key. See the corresponding Show commands for details and options.

# 12.28 Netstat

NETSTAT

The Netstat command shows the currently active network connections. Information is displayed for the AppleTalk, LAT, LAN Manager, NetWare and TCP/IP protocols. This information is primarily meant for debugging network problems.

**Applies To** EEPS4, ETS4P, ETS8, ETS8P, ETS16, ETS16P

# 12.29 Open

The Open command is functionally identical to the **Connect Telnet** command on page 12-9.

# 12.30 Ping

PING *hostname*

Ping sends a TCP/IP request for an echo packet to another network host and therefore provides an easy way to test network connections. In general, any host that supports TCP/IP will respond if it is able, regardless of login restrictions, job load, or operating system. If there is no reply from the host, there may be a network or TCP/IP configuration problem.

**Applies To** EPS4, ETS4P, ETS8, ETS8P, ETS16, ETS16P

**Parameters** **hostname**
Enter either a text hostname or IP address.

**Examples**

```
Local> PING 192.0.1.23

Local> PING hydra.local.net
```

**See Also** *Installation Guide*.

# 12.31 Purge

Purge commands permanently remove an entry (service or IP host) from the ETS's database when the unit is rebooted. Purge does not affect the current operating characteristics. The one exception to this rule is the Purge SLIP command, explained next.

Because Purge is similar to Clear, Purge commands are explained together with their corresponding Clear commands.

## 12.31.1 Purge SLIP

PURGE SLIP { ALL | PORT *portnum* | DEFAULT }

Removes a previously configured Define SLIP entry for a port. Clear SLIP is not a valid command.

**Applies To** EPS4, ETS4P, ETS8, ETS8P, ETS16, ETS16P

**Restrictions** You must be the privileged user to use this command.

**Errors** Purge SLIP will return an error if the specified port does not have SLIP enabled, or if the IP address specified is not associated with that port.

**Parameters**

**All**
Clears all of the SLIP settings for the ETS (entries for all ports and the Default ETS setting).

**Port portnum**
Clears the SLIP entry for the specified port only.

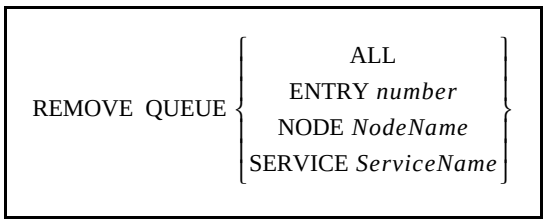
**Default**
Clears the default SLIP setting for the ETS.

**Examples**

```
Local> PURGE SLIP Port 4
```

**See Also** Set/Define SLIP, page 12-95; Show/List SLIP, page 12-112; *Serial Line Internet Protocol (SLIP)*, page 2-12; *SLIP*, page 4-6.

# 12.32 Remove Queue




Removes requests for local services from that service's queue.

**Applies To** EPS4, ETS4P, ETS8, ETS8P, ETS16, ETS16P

**Restrictions** You must be the privileged user to use this command.

**Parameters**

**All**
Removes all requests in the local ETS queue.

**Entry number**
Removes the specified queue entry. Use the Show Queue command to display the queues and entries by number.

**Node NodeName**
Removes all queue requests originating from the specified node.

**Service ServiceName**
Removes all requests queued to the specified local service.

**Examples**

```
Local> REMOVE QUEUE ALL

Local> REMOVE QUEUE ENTRY 5

Local> REMOVE QUEUE NODE opus

Local> REMOVE QUEUE SERVICE MODEM
```

**See Also** Show/Monitor/List Protocols, page 12-104.

# 12.33 Resolve

RESOLVE *hostname*

Attempts to resolve a TCP/IP name from the local host table and/or network nameserver.

**Applies To** EPS4, ETS4P, ETS8, ETS8P, ETS16, ETS16P

**Errors** An error is returned if the attempted nameservice fails.

# 12.34 Resume

RESUME [ [SESSION] *number*]

Leaves Local mode and resumes the current (active) session, or a specified session.

**Applies To** EPS4, ETS4P, ETS8, ETS8P, ETS16, ETS16P

**Errors** An error is returned if there are no active sessions.

**Parameters**

**number**
Enter the number of the session you wish to resume. Session lists can be viewed with the Show Sessions command.

**Examples**

```
Local> RESUME

Local> RESUME SESSION 4
```

**See Also** Set/Define Port Break, page 12-31; *Session Management*, page 6-7.

# 12.35 Rlogin

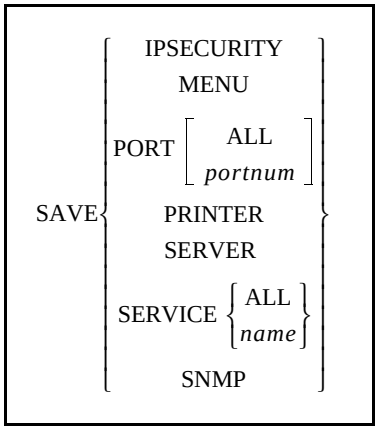
RLOGIN [ *hostname* [*username*]]

Rlogin is shorthand for the **Connect Rlogin** command, discussed on page 12-9, and is provided for simplicity. The hostname can be either text or an IP address. If a preferred Telnet service has been defined, the hostname parameter is optional. If the optional username is specified, it will be used as the login name.

**Applies To** EPS4, ETS4P, ETS8, ETS8P, ETS16, ETS16P

**See Also** Connect, page 12-9; Set/Define Port Preferred, page 12-46; *Rlogin*, page 2-9.

# 12.36 Save




Saves current configurations into the permanent database, essentially Defining everything that has been configured so far using Set commands. Instead of issuing a Define for each Set command to make your changes permanent, you can just issue the Save command after you have configured a port, service, server or printer. For example, **Save Service "print4me"** will save any options configured with Set commands for a service named "print4me" since the ETS booted.

**Note:** *You cannot save the login service; you must use the Define Server Incoming command to make it permanent.*

**Applies To** EPS4, ETS4P, ETS8, ETS8P, ETS16, ETS16P

**Restrictions** You must be the privileged user to use this command.

**Errors** Save without a parameter is invalid.

**Parameters**

**IPsecurity**
Saves the current IPsecurity table.

**Menu**
Saves all menu items set up with Set Menu commands.

**Port**
Saves the settings for a selected port or all ports. If the Port parameter is used without the **All** or **portnum**keywords, the current port is saved.

**Server**
Saves the current ETS settings.

**Service**
Saves all entered Set Service commands for all local services or the named service. If used without the **All** or **name** parameters, the local service characteristics are saved.

**SNMP**
Saves all parameters associated with SNMP.

**See Also** *Set and Define*, page 3-4.

# 12.37 Send

SEND *command*

Sends commands through the current Telnet or LAT session.

**Applies To** EPS4, ETS4P, ETS8, ETS8P, ETS16, ETS16P

**Parameters** **command**
The command can be one of the following:

**Table 12-4:** Send Command Strings

| Abbreviation | Stands for |
|---|---|
| AO | Abort Output (Telnet, LAT) |
| AYT | Are You There (Telnet, LAT) |
| BRK | Break (Telnet, LAT) |
| EC | Erase Character (Telnet) |
| EL | Erase Line (Telnet) |
| GA | Go Ahead (Telnet) |
| IP | Interrupt Process (Telnet, LAT) |
| NOP | No Operation (Telnet) |
| SYNCH | Synchronize (Telnet) |

**Examples**

```
Local>   SEND AYT

Local>   SEND SYNCH
```

**See Also** *LAT and TCP/IP Connectivity*, page 2-15.

# 12.38 Set/Define Dialback


Configures the username/command pairs for the dialback handler. Each username is specified with a command string that is echoed to the serial port after that user logs in. If a modem is connected to the port, a user can dial into the ETS, enter his username, and then have the ETS log him out and call him back at a particular phone number.

**Applies To** EPS4, ETS4P, ETS8, ETS8P, ETS16, ETS16P

**Restrictions** You must be the privileged user to use this command.

**Parameters**

**username**
A text name, up to 20 characters long.

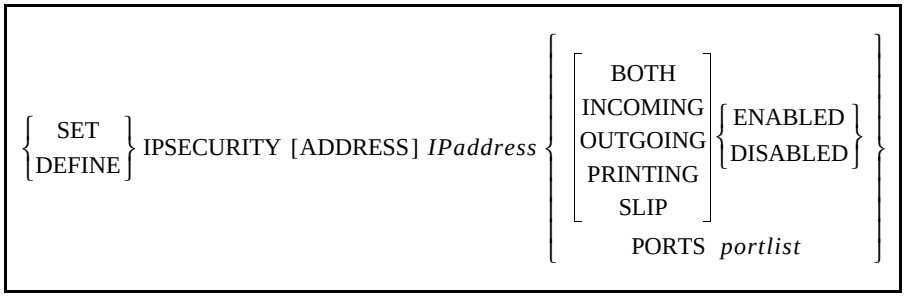
**command**
A string of text, up to 30 characters long, that will be executed when the user connects to the ETS.

**Examples**

```
Local> SET DIALBACK "robert" "atdt555-1234"
```

**See Also** Set/Define Port Dialback, page 12-36; *Dialback*, page 5-11.

# 12.39 Set/Define IPsecurity




This command is used to add or change entries in the IP security table. A port number of 0 is used to denote the virtual (incoming login) ports. Unless noted, IPsecurity features are disabled by default.

**Applies To** EPS4, ETS4P, ETS8, ETS8P, ETS16, ETS16P

**Restrictions** You must be the privileged user to use this command.

**Parameters**

**IPaddress**
Specifies the IP address to restrict based on the additional parameters entered. The IP address can be a full IP address, such as 192.0.1.80. It can also be expressed as a partial address, such as 192.0.1.255, to restrict entire sub-networks.

An address with a 0 in any segment implies Incoming and Outgoing Disabled. An address with a 255 in any segment applies to all the addresses in that range.

**Both**
Restricts logins from the network into the ETS and Telnet sessions to the network from the ETS.

**Incoming**
Restricts logins from the network into the ETS, and connections to the serial port.

**Outgoing**
Restricts Telnet sessions to the network from the ETS.

**Ports portlist**
Restricts connections to this address from certain ports, and connections from this address to the specified ports. If a portlist is not specified, all physical and virtual ports apply.

**Printing**
Restricts TCP/IP printing for this address. The restriction applies to LPR and RTEL print connections, but not to direct port or service socket connections.

**SLIP**
Restricts SLIP sessions for the specified address or range of addresses.

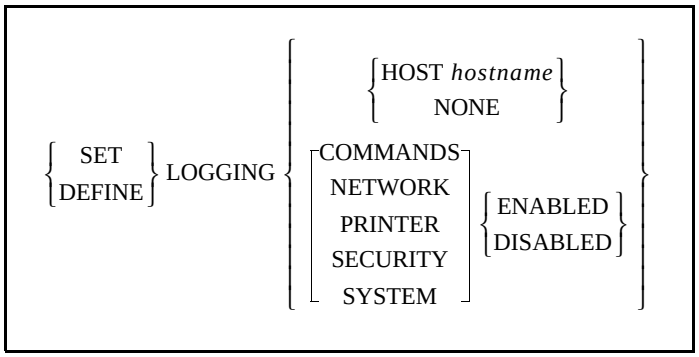
**Examples**

```
Local> SET IPSEC ADDR 192.0.1.255 INC ENA OUT DIS

Local> SET IPSEC 134.0.1.255 Port 3,5-7
```

**See Also**

Clear/Purge IPsecurity, page 12-6; Show/Monitor/List IPsecurity, page 12-100; *IP Security Table*, page 4-16.

# 12.40 Set/Define Logging




Controls error and event logging on the ETS. A destination host must be defined before logging levels can be configured. If the host is disabled, the configured logging events will be saved, and will take effect when the host is re-enabled.

**Applies To** EPS4, ETS4P, ETS8, ETS8P, ETS16, ETS16P

**Restrictions** You must be the privileged user to use this command.

**Parameters**

**Host hostname**
Specifies the host to which event logs are sent. Hosts are specified by entering a hostname followed by one of the following: a double colon (::) for LAT hosts, a single colon (:) for TCP/IP hosts, a backslash (\) for NetWare fileservers, or the word “console” if logging events are to be sent to a console terminal.

**Note:** *The host must be configured to support logging. See Event Logging on page 4-18 for more information.*

**None**
Clears any enabled event logs, and the log host name.

**Commands**
Logs all commands that users type.

**Modem**
Logs all incoming and outgoing modem activity, including modem jobs.

**Network**
Logs network events. This is useful when diagnosing network problems.

**Printer**
Logs printer-related activities (on-line/off-line conditions, job status, etc.).

**Security**
Logs authorization-related activity, such as user logins.

**System**
Logs system-related activity, including ETS boots and log file access.

**Examples**

```
Local> SET LOGGING HOST phred:

Local> SET LOG HOST CONSOLE COMMANDS ENABLED SECUR ENABLED
```

**See Also** Show/Monitor/List Logging, page 12-101; *Event Logging*, page 4-18.

# 12.41 Set/Define Menu

{ SET / DEFINE } MENU { *ItemNum String Command* / TITLE *TitleString* }

Configures the menu and command strings for the menu handler. Each menu string is specified with a command string that is executed if the user selects that menu entry. Individual ports are placed in menu mode with the Define Port Menu command.

**Note:** *It is recommended to alias a command to "Set Port Menu Disabled" if you want users to be able to leave menu mode and return to local mode. See Set/Define Port Menu on page 12-43 for more information.*

**Applies To** EPS4, ETS4P, ETS8, ETS8P, ETS16, ETS16P

**Restrictions** You must be the privileged user to use this command.

**Parameters**

**ItemNum**
Enter a number from 1 to 32 that corresponds to the menu entry you are changing.

**String**
A text string, up to 32 characters long, that is shown to the users in the menu screen.

**Command**
The command, up to 32 characters long, that is executed when the user selects this entry.

**TitleString**
An optional title for the entire menu, up to 48 characters long.

**Examples**

```
Local> Set MENU 5 "show net nodes" "SHOW HOSTS"
```

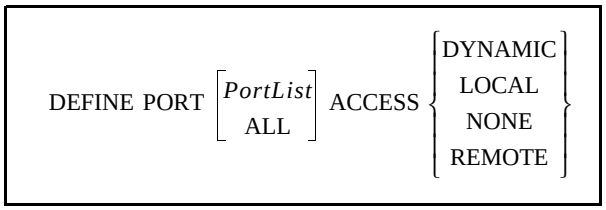
**See Also** Set/Define Port Menu, page 12-43; Show/Monitor/List Menu, page 12-101; Clear/Purge Menu, page 12-6; *Menu Mode*, page 5-14.

# 12.42 Set Noprivileged

Removes privileges from the current session. See *Set Privileged/Noprivileged* on page 12-56.

# 12.43 Set/Define Port Commands

## 12.43.1 Define Port Access




Sets the type of connections allowed to the port.

**Note:** *Autobaud must be disabled for Remote and Dynamic ports.*

**Applies To** EPS4, ETS4P, ETS8, ETS8P, ETS16, ETS16P

**Restrictions** You must be the privileged user to use this command.

**Errors** If a port is active, its access cannot be changed.

**Parameters**

**PortList/All**
Specifies a particular port or group of ports, or all ports. Port numbers are specified with integers between 1 and the total number of physical ports. Lists of ports must be separated by commas. Ranges of ports must be separated by a dash (-).

**Note:** *In the absence of a PortList or the All parameter, the configuration will affect the current port only.*

**Dynamic**
The port can both initiate and receive connection requests.

**Local**
The port may initiate connections to services, and only local logins are permitted. This is the default.

**Remote**
The port can accept network connection requests but no local logins are permitted.

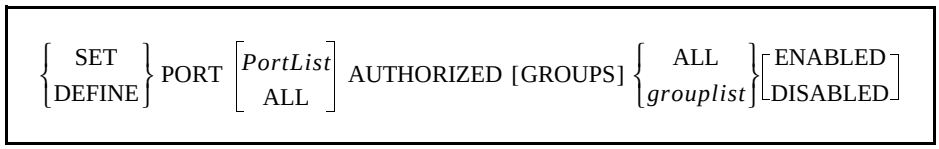
**None**
The port is unusable.

**Examples**

```
Local> DEFINE PORT ACCESS LOCAL
```

**See Also** Set/Define Port Autobaud, page 12-28; Show/Monitor/List Ports, page 12-102; *Port Access*, page 5-1.

## 12.43.2 Set/Define Port Authorized Groups




Adds (Enabled) or deletes (Disabled) groups from the list of service groups that are accessible to a port. Use service groups to restrict access to services on a per-port basis; the authorized groups are the only groups a port can see. When entries are specified without the Enabled/Disabled parameters, they replace the current group list.

**Applies To** ETS4P, ETS8, ETS8P, ETS16, ETS16P

**Restrictions** You must be the privileged user to use this command.

**Parameters**

**PortList/All**
Specifies a particular port or group of ports, or all ports. Port numbers are specified with integers between 1 and the total number of physical ports. Lists of ports must be separated by commas. Ranges of ports must be separated by a dash (-).

**Note:** *In the absence of a PortList or the All parameter, the configuration will affect the current port only.*

**All/grouplist**
Group numbers range from 0 to 255. They can be listed individually (1, 3, 12) and by range (3-25, 110-112), with individual entries separated by a comma. The default is group 0 enabled, groups 1-255 disabled.

**Examples**

```
Local> SET PORT AUTHORIZED 0,2-5,101
```

**See Also** Set Port Groups, page 12-40; Set/Define Server Service Groups, page 12-80; Show/Monitor/List Ports, page 12-102; *Group Numbers*, page 5-12.

## 12.43.3 Set/Define Port Autobaud


Allows a port to detect the incoming baud rate and change its own baud rate to match it at login time. When Autobaud is set, you may have to press Return twice or more to allow the port to determine the baud rate. Autobaud must be disabled for Remote and Dynamic port access and for any port that offers a service.

**Applies To** EPS4, ETS4P, ETS8, ETS8P, ETS16, ETS16P

**Restrictions** You must be the privileged user to use this command.

Autobaud cannot be configured for Virtual ports (Port 0).

**Errors** Autobaud will not work for all parity/baud combinations—it will only function if the port is using either 8-bit characters with no parity or 7-bit characters with even parity, and for baud rates from 1200 through 38400.

**Parameters**

**PortList/All**
Specifies a particular port or group of ports, or all ports. Port numbers are specified with integers between 1 and the total number of physical ports. Lists of ports must be separated by commas. Ranges of ports must be separated by a dash (-).

**Note:** *In the absence of a PortList or the All parameter, the configuration will affect the current port only.*

**Examples**

```
Local> DEF PORT AUTOBAUD DISABLED
```

**See Also** Define Port Access, page 12-27; Set/Define Port Speed, page 12-51; Show/Monitor/List Ports, page 12-102; *Baud Rates*, page 5-8.

## 12.43.4 Set/Define Port Autoconnect

{ SET / DEFINE } PORT [ *PortList* / ALL ] AUTOCONNECT { ENABLED / DISABLED }

Connects a port automatically to the preferred service (LAT or Telnet) upon login. You can still Break to local mode and use the Connect command to attach to other services. Autoconnect is disabled if there is no preferred service defined. Also, if both preferred LAT and preferred Telnet services have been set, the LAT connection will be attempted.

**Applies To** EPS4, ETS4P, ETS8, ETS8P, ETS16, ETS16P

**Parameters**

**PortList/All**
Specifies a particular port or group of ports, or all ports. Port numbers are specified with integers between 1 and the total number of physical ports. Lists of ports must be separated by commas. Ranges of ports must be separated by a dash (-).

**Note:** *In the absence of a PortList or the All parameter, the configuration will affect the current port only.*

**Examples**

```
Local> SET PORT AUTOCONNECT ENABLED
```

**See Also** Set/Define Port Preferred, page 12-46; Show/Monitor/List Ports, page 12-102; *Preferred Services and Hosts*, page 5-4.

## 12.43.5 Set/Define Port Autoprompt


Automatically displays a login prompt upon connection to a LAT login service. If disabled, the user must press the <Return> key first. This option is not applicable to TCP/IP connections, which should always display a login prompt upon connection.

**Applies To** EPS4, ETS4P, ETS8, ETS8P, ETS16, ETS16P

**Parameters**

**PortList/All**
Specifies a particular port or group of ports, or all ports. Port numbers are specified with integers between 1 and the total number of physical ports. Lists of ports must be separated by commas. Ranges of ports must be separated by a dash (-).

**Note:** *In the absence of a PortList or the All parameter, the configuration will affect the current port only.*

**Examples**

```
Local> SET PORT AUTOPROMPT DISABLED
```

**See Also** Show/Monitor/List Ports, page 12-102.

## 12.43.6 Set/Define Port Autostart


Determines whether the port will wait for the input of a carriage return before starting a connection. If enabled, the port will start automatically without waiting for a carriage return.

**Applies To** EPS4, ETS4P, ETS8, ETS8P, ETS16, ETS16P

**Restrictions** You must be the privileged user to use this command.

**Errors** A port enabled for autostart will not be idle unless DTR is held low, and therefore will not be available for connections from the network.

**Parameters**

**PortList/All**
Specifies a particular port or group of ports, or all ports. Port numbers are specified with integers between 1 and the total number of physical ports. Lists of ports must be separated by commas. Ranges of ports must be separated by a dash (-).

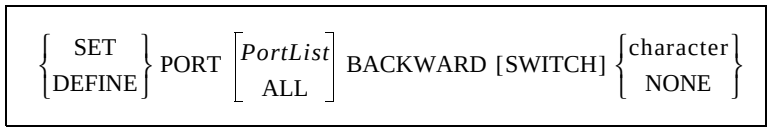
**Note:** *In the absence of a PortList or the All parameter, the configuration will affect the current port only.*

**Examples**

```
Local> SET PORT 4 AUTOSTART ENABLED
```

**See Also** Set/Define Port Preferred, page 12-46; Show/Monitor/List Ports, page 12-102.

## 12.43.7 Set/Define Port Backward




Allows the user to define a key that switches to the previous session without entering local mode. From local mode, typing the key functions as if the Backward command were entered.

**Applies To** EPS4, ETS4P, ETS8, ETS8P, ETS16, ETS16P

**Parameters**

**PortList/All**
Specifies a particular port or group of ports, or all ports. Port numbers are specified with integers between 1 and the total number of physical ports. Lists of ports must be separated by commas. Ranges of ports must be separated by a dash (-).

**Note:** *In the absence of a PortList or the All parameter, the configuration will affect the current port only.*

**character**
Any key can be specified, provided it does not conflict with the line editing, Forward, or Break keys. To specify a control character, hold down the control key while typing the letter, or precede the letter with a caret (^).

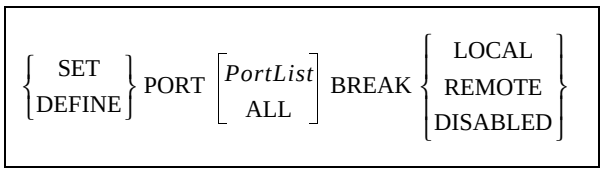
**None**
Clears any previously-configured forward switch character (none is configured by default).

**Examples**

```
Local> SET PORT BACKWARD SWITCH ^K
```

**See Also** Backwards, page 12-4; Set/Define Port Forward, page 12-40; Show/Monitor/List Ports, page 12-102; *Backwards and Forwards*, page 6-7; *Sessions*, page 2-17.

## 12.43.8 Set/Define Port Break




Determines where processing of incoming Break keys will take place. This setting does not affect network or Connect Local trying to send a Break out of the port.

**Applies To** EPS4, ETS4P, ETS8, ETS8P, ETS16, ETS16P

**Parameters**

**PortList/All**
Specifies a particular port or group of ports, or all ports. Port numbers are specified with integers between 1 and the total number of physical ports. Lists of ports must be separated by commas. Ranges of ports must be separated by a dash (-).

**Note:** *In the absence of a PortList or the All parameter, the configuration will affect the current port only.*

**Local**
The Break key is processed by the ETS; the user is returned to Local mode.

**Remote**
The Break key is passed through to the remote service.

**Disabled**
The Break key does nothing.

**Examples**

```
Local> SET PORT BREAK REMOTE
```

**See Also** Resume, page 12-20; Set/Define Port Local, page 12-41; *Break*, page 6-7.

## 12.43.9 Set/Define Port Broadcast


Enables or disables other users' broadcasts to this port. This would typically be set whenever extra messages are not desired on the port's output device.

**Applies To** EPS4, ETS4P, ETS8, ETS8P, ETS16, ETS16P

**Parameters**

**PortList/All**
Specifies a particular port or group of ports, or all ports. Port numbers are specified with integers between 1 and the total number of physical ports. Lists of ports must be separated by commas. Ranges of ports must be separated by a dash (-).

**Note:** *In the absence of a PortList or the All parameter, the configuration will affect the current port only.*

**Examples**

```
Local> SET PORT BROADCAST DISABLED
```

**See Also** Broadcast, page 12-4; Set/Define Server Broadcast, page 12-63; Show/Monitor/List Ports, page 12-102; *Port Messages*, page 5-13.

## 12.43.10 Set/Define Port Character Size


Sets the number of bits per character for the serial port. Character size defaults to 8 bits.

**Applies To** EPS4, ETS4P, ETS8, ETS8P, ETS16, ETS16P

**Restrictions** You must be the privileged user to change the character size of a port other than your own.

**Errors** Autobaud will only work for 8 bits, or for 7 bits with Even parity.

**Parameters**

**PortList/All**
Specifies a particular port or group of ports, or all ports. Port numbers are specified with integers between 1 and the total number of physical ports. Lists of ports must be separated by commas. Ranges of ports must be separated by a dash (-).

**Note:** *In the absence of a PortList or the All parameter, the configuration will affect the current port only.*

**Examples**

```
Local> SET PORT CHARACTER SIZE 7
```

**See Also** Set/Define Port Autobaud, page 12-28; Set/Define Port Parity, page 12-44; Set/Define Port Stop, page 12-52; Show/Monitor/List Ports, page 12-102; *Parity, Character Size, and Stop Bits*, page 5-4.

## 12.43.11 Set/Define Port Command Completion


Enables or disables the command completion feature. If enabled, the ETS will attempt to complete partially typed command words when the user presses the Space or Tab key. If the entry is ambiguous (or if the user types an option), the ETS will send a beep to the terminal.

**Applies To** EPS1, EPS2, EPS2-100, EPS4-100EPS4, ETS4P, ETS8, ETS8P, ETS16, ETS16P

**Parameters**

**PortList/All**
Specifies a particular port or group of ports, or all ports. Port numbers are specified with integers between 1 and the total number of physical ports. Lists of ports must be separated by commas. Ranges of ports must be separated by a dash (-).

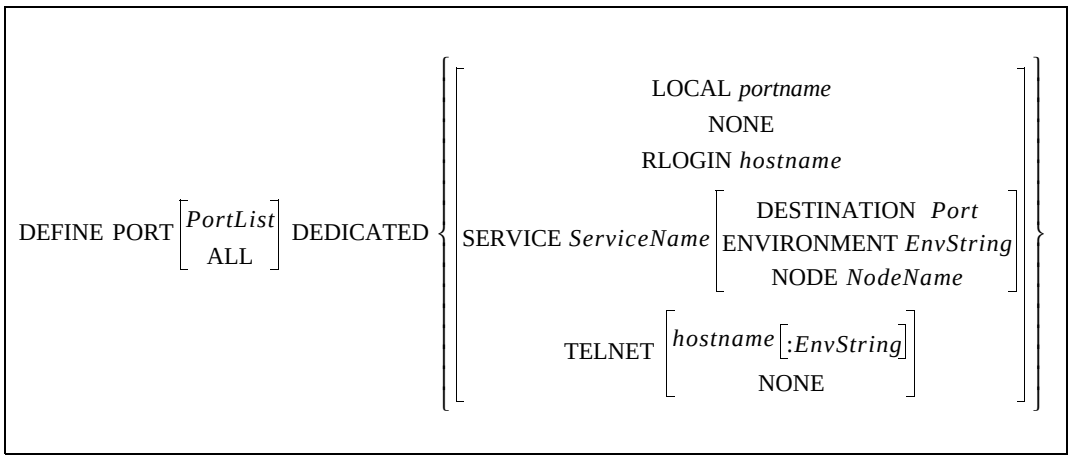
**Note:** *In the absence of a PortList or the All parameter, the configuration will affect the current port only.*

**Examples**

```
Local> SET PORT COMMAND ENABLED
```

**See Also** *Command Line Interface*, page 12-1; Show/Monitor/List Ports, page 12-102;*Command Line Interface*, page 1-4.

## 12.43.12 Set/Define Port Dedicated




Dedicates a port to the desired service, or the desired Telnet or Rlogin host. Once logged into the port, a user is automatically connected to the service. The user cannot return to local mode or issue server commands. Upon exiting the remote service, the user is logged out of the ETS. Configuring any dedicated service or host will clear any preferred services or hosts.

**Note:** *Dedicating a port will disable port verification. See Set/Define Port Verification, page 12-55 for more information.*

An environment string can be part of the dedicated hostname; see the *Environment Strings* section of the *Concepts* chapter for more information. Note that via the environment string, a dedicated host can be connected to via Rlogin, not just Telnet.

WARNING: Defining dedicated connections on all the server's ports is dangerous, as it leaves no easy way to log into the server. You must either connect via the NCP or Telnet console ports (see Chapter 2, *Concepts*), or enable incoming logins (see **Set/Define Server Incoming** on page 12-68).

**Applies To** EPS4, ETS4P, ETS8, ETS8P, ETS16, ETS16P

**Restrictions** You must be the privileged user to use this command.

Dedicated cannot be configured for Virtual ports (Port 0).

**Errors** An error is returned if the specified node cannot provide the service.

**Parameters**

**PortList/All**
Specifies a particular port or group of ports, or all ports. Port numbers are specified with integers between 1 and the total number of physical ports. Lists of ports must be separated by commas. Ranges of ports must be separated by a dash (-).

**Note:** *In the absence of a PortList or the All parameter, the configuration will affect the current port only.*

**Local portname**
Specifies a dedicated connection to another port on the same unit.

**None**
Clears any previously-defined dedicated service.

**Rlogin hostname**
Specify an Rlogin host to use for the Dedicated connection. Either a text host name or an IP address can be used.

**Service ServiceName**
The port is dedicated to the specified service.

**Destination port**
Specifies a connection to a particular port on the dedicated host. This is desirable when more than one port offers the same service.

**NodeName**
Specifies a connection to a particular node on the dedicated host. This is desirable when more than one node offers the same service.

**EnvString**
Sets up the connection environment before the session is started. The string is constructed with a sequence of key letters, some of which are prefaced by either "+" or "-." The generic key letters are:

**Table 12-5:** Environment Strings

| Letter | Action |
|---|---|
| D | Backspace Mode (**+D**) or Delete Mode (**-D**) |
| E | Local Echo Mode (**+E**) or Remote Echo Mode (**-E**) |
| I | Interactive Mode |
| P | Passall Mode (**+P**) or Passthru Mode (**-P**) |
| C | CR becomes CRLF (**+C**) or CR becomes LF (**-C**) |
| T | TCP Mode (raw uninterpreted data stream) |
| R | Rlogin protocol (sets port number to 513 if not already set) |

**Table 12-5:** Environment Strings, cont.

| Letter | Action |
|---|---|
| U | UDP protocol |
| Q | Queued (RTEL) connection to the target |
| *nnn* | optional port number |

**Telnet hostname**
Specify a Telnet host to use for the connection. Either a text host name or an IP address can be used. Environment strings can be added.

**Examples**

```
Local> DEFINE PORT DEDICATED Fileserver NODE opus
DESTINATION port_4

Local> DEFINE PORT 5 DEDICATED TELNET 192.0.1.221:+P
```

**See Also** Set/Define Port Preferred, page 12-46; Set/Define Server Incoming, page 12-68; Show/Monitor/List Ports, page 12-102; *Environment Strings*, page 2-15; *Preferred and Dedicated Connections*, page 5-4.

## 12.43.13 Set/Define Port Dialback

{SET | DEFINE} PORT [*PortList* | ALL] DIALBACK {ENABLED | DISABLED}

Turning on Dialback causes the ETS to check the dialback table (see the Set Dialback command) each time a user logs in. If the given username is not in the table, the port is logged out. If it is in the table, the port is logged out, but the ETS sends the dialback string to the port and awaits a second login. Typically the dialback string will cause a modem attached to the port to call the user back at a certain telephone number for security reasons. Ports with dialback enabled have a 30-second time limit for entering the username when logging in.

**Note:** *Enabling dialback automatically enables modem control, but disabling dialback does not automatically disable modem control.*

**Applies To** EPS4, ETS4P, ETS8, ETS8P, ETS16, ETS16P

**Restrictions** You must be the privileged user to use this command.

Dialback cannot be configured for Virtual ports (Port 0).

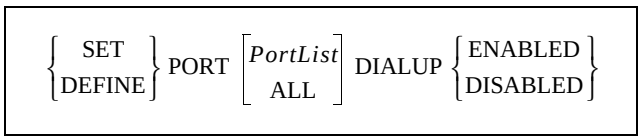
**Parameters**

**PortList/All**
Specifies a particular port or group of ports, or all ports. Port numbers are specified with integers between 1 and the total number of physical ports. Lists of ports must be separated by commas. Ranges of ports must be separated by a dash (-).

**Note:** *In the absence of a PortList or the All parameter, the configuration will affect the current port only.*

**See Also** Clear/Purge Dialback, page 12-5; Define Port Modem Control, page 12-43; Show/Monitor/List Dialback, page 12-100; Show/Monitor/List Ports, page 12-102; *Dialback*, page 5-11.

## 12.43.14 Set/Define Port Dialup




Sets the Dialup characteristic for a port. The ETS does not pay attention to this flag, but passes it on to the host for LAT connections. The remote host can use it appropriately.

**Applies To** EPS4, ETS4P, ETS8, ETS8P, ETS16, ETS16P

**Restrictions** This command requires privileged status.

**Parameters** **PortList/All**
Specifies a particular port or group of ports, or all ports. Port numbers are specified with integers between 1 and the total number of physical ports. Lists of ports must be separated by commas. Ranges of ports must be separated by a dash (-).

**Note:** *In the absence of a PortList or the All parameter, the configuration will affect the current port only.*

**See Also** Show/Monitor/List Ports, page 12-102; *Dialup*, page 5-11.

## 12.43.15 Set/Define Port DSRlogout


When enabled, the port will be logged out when the port's DSR signal is dropped. This usually happens only when the attached terminal device is powered off or disconnected, and is intended to keep users from switching physical terminal lines to access other sessions. Any open connections will be closed before logging out.

**Applies To** EPS4, ETS4P, ETS8, ETS8P, ETS16, ETS16P

**Restrictions** You must be the privileged user to use this command.

DSRLogout cannot be configured for Virtual ports (Port 0).

**Errors** When Modem Control is enabled for a port, DSRlogout is also enabled.

**Parameters**

**PortList/All**
Specifies a particular port or group of ports, or all ports. Port numbers are specified with integers between 1 and the total number of physical ports. Lists of ports must be separated by commas. Ranges of ports must be separated by a dash (-).

**Note:** *In the absence of a PortList or the All parameter, the configuration will affect the current port only.*

**See Also** Define Port Modem Control, page 12-43; Set/Define Port Flow Control, page 12-39; Show/Monitor/List Ports, page 12-102; *DSRlogout*, page 5-16.

## 12.43.16 Set/Define Port DTRwait

{SET / DEFINE} PORT [*PortList* / ALL] DTRWAIT {ENABLED / DISABLED}

If enabled, the ETS will not assert the DTR signal on the serial port until either a user logs into the port or the port is connected to via a service or Telnet connect. When the port is idle, DTR will not be asserted. DTRwait is disabled by default.

**Applies To** EPS4, ETS4P, ETS8, ETS8P, ETS16, ETS16P

**Restrictions** You must be the privileged user to use this command.

DTRwait cannot be configured for Virtual ports (Port 0).

**Errors** Hardware flow control and DTRwait cannot be simultaneously active on six-wire terminal servers (the EPS4, ETS8, and ETS16 models).

DTRwait also cannot be specified with Modem Control.

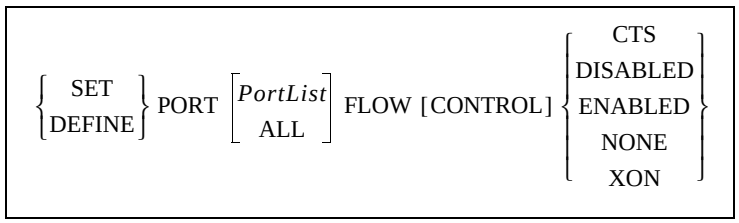
**Parameters**

**PortList/All**
Specifies a particular port or group of ports, or all ports. Port numbers are specified with integers between 1 and the total number of physical ports. Lists of ports must be separated by commas. Ranges of ports must be separated by a dash (-).

**Note:** *In the absence of a PortList or the All parameter, the configuration will affect the current port only.*

**See Also** Define Port Modem Control, page 12-43; Set/Define Port Flow Control, page 12-39; Show/Monitor/List Ports, page 12-102; *DTR (Data Terminal Ready)*, page 5-8; *DTRwait*, page 5-12.

# 12.43.17 Set/Define Port Flow Control




Sets the type of flow control on the port, and whether flow control should be enabled for the port. For example, you can set the type of flow control to DSR/DTR, but have it disabled when you don't want flow control.

**Applies To** EPS4, ETS4P, ETS8, ETS8P, ETS16, ETS16P

**Errors** Modem Control and DSRlogout must be disabled if CTS/RTS or DTR/DSR flow control is selected.

**Parameters**

**PortList/All**
Specifies a particular port or group of ports, or all ports. Port numbers are specified with integers between 1 and the total number of physical ports. Lists of ports must be separated by commas. Ranges of ports must be separated by a dash (-).

**Note:** *In the absence of a PortList or the All parameter, the configuration will affect the current port only.*

**CTS**
Specifies CTS/RTS (hardware) flow control.

**Disabled**
Deactivates the configured flow control method.

**Enabled**
Specifies the configured flow control method.

**None**
Specifies no flow control (removes a CTS, DSR, or XON setting).

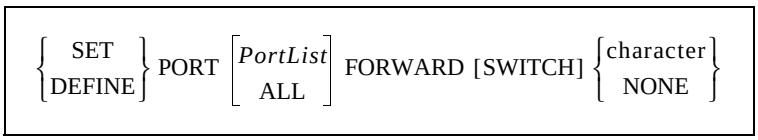
**XON**
Specifies XON/XOFF (software) flow control.

**Examples**

```
Local> SET PORT FLOW CONTROL DSR
```

**See Also** Show/Monitor/List Ports, page 12-102; *Flow Control*, page 5-2.

# 12.43.18 Set/Define Port Forward




Defines a key which allows the user to switch to the next session without entering Local mode. In local mode, the forward key functions as if the Forward command had been typed.

**Applies To** EPS4, ETS4P, ETS8, ETS8P, ETS16, ETS16P

**Parameters**

**PortList/All**
Specifies a particular port or group of ports, or all ports. Port numbers are specified with integers between 1 and the total number of physical ports. Lists of ports must be separated by commas. Ranges of ports must be separated by a dash (-).

**Note:** *In the absence of a PortList or the All parameter, the configuration will affect the current port only.*

**Character**
Any key can be specified, provided it does not conflict with the line editing, Backward, or Break keys. To specify a control character, hold down the control key while typing the letter, or precede the letter with a caret (^).

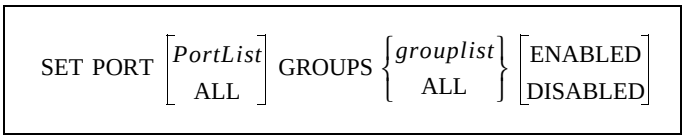
**None**
Clears any previously-configured forward switch character (none is configured by default).

**Examples**

```
Local> SET PORT FORWARD SWITCH ^X
```

**See Also** Set/Define Port Local, page 12-41; Set/Define Port Autostart, page 12-30; Forwards, page 12-13; Show/Monitor/List Ports, page 12-102; *Sessions*, page 2-17; *Backwards and Forwards*, page 6-7.

# 12.43.19 Set Port Groups




Limits which of the Authorized groups the port can access; the groups must already be in the Set Port Authorized Groups list. Group lists are applicable to LAT connections only.

The only group enabled by default is group 0.

If the Enabled or Disabled modifiers are used, the group list is added to or removed from the current list. Otherwise, the group list given replaces the current one.

**Applies To** ETS4P, ETS8, ETS8P, ETS16, ETS16P

**Parameters** **PortList/All**
Specifies a particular port or group of ports, or all ports. Port numbers are specified with integers between 1 and the total number of physical ports. Lists of ports must be separated by commas. Ranges of ports must be separated by a dash (-).

**Note:** *In the absence of a PortList or the All parameter, the configuration will affect the current port only.*

**Examples**
```
Local> SET PORT GROUPS 4,5-9
```

**See Also** Set/Define Port Authorized Groups, page 12-28; Show/Monitor/List Ports, page 12-102; *Group Numbers*, page 5-12.

## 12.43.20 Set/Define Port Inactivity Logout

{SET / DEFINE} PORT [*PortList* / ALL] INACTIVITY [LOGOUT] {ENABLED / DISABLED}

Enables automatic logout of the port if it has been inactive for a set period of time and logs out any open connections. Inactive is defined as having no keyboard or network activity on the port. The timer period is set with the **Set/Define Server Inactivity Timer** command.

**Applies To** EPS4, ETS4P, ETS8, ETS8P, ETS16, ETS16P

**Restrictions** You must be the privileged user to use this command.

**Parameters** **PortList/All**
Specifies a particular port or group of ports, or all ports. Port numbers are specified with integers between 1 and the total number of physical ports. Lists of ports must be separated by commas. Ranges of ports must be separated by a dash (-).

**Note:** *In the absence of a PortList or the All parameter, the configuration will affect the current port only.*

**See Also** Set/Define Server Inactivity Timer, page 12-68; Show/Monitor/List Ports, page 12-102; *Inactivity Logout*, page 5-16.

## 12.43.21 Set/Define Port Local

{SET / DEFINE} PORT [*PortList* / ALL] LOCAL {SWITCH*character* / NONE}

Defines a key that allows the user to switch to Local mode from a remote connection. The local switch is especially useful for network connections into the ETS, where a local break key does not exist. It will function the same as the Break key, except that it will be ignored by the ETS if a session is set up as Passall or Passthru.

**Applies To** EPS4, ETS4P, ETS8, ETS8P, ETS16, ETS16P

**Parameters**

**PortList/All**
Specifies a particular port or group of ports, or all ports. Port numbers are specified with integers between 1 and the total number of physical ports. Lists of ports must be separated by commas. Ranges of ports must be separated by a dash (-).

**Note:** *In the absence of a PortList or the All parameter, the configuration will affect the current port only.*

**Character**
Any key can be specified, provided it does not conflict with the line editing, Backward, or Forward keys. To specify a control character, hold down the control key while typing the letter, or precede the letter with a caret (^).

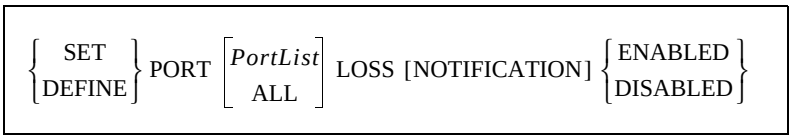
**None**
Clears any previously-configured forward switch character (none is configured by default).

**Examples**

```
Local> SET PORT LOCAL ^V
```

**See Also** Set/Define Port Break, page 12-31; Set Session Passall, page 12-95; Show/ Monitor/List Ports, page 12-102; *Session Management*, page 6-7.

# 12.43.22 Set/Define Port Loss Notification




Sends the terminal device a Ctrl-G (Bell) when a typed character is lost due to a data error or an overrun on the ETS.

**Applies To** EPS4, ETS4P, ETS8, ETS8P, ETS16, ETS16P

**Parameters**

**PortList/All**
Specifies a particular port or group of ports, or all ports. Port numbers are specified with integers between 1 and the total number of physical ports. Lists of ports must be separated by commas. Ranges of ports must be separated by a dash (-).

**Note:** *In the absence of a PortList or the All parameter, the configuration will affect the current port only.*

**See Also** Show/Monitor/List Ports, page 12-102;*Other Port Characteristics*, page 5-11.

# 12.43.23 Set/Define Port Menu

```
{ SET    }
{ DEFINE } PORT [ PortList ] MENU { ENABLED  }
               [ ALL      ]      { DISABLED }
```

Specifies whether the port is given a finite choice of menu options to use after logging in (enabled), or is given the regular Local> prompt (disabled).

**Applies To** EPS4, ETS4P, ETS8, ETS8P, ETS16, ETS16P

**Restrictions** You must be the privileged user to use this command on ports other than your own.

**Parameters**

**PortList/All**
Specifies a particular port or group of ports, or all ports. Port numbers are specified with integers between 1 and the total number of physical ports. Lists of ports must be separated by commas. Ranges of ports must be separated by a dash (-).

**Note:** *In the absence of a PortList or the All parameter, the configuration will affect the current port only.*

**See Also** Set/Define Menu, page 12-26; Clear/Purge Menu, page 12-6; Show/Monitor/List Menu, page 12-101; *Menu Mode*, page 5-14.

# 12.43.24 Define Port Modem Control

```
DEFINE PORT [ PortList ] MODEM [CONTROL] { ENABLED  }
            [ ALL      ]                 { DISABLED }
```

Specifies whether modem control lines are to be used. Modem Control must be disabled to use DSRlogout. Modem Control implies DSRlogout, in that the ETS will attempt to log out any connections if the port's DSR signal drops.

**Applies To** EPS4, ETS4P, ETS8, ETS8P, ETS16, ETS16P

The EPS4, ETS8 and ETS16 only support DSR/DTR. The other models support simultaneous DSR/DTR and RTS/CTS.

**Restrictions** You must be the privileged user to use this command.

Modem Control cannot be configured for Virtual ports (Port 0).

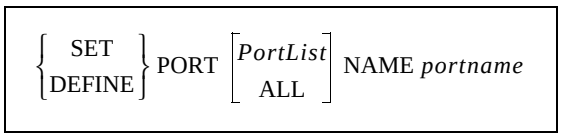
**Parameters**

**PortList/All**
Specifies a particular port or group of ports, or all ports. Port numbers are specified with integers between 1 and the total number of physical ports. Lists of ports must be separated by commas. Ranges of ports must be separated by a dash (-).

**Note:** *In the absence of a PortList or the All parameter, the configuration will affect the current port only.*

**See Also** Set/Define Port DSRlogout, page 12-37; Show/Monitor/List Ports, page 12-102; *Dedicated SLIP*, page 5-5.

## 12.43.25 Set/Define Port Name




Sets a unique name for each port. Remote LAT connections to the ETS can use either a service name or the port name to identify a port for connection purposes.

**Applies To** EPS4, ETS4P, ETS8, ETS8P, ETS16, ETS16P

**Restrictions** You must be the privileged user to use this command.

**Parameters**

**PortList/All**
Specifies a particular port or group of ports, or all ports. Port numbers are specified with integers between 1 and the total number of physical ports. Lists of ports must be separated by commas. Ranges of ports must be separated by a dash (-).

**Note:** *In the absence of a PortList or the All parameter, the configuration will affect the current port only.*

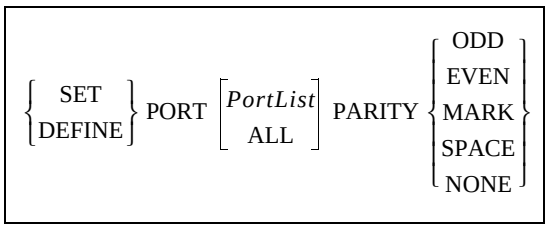
**portname**
A 16 character name composed of alphanumeric characters or the underscore (_) character. The default is *Port_n*, where *n* is the port number. If the name is not enclosed in quotation marks, it will be converted to uppercase.

**Examples**

```
Local> SET PORT NAME "HighSpeed_Modem"
```

**See Also** Show/Monitor/List Ports, page 12-102; *Port Names*, page 5-13.

## 12.43.26 Set/Define Port Parity




Sets the serial port's parity. Using Mark or Space will change a port set for 8 bits character size to 7 bits automatically. Changing the parity back will not automatically change the character size.

**Applies To** EPS4, ETS4P, ETS8, ETS8P, ETS16, ETS16P

**Errors** Autobaud will not work unless the port is using 8 bit characters, or 7 bit characters with Even parity.

**Parameters**

**PortList/All**
Specifies a particular port or group of ports, or all ports. Port numbers are specified with integers between 1 and the total number of physical ports. Lists of ports must be separated by commas. Ranges of ports must be separated by a dash (-).

**Note:** *In the absence of a PortList or the All parameter, the configuration will affect the current port only.*

**See Also** Set/Define Port Autobaud, page 12-28; Set/Define Port Character Size, page 12-33; Set/Define Port Stop, page 12-52; Show/Monitor/List Ports, page 12-102; *Parity, Character Size, and Stop Bits*, page 5-4.

## 12.43.27 Set/Define Port Passflow

```
{ SET    }
{ DEFINE } PORT [ PortList ] PASSFLOW { ENABLED  }
               [ ALL      ]          { DISABLED }
```

Specifies whether the ETS will strip XON/XOFF characters from the data stream. If passflow is enabled, XON/XOFF characters, which may be needed for flow control, will be allowed to pass though to the remote device unchanged. Passflow is disabled by default.

**Applies To** EPS4, ETS4P, ETS8, ETS8P, ETS16, ETS16P

**Errors** Only works when XON/XOFF flow control is enabled.

**Parameters**

**PortList/All**
Specifies a particular port or group of ports, or all ports. Port numbers are specified with integers between 1 and the total number of physical ports. Lists of ports must be separated by commas. Ranges of ports must be separated by a dash (-).

**Note:** *In the absence of a PortList or the All parameter, the configuration will affect the current port only.*

**See Also** *Software Flow Control (XON/XOFF)*, page 5-3.

## 12.43.28 Set/Define Port Password

```
{ SET    }
{ DEFINE } PORT [ PortList ] PASSWORD { ENABLED  }
               [ ALL      ]           { DISABLED }
```

Controls whether a password is needed to log into the ETS from this port. The **Set/Define Server Login Password** command is used to set the password itself.

**Applies To** EPS4, ETS4P, ETS8, ETS8P, ETS16, ETS16P

**Restrictions** You must be the privileged user to use this command.

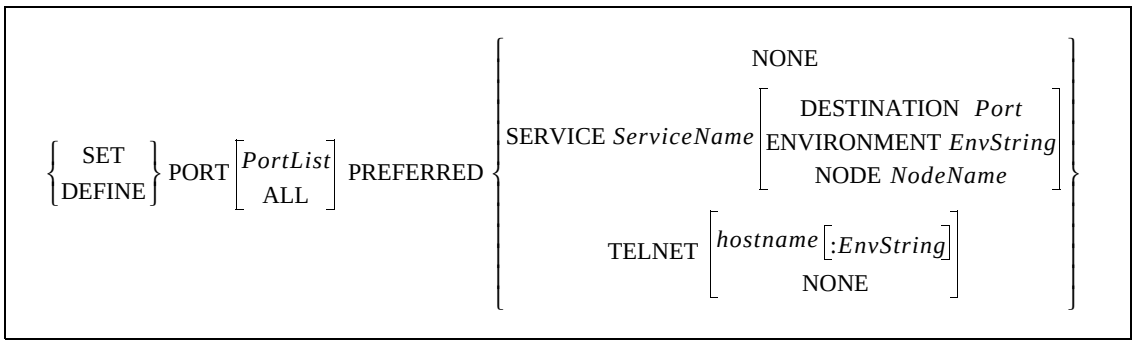
**Parameters**

**PortList/All**
Specifies a particular port or group of ports, or all ports. Port numbers are specified with integers between 1 and the total number of physical ports. Lists of ports must be separated by commas. Ranges of ports must be separated by a dash (-).

**Note:** *In the absence of a PortList or the All parameter, the configuration will affect the current port only.*

**See Also** Set/Define Server Login Password, page 12-71; Show/Monitor/List Ports, page 12-102; *System Passwords*, page 3-8; *Password Restrictions*, page 5-14.

# 12.43.29 Set/Define Port Preferred




Specifies a default service (either LAT or Telnet) for this port. The ETS will attempt to use the preferred service for Autoconnecting, and when no service name is specified in a Connect, Telnet, or Rlogin command. Note that via the environment string, a preferred host can be connected to via Rlogin, not just Telnet.

**Applies To** EPS4, ETS4P, ETS8, ETS8P, ETS16, ETS16P

**Restrictions** You must be the privileged user to use this command.

**Parameters**

**PortList/All**
Specifies a particular port or group of ports, or all ports. Port numbers are specified with integers between 1 and the total number of physical ports. Lists of ports must be separated by commas. Ranges of ports must be separated by a dash (-).

**Note:** *In the absence of a PortList or the All parameter, the configuration will affect the current port only.*

**None**
Clears any previously-configured preferred host.

**ServiceName**
Specify a LAT service for the Preferred connection. The Service keyword is optional.

**Destination port**
Specifies a connection to a particular port on the dedicated host.

**Node NodeName**
Specifies a connection to a particular node on the dedicated host.

**Environment EnvString**
Sets up the connection environment before the session is started. The string is constructed with a sequence of key letters, some of which are prefaced by either "+" or "-." The generic key letters are:

**Table 12-6:** Environment Strings

| Letter | Action |
|---|---|
| D | Backspace Mode (**+D**) or Delete Mode (**-D**) |
| E | Local Echo Mode (**+E**) or Remote Echo Mode (**-E**) |
| I | Interactive Mode |
| P | Passall Mode (**+P**) or Passthru Mode (**-P**) |
| C | CR becomes CRLF (**+C**) or CR becomes LF (**-C**) |
| T | TCP Mode (raw uninterpreted data stream) |
| R | Rlogin protocol (sets port number to 513 if not already set) |
| U | UDP protocol |
| Q | Queued (RTEL) connection to the target |
| *nnn* | optional port number |

**Telnet hostname**
Specify a Telnet host to use for the Preferred connection. Either a text host name or an IP address can be used. Environment strings can be added, such as **:R** which configures a preferred Rlogin connection.

**Examples**

```
Local> SET PORT PREFERRED Vax5

Local> SET PORT PREFERRED TELNET 192.0.1.3:+C+D

Local> SET PORT PREFERRED TELNET TODD
```

**See Also**
Connect, page 12-9; Rlogin, page 12-20; Set/Define Port Autoconnect, page 12-29; Set/Define Port Dedicated, page 12-34; Telnet, page 12-115; Show/ Monitor/List Ports, page 12-102; *Environment Strings*, page 2-15; *Preferred Services and Hosts*, page 5-4.

# 12.43.30 Set/Define Port Printer


Controls whether the ETS will check to make sure the port is online before sending data to it. In the case of serial ports, online is defined as the presence of the DSR signal.

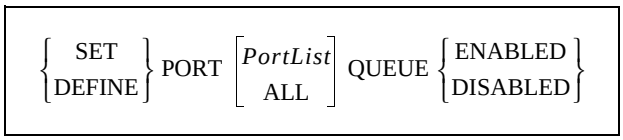
**Applies To** EPS4, ETS4P, ETS8, ETS8P, ETS16, ETS16P

**Restrictions** You must be the privileged user to use this command.

**Parameters** **PortList/All**
Specifies a particular port or group of ports, or all ports. Port numbers are specified with integers between 1 and the total number of physical ports. Lists of ports must be separated by commas. Ranges of ports must be separated by a dash (-).

**Note:** *In the absence of a PortList or the All parameter, the configuration will affect the current port only.*

# 12.43.31 Set/Define Port Queue




Determines whether the port will be "queued" when it requests a connection to a LAT service that is busy. If queueing is enabled, the connection will be accepted in the order in which it was received by the target node. If queueing is disabled, the connection will be rejected.

**Applies To** ETS4P, ETS8, ETS8P, ETS16, ETS16P

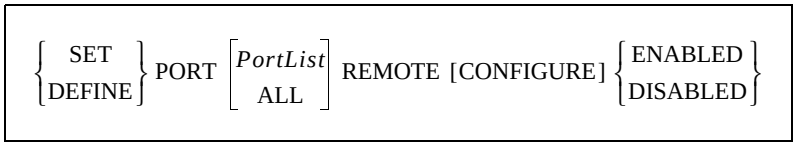
**Restrictions** You must be the privileged user to use this command.

**Parameters** **PortList/All**
Specifies a particular port or group of ports, or all ports. Port numbers are specified with integers between 1 and the total number of physical ports. Lists of ports must be separated by commas. Ranges of ports must be separated by a dash (-).

**Note:** *In the absence of a PortList or the All parameter, the configuration will affect the current port only.*

**See Also** Set/Define Port Security, page 12-49; Show/Monitor/List Ports, page 12-102.

## 12.43.32 Set/Define Port Remote Configure




Controls whether actions on a remote LAT/VMS host are allowed to affect the local port on the ETS. If this feature is enabled, the VMS Set Term/Speed command, for instance, will change the terminal server port (using LAT) to the specified speed.

**Applies To** EPS4, ETS4P, ETS8, ETS8P, ETS16, ETS16P

**Restrictions** You must be the privileged user to use this command.

PortList/All

**Parameters**

**Port List/All**
Specifies a particular port or group of ports, or all ports. Port numbers are specified with integers between 1 and the total number of physical ports. Lists of ports must be separated by commas. Ranges of ports must be separated by a dash (-).

**Note:** *In the absence of a PortList or the All parameter, the configuration will affect the current port only.*

**See Also** Show/Monitor/List Ports, page 12-102.

## 12.43.33 Set/Define Port Security


Restricts a port's access to terminal commands and its ability to get information about other ports.

**Applies To** EPS4, ETS4P, ETS8, ETS8P, ETS16, ETS16P

**Restrictions** You must be the privileged user to use this command.

**Parameters**

**PortList/All**
Specifies a particular port or group of ports, or all ports. Port numbers are specified with integers between 1 and the total number of physical ports. Lists of ports must be separated by commas. Ranges of ports must be separated by a dash (-).

**Note:** *In the absence of a PortList or the All parameter, the configuration will affect the current port only.*

**See Also** Show/Monitor/List Ports, page 12-102; Security, page 5-14.

# 12.43.34 Set/Define Port Session Limit


Limits the number of active sessions on a port. The maximum allowed sessions on any one port cannot exceed the server session limit (8).

To view the server session limit, enter the Show ETS command.

**Applies To** EPS4, ETS4P, ETS8, ETS8P, ETS16, ETS16P

**Restrictions** You must be the privileged user to use this command.

**Parameters**

**PortList/All**
Specifies a particular port or group of ports, or all ports. Port numbers are specified with integers between 1 and the total number of physical ports. Lists of ports must be separated by commas. Ranges of ports must be separated by a dash (-).

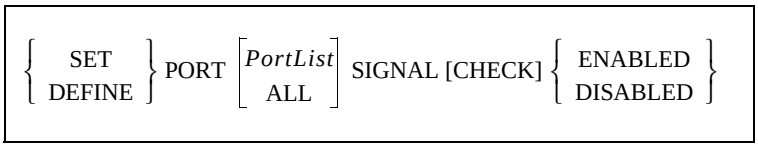
**Note:** *In the absence of a PortList or the All parameter, the configuration will affect the current port only.*

**limit**
Ports can have 0 to 8 sessions. The default limit is 4 sessions.

**None**
Allows the maximum number of sessions allowed on the server.

**See Also** Set/Define Server Session Limit, page 12-80;Show/Monitor/List Ports, page 12-102; Show/Monitor/List Server, page 12-108; *Configuring Your Port*, page 6-2.

# 12.43.35 Set/Define Port Signal Check




Determines whether or not the port will check for the DSR signal when remote connections are made. If this feature is enabled, remote connections to the port will not be permitted unless the DSR signal is asserted. If this command is specified on a parallel port, the parallel status lines will be decoded to determine if the printer is attached and on-line.

**Applies To** EPS4, ETS4P, ETS8, ETS8P, ETS16, ETS16P

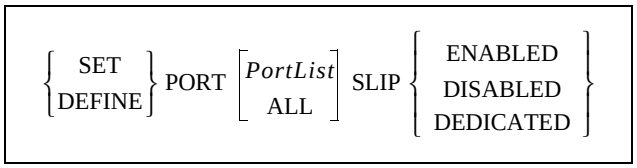
**Restrictions** You must be the privileged user to use this command.

**Parameters** **PortList/All**
Specifies a particular port or group of ports, or all ports. Port numbers are specified with integers between 1 and the total number of physical ports. Lists of ports must be separated by commas. Ranges of ports must be separated by a dash (-).

**Note:** *In the absence of a PortList or the All parameter, the configuration will affect the current port only.*

**See Also** Show/Monitor/List Ports, page 12-102; *DSR for Controlling Remote Logins*, page 5-8.

## 12.43.36 Set/Define Port SLIP




Determines whether the port will be able to start SLIP sessions with the Set SLIP command. Define SLIP Port n implicitly enables SLIP on the port.

**Applies To** EPS4, ETS4P, ETS8, ETS8P, ETS16, ETS16P

**Restrictions** You must be the privileged user to use this command.

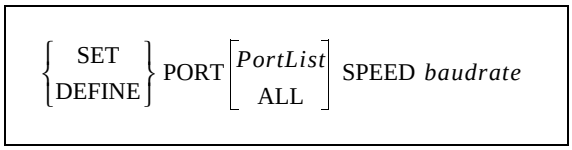
**Errors** SLIP cannot be configured for Virtual ports (Port 0).

**Parameters** **PortList/All**
Specifies a particular port or group of ports, or all ports. Port numbers are specified with integers between 1 and the total number of physical ports. Lists of ports must be separated by commas. Ranges of ports must be separated by a dash (-).

**Note:** *In the absence of a PortList or the All parameter, the configuration will affect the current port only.*

**See Also** Clear/Purge SLIP, page 12-8; Set/Define SLIP, page 12-95; Show/List SLIP, page 12-112; Show/Monitor/List Ports, page 12-102; *Serial Line Internet Protocol (SLIP)*, page 2-12; *SLIP*, page 4-6.

## 12.43.37 Set/Define Port Speed




Configures what baud rate will be used for connections to and from this port.

**Applies To** EPS4, ETS4P, ETS8, ETS8P, ETS16, ETS16P

**Restrictions** You must be the privileged user to use this command.

**Parameters** **PortList/All**
Specifies a particular port or group of ports, or all ports. Port numbers are specified with integers between 1 and the total number of physical ports. Lists of ports must be separated by commas. Ranges of ports must be separated by a dash (-).

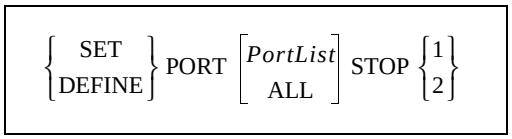
**Note:** *In the absence of a PortList or the All parameter, the configuration will affect the current port only.*

**baudrate**
Acceptable baud rates include 300, 600, 1200, 2400, 4800, 9600, 19200, 38400, 57600, and 115200, and 230400 (Fast Ethernet print servers only).

**Examples**
```
Local> DEFINE PORT 7-8 SPEED 9600
```

**See Also** Set/Define Port Autobaud, page 12-28; Show/Monitor/List Ports, page 12-102; *Baud Rate*, page 5-2.

## 12.43.38 Set/Define Port Stop




Configures whether the port will use one or two stop bits. The default is to use one stop bit.

**Applies To** EPS4, ETS4P, ETS8, ETS8P, ETS16, ETS16P

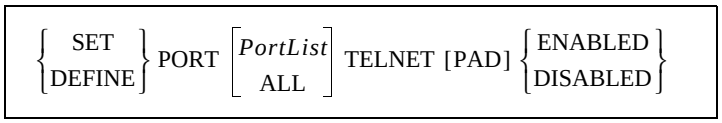
**Restrictions** You must be the privileged user to use this command.

**Parameters** **PortList/All**
Specifies a particular port or group of ports, or all ports. Port numbers are specified with integers between 1 and the total number of physical ports. Lists of ports must be separated by commas. Ranges of ports must be separated by a dash (-).

**Note:** *In the absence of a PortList or the All parameter, the configuration will affect the current port only.*

**See Also** Set/Define Port Parity, page 12-44; Set/Define Port Character Size, page 12-33; Show/Monitor/List Ports, page 12-102; *Parity, Character Size, and Stop Bits*, page 5-4.

# 12.43.39 Set/Define Port Telnet Pad




Determines whether the server will automatically pad carriage returns with null characters during Telnet sessions. It is enabled by default.

**Applies To** EPS4, ETS4P, ETS8, ETS8P, ETS16, ETS16P

**Restrictions** You must be the privileged user to use this command.

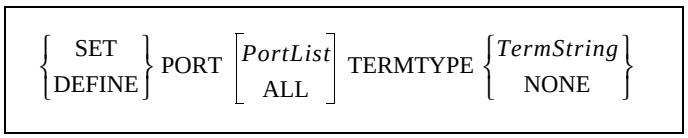
**Parameters**

**PortList/All**
Specifies a particular port or group of ports, or all ports. Port numbers are specified with integers between 1 and the total number of physical ports. Lists of ports must be separated by commas. Ranges of ports must be separated by a dash (-).

**Note:** *In the absence of a PortList or the All parameter, the configuration will affect the current port only.*

**See Also** Show/Monitor/List Ports, page 12-102; *Other TCP/IP Parameters*, page 4-5.

# 12.43.40 Set/Define Port Termtype




Specifies a terminal type for the port. This terminal type is reported to the destination node in Telnet and Rlogin commands, and is a completely arbitrary string.

**Applies To** EPS4, ETS4P, ETS8, ETS8P, ETS16, ETS16P

**Parameters**

**PortList/All**
Specifies a particular port or group of ports, or all ports. Port numbers are specified with integers between 1 and the total number of physical ports. Lists of ports must be separated by commas. Ranges of ports must be separated by a dash (-).

**Note:** *In the absence of a PortList or the All parameter, the configuration will affect the current port only.*

**TermString**
Up to 8 characters long, converted to all uppercase unless enclosed in quotes.

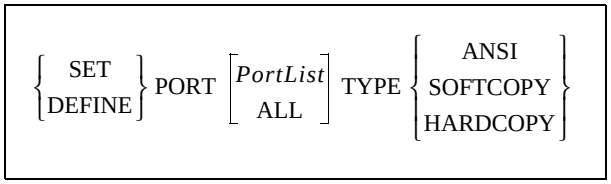
**None**
Clears the terminal type field. No type is configured by default.

**Examples**

```
Local> DEF Port 7 TERMTYPE “vt100”
```

**See Also** Show/Monitor/List Ports, page 12-102; *Terminal Type*, page 5-13.

## 12.43.41 Set/Define Port Type




Describes the type of device connected to the port.

**Applies To** EPS4, ETS4P, ETS8, ETS8P, ETS16, ETS16P

**Parameters**

**PortList/All**
Specifies a particular port or group of ports, or all ports. Port numbers are specified with integers between 1 and the total number of physical ports. Lists of ports must be separated by commas. Ranges of ports must be separated by a dash (-).

**Note:** *In the absence of a PortList or the All parameter, the configuration will affect the current port only.*

**ANSI**
VT100-compatible devices.

**Softcopy**
VT100 without clear screen or cursor controls (the default).

**Hardcopy**
Deleted characters are echoed between backslashes; there is no cursor movement.

**See Also** Show/Monitor/List Ports, page 12-102; *Other Port Characteristics*, page 5-11.

## 12.43.42 Set/Define Port Username


Specifies a username for the port. When a username is defined, users will not be asked to enter a username when logging in to the port.

**Applies To** EPS4, ETS4P, ETS8, ETS8P, ETS16, ETS16P

**Parameters**

**PortList/All**
Specifies a particular port or group of ports, or all ports. Port numbers are specified with integers between 1 and the total number of physical ports. Lists of ports must be separated by commas. Ranges of ports must be separated by a dash (-).

**Note:** *In the absence of a PortList or the All parameter, the configuration will affect the current port only.*

**username**
A username can be up to 16 characters long. The name is converted to all uppercase unless it is enclosed in quotes.

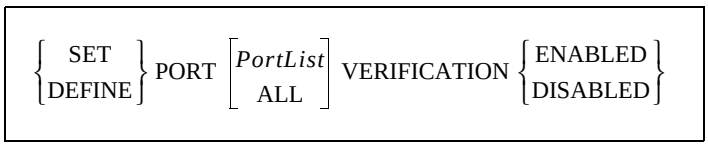
**None**
Removes any previously-configured username. No username is configured by default.

**Examples**

```
Local> SET PORT USERNAME “Ted Smith” COMMAND COMPLETION
ENABLED
```

**See Also** Show/Monitor/List Ports, page 12-102; *Port Names*, page 5-13.

# 12.43.43 Set/Define Port Verification




Determines whether the ETS will issue informational messages whenever a session is connected, disconnected, or switched. It is disabled by default.

Dedicating a port will disable port verification. See **Set/Define Port Dedicated** on page 12-34 for more information.

**Applies To** EPS4, ETS4P, ETS8, ETS8P, ETS16, ETS16P

**Restrictions** You must be the privileged user to enter this command for a port other than your own (the current port).

**Parameters**

**PortList/All**
Specifies a particular port or group of ports, or all ports. Port numbers are specified with integers between 1 and the total number of physical ports. Lists of ports must be separated by commas. Ranges of ports must be separated by a dash (-).

**Note:** *In the absence of a PortList or the All parameter, the configuration will affect the current port only.*

**See Also** Show/Monitor/List Ports, page 12-102; *Other Port Characteristics*, page 5-11; *Port Messages*, page 5-13.

# 12.44 Set Privileged/Noprivileged

SET { PRIVILEGED[OVERRIDE] | NOPRIVELEGED }

Changes the current port's privilege status, provided the correct privileged password is entered. The factory default privileged password is **system**; this password can be changed with the **Set ETS Privileged Password** command. If the password is forgotten, the ETS can be reset to factory defaults.

**Note:** *Only one port on the ETS can be privileged at any time.*

EPS4, ETS4P, ETS8, ETS8P, ETS16, ETS16P

**Restrictions** The user must know the privileged password. Secure users cannot become privileged.

**Parameters**

**Override**
Forces the current port to become the privileged port; the previously privileged port loses the privilege.

**Examples**

```
Local> SET NOPRIVILEGED

Password> system (not echoed)

Local> SET PRIVILEGED OVERRIDE

Password> system (not echoed)
```

**See Also** Set/Define Server Privileged Password, page 12-76; *Privileged Password*, page 3-8.

# 12.45 Set/Define Protocols Commands

## 12.45.1 Define Protocols AppleTalk

{ SET | DEFINE } PROTOCOLS APPLETALK { { ENABLED | DISABLED } | DEVICETYPE *name* | ZONE *ZoneName* }

Enables or Disables the AppleTalk protocol on the ETS, and allows placement of the ETS into a zone other than the default when there is more than one available AppleTalk zone.

**Applies To** EPS4, ETS4P, ETS8, ETS8P, ETS16, ETS16P

**Restrictions** You must be the privileged user to use this command.

**Errors** If the zone specified cannot be confirmed by a router, the command will fail.

Enabled and Disabled must be configured with Define.

**Parameters**

**Devicetype**
Changes what NBP type is used to advertise the attached printer. The default is to advertise printers as LaserWriters.

**name**
Enter the new NBP type enclosed in quotes.

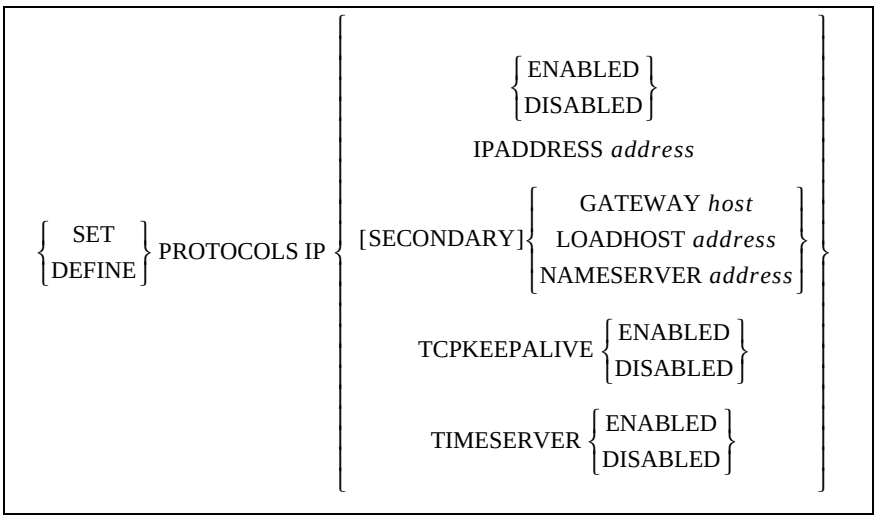
**ZoneName**
Name of the zone to move the ETS into.

**Examples**

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

**See Also** Show/Monitor/List Protocols, page 12-104; *AppleTalk Server Parameters*, page 4-2.

## 12.45.2 Define Protocols IP




Enables or Disables the IP protocol, and allows configuration of other IP parameters. Some parameters may be duplicates of **Set ETS** commands; the functionality is identical. See the Set ETS commands for descriptions of the parameters not explained here.

**Applies To** EPS4, ETS4P, ETS8, ETS8P, ETS16, ETS16P

**Restrictions** You must be the privileged user to use this command.

**Errors** Enabled/Disabled parameters must be defined.

**Parameters**

**TCPKeepalive**
Controls whether the ETS will send TCP keepalive messages. It is enabled by default, and should remain enabled unless you are absolutely sure you want to disable it.

**Timeserver**
Controls whether the ETS will send IP daytime request packets. It is enabled by default.

**See Also** Set/Define Server IPaddress, page 12-69; Set/Define Server Gateway, page 12-66; Set/Define Server Loadhost, page 12-70; Set/Define Server Nameserver, page 12-73; *TCP/IP Server Parameters*, page 4-5; *Installation Guide*.

## 12.45.3 Define Protocols LAN Manager

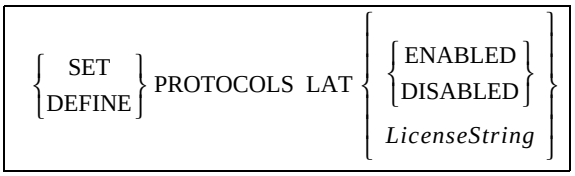

Enables or Disables the LAN Manager protocol.

**Applies To** EPS4, ETS4P, ETS8, ETS8P, ETS16, ETS16P

**Restrictions** You must be the privileged user to use this command.

**See Also** *LAN Manager*, page 2-4.

## 12.45.4 Set/Define Protocols LAT




Enables or Disables the LAT protocol, and allows the ETS administrator to enter the string needed to enable LAT functionality. The license number must be entered before any LAT functionality is available.

**Applies To** EPS4, ETS4P, ETS8, ETS8P, ETS16, ETS16P

**Restrictions** You must be the privileged user to use this command.

**Errors** Enabled/Disabled parameters must be defined.

LicenseString is not needed for single-port servers.

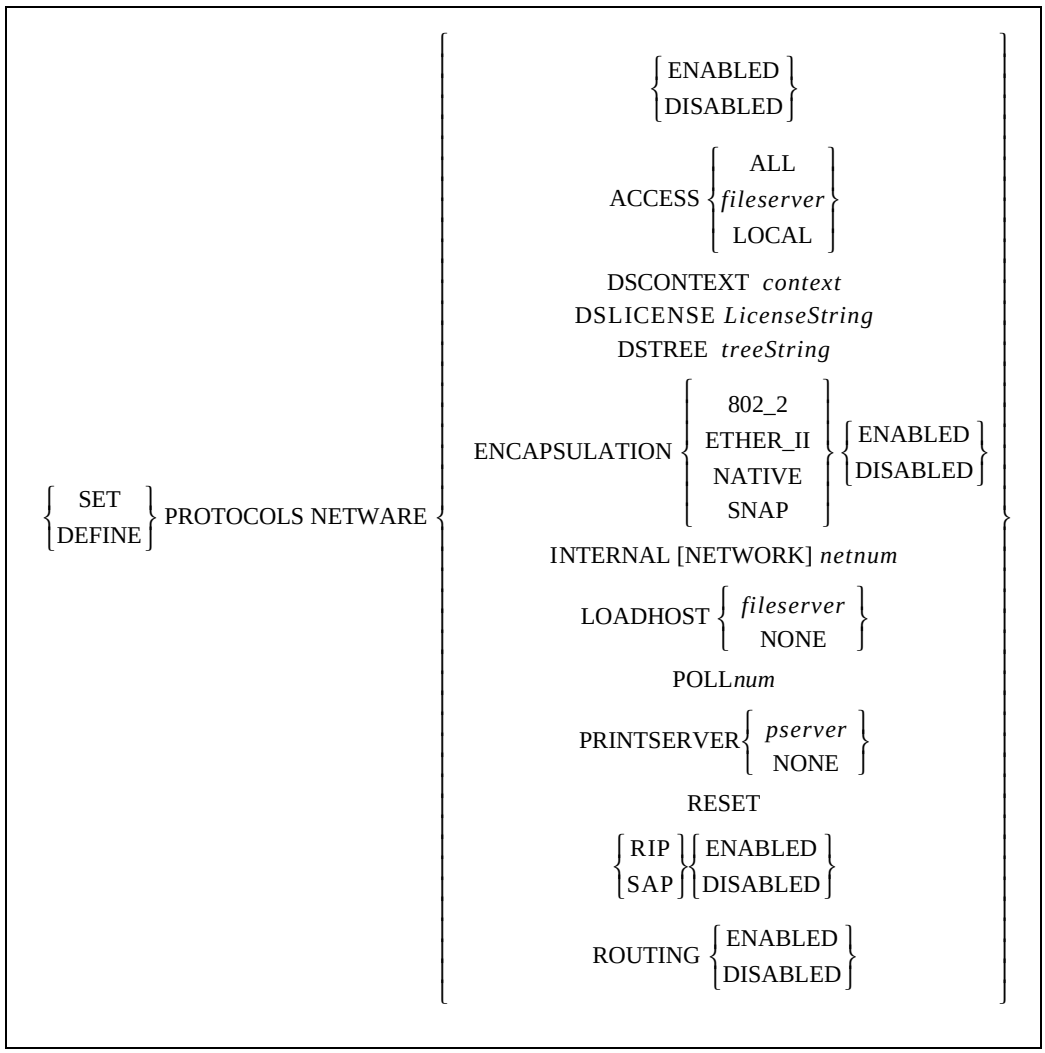
**Parameters**

**LicenseString**
The license string, used to enable LAT functionality on the unit, can be obtained by calling Lantronix.

**Note:** *Because the LAT license string is stored in NVR, it must be re-entered after resetting the unit to factory defaults or restoring NVR.*

**See Also** *LAT*, page 2-5.

## 12.45.5 Set/Define Protocols NetWare




Enables or disables the NetWare protocol, and configures NetWare-related settings.

**Applies To** EPS4, ETS4P, ETS8, ETS8P, ETS16, ETS16P

**Restrictions** You must be the privileged user to use this command.

Enabled/Disabled can only be configured using the Define command.

**Parameters**

**Access**
Allows configuration of a list of fileservers that the ETS will contact for print jobs. By default, only fileservers on the local network will be queried; this command can be used to add or remove additional fileservers.

**All**
All fileservers will be contacted, including those on routed networks.

**fileserver**
An individual fileserver to be queried. The name can be up to 8 characters long.

**Local**
Only fileservers on the local network will be queried.

**DSContext**
Configures the NetWare Directory Service context where the ETS is located.

**context**
Specify the NDS context where the ETS is located. For more information about the format of the NDS context and tree, see your host documentation.

**DSLicense**
Configures the NetWare Directory Service license needed to enable NDS on the ETS.

**LicenseString**
Enter the license string obtained from Lantronix to enable NDS on your ETS.

**DSTree**
Configures the NetWare Directory Service tree in which the ETS is located.

**treeString**
Specify the NDS tree using up to 47 alphanumeric characters.

**Encapsulation**
In conjunction with the **Routing** option, this option configures which frame types the ETS will pay attention to. When routing is enabled, all frame types are enabled; any undesired frame types may then be disabled with this command. When routing is disabled, all frame types are disabled; the desired single frame type may then be enabled using this command.

**802_2**
The ETS uses 802.2 frame format with NetWare SAPs.

**Ether_II**
The ETS uses Ethernet v2 frame format.

**Native**
The ETS uses “native mode” NetWare frame format.

**Snap**
The ETS uses 802.2 frame format with SNAP SAPs.

**Network**
Sets the internal network number for the ETS. This number becomes the ETS's address when routing packets between nodes speaking different NetWare frame types. Under normal circumstances, the default internal network number should not have to be changed.

**netnum**
A non-zero network number of up to eight hexadecimal digits in length.

**Loadhost**
Specifies the name of the fileserver to attempt to download from when the unit is booted. This parameter is only useful if it is defined; if it is Set, it will be cleared/reset at boot time.

**fileserver**
The fileserver name can be up to 8 characters long. The null string (" ") returns the setting to undefined.

**None**
Clears the previously-configured loadhost.

**Poll**
Sets the poll interval, in seconds, for print jobs. The default interval is 60 seconds.

**num**
Enter a number from 1 to 255.

**Printserver**
Configure the fileserver to which the ETS will be dedicated for Rprinter operation.

**pserver**
The printserver name can be up to 8 characters long. The null string (" ") returns the setting to undefined.

**None**
Clears the previously configured printserver.

**Reset**
Instructs the Print ETS module to immediately rescan the network for new connections. This is typically necessary when setting up queues or print servers using PCONSOLE.

**RIP/SAP**
Enables or disables RIP/SAP broadcasts from this node.

**Routing**
Configures whether the ETS will act as an internal router. If routing is enabled, the ETS advertises all of its NetWare services as part of an internal network and itself as a "router" to that network.

Turning routing on enables all frame types. Turning routing off disables all frame types; you must then enable the single desired frame type using the **Encapsulation** option. Routing must be enabled if more than one frame type is desired.

**Examples**

```
Local>> DEFINE PROTOCOLS NETWARE ACCESS LAB_FS4

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

Local>> DEFINE PROTOCOLS NETWARE DSTREE foodco

Local>> DEFINE PROTOCOLS NETWARE INTERNAL a3cc0850

Local>> DEFINE PROTOCOLS NETWARE LOADHOST LAB_FS4

Local>> DEFINE PROTOCOLS NETWARE PRINTSERVER LAB_FS4

Local>> DEFINE PROTOCOLS NETWARE ENCAPSULATION ETHER_II
DISABLED
```

**See Also** Set/Define Protocols NetWare, page 12-59; Set/Define Server NetWare Loadhost, page 12-74; Set/Define Server NetWare Printserver, page 12-74; Set/Define Server Software, page 12-82; Show/Monitor/List Protocols, page 12-104; *NetWare*, page 2-16; *NetWare Server Parameters*, page 4-4; *Node Limit*, page 4-3; *Creating NDS Print Queues with PCONSOLE*, page 8-3; *Installing a Print Queue Using PCONSOLE*, page 8-7.

# 12.46 Set/Define Server Commands

## 12.46.1 Set/Define Server Announcements


Governs whether the ETS will send service advertising messages and MOP remote console announcements over the network.

**Applies To** EPS4, ETS4P, ETS8, ETS8P, ETS16, ETS16P

**Restrictions** You must be the privileged user to use this command.

## 12.46.2 Set/Define Server Bootgateway

{SET / DEFINE} SERVER BOOTGATEWAY *IPaddress*

Specifies a server to send packets to when downloading code so that units can boot without needing proxy arp on the router. This is **not** the loadhost—the packets will be addressed to the loadhost, but will be physically set to the bootgateway host.

**Applies To** EPS4, ETS4P, ETS8, ETS8P, ETS16, ETS16P

**Restrictions** You must be the privileged user to use this command.

**See Also** *Editing the Boot Parameters,* page 3-7.

## 12.46.3 Set/Define Server BOOTP

{SET / DEFINE} SERVER BOOTP {ENABLED / DISABLED}

Enables or disables querying for a BOOTP host at system boot time.

**Applies To** EPS4, ETS4P, ETS8, ETS8P, ETS16, ETS16P

**Restrictions** You must be the privileged user to use this command.

**See Also** Set/Define Server RARP, page 12-78; *Editing the Boot Parameters*, page 3-7.

## 12.46.4 Set/Define Server Broadcast

{SET / DEFINE} SERVER BROADCAST {ENABLED / DISABLED}

Enables or disables broadcasts from Local mode to the server's serial ports.

**Applies To** EPS4, ETS4P, ETS8, ETS8P, ETS16, ETS16P

**Restrictions** You must be the privileged user to use this command.

**See Also** Broadcast, page 12-4; Set/Define Port Broadcast, page 12-32; *Port Messages*, page 5-13.

## 12.46.5 Set/Define Server Buffering

{SET | DEFINE} SERVER BUFFERING *buffersize*

Specifies the size of buffer (in bytes) to use for network connections. The ETS's default setting should be sufficient for most cases. The size can be increased for larger data transfers such as file transfers or printing.

**Applies To** EPS4, ETS4P, ETS8, ETS8P, ETS16, ETS16P

**Restrictions** You must be the privileged user to use this command.

**Parameters** **buffersize**
Acceptable buffer sizes range from 128 bytes to 4096 bytes.

**Defaults** ETS4P, ETS8P, and ETS16P: 2048
Other units: 512

**Examples**

```
Local> SET SERVER BUFFERING 1024
```

## 12.46.6 Set/Define Server Circuit Timer

{SET | DEFINE} SERVER CIRCUIT [TIMER] *TimerValue*

Specifies the delay between LAT messages transmissions from the ETS to other nodes. This setting should not need to be changed under normal circumstances, and should **never** be altered while there are active sessions.

**Applies To** EPS4, ETS4P, ETS8, ETS8P, ETS16, ETS16P

**Restrictions** You must be the privileged user to use this command.

**Parameters** **TimerValue**
Specify a timer value from 30 to 200 milliseconds. The default is 80 milliseconds.

**Examples**

```
Local> SET SERVER CIRCUIT TIMER 55
```

**See Also** *LAT*, page 2-5; *Server Identification*, page 4-3.

## 12.46.7 Set/Define Server Console

{SET | DEFINE} SERVER CONSOLE [PORT] *PortNum*

Specifies which of the server's ports acts as the console port. The console receives all error messages and is the only port that is enabled at boot time. Note that changing the console port settings (such as baud rate or parity) while the server is in operational mode will also change the boot mode settings.

**Applies To** EPS4, ETS4, ETS8, ETS8P, ETS16, ETS16P

**Restrictions** You must be the privileged user to use this command.

**Parameters** **PortNum**
Enter a port number from 1 to the total number of ports.

**Examples**
```
Local> SET SERVER CONSOLE 5
```

**See Also** Set/Define Port Character Size, page 12-33; Set/Define Port Parity, page 12-44; Set/Define Port Speed, page 12-51; *Serial Configuration*, page 5-2; *Installation Guide*.

## 12.46.8 Set/Define Server Domain

{SET | DEFINE} SERVER DOMAIN *DomainName*

Specifies the default domain name to use when attempting to resolve text TCP/IP host names.

**Applies To** EPS4, ETS4P, ETS8, ETS8P, ETS16, ETS16P

**Restrictions** You must be the privileged user to use this command.

**Parameters** **DomainName**
The maximum length for domain names is 64 characters.

**Examples**
```
Local> SET SERVER DOMAIN weasel.ctcorp.com
```

**See Also** Show/Monitor/List Protocols IP, page 12-104; *TCP/IP*, page 2-7.

## 12.46.9 Set/Define Server DHCP

{SET | DEFINE} SERVER DHCP {ENABLED | DISABLED}

Enables or disables querying for a DHCP host at system boot time.

**Applies To** EPS4, ETS4P, ETS8, ETS8P, ETS16, ETS16P

**Restrictions** You must be the privileged user to use this command.

**Errors** Configuring an IP address will automatically disable DHCP.

Enabling DHCP will remove the IP address saved in NVR.

**See Also** Set/Define Server BOOTP, page 12-63; Set/Define Server IPaddress, page 12-69; Set/Define Server RARP, page 12-78; *Dynamic Host Control Protocol (DHCP)*, page 2-10; *Editing the Boot Parameters*, page 3-7.

## 12.46.10 Set/Define Server Gateway

{ SET / DEFINE } SERVER [SECONDARY] GATEWAY *IPaddress*

Specifies the host to be used as a TCP/IP gateway between networks. Packets destined for a different network will be directed to the gateway for forwarding.

**Applies To** EPS4, ETS4P, ETS8, ETS8P, ETS16, ETS16P

**Restrictions** You must be the privileged user to use this command.

**Errors** If no gateway is defined, an error message is returned.

**Parameters**

**Secondary**
If desired, a secondary gateway can be configured for use when the primary gateway is unavailable.

**IPaddress**
Enter an IP address in standard numeric format. Specifying “0.0.0.0” as the address clears any previously-defined setting.

**Examples**

```
Local> SET SERVER GATEWAY 192.0.1.27

Local> SET SERVER SECONDARY GATEWAY 192.0.1.10
```

**See Also** Set/Define Server Nameserver, page 12-73; Set/Define Server Subnet Mask, page 12-83; Show/Monitor/List Protocols, page 12-104; *TCP/IP*, page 2-7; *TCP/IP Server Parameters*, page 4-5.

## 12.46.11 Set/Define Server Groups

See Set/Define Server Service Groups on page 12-80.

## 12.46.12 Set/Define Server Host Limit


Configures the maximum number of TCP/IP hosts about which the ETS will keep information. Only hosts seen with rwho broadcasts are subject to this limit.

**Applies To** EPS4, ETS4P, ETS8, ETS8P, ETS16, ETS16P

**Restrictions** You must be the privileged user to use this command.

**Parameters**

**limit**
The ETS can be limited to between 0 and 200 hosts. The default is 20 hosts.

If the new limit is less than the current limit and the host table is full, the host limit will be slowly graduated down to the new value.

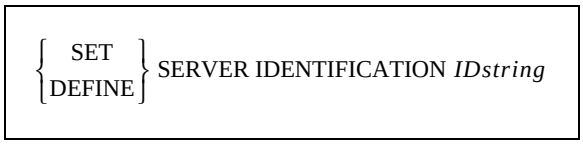
**None**
No limit is imposed.

**Examples**

```
Local> SET SERVER HOST LIMIT 6
```

**See Also** Clear/Purge Hosts, page 12-5; Show/Monitor/List Hosts, page 12-100; Show/Monitor/List Protocols, page 12-104; *Host Limit*, page 4-6.

## 12.46.13 Set/Define Server Identification




Specifies the identification string that is broadcast along with LAT service messages. The identification string is also broadcast as the ident string for a LAT login service.

**Applies To** EPS4, ETS4P, ETS8, ETS8P, ETS16, ETS16P

**Restrictions** You must be the privileged user to use this command.

**Parameters**

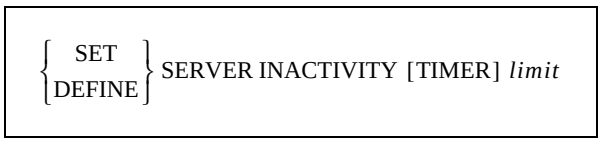
**IDstring**
Enter up to 40 characters of identification data in quotes.

**Examples**

```
Local> SET SERVER IDENTIFICATION “Googol Company LAT Box”
```

**See Also** Set/Define Protocols LAT, page 12-58; Show/Monitor/List Protocols, page 12-104; Show/Monitor/List Server, page 12-108; *Server Identification*, page 4-3.

# 12.46.14 Set/Define Server Inactivity Timer




Sets the period of time after which a port with Inactivity Logout enabled is considered inactive and automatically logged out.

**Applies To** EPS4, ETS4P, ETS8, ETS8P, ETS16, ETS16P, MSS

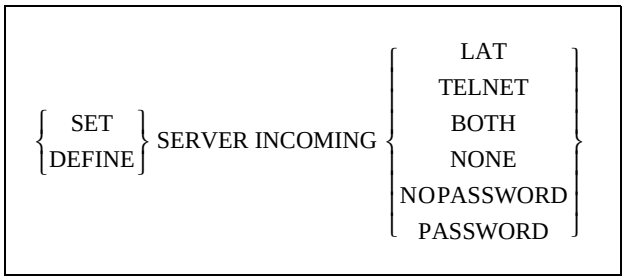
**Restrictions** You must be the privileged user to use this command.

**Parameters** **limit**
Enter the desired inactivity period in minutes. The default is 30 minutes.

**Examples**
```
Local> DEFINE SERVER INACTIVITY LIMIT 20
```

**See Also** Set/Define Port Inactivity Logout, page 12-41; Show/Monitor/List Server, page 12-108; *Inactivity Logout, page 5-16*.

# 12.46.15 Set/Define Server Incoming




Allows or denies incoming LAT or Telnet connections and enforces password protection, if desired. The Show ETS command shows the status of incoming connection parameters.

**Applies To** EPS4, ETS4P, ETS8, ETS8P, ETS16, ETS16P

**Restrictions** You must be the privileged user to use this command.

**Parameters** **LAT**
Enables incoming LAT connections only, and creates a new LAT service that is used to log into the ETS.

**Telnet**
Enables incoming Telnet connections only. The status of incoming Telnet also controls incoming Rlogin sessi

ons from remote hosts. It also removes any LAT-created or Both-created service and the ability to log in using LAT.

**Both**
Enables incoming LAT and Telnet connections, and creates a new LAT service that is used to log into the ETS.

**None**
Disables incoming LAT and Telnet connections (the default).

It also removes any LAT-created or Both-created service and the ability to log in using LAT.

**Nopassword**
Allows the establishment of incoming connections without prompting for a password (the default).

**Password**
Causes the ETS to prompt for a password for all incoming connections.

**Examples**

```
Local> SET SERVER INCOMING TELNET INCOM PASSW
(sets up password protected Telnet logins)
```

**See Also** Show/Monitor/List Server, page 12-108; *LAT and TCP/IP Connectivity*, page 2-15; *System Passwords, page 3-8.*

## 12.46.16 Set/Define Server IPaddress

{SET | DEFINE} SERVER IPADDRESS *IPaddress*

Sets the ETS's IP network address. The IP address must be set before any TCP/IP connectivity is available (i.e., Telnet, Rlogin, and Reverse Telnet) and before EZWebCon can be used. It cannot be changed when there are active TCP/IP sessions. A default subnet mask will also be created when you set the IP address; it can be overridden with the Set ETS Subnet Mask command.

**Note:** *If the IP address is cleared after a reboot but List ETS still shows the address, there is some other node on the network responding to that IP address.*

**Applies To** EPS4, ETS4P, ETS8, ETS8P, ETS16, ETS16P

**Restrictions** You must be the privileged user to use this command.

**Errors** Configuring an IP address will automatically disable DHCP.

**Parameters**

**IPaddress**
Enter the address in standard numeric format.

**Examples**

```
Local> SET SERVER IPADDRESS 192.0.1.49
```

**See Also** Set/Define Server Console, page 12-65; Set/Define Server Subnet Mask, page 12-83; Show/Monitor/List Server, page 12-108; Show/Monitor/List Protocols, page 12-104; *TCP/IP*, page 2-7; *Dynamic Host Control Protocol (DHCP)*, page 2-10.

## 12.46.17 Set/Define Server Keepalive Timer

{ SET / DEFINE } SERVER KEEPALIVE[TIMER]*time*

Sets the period in seconds between "hello" messages on active, but quiet, LAT sessions.

**Applies To** EPS4, ETS4P, ETS8, ETS8P, ETS16, ETS16P

**Restrictions** You must be the privileged user to use this command.

**Parameters**

**time**
Enter a number from 10 to 180.

**Examples**

```
Local> SET SERVER KEEPALIVE TIMER 30
```

**See Also** Show/Monitor/List Server, page 12-108; *Server Identification*, page 4-3.

## 12.46.18 Set/Define Server Loadhost

{ SET / DEFINE } SERVER [SECONDARY] LOADHOST *IPaddress*

Specifies the TCP/IP host from which the ETS requests its runtime code. For LAT-loading ETSs, this command has no function.

**Applies To** EPS4, ETS4P, ETS8, ETS8P, ETS16, ETS16P

**Restrictions** You must be the privileged user to use this command.

**Parameters**

**Secondary**
Allows you to specify a backup loadhost for use when the primary loadhost is unavailable.

**IPaddress**
Specify the address in standard numeric format. Specifying "0.0.0.0" as the address clears the previously-defined loadhost. No text host names can be used.

**Examples**

```
Local> DEFINE SERVER LOADHOST 193.23.71.49

Local> DEFINE SERVER SECONDARY LOADHOST 192.0.1.89
```

**See Also** Show/Monitor/List Server, page 12-108; *Reloading Operational Software*, page 3-7; *Editing the Boot Parameters*, page 3-7.

## 12.46.19 Set/Define Server Lock

{SET / DEFINE} SERVER LOCK {ENABLED / DISABLED}

Controls whether or not local users rare permitted to Lock their ports. When a port is locked, the active session or connection cannot be used until the port is unlocked. This is desirable when you want to leave a console running, possibly with privileged status enabled, without having to worry about security considerations.

**Applies To** EPS4, ETS4P, ETS8, ETS8P, ETS16, ETS16P

**Restrictions** You must be the privileged user to use this command.

**See Also** Lock, page 12-16; *Enabling Server-Wide Port Characteristics*, page 4-1; *Locking a Port*, page 5-15.

## 12.46.20 Set/Define Server Login Password

{SET / DEFINE} SERVER LOGIN [PASSWORD][*passwd*]

Specifies the password that is used to log into the ETS from a serial port or the network when Port Password is Enabled. If the password is not given on the command line, the user will be prompted for it; it will not be displayed when typed.

**Applies To** EPS4, ETS4P, ETS8, ETS8P, ETS16, ETS16P

**Restrictions** You must be the privileged user to use this command.

**Parameters** **passwd**
Enter a password of up to 6 alphabetic characters.

**Examples**

```
Local> SET SERVER LOGIN PASSWORD

Password> platyp (not echoed)

Verification> platyp (not echoed)

Local>
```

**See Also** Set/Define Port Password, page 12-45; *Login Password*, page 3-9.

## 12.46.21 Set/Define Server Maintenance Password

{SET / DEFINE} SERVER MAINTENANCE [PASSWORD][*passwd*]

Specifies the password that allows remote NCP connections to the ETS. The maintenance password is only used by the MOP protocol itself; it is not needed for user-level logins.

**Applies To** EPS4, ETS4P, ETS8, ETS8P, ETS16, ETS16P

**Restrictions** You must be the privileged user to use this command.

**Parameters** **passwd**
A string of up to sixteen hexadecimal digits (0-9, A-F, a-f) that defaults to all zeros (off). Zero is also NCP's default.

**Examples**
```
Local> DEFINE SERVER MAINTENANCE PASSWORD 89aacb
```

**See Also** *Maintenance Password*, page 3-9.

## 12.46.22 Set/Define Server Multicast Timer

{SET / DEFINE} SERVER MULTICAST[TIMER] *timer*

Specifies the length of time between ETS service announcement broadcasts for LAT circuits. This parameter should not need to be changed under normal circumstances.

**Applies To** EPS4, ETS4P, ETS8, ETS8P, ETS16, ETS16P

**Restrictions** You must be the privileged user to use this command.

**Parameters** **timer**
Enter an interval between multicast, ranging from 10 to 180 seconds. The default is 30 seconds.

**Examples**
```
Local> SET SERVER MULTICAST TIMER 40
```

**See Also** Show/Monitor/List Server, page 12-108; *LAT*, page 2-5; *Server Identification*, page 4-3.

## 12.46.23 Set/Define Server Name

{ SET / DEFINE } SERVER NAME *ServerName*

Specifies the name of the ETS.

**Applies To** EPS4, ETS4P, ETS8, ETS8P, ETS16, ETS16P

**Restrictions** You must be the privileged user to use this command.

**Parameters** **ServerName**
Enter a string of up to 16 alphanumeric characters.

**Note:** *The ETS name string must be enclosed in quotes to preserve case.*

**See Also** Show/Monitor/List Server, page 12-108; *Changing the Server Name*, page 3-5.

## 12.46.24 Set/Define Server Nameserver

{ SET / DEFINE } SERVER [SECONDARY] NAMESERVER *IPaddress*

Specifies the IP address of the name server used for TCP/IP connections, if any. This host will attempt to resolve text Telnet hostnames into numeric form if the local host table cannot do so.

**Applies To** EPS4, ETS4P, ETS8, ETS8P, ETS16, ETS16P

**Restrictions** You must be the privileged user to use this command.

**Parameters** **Secondary**
Allows you to specify a backup nameserver for when the primary nameserver is unavailable.

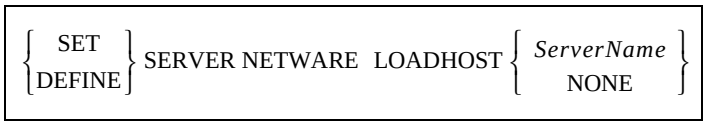
**IPaddress**
Enter the network address of the nameserving host in standard numeric IP format. Specifying “0.0.0.0” as the address clears the previously-defined nameserver.

**Examples**

```
Local> SET SERVER NAMESERVER 192.0.1.49

Local> SET SERVER SECONDARY NAMESERVER 192.0.1.34
```

**See Also** Define Protocols IP, page 12-57; Show/Monitor/List Protocols IP, page 12-104; *TCP/IP*, page 2-7; *Editing the Boot Parameters*, page 3-7; *Other TCP/IP Parameters*, page 4-5.

## 12.46.25 Set/Define Server NetWare Loadhost




Used to specify the name of the NetWare file server to be used for downloading new software.

**Applies To** EPS4, ETS4P, ETS8, ETS8P, ETS16, ETS16P

**Restrictions** You must be the privileged user to use this command.

**Parameters**

**ETSName**
Enter a file server name of up to 11 characters. The null string (" ") returns the setting to undefined.

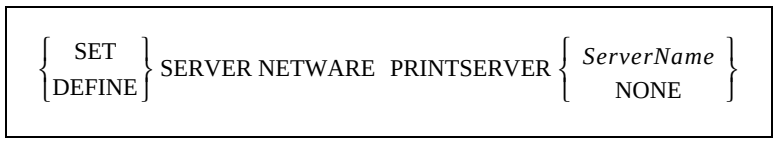
**None**
Clears the previously-configured loadhost.

**Examples**

```
Local> SET SERVER NETWARE LOADHOST FRED
```

**See Also** Set/Define Protocols NetWare Loadhost, page 12-59; Show/Monitor/List Protocols, page 12-104; *Editing the Boot Parameters*, page 3-7.

## 12.46.26 Set/Define Server NetWare Printserver




Used to specify the name of the print server VAP/NLM running on the NetWare file server. This is necessary when setting up the ETS as an RPRINTER client.

**Applies To** EPS4, ETS4P, ETS8, ETS8P, ETS16, ETS16P

**Restrictions** You must be the privileged user to use this command.

**Parameters**

**ETSName**
Enter a name of up to 8 characters. The null string (" ") returns the setting to undefined.

**None**
Clears the previously-configured setting.

**Examples**

```
Local> SET SERVER NETWARE PRINTSERVER FRED
```

**See Also** Set/Define Protocols NetWare Printserver, page 12-59; Show/Monitor/List Protocols, page 12-104.

## 12.46.27 Set Server NetWare Reset

```
SET SERVER NETWARE RESET
```

Instructs the Print ETS module to immediately rescan the network for new connections. This is typically necessary when setting up queues or print servers using PCONSOLE.

**Applies To** EPS4, ETS4P, ETS8, ETS8P, ETS16, ETS16P

**Restrictions** You must be the privileged user to use this command.

**Examples**

```
Local> SET SERVER NETWARE RESET
```

**See Also** Set/Define Protocols NetWare Reset, page 12-59; Show/Monitor/List Protocols, page 12-104.

## 12.46.28 Set/Define Server Node Limit

```
{ SET    }
{ DEFINE } SERVER NODE [LIMIT] { limit }
                               { NONE  }
```

Sets the maximum number of LAT service nodes about which the ETS will keep information. If the new limit is less than the current limit and the service table is full, the number of nodes will be slowly pruned down to the new value.

**Applies To** EPS4, ETS4P, ETS8, ETS8P, ETS16, ETS16P

**Restrictions** You must be the privileged user to use this command.

**Parameters**

**limit**
The ETS can be limited to between 0 and 200 hosts. The default is 50 nodes.

**None**
No limit is imposed.

**Examples**

```
Local> SET SERVER NODE LIMIT 6
```

**See Also** Show/Monitor/List Server, page 12-108; *Node Limit*, page 4-3.

## 12.46.29 Set/Define Server Password Limit

```
{ SET    }
{ DEFINE } SERVER PASSWORD [LIMIT] { limit }
                                   { NONE  }
```

Limits the number of failures allowed when entering the privileged password while attempting to become the privileged user. After this number of tries, the port will be logged out. The user can abort the password process by pressing Ctrl-Z instead of typing the password.

**Applies To** EPS4, ETS4P, ETS8, ETS8P, ETS16, ETS16P

**Restrictions** You must be the privileged user to use this command.

**Parameters**

**limit**
A value between 0 and 100. If 0 is specified, the port is never logged out for too many password failures. The default is 3 retries.

**None**
Changes the retry limit to 0 (no limit).

**Examples**

```
Local> SET SERVER PASSWORD LIMIT 10
```

**See Also** Set Privileged/Noprivileged, page 12-56; Set/Define Server Privileged Password, page 12-76; *System Passwords*, page 3-8.

## 12.46.30 Set/Define Server Privileged Password

{SET | DEFINE} SERVER PRIVILEGED[PASSWORD][*passwd*]

Sets the password for becoming the privileged user or "superuser" of the ETS. If the password is not specified on the command line, the user will be prompted for it (it will not be displayed).

**Applies To** EPS4, ETS4P, ETS8, ETS8P, ETS16, ETS16P

**Restrictions** You must be the privileged user to use this command.

**Parameters**

**passwd**
Enter a password of up to 6 alphanumeric characters.

**Examples**

```
Local> SET SERVER PRIVILEGED PASSWORD "yodel"
```

**See Also** Set Privileged/Noprivileged, page 12-56; Set/Define Server Password Limit, page 12-75; *System Passwords*, page 3-8.

## 12.46.31 Set/Define Server Prompt

{SET | DEFINE} SERVER PROMPT *PromptString*

Allows the system administrator to change the prompt that users see (the default is **Local_*x*>**).

**Applies To** EPS4, ETS4P, ETS8, ETS8P, ETS16, ETS16P

**Restrictions** You must be the privileged user to use this command.

**Parameters** **PromptString**
The string may be up to 16 characters long, and should be enclosed in quotes to preserve case. The following variables can be included in the prompt string:

**Table 12-7:** ETS Prompt Building Blocks

| String | Substituted Value | String | Substituted Value |
|---|---|---|---|
| %p | port name | %C | manufacturer name (Lantronix) |
| %n | port number | %D | product name (ETS, EPS, MPS) |
| %s | server name | %P | “>” to denote privileged user |
| %S | session name | %% | % |

**Examples** (Shown with the resulting prompts on the next command line)

```
Local> SET SERVER PROMPT “Port %n:”
Port 1: SET SERVER PROMPT “%D:%s!”
ETS:LabServ! SET SERVER PROMPT “%p%S_%n%P%%”
Port_2[NoSession]_2>% SET SERVER PROMPT “Lcl_%n>%P”
Lcl_3>>
```

**See Also** *Changing the Server Prompt*, page 3-6.

## 12.46.32 Set/Define Server Queue Limit

{SET / DEFINE} SERVER QUEUE [LIMIT] {*limit* / NONE}

Limits the number of queue entries for users waiting for a local service. If connect requests come in after the limit is reached, they will be rejected.

**Applies To** EPS4, ETS4P, ETS8, ETS8P, ETS16, ETS16P

**Restrictions** You must be the privileged user to use this command.

**Parameters** **limit**
A value between 0 and 32 (the default). If 0 is specified, queueing is not allowed and only the user with possession of the service may use it.

**None**
There will be no limit except for the ETS’s memory constraints.

**Examples**

```
Local> DEFINE SERVER QUEUE LIMIT 4
```

**See Also** Show/Monitor/List Server, page 12-108; Show/Monitor Queue, page 12-107.

## 12.46.33 Set/Define Server RARP


Enables or disables querying for a RARP host at system boot time.

**Applies To** EPS4, ETS4P, ETS8, ETS8P, ETS16, ETS16P

**Restrictions** You must be the privileged user to use this command.

**See Also** Set/Define Server BOOTP, page 12-63; *Editing the Boot Parameters*, page 3-7.

## 12.46.34 Set/Define Server Reload


Specifies when to reload the code in the flash ROM.

**Applies To** EPS4, ETS4P, ETS8, ETS8P, ETS16, ETS16P

**Restrictions** You must be the privileged user to use this command.

**Parameters**

**Always**
The ETS will reload flash each time it boots.

**Default**
The ETS will only reload flash when told to do so (the default).

**See Also** Initialize, page 12-14; *Reloading Operational Software*, page 3-7.

## 12.46.35 Set/Define Server Retransmit Limit


Specifies the number of retries attempted if a network message receives no acknowledgment. This limit may need to be increased on especially noisy or heavily-used networks.

**Applies To** EPS4, ETS4P, ETS8, ETS8P, ETS16, ETS16P

**Restrictions** You must be the privileged user to use this command.

**Parameters** **RetransLimit**
Enter a value between 4 and 100. The default is 50 retries.

**Examples**
```
Local> SET SERVER RETRANSMIT LIMIT 5
```

**See Also** Show/Monitor/List Protocols, page 12-104; *Server Identification*, page 4-3.

## 12.46.36 Set/Define Server Rlogin


Restricts the use of the RLOGIN command from the ETS to other hosts. If Rlogins are disabled, users may not RLOGIN to remote hosts, but incoming Rlogin connections are still permitted.

**Applies To** ETS4P, ETS8, ETS8P, ETS16, ETS16P

**Restrictions** You must be the privileged user to use this command.

**See Also** Show/Monitor/List Server, page 12-108; Set/Define Server Incoming, page 12-68; *Rlogin*, page 2-9.

## 12.46.37 Set/Define Server Secondary

Please see the entries for Set/Define Server Gateway on page 12-66, Set/Define Server Loadhost on page 12-70, and Set/Define Server Nameserver on page 12-73.

## 12.46.38 Set/Define Server Serial Delay


Changes the amount of time the ETS will wait before sending data out to the network after a connection has been made to the serial port. When a network connection has been established and the first serial character is received, a timer starts. When the timer completes a cycle (the length of time specified with the num parameter), all serial characters received in that cycle are passed to the network and the timer resets.

**Applies To** EPS4, ETS4P, ETS8, ETS8P, ETS16, ETS16P

**Restrictions** You must be the privileged user to use this command.

**Errors** This command has no effect when used from the Local> prompt.

**Parameters** **num**
Enter the number of milliseconds for the delay. The range is 10 to 200 msec, and is rounded to the nearest 10 msec. The default is 30 msec.

# 12.46.39 Set/Define Server Service Groups


Establishes the LAT group numbers of the services provided by this ETS, and whether groups should be added to the list (Enabled) or removed from the list (Disabled).

**Applies To** EPS4, ETS4P, ETS8, ETS8P, ETS16, ETS16P

**Restrictions** You must be the privileged user to use this command.

**Parameters**

**All**
All group numbers are provided or disabled.

**GroupList**
Adds to or subtracts from the ETS's list of group numbers. Group numbers range from 0 to 255, and can be entered one at a time. In addition, ranges can be separated with dashes, and multiple entries can be separated by commas. Group 0 is the only group enabled by default.

**Enabled**
The given group numbers are added to the ETS's list of service groups.

**Disabled**
The group numbers are removed from the ETS's list of service groups.

**Examples**

```
Local> DEFINE SERVER SERVICE GROUPS 2,5,6,8-44 ENABLED

Local> SET SERVER SERVICE GROUPS ALL DISABLED
```

**See Also** Set/Define Port Authorized Groups, page 12-28; Show/Monitor/List Server, page 12-108; *LAT*, page 2-5.

# 12.46.40 Set/Define Server Session Limit


Sets a server-wide limit for active sessions per port. Each port can have an individual limit less than or equal to this limit.

**Applies To** EPS4, ETS4P, ETS8, ETS8P, ETS16, ETS16P

**Restrictions** You must be the privileged user to use this command.

**Parameters**

**limit**
Enter a value between 0 and 8. The default limit is 4 sessions.

**None**
Returns the session limit to the default value of 8.

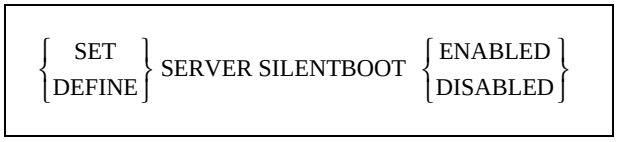
**Examples**

```
Local> SET SERVER SESSION LIMIT 2
```

**See Also**

Set/Define Port Session Limit, page 12-50; Show/Monitor/List Server, page 12-108; Show/Monitor Sessions, page 12-111; *Enabling Server-Wide Port Characteristics*, page 4-1.

## 12.46.41 Define Server Silentboot




Causes the unit to attempt to boot without sending any status messages to the console port (unless there are errors). By default, the ETS prints status messages.

**Note:** *This command only works with BOOT ROM versions.*

**Applies To** EPS4, ETS4P, ETS8, ETS8P, ETS16, ETS16P

**Restrictions** You must be the privileged user to use this command.

**See Also** Show/Monitor/List Server, page 12-108; *Editing the Boot Parameters*, page 3-7.

## 12.46.42 Set/Define Server SLIP Password


Configures the password required to start SLIP mode on a port. If the password is not provided on the command line, the server will prompt the user to enter it.

**Applies To** EPS4, ETS4P, ETS8, ETS8P, ETS16, ETS16P

**Restrictions** You must be the privileged user to use this command.

**Parameters**

**passwd**
Enter a password of up to 6 alphanumeric characters. Entering a null string (“ “) disables the password.

**None**
Clears any previously-entered password, removing the password restriction from SLIP connections (the default).

**Examples**

```
Local> SET SERVER SLIP PASSWORD beano
```

**See Also** Clear/Purge SLIP, page 12-8; Set/Define SLIP, page 12-95; Show/List SLIP, page 12-112; *SLIP*, page 4-6.

## 12.46.43 Set/Define Server Software

{ SET / DEFINE } SERVER SOFTWARE *filename*

Specifies the name of the download software file (if any) that the ETS will attempt to load at boot time. For IP- or LAT-loading hosts, this is the file that will be requested at boot time. For TFTP loading, you can also specify the complete pathname of the file if it is located in a directory other than the default.

**Note:** *This option is only useful if a Define command is used; if a Set command is used, the setting will be cleared/reset at boot time.*

**Applies To** EPS4, ETS4P, ETS8, ETS8P, ETS16, ETS16P

**Restrictions** You must be the privileged user to use this command.

**Parameters**

**filename**
Enter the desired loadfile name of up to 11 characters or path of up to 26 characters. The ETS will add the ".SYS" extension to the filename. File names and paths should be placed in quotes to preserve case.

**Examples**

```
Local> DEFINE SERVER SOFTWARE ETS

Local> DEFINE SERVER SOFTWARE "SYS:\LOGIN\PS1.SYS"

Local> DEFINE SERVER SOFTWARE "/tftpboot/tscode"
```

## 12.46.44 Set/Define Server Startupfile

{ SET / DEFINE } SERVER STARTUPFILE [ *host*:*filename* / *node*::*filename* / *node**sys*:*login**filename* / NONE ] [RETRY *num*]

Configures the startup configuration file that the ETS will attempt to download at boot time. This file contains the ETS commands that will configure the ETS before any users and services are started. If a text hostname is used for TFTP, the name must be resolvable at boot time, otherwise you must use an IP address.

Both the Telnet and NCP consoles are available at the time the ETS attempts to download the startupfile; if there is a problem with the download, you can still log into the ETS and determine what went wrong.

**Applies To** EPS4, ETS4P, ETS8, ETS8P, ETS16, ETS16P

**Restrictions** You must be the privileged user to use this command.

**Parameters**

**host:filename**
Used to load from a TCP/IP host via TFTP.

Enter a TCP/IP hostname or IP address followed by a colon and a startup file name of up to 47 characters. The entire string should be enclosed in quotes to preserve case. If you use a text host name, it must be resolvable at boot time.

**node::filename**
Used to load from a VAX machine via LAT. Enter the nodename followed by two colons and the startup file name of up to 47 characters.

**node\SYS:\LOGIN\filename**
Used to load from a Novell fileserver. Enter the proper node and filename. The path should exceed 47 characters.

**None**
Clears any previously configured startupfile name, host, and retry setting.

**Retry num**
Specifies how many times to retry the download attempt. The default is 5. If zero is specified, the ETS will retry until the startupfile is read (indefinitely).

**Examples**

```
Local> DEFINE SERVER STARTUPFILE “bob:start” RETRY 6

Local> DEFINE SERVER START hevax::start.com

Local> DEFINE SERVER STARTUPFILE
engfs\sys:\login\start.cmd”
```

**See Also** Set/Define Server Loadhost, page 12-70; *Reloading Operational Software*, page 3-7; *Installation Guide*.

## 12.46.45 Set/Define Server Subnet Mask

{ SET / DEFINE } SERVER SUBNET [MASK] *mask*

Sets an IP subnet mask for the ETS, or overrides the subnet automatically created when the IP address was configured. The mask is applied to target IP addresses to determine whether the destination address is on the local network segment. If it is not, the ETS’s gateway host will be accessed to provide the connection.

**Applies To** EPS4, ETS4P, ETS8, ETS8P, ETS16, ETS16P

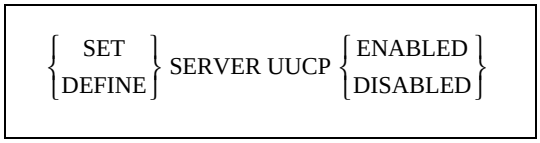
**Restrictions** You must be the privileged user to use this command.

**Parameters** **mask**
Enter a mask in numeric IP format. A 0 in any bit position prevents that bit from passing while a 1 in any bit position allows the bit to pass through.

**Examples**
```
Local> SET SERVER SUBNET MASK 255.255.192.0
```

**See Also** Set/Define Server IPaddress, page 12-69; Set/Define Server Gateway, page 12-66; *TCP/IP*, page 2-7; *IP Address*, page 4-5.

## 12.46.46 Set/Define Server UUCP




Determines whether the ETS will use the UUCP handler. If enabled, the ETS will listen to TCP/IP port 540 and attempt to connect any logins there to a service called “UUCP” (typically a serial line with an attached modem).

**Applies To** EPS4, ETS4P, ETS8, ETS8P, ETS16, ETS16P

**Restrictions** You must be the privileged user to use this command.

**Errors** If a UUCP service does not exist, the connection will be closed.

**See Also** *UUCP Support*, page 2-14.

# 12.47 Set/Define Service Commands

## 12.47.1 Set/Define Service


Creates a local service. A maximum of 16 services may be configured for the ETS. Additional service parameters are discussed in the following pages.

**Note:** *Services have no default parameters; all options must be configured manually.*

**Applies To** EPS4, ETS4P, ETS8, ETS8P, ETS16, ETS16P

**Restrictions** You must be the privileged user to use this command.

**Parameters** **ServiceName**
Enter a service name of up to 14 alphanumeric characters.The default service name is based on the ETS name.

**Note:** *The Set/Define Service options do not necessarily apply to virtual sessions. See Set/Define Service Virtual on page 12-92 for more information.*

**See Also** Clear/Purge Service, page 12-7; Show/Monitor/List Services, page 12-111; *Creating Services*, page 4-12.

## 12.47.2 Set/Define Service AppleTalk

{SET | DEFINE} SERVICE *ServiceName* APPLETALK {ENABLED | DISABLED}

Specifies whether AppleTalk clients will be able to use the service. If enabled, the service name will be displayed as a selectable printer in Macintosh chooser screens.

**Applies To** EPS4, ETS4P, ETS8, ETS8P, ETS16, ETS16P

**Restrictions** You must be the privileged user to use this command.

**See Also** Clear/Purge Service, page 12-7; Show/Monitor/List Services, page 12-111; *TCP/Telnet Service Sockets*, page 4-14; *Macintosh Service Configuration*, page 10-2.

## 12.47.3 Set/Define Service Banner

{SET | DEFINE} SERVICE *ServiceName* BANNER {ENABLED | DISABLED}

Specifies whether the ETS will print a banner page before starting a print job. Banners should be disabled (the default) for all PostScript and plotter (binary) data.

**Applies To** EPS4, ETS4P, ETS8, ETS8P, ETS16, ETS16P

**Restrictions** You must be the privileged user to use this command.

**See Also** Clear/Purge Service, page 12-7; Show/Monitor/List Services, page 12-111; *TCP/Telnet Service Sockets*, page 4-14.

## 12.47.4 Set/Define Service Binary

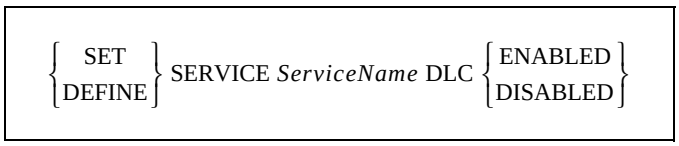

If the binary characteristic is enabled on a service, there will be no data processing (<CR> to <CR><LF> translation and tab expansion). The binary characteristic should be enabled when printing PCL data.

**Applies To** EPS4, ETS4P, ETS8, ETS8P, ETS16, ETS16P

**Restrictions** You must be the privileged user to use this command.

**See Also** Clear/Purge Service, page 12-7; Show/Monitor/List Services, page 12-111; *TCP/Telnet Service Sockets*, page 4-14.

## 12.47.5 Set/Define Service DLC




Specifies that the service will handle DLC print requests from Windows NT hosts. Note that only one service on the ETS can have DLC enabled at any time.

**Applies To** EPS4, ETS4P, ETS8, ETS8P, ETS16, ETS16P

**Restrictions** You must be the privileged user to use this command.

**See Also** Clear/Purge Service, page 12-7; Show/Monitor/List Services, page 12-111; *TCP/Telnet Service Sockets*, page 4-14; *DLC*, page 11-1.

## 12.47.6 Set/Define Service EOJ


Specifies a string to be sent to the attached device at the end of every job regardless of network protocol.

**Applies To** EPS4, ETS4P, ETS8, ETS8P, ETS16, ETS16P

**Restrictions** You must be the privileged user to use this command.

**Parameters**

**EndString**
Any ASCII characters, or non-ASCII characters entered as a backslash and 2 hex digits (for example, \45). The combined length of the SOJ and EOJ strings must not exceed 62 characters.

**None**
Clears any previously-configured string. No string is configured by default.

**See Also** Clear/Purge Service, page 12-7; Set/Define Service SOJ, page 12-91; Show/Monitor/List Services, page 12-111.

## 12.47.7 Set/Define Service Formfeed

{SET | DEFINE} SERVICE *ServiceName* FORMFEED {ENABLED | DISABLED}

Determines whether the ETS will append a formfeed to the end of any LPR print jobs.

**Applies To** EPS4, ETS4P, ETS8, ETS8P, ETS16, ETS16P

**See Also** Clear/Purge Service, page 12-7; Show/Monitor/List Services, page 12-111; *TCP/Telnet Service Sockets*, page 4-14.

## 12.47.8 Set/Define Service Identification

{SET | DEFINE} SERVICE *ServiceName* IDENTIFICATION {*IDstring* | NONE}

Specifies an identification string for this service to be sent by the ETS in multicast messages.

**Applies To** EPS4, ETS4P, ETS8, ETS8P, ETS16, ETS16P

**Restrictions** You must be the privileged user to use this command.

**Parameters**

**IDstring**
Enter up to 40 characters of identification information. Enclose the string in quotes to preserve case and spaces.

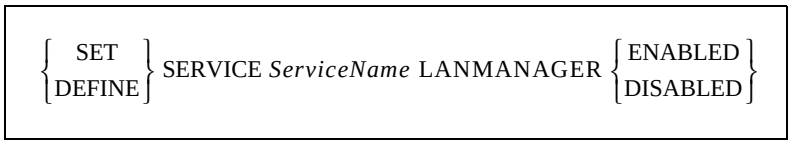
**None**
Clears any previously-configured IDstring.

**Examples**

```
Local> SET SERVICE pplab5 IDENT “Printer for Lab 5”
```

**See Also** Clear/Purge Service, page 12-7; Show/Monitor/List Services, page 12-111.

## 12.47.9 Set/Define Service LAN Manager




Enables or disables LAN Manager (NetBIOS) access to the specified service.

**Applies To** EPS4, ETS4P, ETS8, ETS8P, ETS16, ETS16P

**Restrictions** You must be the privileged user to use this command.

**See Also** Clear/Purge Service, page 12-7; Show/Monitor/List Services, page 12-111; *NetBIOS*, page 11-3.

## 12.47.10 Set/Define Service LAT


Enables or disables LAT access to the specified service. LAT must be licensed to use LAT functionality on multiport ETS's.

**Applies To** EPS4, ETS4P, ETS8, ETS8P, ETS16, ETS16P

**Restrictions** You must be the privileged user to use this command.

**See Also** Clear/Purge Service, page 12-7; Show/Monitor/List Services, page 12-111; *Printing from LAT*, page 9-1.

## 12.47.11 Set/Define Service NetWare


Enables or disables NetWare access to the specified service.

**Applies To** EPS4, ETS4P, ETS8, ETS8P, ETS16, ETS16P

**Restrictions** You must be the privileged user to use this command.

**See Also** Clear/Purge Service, page 12-7; Netstat, page 12-17; Set/Define Protocols NetWare Access, page 12-59; Show/Monitor/List Services, page 12-111.

## 12.47.12 Set/Define Service Password


Specifies an access password that users must enter to connect to the service. If the password is not given on the command line, the user will be prompted for it.

**Applies To** EPS4, ETS4P, ETS8, ETS8P, ETS16, ETS16P

**Restrictions** You must be the privileged user to use this command.

**Parameters**

**passwd**
Choose a password of up to 6 alphanumeric characters.

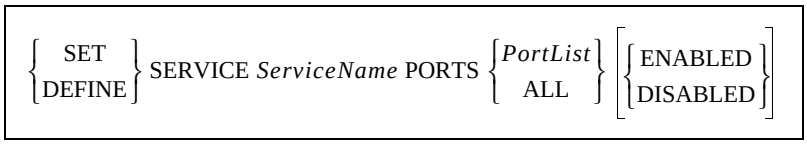
**None**
Clears any previously-configured password for the given service.

**Examples**

```
Local> DEFINE SERVICE lab5 PASSWORD “this”
```

**See Also** Clear/Purge Service, page 12-7; Show/Monitor/List Services, page 12-111.

## 12.47.13 Set/Define Service Ports




Specifies a list of ports that will support or offer this service. If Enabled or Disabled is specified, the ports listed will be added or removed from the port list, respectively. If neither option is given, the ports listed will replace the old list. Ports offering a service must be in the correct access mode for connections to succeed.

**Applies To** EPS4, ETS4P, ETS8, ETS8P, ETS16, ETS16P

**Restrictions** You must be the privileged user to use this command.

**Parameters**

**PortList/All**
Specifies a particular port or group of ports, or all ports. Port numbers are specified with integers between 1 and the total number of physical ports. Lists of ports must be separated by commas. Ranges of ports must be separated by a dash (-).

**Examples**

```
Local> SET SERVICE lab5 PORTS 3,4,7-8 ENABLED
```

**See Also** Clear/Purge Service, page 12-7; Define Port Access, page 12-27; Show/Monitor/List Services, page 12-111; *Creating Services* on page 4-12.

## 12.47.14 Set/Define Service PostScript


Determines how the ETS will handle PostScript print jobs. If enabled, the ETS will assume there is a PostScript printer attached to the service port(s) and try to ensure a job is done before starting another. It will send a small PostScript job to the printer before the user data to "force" the printer into PostScript mode.

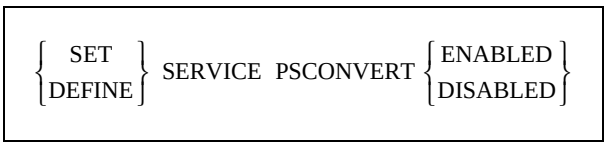
At the end of each job it will wait for the printer to signal that the job was completed. If this is not done, slower printers may lose jobs as new jobs overwrite a previous job which is still being interpreted. Enabling PostScript mode is strongly recommended for all PostScript queues.

**Applies To** EPS4, ETS4P, ETS8, ETS8P, ETS16, ETS16P

**Restrictions** You must be the privileged user to use this command.

**See Also** Clear/Purge Service, page 12-7; Show/Monitor/List Services, page 12-111; *TCP/Telnet Service Sockets*, page 4-14.

## 12.47.15 Set/Define Service PSConvert




Controls whether the ETS will place a PostScript wrapper around each job. The ETS will try to detect if the job is already PostScript, in which case it would not add an additional wrapper.

**Applies To** EPS4, ETS4P, ETS8, ETS8P, ETS16, ETS16P

**See Also** Clear/Purge Service, page 12-7; Show/Monitor/List Services, page 12-111.

## 12.47.16 Set/Define Service RTEL


Enables or disables TCP/IP access to the specified service.

**Applies To** EPS4, ETS4P, ETS8, ETS8P, ETS16, ETS16P

**Restrictions** You must be the privileged user to use this command.

**See Also** Clear/Purge Service, page 12-7; Show/Monitor/List Services, page 12-111; *Reverse Telnet (RTEL)*, page 2-13.

## 12.47.17 Set/Define Service SOJ


Specifies a string to be sent to the attached device at the start of every access, regardless of network protocol.

**Applies To** EPS4, ETS4P, ETS8, ETS8P, ETS16, ETS16P

**Restrictions** You must be the privileged user to use this command.

**Parameters**

**StartString**
Any ASCII characters, or a backslash and two hex digits.

**None**
Clears any previously-configured string.

**Examples**

```
Local>> DEFINE SERVICE myserv SOJ \45
```

**See Also** Clear/Purge Service, page 12-7; Set/Define Service EOJ, page 12-86; Show/Monitor/List Services, page 12-111.

## 12.47.18 Set/Define Service TCPport


Specifies a TCP listener socket for this service. TCP connections to the socket are accepted or rejected based on the availability of the service.

**Applies To** EPS4, ETS4P, ETS8, ETS8P, ETS16, ETS16P

**Restrictions** You must be the privileged user to use this command.

**Parameters**

**portnum**
Enter a socket number between 4000 and 4999.

**None**
Clears any previously-defined TCPport. No TCPPort is configured by default.

**Note:** *Either a TCPport or a Telnetport may be configured for a service, but not both.*

**See Also** Clear/Purge Service, page 12-7; Show/Monitor/List Services, page 12-111; *TCP/Telnet Service Sockets*, page 4-14.

## 12.47.19 Set/Define Service Telnetport


Specifies a TCP listener socket for this service. TCP connections to the socket are accepted or rejected based on the availability of the service. Unlike the TCPport option, a Telnetport socket will perform Telnet IAC negotiations on the data stream.

**Applies To** EPS4, ETS4P, ETS8, ETS8P, ETS16, ETS16P

**Restrictions** You must be the privileged user to use this command.

**Parameters**

**portnum**
Enter a socket number of 4000 to 4999.

**None**
Clears any previously-configured Telnetport. No Telnetport is configured by default.

**Note:** *Either a TCPport or a Telnetport may be configured for a service, but not both.*

**See Also** Clear/Purge Service, page 12-7; Set/Define Service TCPport, page 12-91; Show/Monitor/List Services, page 12-111; *TCP/Telnet Service Sockets*, page 4-14.

## 12.47.20 Set/Define Service Virtual


Creates a LAT "service" from a TCP/IP hostname. When LAT users connect to this **proxy service**, they are given a Telnet session with the specified host.

**Note:** *The Disabled option currently does nothing; use Clear/Purge Service on page 12-7 instead.*

**Applies To** EPS4, ETS4P, ETS8, ETS8P, ETS16, ETS16P

**Restrictions** You must be the privileged user to use this command.

**Errors** If the host is not reachable or resolvable at connection time, the connect attempt will fail.

**Parameters**

**ServiceName**
The hostname to which LAT users will connect, up to 16 characters long. An identification string showing it is a Telnet connection to the host will be added if not specified.

**Examples**

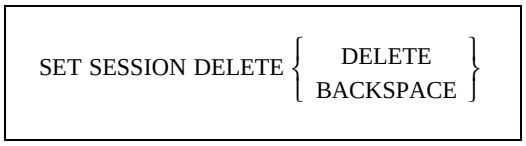
```
Local> SET SERVICE hydra VIRTUAL ENABLED
```

**See Also**

Clear/Purge Service, page 12-7; Show/Monitor/List Services, page 12-111; *LAT and TCP/IP Connectivity*, page 2-15.

# 12.48 Set Session Commands

## 12.48.1 Set Session Delete




Allows you to change what is sent to the remote TCP/IP host when you press the Delete key. This command has no effect in Local mode or on LAT sessions, nor does it have any effect if Passthru or Passall is in effect. This command and the Set Session Newline command may be helpful if you are getting odd output from a Telnet session.

**Applies To**

EPS4, ETS4P, ETS8, ETS8P, ETS16, ETS16P

**Errors**

An error is returned if no sessions are active.

**Parameters**

**Delete**
Sends a delete character (ASCII 0x7f) when the Delete key is pressed.

**Backspace**
Sends a backspace character (ASCII 0x8, Ctrl-H) when the Delete key is pressed.

**Examples**

```
Local> SET SESSION DELETE BACKSPACE
```

**See Also**

Set Session Newline, page 12-94; Set Session Passall, page 12-95; Set Session Passthru, page 12-95.

## 12.48.2 Set Session Echo


Requests that the ETS perform local echoing for TCP connections. The default is Disabled, on the assumption that the remote host will provide echoing.

**Applies To** EPS4, ETS4P, ETS8, ETS8P, ETS16, ETS16P

**See Also** Chapter 6, *Using the ETS*.

## 12.48.3 Set Session Interactive

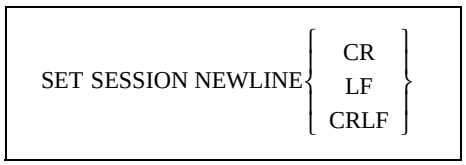
```
SET SESSION INTERACTIVE
```

Allows the ETS to interpret server-specific keys (Forward, Backward, and Local) and messages.

**Applies To** EPS4, ETS4P, ETS8, ETS8P, ETS16, ETS16P

**See Also** Set Session Passall, page 12-95; Set Session Passthru, page 12-95; Chapter 6, *Using the ETS*.

## 12.48.4 Set Session Newline




Changes what is sent to the remote service when you press the newline key (usually *Return*). This command has no effect when in Local mode or LAT sessions; nor does it have any effect if Passthru or Passall are in effect. This command and the **Set Session Delete** command may be helpful if you are getting odd output from a Telnet session.

**Applies To** EPS4, ETS4P, ETS8, ETS8P, ETS16, ETS16P

**Parameters**

**CR**
Send carriage returns (ASCII 0xA) only.

**LF**
Send linefeeds (ASCII 0xD) only.

**CRLF**
Send both carriage returns and linefeeds.

**Examples**

```
SET SESSION NEWLINE CRLF
```

**See Also** Set/Define Port Telnet Pad, page 12-53; Set Session Delete, page 12-93; Set Session Passall, page 12-95; Set Session Passthru, page 12-95; *Connecting to Telnet Hosts*, page 6-4.

## 12.48.5 Set Session Passall

```
SET SESSION PASSALL
```

Disables ETS interpretation of switch characters, messages, and XON/XOFF flow control. It is often used for binary file transfers, such as executable files and graphics.

**Applies To** EPS4, ETS4P, ETS8, ETS8P, ETS16, ETS16P

**See Also** Set Session Interactive, page 12-94; Set Session Passthru, page 12-95.

## 12.48.6 Set Session Passthru

```
SET SESSION PASTHRU
```

Disables ETS interpretation of switch characters and server messages, but not XON/XOFF flow control. It is often used for ASCII file transfers.

**Applies To** EPS4, ETS4P, ETS8, ETS8P, ETS16, ETS16P

**See Also** Set Session Interactive, page 12-94; Set Session Passall, page 12-95.

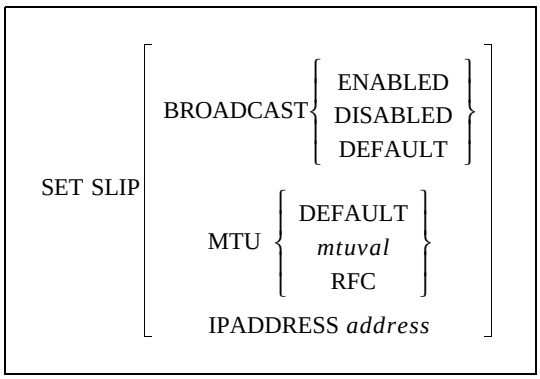
# 12.49 Set/Define SLIP

Set SLIP and Define SLIP do very different things, so they will be discussed separately. Set SLIP can only initiate a SLIP session on your port. The remote IP address and any options can be set on the command line or obtained from any server or port SLIP defaults. Define SLIP is used to configure default SLIP parameters for the ETS as well as set up permanent SLIP sessions for particular ports.

Keep two things in mind when initiating SLIP sessions:

- When SLIP interpretation begins, the Local> prompt will no longer be accessible unless the port is logged out.
- Once started, each SLIP connection is not affected by the Set command—you must log out of the port to end the SLIP session or to change connection options.

# 12.49.1 Set SLIP




Initiates a SLIP connection. The IP address of the remote SLIP host and the MTU and Broadcast parameters are optional; the server SLIP defaults will be used if they are not specified. An IP address must be present, either on the Set SLIP command line or in the Define SLIP tables.

**Applies To** EPS4, ETS4P, ETS8, ETS8P, ETS16, ETS16P

**Parameters**

**Broadcast**
Specifies whether broadcast IP packets will be forwarded to the remote SLIP host. There are three choices for Broadcast: Enabled, Disabled, and Default. The Default setting takes its value from the SLIP defaults; if none is set, it defaults to Disabled.

**MTU**
Specifies the SLIP connection's Maximum Transfer Unit (maximum packet size) in bytes. Lower *mtuval* settings give less retransmission but are also less efficient.

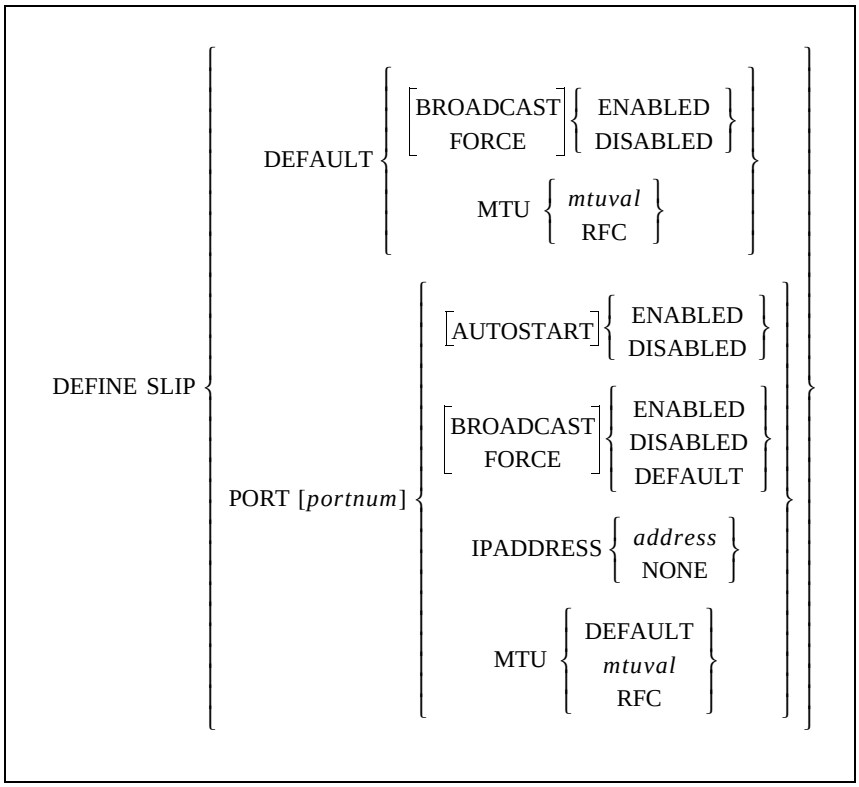
**IPaddress**
Enter the numeric IP address of the desired host.

**Examples**

```
Local> Set SLIP [uses all defaults]

Local> Set SLIP IPADD tunafish MTU 500
```

**See Also** Clear/Purge SLIP, page 12-8; Set/Define Server SLIP Password, page 12-81; Show/List SLIP, page 12-112; *Serial Line Internet Protocol (SLIP)*, page 2-12; *SLIP*, page 4-6.

# 12.49.2 Define SLIP




Configures SLIP defaults to be used when a user doesn't explicitly specify options in the Set SLIP command, or permanent SLIP connections for particular ports.

**Applies To** EPS4, ETS4P, ETS8, ETS8P, ETS16, ETS16P

**Restrictions** You must be the privileged user to use this command.

**Note:** *Define SLIP Port n implicitly does a Define Port n SLIP Enabled.*

**Parameters**

**Default**
Specifies default SLIP settings to be used for the port. These settings can be overridden by user-specified options, or when the Force option is Set.

**Port**
Specifies SLIP options that are intended to affect the port specified with the *portnum*parameter, or the current port (when no *portnum* is given).

**Autostart**
If enabled, the port will treat all serial input as SLIP packets and will run SLIP until the port is logged out. The port will then remain idle until reactivated. If disabled, any defined parameters will be treated as defaults for that particular port.

**Broadcast**
Specifies whether broadcast IP packets will be forwarded to the remote SLIP host. There are three choices for Broadcast: Enabled, Disabled, and Default. The Default setting takes its value from the SLIP defaults; if none is set, it defaults to Disabled.

**Force**
Controls whether the SLIP defaults will take precedence over options in the Set SLIP command line. Choose Enabled, Disabled, or Default. If enabled, the defaults will take priority; if disabled, the Set SLIP command line options will take precedence over the defaults

**MTU**
Specifies the SLIP connection's Maximum Transfer Unit (maximum packet size) in bytes. Lower *mtuval* settings give less retransmission but are also less efficient.

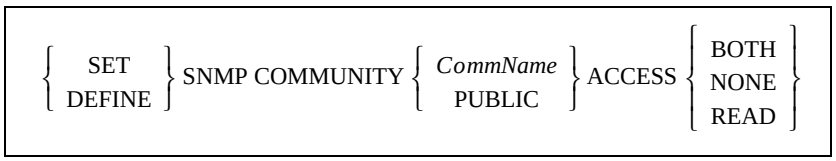
**IPaddress**
Sets the default host to use for SLIP connections when the Set SLIP command is entered. Enter the desired host's numeric IP address.

**Examples**

```
Local> Define SLIP Port 5 IPAD 192.0.1.100 MTU 500

Local> Define SLIP DEFAULT MTU RFC BROADCAST ENABLED FORCE
ENABLED
```

**See Also** Clear/Purge SLIP, page 12-8; Set/Define Server SLIP Password, page 12-81; Show/List SLIP, page 12-112; *Serial Line Internet Protocol (SLIP)*, page 2-12; *SLIP*, page 4-6.

# 12.50 Set/Define SNMP




Configures a community name and an access mode for SNMP: Read (read access only), Both (read and write access), or None (no SNMP requests allowed). Each community name has an access restriction associated with it; if an SNMP command comes in with an unknown name or an unauthorized command, an SNMP error reply will be returned.

**Note:** *To disable SNMP traps, define the Loadhost as "0.0.0.0" and reboot the ETS. See the Set/Define Server Loadhost command on page 12-70 for syntax.*

**Applies To** EPS4, ETS4P, ETS8, ETS8P, ETS16, ETS16P

**Restrictions** You must be the privileged user to use this command.

**Parameters**

**CommName**
Enter a text community name of up to 16 characters long. This string is not case sensitive.

**Access**
Choose Read access, Both read and write access, or None (no SNMP requests allowed).

**Examples**

```
Local> SET SNMP COMMUNITY group2 ACCESS BOTH
```

**See Also** Clear/Purge SNMP, page 12-8; Show/Monitor/List SNMP, page 12-112; *Simple Network Management Protocol (SNMP)*, page 2-13; *SNMP Security*, page 4-18.

# 12.51 Set/Define Telnet Hosts

{ SET / DEFINE } [TELNET] HOSTS *hostname ipaddress*

Associates a TCP/IP hostname with an IP address in the local host table. This will allow you to use the hostname for Telnet connections, even if there is no name server to resolve host names. If the given host name has already been configured, the new IP address will replace the previous value.

**Applies To** EPS4, ETS4P, ETS8, ETS8P, ETS16, ETS16P

**Restrictions** You must be the privileged user to use this command.

**Errors** IP addresses specified in a questionable format will be so noted.

**Parameters**

**hostname**
Enter the hostname string you wish to define, limited to 64 alphanumeric characters. Only 16 characters are allowed between period delimiters.

**ip_address**
Enter the standard numeric IP address of the machine referred to by the *hostname*.

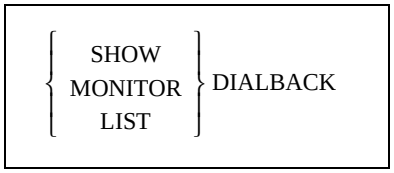
**Examples**

```
Local> Set HOST SPECTRE 192.0.1.15
```

**See Also** Clear/Purge Telnet Hosts, page 12-8; Show/Monitor/List [Telnet] Hosts, , page 12-113; *Local Host Table*, page 2-10; *Local Host Table*, page 4-6

# 12.52 Show/Monitor/List Commands

## 12.52.1 Show/Monitor/List Dialback




Displays the currently-configured dialback strings, as well as the number of connect attempts and failures associated with the strings.

**Applies To** EPS4, ETS4P, ETS8, ETS8P, ETS16, ETS16P

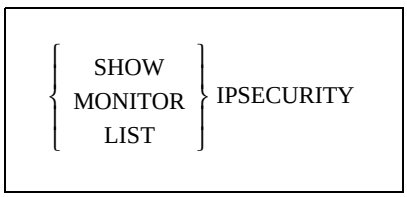
**Restrictions** You must be the privileged user to use this command.

**See Also** Clear/Purge Dialback, page 12-5; Set/Define Port Dialback, page 12-36; *Modem Features*, page 2-18; *Dialback*, page 5-11; *Status Displays*, page 6-9.

## 12.52.2 Show/Monitor/List Hosts

See *Show/Monitor/List [Telnet] Hosts* on page 12-113.

## 12.52.3 Show/Monitor/List IPsecurity



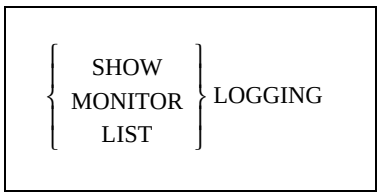

Displays the current or saved TCP/IP security table. Each address or address range is displayed including the direction of concern and the list of ports affected by the entry.

**Applies To** EPS4, ETS4P, ETS8, ETS8P, ETS16, ETS16P

**Errors** An error is returned if there are no IP security table entries.

**See Also** Clear/Purge IPsecurity, page 12-6; Set/Define IPsecurity, page 12-23; *Security*, page 2-19; *IP Security Table*, page 4-16; *Status Displays*, page 6-9.

## 12.52.4 Show/Monitor/List Logging



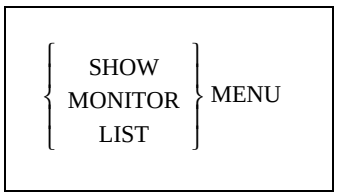

Displays the current or saved event logging configuration.

**Applies To** EPS4, ETS4P, ETS8, ETS8P, ETS16, ETS16P

**Errors** Node information cannot be Listed.

**See Also** Set/Define Logging, page 12-25; *Event Reporting/Logging*, page 2-21; *Event Logging*, page 4-18; *Status Displays*, page 6-9.

## 12.52.5 Show/Monitor/List Menu



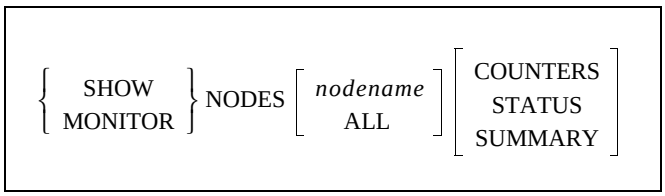

Displays the current or saved menu entries.

**Applies To** EPS4, ETS4P, ETS8, ETS8P, ETS16, ETS16P

**Errors** An error is returned if the are no menu entries configured.

**See Also** Clear/Purge Menu, page 12-6; Set/Define Menu, page 12-26; *Menu Mode*, page 2-20; *Menu Mode*, page 5-14; *Status Displays*, page 6-9.

## 12.52.6 Show/Monitor Nodes




Displays information about all or a particular LAT service node(s). If the ETS has no knowledge of the specified node, it will say so.

**Applies To** EPS4, ETS4P, ETS8, ETS8P, ETS16, ETS16P

**Restrictions** You must be the privileged user to use the Monitor Nodes command.

**Errors** Nodes cannot be Listed.

**Parameters**

**NodeName**
Displays information regarding only that node.

**All (or *)**
Displays information regarding all known LAT nodes on the network (the default).

**Counters**
Displays LAT messages and error counters associated with the node(s). Note that multicasts are not counted as messages in this field—only connection messages are counted.

**Status**
Displays Summary information plus the node's Ethernet address, the service(s) offered, and the ident strings of those services.

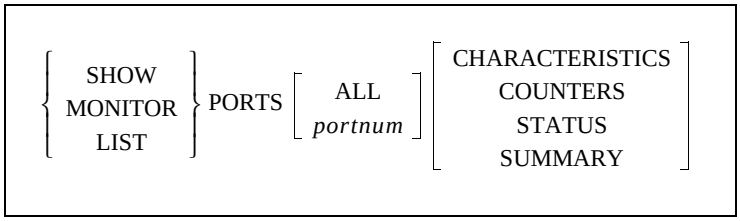
**Summary**
Displays the nodes, their identifications strings, and the LAT protocol version (the default).

**Examples**

```
Local> MONITOR NODE corky COUNTERS
```

**See Also** Set/Define Service LAT, page 12-88; *Node Limit*, page 4-3; *Status Displays*, page 6-9; *Printing to a Service*, page 9-2.

## 12.52.7 Show/Monitor/List Ports




Displays information about the ETS's ports. The current port is the default, unless an optional port designation is specified.

**Applies To** EPS4, ETS4P, ETS8, ETS8P, ETS16, ETS16P

**Restrictions** You must be the privileged user to use the Monitor Ports command.

Secure users cannot Show or List ports other than their own.

**Errors**

If the port is a virtual port, irrelevant information such as baud rate, parity, and flow control will not be displayed.

Any List on a virtual port will display template port configuration.

Status and Counters parameters are not valid with List.

Counters is also not valid for virtual ports.

**Parameters**

**All**
Displays information about all ports.

**Access**
Displays information about all local ports having a particular access type.

**portnum**
Displays information about a specified port.

**Characteristics**
Displays the port's settings, such as baud rate, parity, preferred services, name, username, and group codes.

**Counters**
Displays the port's local and remote accesses, as well as the communication errors on the device.

**Status**
Displays the port's connection status: the number of sessions and information about the current connection. It also shows the current flow control state and the state of the DSR and DTR serial signals.

**Summary**
Displays the access type, offered services, and the login status of the port.

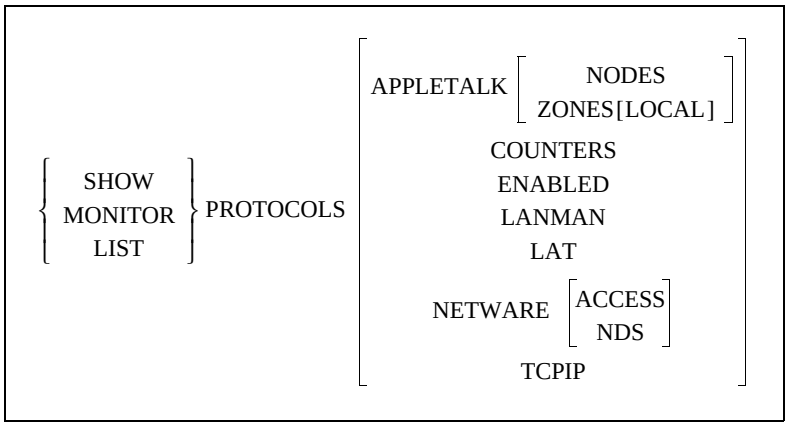
**Examples**

```
Local> LIST PORT ACCESS DYNAMIC SUMMARY
```

**See Also**

Set/Define Port Commands, page 12-27; Chapter 5, *Ports*; *Status Displays*, page 6-9.

# 12.52.8 Show/Monitor/List Protocols




Displays a summary screen of all supported protocols. General figures, such as packet counts and error status, will be shown. Individual protocol options show what is happening in greater detail. Also refer to the Netstat command, which shows currently active network socket connections.

**Applies To** EPS4, ETS4P, ETS8, ETS8P, ETS16, ETS16P

**Restrictions** You must be the privileged user to use this command.

**Errors** Counters is not valid with List.

**Parameters**

**AppleTalk**
Displays counters and status messages specific to the AppleTalk protocol.

**Nodes**
Displays AppleTalk nodes, their hardware addresses, status, and uptime.

**Zones**
Displays available AppleTalk zones, including those learned via routers.

**Local**
Displays only those AppleTalk zones located on the ETS's local network segment.

**Counters**
Displays general Ethernet counter information and counters specific to the LAT and Telnet protocols.

**Enabled**
Displays a list of the enabled protocols.

**LANMan**
Displays information specific to the LAN Manager protocol, including NetBIOS and SMB statistics.

**LAT**
Displays detailed counters and status messages specific to the LAT protocol, including configured timers and session limits.

**NetWare**
Displays detailed counters and status messages specific to the NetWare protocol, including routing and encapsulation information, and packet transfer counters by packet type.

The Error Reasons field shows error counters in hexadecimal with the rightmost bit being 0. For example, an Error Reason of 0040 represents 0000 0000 0100 0000 in binary, which means that bit 6 is set. The meaning of each bit is explained in Table 12-8.

**Table 12-8:** IPX Error Reasons

| Bit | Meaning | Explanation |
|---|---|---|
| 0 | Received packet for unknown IPX protocol. | Packet discarded. |
| 1 | Received packet for unknown socket. | Packet discarded. |
| 2 | Couldn't attach to print queue on fileserver. | When a printer is found that needs to be serviced, the ETS attaches to the fileserver. If the ETS can't attach, it can't service the queue. |
| 3 | Couldn't connect to a fileserver. | If the ETS hears from a fileserver that matches its own access list, it will try to connect to the fileserver and scan for print queues. If the connection does not go through, there may be security or license limit issues. |
| 4 | Couldn't log out of the fileserver. | This bit should never be set. |
| 5 | Couldn't get ETS name and password credentials from fileserver during login. | Login fails. |
| 6 | Fileserver did not accept the ETS's server name and password credentials. | If the login password is "access" (the default), the ETS doesn't send a password. Otherwise, the login password has to match the print server password on the fileserver. |
| 7 | Couldn't log into the fileserver. | Often means that the login slots are filled. |
| 8 | Check membership call failed. | While scanning for print queues, the ETS checks the memberships of various objects; this is not generally a problem. |
| 9 | Couldn't map user to trustee. | This is where the ETS tries to get rights to access the print queue; login fails. |
| 10 | Couldn't attach to print queue on fileserver. | Same as bit 2. |
| 11 | Couldn't service the print queue or job. | There is a print job on the fileserver that the ETS can't access. |
| 12 | Couldn't open a file on the fileserver. | This is not a serious error. |
| 13 + | Unused, should be 0. | |

**Access**
Displays the current list of accessible NetWare fileservers.

**NDS**
Displays NDS error reason counters to help diagnose NDS-related problems. They are listed in the following table.

**Table 12-9:** NDS Failure Reasons

| Bit | NDS Error Reason |
|---|---|
| 0 | Success |
| 1 | Print server ran out of memory |
| 2 | Unexpected response from file server |
| 3 | Unexpected response from file server |
| 4 | No printers found for the print server |
| 5 | No queue found for the printer |
| 6 | Login failed. |
| 7 | Authentication failed |
| 8 | Print server cannot attach to queue |

**TCPIP**
Displays detailed counters and status messages specific to the TCP/IP protocol, including configured nameservers and gateways, the default domain name, packet information, and ICMP counters.

ICMP messages are sent by TCP/IP nodes in response to errors in TCP/IP messages or queries from other nodes. The ICMP failure reason counters may be helpful for detecting specific network problems. They are listed in the following table.

**Table 12-10:** ICMP Failure Reasons

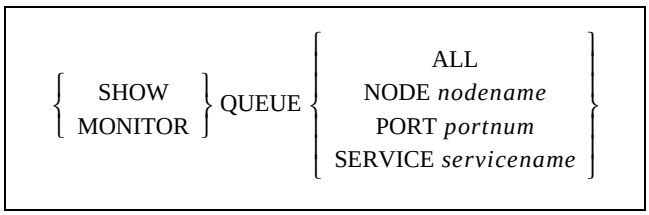
| Bit | ICMP Message Reason |
|---|---|
| 0 | ICMP echo message received |
| 1 | ICMP echo reply received |
| 2 | Destination unavailable—see bits 4-7 |
| 3 | Unknown ICMP type received |
| 4 | Network unreachable, usually from a gateway host |
| 5 | Host unreachable |
| 6 | Port unreachable, usually from a nameserving error |
| 7 | Protocol unreachable |
| 8-15 | Unused, should be 0 |

**Examples**

```
Local> SHOW PROTOCOLS APPLETALK ZONES
```

**See Also** Netstat, page 12-17; Clear/Purge Protocol NetWare Access, page 12-7; Set/Define Protocols Commands, page 12-56; *Status Displays*, page 6-9.

## 12.52.9 Show/Monitor Queue




Displays the entries in a particular local service's connect queue, if it exists. Particular sets of queues or entries can be selected with the parameters.

**Applies To** EPS4, ETS4P, ETS8, ETS8P, ETS16, ETS16P

**Restrictions** You must be the privileged user to use the Monitor Queue command.

**Parameters**

**All**
Displays all queue entries, regardless of type.

**Node**
Displays only connect requests from a specific network node.

**nodename**
Enter the name of the node whose queue you wish to view.

**Port**
Displays the entries that could be serviced by the specified port.

**portnum**
Enter a valid ETS port number.

**Service**
Displays the entries waiting for the specified service.

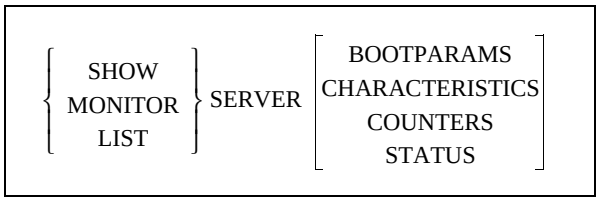
**servicename**
Enter the name of the service whose queue you wish to view.

**Examples**

```
Local> SHOW QUEUE Port 2

Local> MONITOR QUEUE Service lab5
```

**See Also** Set/Define Server Queue Limit, page 12-77; *Status Displays*, page 6-9.

# 12.52.10 Show/Monitor/List Server




Displays the global attributes or counters for the ETS itself, and the software version number and the time since the last reboot. The Counter fields are described below.

**Applies To** EPS4, ETS4P, ETS8, ETS8P, ETS16, ETS16P

**Restrictions** You must be the privileged user to use the Monitor Server command.

**Errors** Counters and Status are not valid with List.

**Parameters**

**Bootparams**
Displays parameters related to rebooting the unit and reloading the software file.

**Characteristics**
Displays the LAT network settings, the IP addresses, the ETS's enabled characteristics (for example, Broadcast), and the local limits (such as password, queue, and session). This is the default if no parameter is used.

**Counters**
Displays the accumulated counters for the Ethernet, LAT and TCP/IP protocols. The first seven lines of counters apply to Ethernet traffic in general. The fields and error counters are explained below.

**Table 12-11:** Counters Display Fields

| Field | Meaning of Counter |
|---|---|
| Frames sent with xx collisions | Gives a rough estimate of Ethernet traffic. In general, higher traffic levels cause more collisions. |
| Bad Destination | Counts packets that the ETS received for an unsupported protocol. These are generally multicasts or broadcast packets; frequently seen unknown protocols include LAVC and DECnet routing. |
| Buffer Unavailable | Counts packets lost due to an inability to allocate receive space on the part of either the Ethernet controller (Net Buffer) or the operating system (Sys Buffer). |
| Data Overrun | Shows packets that were dropped due to the controller's inability to transfer Ethernet data to memory. Generally, this happens only under unusually heavy load conditions. Packets dropped by the Ethernet hardware are retransmitted by the LAT or TCP/IP protocol handlers. |
| Failure Reasons | Values represent a combination of the error reasons that have occurred since the counters were last zeroed. |

The values for failure reasons are expressed in hexadecimal codes and represent binary masks of all of the errors that have occurred since the counters were last zeroed. There are different numbers of significant digits for each field; they represent the following:

Format: 0 0 h h (0 = unused, h = hex digit)

For example, a value of 000C in the **Recv Failure Reasons** represents a non-aligned packet and FIFO overrun because 000C hex= 12 decimal= 0000 0000 0000 1100 binary. The binary bits are numbered right to left starting with zero, so in this example, bits 2 and 3 are set.

Table 12-12 shows the ETS failure reasons and their meanings.

**Table 12-12:** Failure Reasons

| Bit | Send Failure Reason | Receive Failure Reason | Connect Failure Reason | Invalid Packet Reason |
|---|---|---|---|---|
| 0 | Unused, should be 0 | Unused, should be 0 | Internal failure, should be 0 | Data received outside window |
| 1 | Unused, should be 0 | Packet received with CRC error | Internal failure, should be 0 | Connection terminated abnormally |
| 2 | At least one collision has occurred while transmitting | Received packet did not end on byte boundary | No nameserver defined for a text hostname | Packet received with an invalid data checksum |
| 3 | Transmit aborted due to excessive (more than 16) network collisions | FIFO overrun: could not write received data before new data arrived | Attempted nameservice failed | Packet received with an invalid data header |
| 4 | Carrier sense was lost during transmission | Receive packet could not be accommodated due to lack of available receive buffers | No gateway has been configured for non-local connections | RST packet sent to remote node |
| 5 | FIFO underrun: Ethernet controller could not access transmit data in time to send it out (ERROR) | Received a packet larger than the maximum Ethernet size (1536 bytes) | Attempted ARP failed | Packet received for an unknown local user |
| 6 | ETS did not receive CD heartbeat after transmit | Unused, should be 0 | Remote host did not answer | Unused, should be 0 |
| 7 | Out-of-window collision detected | Unused, should be 0 | Host rejected the connection | Unused, should be 0 |
| 8-15 | Unused, should be 0 | Unused, should be 0 | Unused, should be 0 | Unused, should be 0 |

**Status**
Displays current ETS use, such as active ports, services, and circuits.

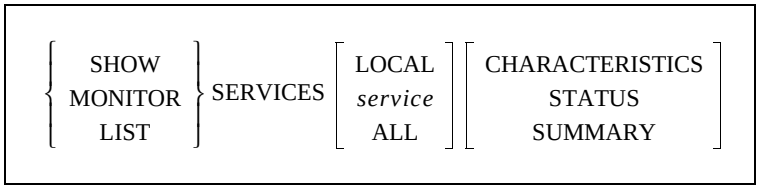
**Examples**

```
Local> SHOW SERVER STATUS

Local> MONITOR SERVER COUNTERS
```

**See Also**

Set/Define Server Commands, page 12-62; *General Server Parameters*, page 4-1; *Status Displays*, page 6-9.

## 12.52.11 Show/Monitor/List Services




Displays characteristics of the services on the network. Remember that the service list is masked by the service groups that this port is eligible to see, which means users will not see information about services to which they cannot connect.

**Applies To** EPS4, ETS4P, ETS8, ETS8P, ETS16, ETS16P

**Restrictions** You must be the privileged user to use the Monitor Services command.

**Parameters**

**Local**
Displays those services provided by this ETS, whether available or not.

**All**
Displays all known network services usable by the current port.

**service**
Displays any known information about this service. Wild cards are permitted.

**Characteristics**
Displays the service's rating, group codes, and, if the service is local, the service ports and service flags (such as Queueing, Connections, and Password).

**Status**
Displays the service name, offering node, availability status, and ident string.

**Summary**
Displays the service, ident string, and availability. This is the default if no parameter is added.

**Examples**

```
Local> SHOW SERVICE lab5_prtr STATUS

Local> MONITOR SERVICE LOCAL SUMMARY
```

**See Also** Clear/Purge Service, page 12-7; Set/Define Server Commands, page 12-62; *Creating Services*, page 4-12; *Status Displays*, page 6-9.

## 12.52.12 Show/Monitor Sessions

Displays information about the current port's sessions or all sessions.

**Applies To** EPS4, ETS4P, ETS8, ETS8P, ETS16, ETS16P

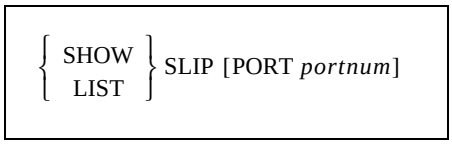
**Restrictions** You must be the privileged user to use the Monitor Sessions command. Secure users cannot specify Port or All.

**Examples**

```
Local> SHOW SESSION

Local> SHOW SESSION PORT 5
```

**See Also** Set Session Commands, beginning with Set Session Delete, page 12-93; Chapter 6, *Using the ETS*.

## 12.52.13 Show/List SLIP



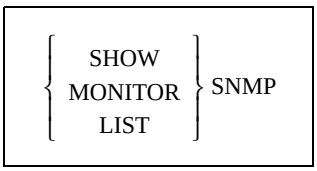

Displays the current or saved SLIP entries. If a port number is specified, that port's connections and SLIP counters will be displayed. The List command displays permanently-configured address/port pairs, as well as any configured SLIP default options.

**Applies To** EPS4, ETS4P, ETS8, ETS8P, ETS16, ETS16P

**Errors** The Port option cannot be specified with List.

**See Also** Clear/Purge SLIP, page 12-8; Set/Define SLIP, page 12-95; *Serial Line Internet Protocol (SLIP)*, page 2-12; *SLIP*, page 4-6; *Status Displays*, page 6-9.

## 12.52.14 Show/Monitor/List SNMP




Displays the current or saved SNMP security table entries.

**Applies To** EPS4, ETS4P, ETS8, ETS8P, ETS16, ETS16P

**Restrictions** You must be the privileged user to use this command.

**See Also** Clear/Purge SNMP, page 12-8; Set/Define SNMP, page 12-98; *Simple Network Management Protocol (SNMP)*, page 2-13; *SNMP Security*, page 4-18; *Status Displays*, page 6-9.

# 12.52.15 Show/Monitor/List [Telnet] Hosts


Displays either the currently available TCP/IP hosts or the ones that have been defined in the local host table. Hosts will be displayed along with the method of discovery, such as rwho, a connection, or a host table look-up. There will be a marking to denote the current nameserver and/or gateway.

The Telnet and Host keywords are interchangeable as well as combinable. You can specify one or the other, or both, and get the same information.

**Applies To** EPS4, ETS4P, ETS8, ETS8P, ETS16, ETS16P

**Restrictions** You must be the privileged user to use the Monitor Hosts command.

**Parameters**

**ALL**
Displays all known TCP/IP hosts (the default).

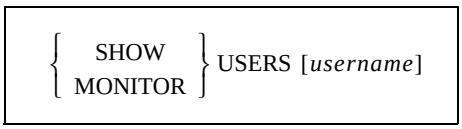
**hostname**
Displays host information for the specified port only. Wildcards are allowed.

**Examples**

```
Local> SHOW TELNET HOSTS ALL

Local> LIST HOST MYVAXSTN
```

**See Also** Clear/Purge Hosts, page 12-5; Set/Define Telnet Hosts, , page 12-99; *Local Host Table*, page 2-10; *Local Host Table*, page 4-6; *Status Displays*, page 6-9.

# 12.52.16 Show/Monitor Users




Displays the current users logged onto the ETS. If a username is given, only information for that user is shown.

**Applies To** EPS4, ETS4P, ETS8, ETS8P, ETS16, ETS16P

**Restrictions** You must be the privileged user to use the Monitor users command.

**See Also** Set/Define Port Username, page 12-54; *Status Displays*, page 6-9.

## 12.52.17 Show Version

SHOW VERSION

Displays operating software version information.

**Applies To** EPS4, ETS4P, ETS8, ETS8P, ETS16, ETS16P

**See Also** Set/Define Server Software, page 12-82; *Reloading Operational Software*, page 3-7; *Status Displays*, page 6-9.

# 12.53 Source

SOURCE [ *hostname*:*filename* | *node*::*filename* | *hostname**sys*:*login**filename* ] VERIFY

Attempts to download a configuration file from a MOP, TFTP, or NetWare host. The file is assumed to contain lines of ETS commands to be executed. The Source command is most useful for trying out a configuration file before using the Set Server Startupfile command.

**Applies To** EPS4, ETS4P, ETS8, ETS8P, ETS16, ETS16P

**Restrictions** You must be the privileged user to use this command.

**Parameters**

**hostname:filename**
For TFTP downloads, enter the TFTP hostname (either a text name or an IP address) followed by a colon and the download path and file name. The entire string must be in quotes.

**node::filename**
For MOP downloads, enter a MOP node name followed by two colons and the download path and file name.

**hostname\sys:\login\filename**
For NetWare downloads, enter the host, pathname, and filename in the above format. Due to access restrictions, download files must be in the fileserver's login directory.

**Verify**
Causes each command from the downloaded file to be echoed before execution.

**Examples**

```
Local> SOURCE ALVAX::start.com veri

Local> SOURCE "labsun:start.com"

Local> SOURCE LABFS4\SYS:\LOGIN\ETS.COM
```

**See Also** Set/Define Server Software, page 12-82; *Installation Guide*.

# 12.54 Stty

The Stty command is functionally identical to the **Set Ports** and **Show Ports** commands. If used with a parameter, it is treated as a Set Ports command. If used with no parameter, it is equivalent to Show Ports.

**Examples**

```
Local> STTY

Local> STTY SPEED 9600
```

**See Also** Set/Define Port Commands, beginning with Define Port Access on page 12-27; Show/Monitor/List Ports, page 12-102.

# 12.55 Su

The Su command is functionally identical to the Set Privileged/Noprivileged command detailed on page 12-56. It is provided for UNIX compatibility.

# 12.56 Telnet

TELNET *hostname* [*:EnvString*]

Telnet is shorthand for the **Connect Telnet** command, and is provided for simplicity.

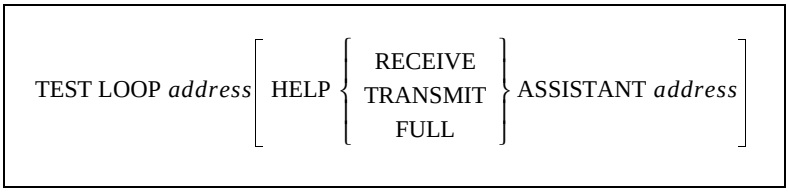
**Applies To** EPS4, ETS4P, ETS8, ETS8P, ETS16, ETS16P

**Examples**

```
Local> TELNET 192.0.1.252

Local> TELNET 192.0.1.252:2812

(connects to port 2812)

Local> TELNET dopus.csedu.uvts.edu
```

**See Also** Clear/Purge Hosts, page 12-5; Connect, page 12-9; Set/Define Port Preferred, page 12-46; Set/Define Telnet Hosts, page 12-99; *Telnet*, page 2-8; *Parity, Character Size, and Stop Bits*, page 5-4; *Connecting to Telnet Hosts*, page 6-4.

# 12.57 Test Loop




Tests the network connections to MOP hosts. A simple loopback service verifies that the remote node is receiving the ETS's transmissions. An Assistant or "helper" node can be specified to forward one or both of the transmissions (outbound or incoming).

**Applies To** EPS4, ETS4P, ETS8, ETS8P, ETS16, ETS16P

**Restrictions** You must be the privileged user to use this command.

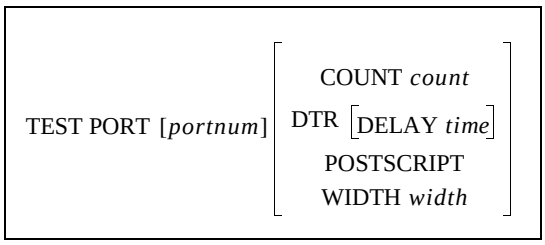
**Parameters**

**address**
Specify either a text host name or an Ethernet address. Ethernet addresses are specified in *xx-xx-xx-xx-xx-xx* (hexadecimal) format, where each *xx* represents one of the 6 bytes of the node's hardware address. If text names are used, only LAT service names can be resolved to hardware addresses.

**Examples**

```
Local> TEST LOOP 45-a2-ed-48-12-3c

Local> TEST LOOP 12-68-df-ea-38-c5 HELP REC ASS 78-23-ad-
2c-11-4e

Local> TEST LOOP LABVAX
```

# 12.58 Test Port




Tests a port's connection by sending a continuous stream of ASCII alphabetic characters from the port for a certain number of lines. If no width or count is specified, the ETS will produce 70-character lines until a key is pressed to stop the test.

**Applies To** EPS4, ETS4P, ETS8, ETS8P, ETS16, ETS16P

**Restrictions** You must be the privileged user to test a port other than your own. Virtual and multisession-enabled ports can only be tested by the current user on that port.

**Parameters**

**DTR [Delay]**
Lowers and then raises DTR on a specified *serial* port. You must enter the number of a serial port as the *portnum* in order for the command to work.

**Note:** *Performing DTR tests while Modem Control or DTRWait are enabled may affect those settings. Make sure to check the port configuration when you have finished testing.*

**time**
Enter a delay time of between 50 and 3000 milliseconds. If no delay is entered, the ETS will lower DTR for approximately one second, then raise it.

**Count**
Governs the number of test lines that will be sent. Generally, the *count* value can be any whole number. If a count is not specified in the command, the ETS will continue to produce character streams until a key is pressed.

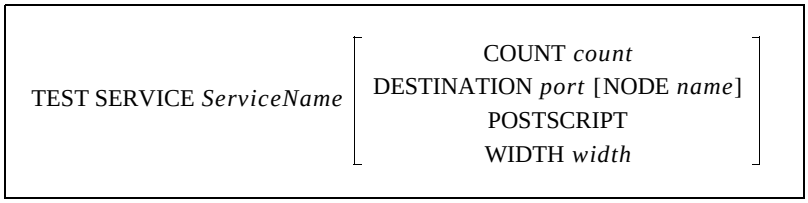
**PostScript**
Sends a PostScript test page to the port instead of ASCII data. The Count parameter controls the number of pages to print in this case, and the Width parameter is ignored.

**Width**
Breaks the stream of ASCII characters into lines that are each *width* characters long. The width value can range from 1 to 133. The default is 70 characters.

**Examples**

```
Local> TEST Port
Local> TEST Port 4 WIDTH 45 COUNT 5
```

# 12.59 Test Service




Tests a connection to a LAT service. A continuous stream of ASCII alphabetic characters is sent to the service and (hopefully) echoed back until the number of lines specified by Count is reached; the test can be stopped at any time by pressing a key. The ETS will show the number of packets sent and lost.

**Note:** *Optional parameters can be used in any combination. They work the same as in the Test Port command.*

**Applies To** EPS4, ETS4P, ETS8, ETS8P, ETS16, ETS16P

**Restrictions** You must be the privileged user to test a port other than your own.

**Errors** This is a LAT lookpback test only. Testing a Local, Login or proxy Telnet service will fail; use Test Port if you are unsure of the connection to a local service.

**Parameters**

**Count**
Governs the number of test lines that will be sent. Generally, the *count* value can be any whole number. If a count is not specified in the command, the ETS will continue to produce character streams until a key is pressed.

**Destination**
The test stream will be sent to the specified port on the LAT device.

**Node**
The test stream will be sent to the specified node of the LAT destination port.

**PostScript**
Performs a bidirectional data test of the interface between the ETSand the printer. This test will not generate any paper output. Instead it should echo the PostScript data back to the ETS and issue a status message on the result of the test.

**Note:** *Autosensing printers must be locked into PostScript mode for this test to succeed.*

**Width**
Breaks the stream of ASCII characters into lines that are each *width* characters long. The width value can range from one to 133. The default is 70 characters.

**Examples**

```
Local> TEST Service ALEX COUNT 1000 WIDTH 80
```

**See Also** Set/Define Server Incoming, page 12-68; Set/Define Service Virtual, page 12-92.

# 12.60 Unattach Port

UNATTACH PORT *portnum*

Detaches a previously Attached port. Use Disconnect to disconnect your own port. Use Logout Port to disconnect all sessions and to logout a port.

**Applies To** EPS4, ETS4P, ETS8, ETS8P, ETS16, ETS16P

**Restrictions** You must be the privileged user to use this command.

**Examples**

```
Local> UNATTACH PORT 5
```

# 12.61 Unlock Port

UNLOCK PORT*portnum*

Unlocks a locked port, which may be necessary if a user has locked the port and forgotten the password.

**Applies To** EPS4, ETS4P, ETS8, ETS8P, ETS16, ETS16P

**Restrictions** You must be the privileged user to use this command.

**Examples**

```
Local> UNLOCK PORT 6
```

**See Also** Lock, page 12-16; Set/Define Server Lock, page 12-71; *Enabling Server-Wide Port Characteristics*, page 4-1; *Locking a Port*, page 5-15.

# 12.62 Who

The Who command is functionally identical to the Show/Monitor Users command on page 12-113. It is provided for UNIX compatibility.

# 12.63 Zero Counters

ZERO COUNTERS [ ALL | PORT *portnum* ]

Resets the counters for errors and other network and ETS events. If no parameter is added to the command, only the port counters for the current port will be reset.

**Applies To** EPS4, ETS4P, ETS8, ETS8P, ETS16, ETS16P

**Restrictions** You must be the privileged user to zero a port other than your own.

**Parameters**

**All**
Zeroes all port, node, and Server counters.

**Port portnum**
Zeroes counters for events associated with the specified serial or virtual port, including SLIP events.

**Examples**

```
Local> ZERO COUNTER NODE vax5
Local> ZERO COUNTERS Port 2
```

**See Also** Show/Monitor/List Ports Counters, page 12-102.

# A: Contact Information

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

## A.1 Problem Report Procedure

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

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

## A.2 Full Contact Information

Address: 15353 Barranca Parkway, Irvine, CA 92618 USA
Phone: 949/453-3990
Fax: 949/453-3995
World Wide Web: http://www.lantronix.com

North American Direct Sales: 800/422-7055
North American Reseller Sales: 800/422-7015
North American Sales Fax: 949/450-7232
Internet: sales@lantronix.com

International Sales: 949/450-7227
International Sales Fax: 949/450-7231
Internet: intsales@lantronix.com

Technical Support: 800/422-7044 or 949/453-3990
Technical Support Fax: 949/450-7226
Internet: support@lantronix.com

# B: Troubleshooting

Before troubleshooting your ETS, ensure that all physical connections are secure. Refer to the *Installation* chapter of your *Installation Guide* for connection instructions. Your *Installation Guide* may also contain additional troubleshooting information.

Many unexplained errors are the result of having duplicate IP addresses on the network. Ensure that your ETS has a unique IP address before proceeding.

If you are having problems operating the ETS in a wireless Ethernet network, it may help to connect the ETS to a wired Ethernet network for troubleshooting.

## B.1 Power-up Troubleshooting

**Table B-1:** Error Messages

| Message | Diagnosis/Remedy |
|---|---|
| Power-up diagnostic failure (hardware failure) | Note which LED is blinking and its color, then contact your dealer or Lantronix Technical Support |
| Network Error: The ACT/ OK LED will blink yellow 2-3 times per second. | Make sure the Ethernet network cable is properly connected and reboot the ETS. If that fails to resolve the problem, reload Flash ROM. Refer to *Appendix C*. |

## B.2 DHCP Troubleshooting

**Table B-2:** DHCP Troubleshooting

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

# B.3 BOOTP Troubleshooting

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

**Table B-3:** BOOTP Troubleshooting

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

# B.4 RARP Troubleshooting

**Table B-4:** RARP Troubleshooting

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

# B.5 Modem Configuration Checklist

**Note:** *Modem functions do not apply to RS-485.*

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

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

# C: Updating Software

Current software files (ETS*.SYS) are available on the distribution CD. Software updates and release notes for the ETS can be downloaded directly from the Lantronix development systems via the Lantronix World Wide Web site (www.lantronix.com), or via anonymous FTP through the Internet (ftp.lantronix.com).

## C.1 Obtaining Software

### C.1.1 Via the Web

The latest version of ETS*.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 home page, http://www.lantronix.com, click on **Firmware Downloads**.
2. From the **All Products** pop-up menu, select **Terminal Servers: ETS**.
3. From the **All Categories** pop-up menu, select **Latest Firmware and Software**.
4. Click the **Submit** button. You will go to a page that shows links for ETS-related firmware and software.
5. From the available files, select **Latest firmware for ETS4P, ETS8P, ETS16P, ETS16PR, ETS32PR, and ETS422PR Multiport Device Server**.
6. Click the **Submit** button. You will go to a page that describes the selected software file.
7. If this is the correct file, click the **Download ETS4P, ETS8P, ETS16P, ETS16PR, ETS32PR, and ETS422PR Firmware VX.X/X Binary** link. If it is not the correct file, use your browser's **Back** button to return to the previous page to choose a different option.

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

### C.1.2 Via FTP

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

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

**Figure C-1:** Sample FTP Login

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

# C.2 Reloading Software

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

- The Flash ROM software file name, **ETS*.SYS**, should not be changed.
- The download file should be world-readable on the host.
- There is a sixteen character length limit for the path name.
- There is a twelve character length limit for the filename.
- Use the **List Server Boot** command to check settings before rebooting.

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

## C.2.1 Reloading Sequence

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

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

**Note:** *If you experience problems reloading Flash ROM, refer to Troubleshooting Flash ROM Updates on page C-4.*

### C.2.1.1 TCP/IP

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

**Note:** *EZWebCon can also be used to reload software. See the Readme in the EZWebCon directory on the distribution CD-ROM.*

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

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

If BOOTP cannot be used to configure the ETS IP parameters, manually configure them using the following commands.

**Figure C-2:** Configuring TCP/IP Reload

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

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

### C.2.1.2 NetWare

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

**Figure C-3:** Configuring NetWare Reload

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

### C.2.1.3 MOP

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

**Note:** *If an error message is displayed indicating an invalid record size on the VAX console, re-transfer the ETS*.SYS file in binary mode.*

## C.3 Troubleshooting Flash ROM Updates

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

**Table C-1:** Flash ROM Troubleshooting

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

# Glossary

**AppleTalk** AppleTalk was developed by Apple Computer to allow networking between Macintoshes. All Macintosh computers have a LocalTalk port running AppleTalk over a 230kbit serial line. AppleTalk also runs over Ethernet media (via EtherTalk) and Token Ring network media (via TokenTalk). Due to dynamic addressing and powerful name directory services, installing an AppleTalk device is generally as simple as attaching it and turning it on.

**ARP** Address Resolution Protocol. A network protocol that allows hosts to discover a node's **hardware address** from its **IP address**. ARP requests are generally sent as broadcast to all nodes, and the node whose IP address matches that in the request replies. The arp command on UNIX hosts shows the current IP address to hardware address mapping; the arp command on the Server shows the current IP host table.

**AUI** Attachment Unit Interface. A15-pin shielded, twisted pair Ethernet cable used optionally to connect the ETS and a **MAU**.

**autobaud** Autobauding occurs when the server tries to determine a terminal device's speed (or baud rate) and parity by examining the characters that are being sent at login time. Ideally, the user could know nothing about setting up his or her terminal, but would be able to turn it on and press the Return key and have the server configure itself automatically.

Autobaud will not work for all parity and baud rate combinations; it will only function if the port is using 10-bit characters with no parity or with even parity. It also will not work for device speeds below 1200 baud. Depending on the speed of the terminal device, it may take two or more presses of the Return key at login time to establish the proper baud rate.

**backbone** The main network cable. Any communications network has a main "cable," and devices can be thought of as attaching to this main conductor. ("Cable" is misleading, because networks can use microwave or fiber optic carriers as well.) For example, in a university setting, the backbone might be the cable that runs to all the buildings that need network access. Local sub-networks and devices are attached to the main backbone.

**BOOTP** A TCP/IP network protocol that lets "dumb" network nodes request configuration information from a BOOTP server node. At boot time, the dumb node sends a broadcast message requesting information and waits for a reply. The BOOTP host, if configured, provides the dumb node with an IP address,

the IP address of a load host (usually itself), and the name of the download file. The dumb node needs only know its own hardware address, as this is what the BOOTP server uses to decide whether it can help the node and what information to provide.

BOOTP implementations usually have a configuration file (such as /usr/etc/bootptab) that lists the hardware and IP addresses of BOOTP clients, as well as the download file they should use. Most TCP/IP hosts can act as servers if BOOTP replies have been enabled. See your local documentation (man pages) for specific information.

**console** The terminal used to configure the Server at boot time. When the Server first powers up and cannot access a load file, a console is enabled on Port 1 to let the manager set up the Server. This console port is the only port that is operational at boot time. After the Server is running normally, the Server will send diagnostic and error messages to this port.

See the **Set/Define Server Console** command for more information.

**dialback** A security feature that ensures people do not log into usernames or Server ports that they shouldn't have access to. When dialback is enabled on a port, the user is prompted for a username. If that username is not in the dialback table, the port is logged out and Server access is denied. If it is in the table, the port is logged out and the Server sends a command to the serial port (and presumably the attached modem) to try to reconnect the user. The command is commonly a modem command used to dial a particular phone number, thus verifying that the user is accessing the server from the proper place.

**DHCP** Dynamic Host Control Protocol. DHCP allows nodes on the network to lease IP addresses from a DHCP server. If the node has been configured to query a DHCP server, the node will receive a temporary IP address each time it boots. When a node is no longer using the IP address, it goes back into the pool of available IP addresses for the next query.

**domain name** A text name appended to a host name to form a unique host name across internets. Very loosely, it is a text name corresponding to the network portion of an IP address. For example, IP address 192.0.1.150 might correspond to host "alex.ctcorp.com;" if the hostname is "alex," the domain name is "ctcorp.com." The domain name on the Server is used for nameserving, when a host might be known only by its full name (including domain name).

**download** The transfer of a file or information from one network **node** to another. Generally it refers to transferring a file from a "big" node, such as a computer, to a "small" node, such as a terminal server or printer. Because the Server code is downloaded (as opposed to being stored permanently in the device's ROM), the code can be upgraded easily.

**Fast Ethernet** High-speed Ethernet. See **100BASE-T**.

**flash ROM** See **ROM**.

**gateway** A TCP/IP host that can access two or more different Ethernet networks. As such, it can forward messages across networks that other hosts would not be able to access. The host generally has multiple IP addresses, one for each network. For example, a gateway might "live" at addresses 192.0.1.8 and 193.0.1.8. Hosts wishing to forward messages may address the messages to the gateway which will then pass them on to the other network. For example, if an ETS at address 192.0.1.33 wished to talk to a host at address 196.0.1.58, he would have to go through a gateway machine on his network. The gateway would forward messages between networks 192.0.1 and 196.0.1. See **subnet mask**.

**hardware address** Every node has a hardware address that is unique across all networks. If you know a node's hardware address, you should be able to identify the exact piece of equipment that goes with it. Hardware addresses are generally set up by the company that manufactured the equipment and should never change. The hardware address is usually specified as a list of six hexadecimal numbers separated by dashes, such as "ae-34-2c-1d-69-f1." The hardware address for your ETS is shown on a label on the rear of the unit. See **network address**.

**host** Generally a **node** on a network that can be used interactively, or logged into, usually an to interactive computer. In the ETS command set, host is used to refer to a TCP/IP node, rather than TCP/IP and LAT nodes.

For example, the Show Hosts command displays only the known TCP/IP nodes.

**host table** A list of TCP/IP **hosts** on the network along with their **IP addresses**. Storing this list locally means users wishing to connect to these hosts can use text names (rather numeric IP addresses) without using a **nameserver**. See the Set Telnet Host and Show Hosts commands and *Local Host Table* on page 2-10 for more information.

**ICMP** Internet Control Message Protocol. ICMP messages are sent by TCP/IP **nodes** in response to errors in TCP/IP messages or queries from other nodes. They are sent, for example, when a node sends a packet to an incorrect gateway host, or when a network packet expires. ICMP messages may also be sent as broadcasts, not just sent to a specific host. The ETS counters for ICMP messages may be helpful for detecting network problems.

**IP address** In the case of **TCP/IP** networks, each node has a software or IP address that is configurable by the managers of the nodes. The software address is usually specified as four decimal numbers separated by periods (for example, 197.49.155.247). In this case, each number must be between zero and 255, and each corresponds to a different network or sub-network. Depending on how many other nodes and networks a node can "see" on its network, addresses are either assigned to nodes (in the case of large, cross-country networks) or chosen randomly (for small networks that do not connect to the outside world). Each software address should be unique across all the networks it can access. See **network address**.

**LAT**

Local Area Transport. LAT is a Digital Equipment Corporation proprietary network communication **protocol**. The protocol is based on the idea of a relatively small, known number of hosts on a local network sending small network packets at regular intervals. LAT will not work on a wide area network scale as **TCP/IP** does, as it cannot distinguish large numbers of **nodes**. For local networks, however, LAT is usually faster and less prone to pauses than TCP/IP.

LAT also allows remote connections to **services** and other network devices, about which TCP/IP has no understanding. The fact that the ETS supports both LAT and TCP/IP protocols transparently means that you are not bound by the limitations of either protocol.

**login service**

Created when the ETS is configured to allow users to log in from the network (as opposed to logging in from the serial ports). The Server advertises a new service with the same name as the server. **LAT** users who connect to the service will not be connected to a physical port or device; they will be given a **virtual port** on the Server instead. Although they obtain a Local> prompt and can issue commands as if they were physically connected to the Server. When they log off the Server, their virtual port disappears. Each login to the Server consumes a **virtual port**.

**MAU**

Medium Attachment Unit. This is a small device used as a transceiver between a **Thinwire** network cable and an **AUI** cable or a **Thickwire** cable and an **AUI** cable. It consists of the physical adapter as well as the circuitry needed to convert signals from one medium to the other.

**MMJ**

Modified Modular Jack. These are the 7-pin connectors that the Server uses to connect serial terminal lines to terminal devices. They are much smaller and easier to manage than the traditional RS-232 25-pin connectors. Many non-terminal devices such as printers and modems still use RS-232 connectors, so adapters are frequently needed. MMJ jacks can be distinguished from the similar RJ-12 jacks by their side locking tabs (RJ-12 locking tabs are center-mounted).

**MOP**

Maintenance Operations Protocol. MOP is a Digital **protocol** for Ethernet network traffic. The protocol is used for remote communications between **hosts** and devices on the network. Terminal servers use this protocol to download code from a host quickly and easily. For networks where LAT and MOP are the dominant network services, MOP is the simplest way to boot the Server.

At boot time, the Server broadcasts a request on the network for a load file, and a MOP host will respond and send the file. MOP is also used to signal the Server of an **NCP** request or connection from another host, and is the protocol that TSM is based on.

**MTU** Maximum Transmission Unit. The MTU of a link is the maximum packet size, in bytes, that can be transmitted across the link. For Ethernet, this is 1536 bytes. For SLIP lines, it can be variable, based on each host's ability to receive and reassemble packets. The RFC for SLIP suggests an MTU of 1006 bytes, but this is not a requirement.

**multicast** A message that is sent out to multiple devices on the network by a **host**. Multicasts are generally sent at specified intervals to avoid cluttering the network, and in the case of LAT, contain the name of the host sending them as well as information about what LAT **services** that host provides.

**nameserver** A device that translates (or resolves) text hostnames (such as alex.ctcorp.com) into their numeric IP address equivalents (such as 192.0.1.55). **IP addresses** can be routed easily since hosts on the network know how to map numeric addresses to exact hosts. Hosts have more trouble with names, and this is where name servers come in. No Telnet connect request can be attempted until a numeric address is known for a host, so if there is no accessible name server (or the Server has not been told of its identity with the Set Server Nameserver command), numeric addresses must be used.

**NCP** Network Control Program. NCP is a program run on VMS machines to configure local network hardware and remote network devices. In the case of the ETS, NCP can be used to remotely log into and reboot the Server or cause it to "dump" its memory to a host for analysis. It is can also be used to access the ETS console port from a host VMS system.

**NetWare** A Novell-developed Network Operating System (NOS). NetWare provides file and printer sharing among networks of Personal Computers (PC's). Each NetWare network must have at least one fileserver, and access to other resources is dependent on connecting to and logging into the fileserver. The fileserver(s) control user logins and access to other network clients, such as user PC's, print servers (such as the ETS), modem/fax servers, disk/file servers, and so on.

**network address** The identifier for a node. Every node has a hardware address that is unique across all networks and, for TCP/IP networks, an IP address that is unique on the network. See **hardware address** and **IP address**.

**node** Any intelligent device connected to the network. This includes terminal servers, host computers, and any other devices that are directly connected to the network.

A node can be thought of as any device that has a **hardware address**. A service node is a node on the network that provides a service other users can connect to, for example, a printer. A terminal server that allows only local logins is not a service node, as it does not allow remote network users to connect to it.

**PostScript** A printer/display protocol developed by Adobe Corporation. PostScript is actually a printing and programming language used to display text and graphics. Unlike line/ASCII printers, which print character input verbatim, PostScript printers accept an entire PostScript page, and then interpret and print it. The programming aspects of PostScript can be used to define shapes and routines that will be used on successive pages, change fonts and text orientation, and print fine bitmap images within blocks of text.

**protocol** Any standard method of communicating over a network. There are protocols for placing actual bits onto the network cable; other protocols are layered on top from there. **LAT** is a protocol for network access. TCP and IP are also protocols (TCP runs on top of the IP layer).

**proxy service** A service configured to offer a Telnet host as a LAT service. The Server can be set to offer Telnet hosts as services to which LAT users can connect with the **Set/Define Service Virtual** command. When the users connect, the Server translates between the LAT and Telnet sessions. When the user logs out of the remote Telnet host, he is also disconnected from the Server. A user connecting "through" the Server in this way consumes a **virtual port** while connected.

**RARP** Routing Address Resolution Protocol. RARP allows a node to broadcast a message asking for an IP address given its hardware address. If a RARP server has been configured to reply to this node, it will tell the node what its IP address should be. Note that RARP provides less information than BOOTP, but is more widely implemented.

**repeater** A network device that repeats signals from one cable onto one or more other cables, while restoring signal timing and waveforms. Repeaters are the most common way to connect local networks together, and can provide either **Thinwire** or **Thickwire** connections. They are commonly used to create larger local networks up to a certain limit based on the number of repeaters and the length of the cables.

**RFC** Request For Comments. An RFC is a standard document describing protocols, systems, or procedures used by the Internet community. For example, the IP network protocol is detailed in an RFC (RFC 791), as are SNMP, TCP, Finger, BOOTP, and the Domain name system. Information on obtaining RFCs is available from NIC@NIC.DDN.MIL.

**RIP** Routing Information Protocol. RIP packets, along with **SAP** packets, allow the Server to broadcast its known routes and services to the network and obtain this information from other routers on the network.

**Rlogin** An application that provides a terminal interface between (usually UNIX) hosts using the **TCP/IP** network protocol. Unlike **Telnet**, Rlogin assumes the remote host is or behaves like a UNIX machine. Rlogin can also be configured to disable login password checking, so should be used with care. See your host's documentation, especially regarding the .rhosts and hosts.equiv files, for more information.

**ROM** Read-Only Memory. This kind of memory device retains its information even when its power source is removed. A ROM version of the ETS does not need to **download** code, since it carries the entire executable code in ROM. Frequently the ROM is provided as flash ROM, which can be reprogrammed if the software needs to be updated.

**router** Hosts on large networks that are connected to more than one network and route messages to the correct destination nodes. Routers may send an incoming message to an adjacent network if they do not know the destination host by name, or they may send it right to the intended destination. On cross-country networks, a message may go through several routers before arriving at its final destination.

**rwho** A UNIX feature that enables network **hosts** to know what users and systems are on the network without actively connecting to them. If rwho is enabled on a host, it both sends and receives network broadcasts containing this information. The packets generally contain the host's name, IP address, and the number and names of the users on the system. The ETS listens for these broadcasts and adds the hosts to the local **host table**, eliminating the need to nameserve for their names.

Because the broadcasts are periodic (typically 30 seconds to two minutes), hosts that are seen with rwho and then removed from the local host table will reappear later. Rwho usually has to be enabled explicitly on the host system, and may not be enabled on large network environments where the extra network traffic is unacceptable. In this case hosts can be added to the local host table by hand.

**SAP** Service Advertising Protocol. SAP packets, along with **RIP** packets, allow the Server to broadcast its known routes and services to the network and obtain this information from other routers on the network.

**service** Any device on a network that can be connected to and accessed, such as a printer, modem, or a remote computer. Network users can generally see the services available on the network because the **nodes** that provide these services "advertise" them to the world. In the case of LAT, each service node sends out occasional network messages called **multicasts** describing what services it is providing and which users are connected to them.

The concept of services is specific to **LAT** and local area networks. TCP/IP and other wide area networks have no such facility. The service will occasionally be used to refer to anything that can be connected, whether LAT or not.

**session**

Any connection to a network **service**. The network service can be an interactive login to a LAT or TCP/IP host, a connection to a modem on the Server or another server, or something else. Users on the Server can have more than one session active at one time, allowing them to quickly switch between hosts or connections.

Sessions are kept in a list, and can be switched with the Forward and Backward commands. They can be listed with the Show Session command. There is an absolute limit of eight sessions per port on the Server; this limit can be lowered with the Set Server Session and Set Port Session commands.

**SLIP**

Serial Line Internet Protocol. SLIP runs TCP/IP over serial lines allowing hosts to dial into the Server via modems, for example, and run TCP/IP connections to the Server's attached Ethernet network. The Server in this case routes packets between the serial lines and the Ethernet, making connections to all the hosts transparent to the user. Since the serial line is actually carrying network packets and not plain keyboard data, there is no way to return to the Server Local> prompt without closing the SLIP session and re-logging into the server.

**SNMP**

Simple Network Management Protocol. SNMP allows a TCP/IP host running an SNMP application to query other nodes for network-related statistics and error conditions. The other hosts, which provide SNMP agents, respond to these queries and allow a single host to gather network statistics from many other network nodes. The Server provides this SNMP agent only; it cannot generate queries to other hosts. It only responds to them.

**subnet mask**

A "filter" that tells the Server whether a node is on the local network or a remote network. The ETS supports Telnet connections across networks through the use of **gateways**, using gateway hosts to forward messages across network boundaries. The ETS uses the subnet mask as a filter; if the ETS's IP address and the remote IP address appear the same after the filter, the remote host is assumed to be on the same local network. Otherwise, the gateway is used.

The mask itself is a list of bits that should be enabled in the result—a 1 in the mask means to let that bit in the IP address through, and 0 means do not. For example, address 192.1.2.22 with mask 255.255.0.0 becomes 192.1.0.0. For network purposes, host 192.1.5.12 is on the same network, based on the mask specified. In this case, a gateway would not need to be accessed. A host at 192.8.12.34 would be considered as part of a different network, however, since the network mask comes out to be 192.8.0.0 which does not match the previous two masks. In this second case, the gateway host would be used—if it had not been defined, the connect attempt would fail.

If the subnet mask is not set explicitly with the **Set/Define Server Subnet Mask** command, the ETS will assume a mask based on its IP address and thus the apparent network type. This mask will be 255.255.255.0 for most 19x.x.x.x and 2xx.x.x.x IP addresses.

**tap** A point on the network **backbone** where other devices can be attached. If the network is thought of as a freeway, the taps on the network are the on and off ramps to the freeway (and like freeway access ramps, taps are usually where network problems occur). Taps may be of several types, including simple "T" connectors or "Vampire" taps that attach directly to a network cable.

**TCP/IP** The standard network **protocols** in UNIX environments. They are almost always implemented and used together. TCP/IP is an extremely flexible protocol, allowing reliable access to over four billion possible nodes anywhere in the world. It also allows many protocols to run on top of it, notably **Telnet**, **Rlogin**, and **TFTP**. TCP/IP support may be integral to an operating system, as in UNIX, or it can be a separate product added later as on VMS machines.

**Telnet** An application that provides a terminal interface between hosts using the **TCP/IP** network protocol. It has been standardized so that Telnetting to any host should give you an interactive terminal session, regardless of the remote host type or operating system. Note that this is very different from the **LAT** software, which allows only local network access to LAT hosts.

**Telnet proxy service** See **proxy service**.

**10BASE2** **Thinwire** network cable.

**10BASE5** **Thickwire** network cable.

**100BASE-T** **Fast Ethernet** cable. It is similar physically to 10BASE-T, but capable of higher speeds.

**10BASE-T** Ethernet running across Unshielded Twisted Pair (UTP) cable. Note that 10BASE-T is a point-to-point network media, with one end of the cable typically going to a repeater/hub and the other to the network device.

**TFTP** Trivial File Transfer Protocol. On computers that run the **TCP/IP** networking software, TFTP is used to quickly send files across the network with fewer security features than FTP. TFTP is used by the ETS to download a boot file in the UNIX environment.

**Thickwire** One of the major varieties of Ethernet cabling. Thickwire network cable is 1/2" diameter coax cable. It is generally found on larger networks where a cable may travel for long distances and usually connects multi-user computers to the network. It is harder to work with than **Thinwire** cable, but offers better noise and error protection and can be run much farther (up to 500m/1500 ft. without repeaters). Connections to Thickwire networks are usually made with 15-pin connectors.

**Thinwire** Thin, co-axial cable similar to that used for television/video hookups and typically used with BNC-type connectors. Thinwire cable is much easier to route and work with than **Thickwire**, but it should not be run more than 185 meters (~600 feet) without using a repeater to reinforce the signal. Thinwire connectors are usually seen on terminal servers, personal workstations, networked printers, and in networks where the **nodes** are all relatively close to each other.

**transceiver** The physical device that interfaces between the network and the local **node**. When talking about networks, the term transceiver generally refers to any connector that actively converts signals between the network and the local node. An example of a transceiver is a **MAU**.

**TSM** Terminal Server Manager. TSM is a software package that allows terminal servers on a network to be remotely managed from another node. It is supported on VMS systems running MOP and is incompatible with TCP/IP-only networks.

**virtual port** A partially-configured port containing default setup information that is given to logins.When users log into the Server through the network or start a new session, they are not connected to any physical port, so they rely on the virtual port to manage the connection initially. When the user logs out or the Server is rebooted, the virtual port disappears.

Rather than force each user to configure his port every time he logs in, a “template” port can be configured. Setup made to this port (port 0) will be applied to each new virtual port on the Server. For example, if port 0 has Broadcast enabled, all of the incoming logins will also enabled it, unless they explicitly use the Set Port command to disable it after they log in. Other than this, the virtual ports behave much like the physical ports.

Due to system resource limitations, there is a limit of 16 virtual ports on the Server.

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## Symbols



## Numerics



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# F



# G



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# I



# J



# K

# L



# M



# N

# O



# P

# Q



# R



# S

# T

# U



# V



# W



# X



# Z