Print Server Reference Manual

For the Lantronix Family of Ethernet Print 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.

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1: Introduction

1.1 Product Overview

The Lantronix Print Servers (EPS, MPS, and LPS models) are multi-protocol print servers that provide shared network access to printers for a variety of network protocols and operating systems. The print servers generally support the TCP/IP, IPX (NetWare), and Local Area Transport (LAT), AppleTalk (EtherTalk), and Microsoft LAN Manager protocols. They can queue multiple pending jobs and service those jobs in the order in which they are received from hosts.

> **Note:** *The LPS does not support AppleTalk or LAT.*

For a description of your individual print server model, please refer to the Installation Guide that came with your print server.

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 Server" unless a distinction needs to be made between models.*

1.2 Protocol Support

The Server 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, and the LPR and RTEL printing systems.

NetWare (IPX/SPX)
> NetWare allows devices attached to the Server to act as networked printers. The Server 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 Server and access them as they would any networked printer.

LAN Manager
> The Server 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 Server 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 Server can offer its attached printers to the network as services.

Local mode   The Server user interface, which is used to issue configuration commands and establish sessions with services.

1.4   Server Features

AppleTalk Support
The Server provides Ethernet access to attached laser printers; Server 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 Server 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 Server supports LAT and TSM/NCP, making it fully compatible with most Digital Equipment Corporation operating environments.

NetWare Support
The Server is used primarily for print serving. The Server 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 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.

Small Size
The small, attractive case is designed to fit into any office environment. Because there is no internal fan, the Server 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 Server from a any host machine running the Java Virtual Machine (JVM).

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

Remote Configuration

The Server 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 Server 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 Server operating code is downloaded automatically at power-up, making software upgrades as easy as copying a file.

The Server 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 Server's local command line mode. These commands control port and server configuration

> **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 12-6 for more information.*

Host-Initiated Connections

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

Security

The Server includes several configurable security features. They include:

❍ Group codes, which allow the Server 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.

DHCP Support

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

SNMP Support

The Server 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 Server. Information is broken down as follows:

◆   Chapters 2 through 6 cover general functionality:

◆   Chapter 2, *Concepts*, explains the basic ideas behind Server 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

◆   Chapters 7 through 11 cover protocol-specific issues and troubleshooting:

❍   Chapter 7 covers TCP/IP Host Setup for LPR and RTEL printing.

❍   Chapter 8 covers NetWare Host Setup needed for printing.

❍   Chapter 9 covers LAT Host Setup for VMS printing.

❍   Chapter 10 covers AppleTalk Host Setup needed for printing.

❍   Chapter 11 covers LAN Manager Host Setup needed for printing.

◆   Chapter 12, *Command Reference*, lists the Server 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

2.1 Services

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

2.2 Network Protocols

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

Figure 2-1: Supported Network Protocols

AppleTalk	LAN Manager	LAT	NetWare	TCP/IP
Printer Access Protocol	SMB	LAT	NCP	Telnet/ Rlogin/ RTEL/ lpd
ATP	NetBEUI		SPX	TCP
DDP			IPX	IP
Ethernet/IEEE 802.3 Data Layer				

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.

2.3 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 Server supports only the Printer Access Protocol (PAP) and therefore cannot create outgoing AppleTalk sessions—only incoming print requests are accepted. Any services on the Server with AppleTalk enabled will show up as LaserWriters in Macintosh Chooser windows and are associated with an available zone (explained in Section 2.3.2). Users who select a Server service as their LaserWriter will have their print jobs forwarded to the Server for printing, or for queueing if the print port on the Server 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 Server 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 Server parallel ports support Bitronics mode, provided the attached laser printer also implements it.

2.3.1 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 Server will save zone/network/node ID triplets in permanent memory, which reduces traffic at reboot time, although the Server 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 Server 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.

2.3.2 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 Server, or if the defined zone is no longer valid, the Server will join the default zone and no other configuration is needed. The Server can be placed in a different zone with the **Define Protocols AppleTalk** command. Each time the Server is booted, or when its zone is changed, it will verify the zone name with a router.

2.3.3   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 Server 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 Server.

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 Server 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 Server.

2.4   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 Server implements only enough of the NetBIOS protocol stack to provide print services to nodes; no interactive logins are allowed.

The Server 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 Server as the target for the print job. DLC operation is only supported under Windows NT. DLC does not provide queueing on the Server, nor does it allow printing to more than one service on the Server.

2.4.1   Networking

NetBIOS is not a routable protocol, so the Server 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 Server will print an error message if any configuration that violates this rule is attempted.

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

2.5 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 Server, is called a **node**.

In general, all services offered by the Server 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

Node Vax2, with service Vax2 (logins to other users)

Node Server_1, offering service "modem"

Node Phred, a computer offering services "LaserPrinter" (for printing) and "Phred" (for logins)
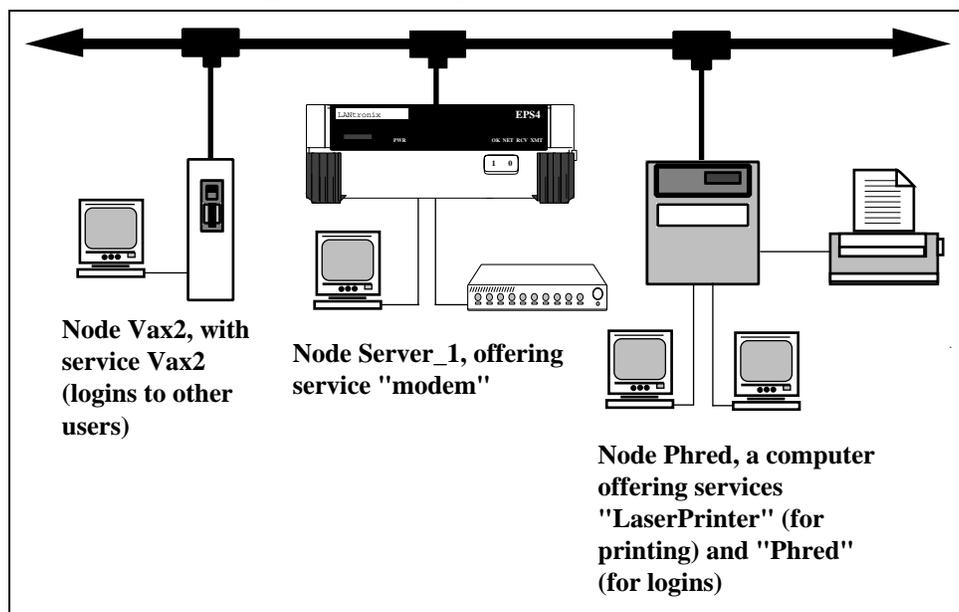
Nodes advertise their services to the network by broadcasting occasional messages about them. These messages, referred to as **multicasts**, contain the node's name and its list of services. By monitoring multicast messages, all hosts on the network know what nodes and services are available and can 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 Server 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 Server 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 Server 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-HIDDEN and Set/Define Server Service Groups on page 12-49 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.

2.6 TCP/IP

2.6.1 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 Server 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 Server. See *Dynamic Host Control Protocol (DHCP)* on page 12-6 for more information.

2.6.2   Dynamic Host Control Protocol (DHCP)

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

If your Server has boot mode DHCP support, the Server will attempt to acquire an IP address via DHCP at boot time. If it succeeds, the Server will save the IP address into NVR and continue with the boot process. Once running, the Server'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 Server will use the address saved in NVR.

If your Server 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 Server 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 Server 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 Server 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 Server boots, and the List Server Bootparams command (which shows the characteristics that will be in effect the next time the Server boots) may show a different IP address than the one that is currently in use.*

2.6.3   Simple Network Management Protocol (SNMP)

The Server 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 Server 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.

The Server 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 12-61 for more information about configuring MIB usage.

Traps are sent to a host when an abnormal event occurs on the Server. The Server 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 Server will send an **Authentication** trap. In all three cases, the trap will be directed to the IP address of the Server's loadhost. The Server 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 12-41 for syntax.*

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

2.6.4   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 Server in much the same way. It is called Reverse Telnet because "normal" connections are logins from a server to a host.

Your Server 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 Server through your host's **lp** or **lpr** print system. Server services do not care what hosts are using them. Multiple jobs from any of the supported protocols can be queued simultaneously on any service.

2.6.5   LPR Support

The Server 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 Server as a print host, add the Server's IP address to a host table and add the Server's service name as a print queue. No special host software or other configuration is needed. Server 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 Server print queues, configure the other hosts to forward their print jobs to that host which will forward them to the Server for printing.

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

2.6.6   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 Server. 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 Server 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.

2.7   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 Server 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 Server. 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 Server.

The Server 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 12-43 for more information.

NetWare support also allows logins from fileservers to the Server (for configuration) and file downloading (to download the system software at boot time).

2.7.1   Networking

Each NetWare node uses its hardware address as its node ID. In addition, the Server 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 Server will use the network number for that frame type. If there are multiple frame types, limitations to the NetWare protocol require that the Server use a different network number for each frame type on which it wants to advertise itself.

The Server 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 Server use this new network number, and treat the Server as a router to that network. If this behavior is not desired, the Server can be forced to use only one frame type (and thus not need an internal network number).

2.7.2 Access Lists

Since NetWare networks can have hundreds of fileservers, the network needs a way to reduce the number of Server 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 12-31) you can control which file servers the Server will and won't poll for print jobs.

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

2.8 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 Server. 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 Server 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 Server 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 Server 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 12-55.

The Server 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 Server to accept the next one.

2.9   Security

Several methods can be used to control access to the Server 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 Server.

- 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 Server features that are used for more than security reasons, see the *Server Configuration* and *Ports* chapters.

2.9.1   Event Reporting/Logging

The Server 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 Server. See **Set/Define Logging** on page 12-13 for more information.

3: Getting Started

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

This chapter assumes the following:

◆ The Server has booted properly and is running its operational code

◆ The Server is connected to the Ethernet

◆ For IP network users, the Server 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 Server.

3.1   Configuration Methods

The Server 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 Server 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 Server 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 Server using a standard web browser with JavaScript enabled. Simply type the Server IP address or resolvable text name into the browser's URL/Location field.

Figure 3-1: Sample Web Browser Login
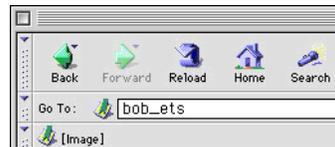
Once you have connected to the Server, you will see the Lantronix ThinWeb Manager interface. Use the left-hand menu to navigate to subpages where you can configure important settings as well as view statistics and other server information.

Figure 3-2: ThinWeb Manager Interface
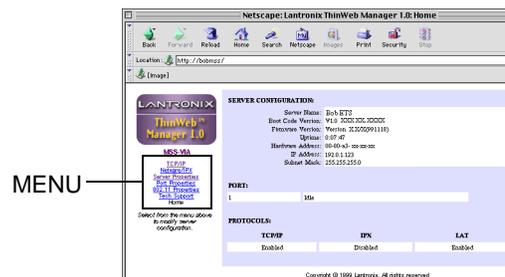
3.1.3   Command Line Interface

To configure the Server 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 Server 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, Server 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 Server **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 Server 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 12-17 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
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 12-11 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.

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.

3.5 Abbreviating Keywords

When configuring the Server 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 Server is initially configured with a server name. However, you can give the Server 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 Server name string must be enclosed in quotes if lowercase letters are used.

> **Note:**   *For the EPS1, MPS, and LPS, a server name of no more than 13 alphanumeric characters is recommended due to service name constraints.*

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 12-46 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 Server: 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 12-7 for more information.

Figure 3-8: Rebooting the Server

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

3.6.4 Restoring Factory Defaults

Should it become necessary, the Server can be restored to the default settings installed at the factory. This will restore **everything**—the Server 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 3-9: Restoring Factory Defaults

```
Local>> INITIALIZE FACTORY
```

3.6.5 Reloading Operational Software

The Server 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 Server LEDs will indicate continuing activity. If the Server is powered off or otherwise interrupted during the ROM programming phase, the code in the ROMs will be invalid and the Server 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 Server uses at boot time changes, you must edit the Server **boot parameters**, including:

- ◆ Loadhost (TCP/IP or NetWare)

  The **loadhost** is the host from which the Server 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 3-10: 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 Server: 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 3-11: 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 Server as the privileged user, you can use the Set Privileged Override command to forcibly become the privileged user.

The default privileged password for the Server is system. To change the privileged password, use the **Set/ Define Server Privileged Password** command on page 12-46 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 3-12: 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 12-42. 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 3-13: 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 3-14: Enabling Login Password

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

The Server 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 3-15: Defining a Maintenance Password

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

3.9 Configuration Files

A configuration file is a series of Server 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 Server boots.

Using a configuration file can reduce the time required to configure the Server. 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 Server, translate this information into a series of commands, and save the commands in a file. This file can be downloaded to configure the Server. 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 Server to use the configuration file.

3.9.2.1   Creating the File

The configuration file contains Server commands, one per line, that will be executed by the Server 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 Server 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 Server 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 Server from booting.

Figure 3-16: 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 Server 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 Server to use the commands in the configuration file, use the **Source** command. If the configuration file must be downloaded each time the Server 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 3-17: 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 Server will attempt to resolve the name at boot time; if it cannot resolve the name, the download will fail.*

Figure 3-18 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 3-18: Downloading from a NetWare Fileserver

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

Figure 3-19 displays the command needed to download the same startup file from VMS host PIKE.

Figure 3-19: 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 Server will retry forever until it can download the file. Otherwise it will try a specific number of times, then continue booting.

Figure 3-20: Defining the Startupfile

```
Local> DEFINE SERVER STARTUPFILE "filename" RETRY 10
```

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

If the startupfile is not readable, or if there is a problem with the file and the Server cannot boot fully, you will still be able to access the Server 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 Server 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 12-40 for instructions.*

After configuring server-wide parameters for your Server, 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 Server 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 Server, 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 Server.

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 12-39.*

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 Server 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 Server 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 Server 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 Server does not broadcast announcements.

> **Note:**   *For command syntax, see Set/Define Server Announcements on page 12-34.*

4.2   AppleTalk Server Parameters

The only configurable AppleTalk parameter is the zone to which the Server will belong. If there is no AppleTalk router on the network, all devices will pick the same zone ("*"). If a router is present, the Server 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 Server 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 Server for printing or configuration.

4.3   LAT Server Parameters

Two groups of LAT parameters can be specified in order for the Server to communicate on the network: the Server'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 Server, 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: Printer Avail-
able"
```

Note: *If you change the Server 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 Server will store information. This limit can be set in large network environments to keep Server 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 Server 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 Server 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 Server regardless of frame type. If this behavior is not desired, the Server 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 2-1 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 Server will query for print requests. By default, the Server 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 Server). For example, the following commands allow the Server 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 Server 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 Server to rescan all fileservers for pending jobs. This is useful after rebooting or after configuring new queues on the fileservers to ensure that the Server recognizes queues directed to it.

Keep in mind that fileservers cannot tell if the Server is not polling them due to access restrictions. There will be no error messages if a valid fileserver cannot print to the Server 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 Server. First and foremost, the Server 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 Server'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 Server 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 set a gateway host, which allows TCP/IP connections to other connected network segments, and a loadhost (if not done already) from which to download operational code.

Figure 4-11: Setting TCP/IP Parameters

```
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 GATEWAY 192.0.1.195
```

4.5.3   Host Limit

The **Set/Define Server Host Limit** command is used to set the number of remote TCP/IP hosts for which the Server will store information. In large network environments, this will keep Server 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 4-13: Setting a Host Limit

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

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 Server 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.

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 Server 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 4-14 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 4-14 using a terminal as the print device.

The EPS models generally come with *preconfigured* services for the serial port and parallel port(s). The service names are based on the last six digits of the unit's Ethernet address. Unlike services created via the command line, these preconfigured services have NetWare enabled and LAT disabled. And unlike the services set by the user, the preconfigured serial port service has AppleTalk enabled by default. These settings may be changed.

> **Note:**   *The EPS1 and MPS models have no method of connecting to a local service; the service must be tested from another LAT, TCP, NetWare, or AppleTalk node.*

The EPS4 and MPS models have three unique *default* printing services: one for text (xPS_*xxxxxx*_TEXT), one for PostScript (xPS_*xxxxxx*_PS), and one for Binary/PCL (xPS_*xxxxxx*_PCL).

> **Note:**   *For more information on the available preconfigured and default services, see the Services chapter of your Installation Guide.*

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 4-14 shows the command needed to create a service called *dump_port* on port 1.

Figure 4-14: Set Service Command

```
Local> SET SERVICE dump_port PORT 1 LAT ENABLED
Local> LOGOUT PORT 1
```

If the device connected to port 1 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 4-15: Show Service Command

```
Local> SHOW SERVICE LOCAL CHARACTERISTICS

Service: DUMP_PORT      Ident:
Rating: 255             Ports: 1
Characteristics:        Queuing Banner RTEL Formfeed NetWare
                        LAT Connections
Enabled Groups: 0
```

In Figure 4-15, 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 4-16: 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 4-17: Service Configuration Example

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

In order, the commands in Figure 4-17:

◆   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 Server (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 Server 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 Server. Note that all AppleTalk enabled services on the Server are assumed to be LaserWriter printers running PostScript. There is no way to support non-PostScript devices (such as ImageWriters).
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 Server service setting. This option should not be used with PostScript.
Binary	If enabled, prevents the Server from processing the data stream. Disabling this feature (the default), allows the Server 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 Server services, the Server will not poll the fileservers.
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 4-18 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 4-18: Modem Service Setup

```
Local> DEFINE PORT 1 PARITY NONE FLOW XON SPEED 19200
Local> DEFINE PORT 1 BROADCAST DISABLED
Local> DEFINE PORT 1 ACCESS DYNAMIC
Local> DEFINE PORT 1 NAME "modem" BREAK DISABLED
Local> DEFINE PORT 1 MODEM ENABLED PASSWORD ENABLED
Local> LOGOUT PORT 1
Local> SET SERVICE MODEM PORT 1 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 Server'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 Server login password to log in from the network. The following commands allow LAT and Telnet users to log into the Server without having to enter a password.

Figure 4-19: 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 4-20: Configuring Password for Incoming Connections

```
Local> SET SERVER INCOMING PASSWORD
Local> SET SERVER LOGIN PASSWORD "8ball"
```

Connection Methods on page -HIDDEN 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 Server 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 4-11 for more information.

4.7.2   IP Security Table

The Server 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 Server 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 4-21: Setting Server Access

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

In order, the command in Figure 4-21:

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 4-22: 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 Server. 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 Server from the network). If no ports are specified on the command line, all ports, both physical and virtual, are included by default.

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 4-23: Clear IPsecurity Command

```
Local> CLEAR IPSECURITY 192.1.1.102
```

The entire security table can be cleared with one command:

Figure 4-24: 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 4-25: 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 Server settings, a way to prevent unauthorized Set commands is needed. The Server 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 12-61 for more information.

4.8   Event Logging

The Server can be configured to report various events either to a serial port on the Server 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 Server 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 Server 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 Server 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 4-26: 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 4-27: 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 Server. 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 Server. 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 5-4.*

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 Server 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.

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 Server 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
```

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 Server 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 Server 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 Server 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 Server 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 Server to stop sending.

> **Note:** *Modem control only works with CTS/RTS flow control on the EPS1, EPS2-100, and EPS4-100. 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 5-5: 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 Server port you're configuring. Use the Set/Define Port Autobaud command.

Figure 5-6: 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 Server using the **Set/Define Port Flow Control** command. Figure 5-7 displays an example.

Figure 5-7: 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 12-19.

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 5-8: Configuring Parity, Character Size, and Stop Bits

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

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 12-15) 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., DSRLogout, DTRWait).

For example, the command in Figure 5-9 makes all ports process the Break key locally rather than passing it on to the remote service.

Figure 5-9: 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.*

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

5.2   Other Port Characteristics

5.2.1   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 Server will deassert DTR until the port receives a connection request. When such a connection begins, the Server will assert DTR; when the connection is closed, DTR will be de-asserted.

Figure 5-10: Enabling Dtrwait

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

5.2.2   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 5-11: Assigning Port Name

```
Local>> DEFINE PORT 3 NAME "highspeed"
```

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 5-12 displays an example.

Figure 5-12: Specifying a Username

```
Local>> DEFINE PORT 2 USERNAME "fred"
```

5.3   Security

5.3.1   Password Restrictions

Users can be required to enter the Server 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 Server to require the login password, enter the **Set/Define Port Password** command.

Figure 5-13: Requiring the Login Password

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

5.3.2 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 5-14: Enabling Signal Check

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

5.3.3 Automatic Logouts

Ports can be configured to log out automatically when the DSR signal is dropped. Ports can also be configured to log out automatically or when they've been inactive for a specified period of time.

5.3.3.1 DSRlogout

When a device connected to the Server 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 5-15: 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 Server will log out the port's user if *either* of these cases occurs.

5.3.3.2 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 5-16: Enabling Inactivity Logout

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

6: Using the Server

6.1 Logging In and Out

6.1.1 Logging In

Each port on the Server can support a device such as a printer. Use the following steps to log into the Server:

1 Telnet into the Server.

2 If the Server manager has enabled password protection you will see the words `Login Password>`. Type the login password and press the **Return** key.

3 If this port has no permanent username associated with it, the Server 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.

4 You will see the `Local_x>` prompt, where *x* is your port number. You are now in Server **Local mode**, and you can enter only the Server commands for which you are privileged. Type **Help** if you need information about the Server command set.

6.1.2 Logging Out

When you're through using the Server, type **Logout** at the Local> prompt. You can also type either **Ctrl-D** or **Ctrl-Z** at the local prompt to log out. The Server will then await another login.

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

◆ Many hosts are set to log off users after a set period of inactivity; this will not affect your login to the Server.

◆ The Server supports an inactivity logout timer of its own. If the Server manager has enabled this feature, you will be logged out of the Server 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 connection is disrupted.

6.2 Configuring Your Port

6.2.1 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.

◆ **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 Server password is required for logins.

6.3   Local Server Commands

Each local port can use the following Local mode commands: **Logout**, and **Test Port**.

6.3.1   Logout

Obviously, **Logout** logs out the current port. Any connections to session or services will be disconnected.

6.3.2   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.*

6.4   Status Displays

Three sets of commands can be used to view Server status displays. The **Show** commands show the current availability of hosts and services as well as the state of the Server, 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 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. 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 Server's print queue(s).

Show Server   Shows the state of the Server, 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 Server.

                      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 SNMP   Shows the SNMP community names and access types.

Show Users   Displays the users on the Server. 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 Serverwill 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 Server has a unique IP address.*

7.1   Selecting A Printing Method

The Server 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 Server 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 Server 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 Server 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 Server 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 Server print devices, and also allows the creation of named pipe devices on the host that map to the Server'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 Server. 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 Server. However, the data flow is one-way from the host system to the Server and this approach does require one RTELPD daemon process for each print queue configured.

TCP Socket Connects   The Server 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 Server 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 Server 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 Server, 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 Server) and the Server 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 Server,

1   Add the Server 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

```
Server_PRT|Printer on LAB Server:\
       :rm=Server_xxxxxx:\
       :rp=Server_xxxxxx_TEXT:\
       :sd=/usr/spool/lpdServer_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 **Server_PRT**. The **rm** parameter is the name of the Server in the host's address file, the **rp** parameter is the name of the service as it exists on the Server, 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/Server_PRT
# chmod 777 /usr/spool/lpd/Server_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
Server_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 -PServer_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**.
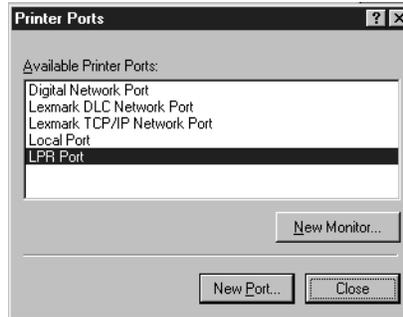
> **Note:**   *If LPR Port is not an option, refer to your Windows NT documentation for instructions on installing the Microsoft TCP/IP Printing service.*

6   Enter the name or IP address of your Server on the first line, and enter the name of your Server print service on the second line.
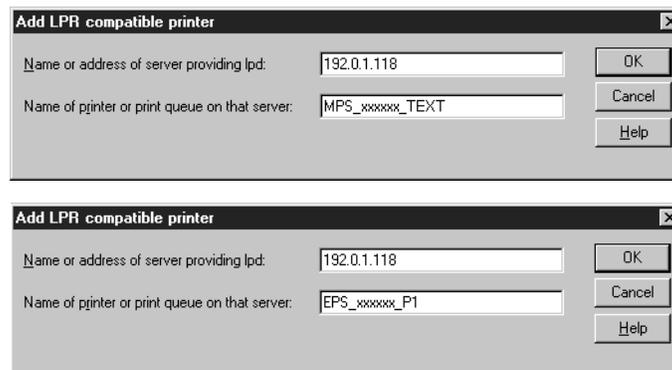
7   Select the manufacturer and printer type.

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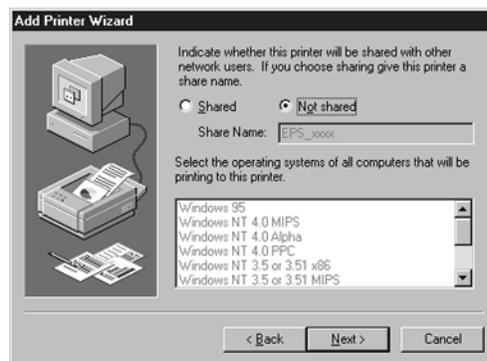
10   Test the printer by choosing **Yes** and clicking **Finish**.

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

```
Server_PRT:
        device = Server_PRTd
        up = TRUE
        host = Server_xxxxxx
        s_statfilter = /usr/lpd/bsdhort
        l_statfilter = /usr/lpd/bsdlong
        rq = Server_xxxxxx_S1
Server_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 -dServer_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 Server unit

    C   The name of the Server 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 -pServer_PRT -v/dev/null -mrmodel \
-ocmrcmodel -osmrsmodel -ormServer_xxxxxx -
orpServer_xxxxxx_P1
# /usr/lib/accept Server_PRT
# /usr/bin/enable Server_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 Server unit, and the name of the Server 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): Server_xxxxxx_P1
Is printer Server_xxxxxx_P1 a remote printer or a local printer? (r/l) r
Please enter the name of the remote host that Server_xxxxxx_P1 is
attached to: host_name
The Server_xxxxxx_P1 is connected to host Server_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 Server_xxxxxx_P1 appears in /etc/printcap (in BSD format).
Make sure Server_xxxxxx_P1 has a spool directory on Server_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 Server_xxxxxx_P1
# /usr/lib/lpadmin -p Server_PRT _s
Server_xxxxxx_P1!Server_serv
# /usr/lib/accept Server_PRT
# enable Server_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 Server 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 pro-
    cess. For instructions on how to do this, consult the README files in the newly-installed RTEL di-
    rectory.

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 Server itself. If you are only
printing to one queue from one host to one Server service, the queueing is provided by the host; it will not
release a new job to the Server until the previous job has completed.

When multiple print queues (possibly on more than one host) point to the same Server queue, the hosts will
provide local queueing, but you may still have multiple jobs attempting to access the Server. In this case,
the Server 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 Server will show the order of jobs pending on the Server. 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.
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 Server print queue you wish to use. You may have multiple UNIX print queues using the same Server print queue (for example, when you want to use different sets of options) but a UNIX print queue cannot use multiple Server 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 out-
put 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 Server 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 Server 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 12-60** or **Set/Define Service Telnetport on page 12-61** 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 Server_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.*

Server 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 Server 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 Server, 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 Server 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 Server 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 Server

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

8.3 Printing

The Server can process NetWare print jobs either as a printserver (pserver) or via rprinter. When using the pserver method, the Server logs into a file server and then queries the server for pending print jobs that it can service. When using the rprinter method, the Server 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 Server 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 Server 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 Server 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 Server as explained in the *Licensing NDS* section on page 8-1.

1   Configure the Server.

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 Net-Ware Access** command.

Figure 8-5: Adding to the Access List

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

2   Reboot the Server.

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 Server, 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: Server_xxxxxx
New Printer: Server_xxxxxx_PCL
New Print Queue: printq
...
```

The print server name is the name of your Server. The new printer name is the name of the Server 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 Server queues.*

4   Log into the Server 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 Server 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
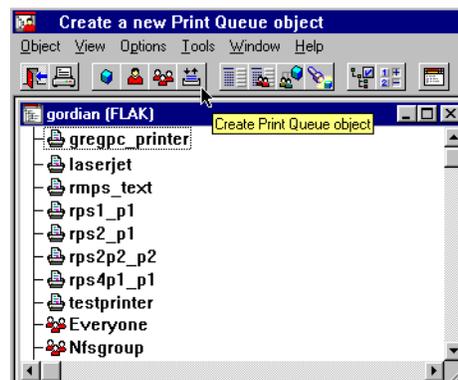
3   From the Menu Bar, select **Tools: Print Services Quick Setup**.

Figure 8-9: Quick Setup Menu Option
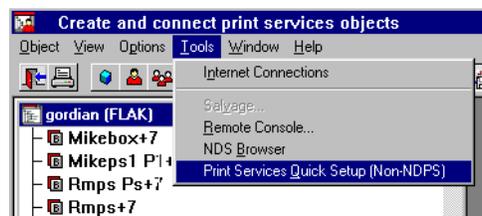
4   In the Quick Setup dialog box, enter the necessary information.

Figure 8-10: Quick Setup Dialog Box
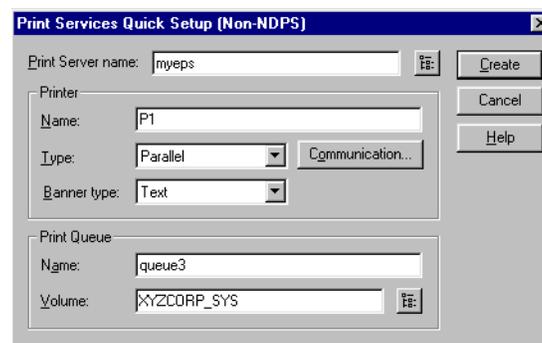
A   In the **Print Server Name** field, enter the name of your Lantronix server.

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 Server. The following example uses an Server named Server_*xxxxxx* with a service named Server_*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.
: Server_xxxxxx <CR>
Enter the name of the queue to create.
: Server_PRT <CR>
Adding print queue Server_PRT on volume GIZA_SYS
Enter the service name on Server_xxxxxx which will service this
queue
: Server_xxxxxx_TEXT <CR>
Adding print server Server_xxxxxx. Please wait...
Attaching Server_xxxxxx to Server_PRT
Adding print server Server_xxxxxx_TEXT. Please wait...
Attaching Server_xxxxxx_TEXT to Server_PRT

Print queue installed successfully. Resetting Server_xxxxxx.
Resetting print server.
Install another queue [y/n]? n
F:\>
```

5   Use the **nprint** command to print a job to the Server.

Figure 8-12: NPRINT Command

```
F:\> nprint C:\AUTOEXEC.BAT /queue=Server_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

```
Available Options

Change Current File Server

Print Queue Information

Print Server Information
```

You will see a list of current print servers.

4   Press **Insert** to create a new entry, add the Server name, and press **Enter**.

Figure 8-15: Entering Server Name

```
Enter Print Server Name: LAB_Server
```

This is the name that the Server will log in as when querying the file server's print queues. If you later change the Server name, you will need to update the file server(s).

If you change the login password on the Server, you will need to add a password for the entry you just added. Highlighting the Server name and pressing **Enter** shows the **Print Server Information** menu, in which you can change the Server password.

5   Use **Insert** to add the name of the service on the Server 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 Server 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

```
┌──────────────────────────────────────┐
│ Available Options                     │
├──────────────────────────────────────┤
│ Change Current File Server            │
│                                       │
│ Print Queue Information               │
│                                       │
│ Print Server Information              │
└──────────────────────────────────────┘
```

9 Select the Server name (LAB_Server) and press **Enter**. The menu shown in Figure 8-18 appears.

Figure 8-18: Print Server Information Menu

```
┌──────────────────────────────────────┐
│ Print Server Information              │
├──────────────────────────────────────┤
│ Change Password                       │
│                                       │
│ Print Queue Full Name                 │
│                                       │
│ Print Server Configuration            │
│                                       │
│ Print Server ID                       │
│                                       │
│ Print Server Operators                │
│                                       │
│ Print Server Status/Control           │
│                                       │
│ Print Server Users                    │
└──────────────────────────────────────┘
```

10 Highlight **Print Server Status/Control** and press **Enter**.

11 Highlight **Server Info** and press **Enter**.

Figure 8-19: Server Status Menu

```
┌──────────────────────────────────────┐
│ Print Server Status                   │
├──────────────────────────────────────┤
│ File Servers Being Serviced           │
│                                       │
│ Notify List for Printer               │
│                                       │
│ Printer Status                        │
│                                       │
│ Queues Services by Printer            │
│                                       │
│ Server Info                           │
└──────────────────────────────────────┘
```

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 Server 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 Server—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 Server 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 Server **Show Queue** display.

8.3.5 Configuring Rprinter

Configuring a Server 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 Server, but multiple ports on the Server 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 Server.

1   Set the rprinter printserver on the Server.

A   From the Server 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 Server 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 Server 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

```
Print Queue Information
Current Print Job Entries
Current Queue Status
Currently Attached Servers
Print Queue ID
Queue Operators
Queue Servers
Queue Users
```

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

```
Queue Server Candidates
LAB_Server          (Print Server)
LABPRT_S1           (Print Server)
```

5   Tell the file server about the Server 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

```
Available Options
Change Current File Server
Print Queue Information
Print Server Information
```

C   Select the Server name from the list of print servers and press **Enter**.

Figure 8-29: Available Print Servers

```
Print Servers
LAB_Server
LABPRT_S1
```

D Select **Print Server Configuration** and press **Enter**.

Figure 8-30: Print Server Configuration Option

```
┌─────────────────────────────────┐
│ Print Server Information         │
├─────────────────────────────────┤
│ Change Password                  │
│ Full Name                        │
│ Print Server Configuration       │
│ Print Server ID                  │
│ Print Server Operators           │
│ Print Server Status/Control      │
│ Print Server Users               │
└─────────────────────────────────┘
```

E Select **Printer Configuration** and press **Enter**.

Figure 8-31: Printer Configuration Option

```
┌─────────────────────────────────┐
│ Print Server Configuration       │
├─────────────────────────────────┤
│ File Servers to be Serviced      │
│ Notify List for Printer          │
│ Printer Configuration            │
│ Queues Serviced By Printer       │
└─────────────────────────────────┘
```

F Highlight the first printer entry called **Not Installed** and press **Enter**.

Figure 8-32: Configured Printers Menu

```
┌──────────────────────────┬──────┐
│ Configured Printers      │      │
├──────────────────────────┼──────┤
│ <printer name>           │ 0    │
│ <printer name>           │ 1    │
│ Not Installed            │ 2    │
│ Not Installed            │ 3    │
│ ...                      │ ...  │
└──────────────────────────┴──────┘
```

G Highlight the **Name** field and enter the printer name. Press **Enter**.

Figure 8-33: Name Field

```
┌─────────────────────────────────┐
│ Printer 2 Configuration          │
├─────────────────────────────────┤
│ Name:LABPRT_S1                   │
│ Type:                            │
│ ...                              │
└─────────────────────────────────┘
```

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 Server 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 Server 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 Server 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 Server does not connect within one minute, use the **Set/Define Protocols NetWare Reset** command to force the Server 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 Server_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 Server_xxxxxx_S1 POSTSCRIPT ENABLED
```

EPS1 and EPS2 users may also wish to set the Silent/Verbose switch to Silent mode. Leaving the switch in Verbose mode will result in boot-time diagnostic messages which may confuse the printer.

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.)

Table 8-1: NetWare Host Troubleshooting, cont.

Things to Check	Suggestion
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 Server and the queue password on the file server match.	If necessary, change the password on the Server. Unless the passwords match, the Server 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.

Table 8-2: NDS Printing Errors, cont.

Bit	Failure Code Meaning	Remedy
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. 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 PCON-SOLE 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 Server. 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 Server 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 Server 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 1 on the Server. The LAT port can be mapped to either a service or a specific port on the Server.

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_1
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 LTAnnnn to connect to the Server. 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 Server, 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 Server as shown in the example below. See *Creating Services* on page 4-6 for an explanation of the Server 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 Server 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 Server 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 Server 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)
Server_POST
```

5   Print to the queue.

Figure 9-16: Print Request

```
$ PRINT/QUEUE=Server_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.*

9.2   **Troubleshooting**

9.2.1   **VMS Printer Troubleshooting**

If a remote print queue is not functioning properly, check the following items:

◆   Make sure that LAT is licensed on your Server, 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 Server name matches the information obtained via **Show Port LTAnnnn**.

◆ On your Server, 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 Server command:

Figure 9-17: 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 Server 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 Server command to see if the host is attempting to make a LAT connection:

Figure 9-18: 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 Server is configured properly.

If the printer still does not function properly after verifying these conditions, contact Lantronix Technical Support for assistance.

9.2.2   VMS Host Troubleshooting

Table 9-1: VMS Host Troubleshooting

Area to Check	Explanation
The Server IP address and name are entered in the host file	Telnet to the Server using the name in the host file and verify that the Server name is resolvable and that the Server is reachable via the network.
Jobs that appear in the host queue reach the Server	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. 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 9-19.

Figure 9-19: 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 1** 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 Server.

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 Server.
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 Server. 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 Server*

10.1 Configuration

An Server servicing AppleTalk print queues must have the AppleTalk protocol enabled (the default). To verify that AppleTalk is enabled, enter the **List Protocols** command.

The Server advertises its attached printers as LaserWriters. The Server 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 Server aren't directly connected to the network, any programs or utilities that attempt to modify their AppleTalk settings will fail. The Server 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 Server 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 Server 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 Server parallel port, use the following commands:

Figure 10-2: Enabling Bitronics Mode

```
Local>> DEFINE PORT 1 BITRONICS ENABLED
Local>> LOGOUT PORT 1
```

If the PostScript printer attached to the Server 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 mps_prt.

Figure 10-3: Enabling AppleTalk and PostScript on a Service

```
Local>> DEFINE SERVICE mps_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 Server. If you have multiple zones on your network, the service will appear in the default zone specified by the AppleTalk router.

3   Locate your Server 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 Server services should be visible like any other AppleTalk printer, and print queues should be able to access the Server 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 Server 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 Server and watch the output. Also, there is no way to "connect" to the Server 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.

A printer set to LocalTalk will not send errors, replies, or acknowledgments to the Server. 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 Server/ Macintosh. If the LED is not blinking, try to get an error message from the printer (see *Error Messages* on page 10-4).

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 Server never sees the printer flow control, it may overrun the printer buffer resulting in corrupt data. 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 Server service—this ensures that the Server 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 Server 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.*

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 Server. See your *Installation Guide* for more information on using the EZWebCon software.

> **Note:** *The Server must be added as a Windows NT printer before it can accept print jobs from a Windows NT host.*

An Server 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 Server 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 1
```

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
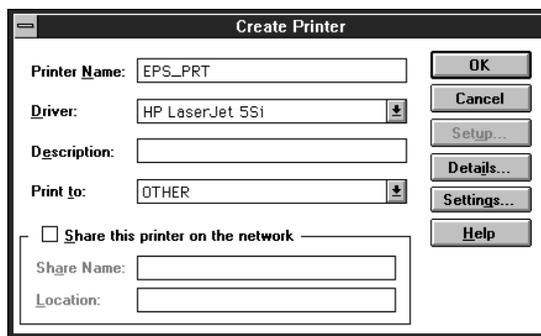
2   In the **Printer Name** box, enter a printer name of up to 32 characters.

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
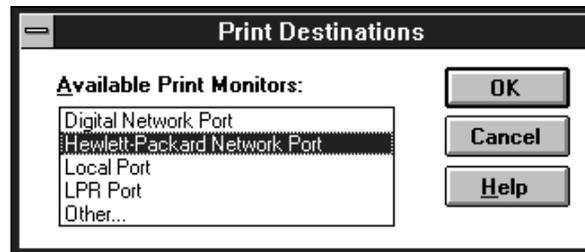
7   Choose **Hewlett Packard Network Port** and click **OK**. The following dialog box will appear:

Figure 11-4: Hewlett Packard Network Port Dialog Box
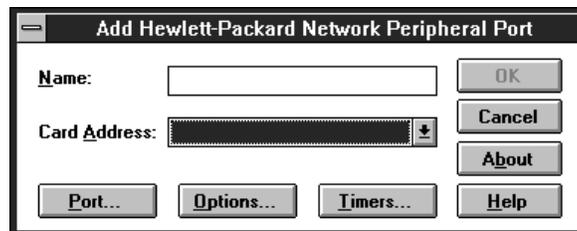
All known DLC nodes will be listed in the **Card Address** box.

8   Select the Server 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
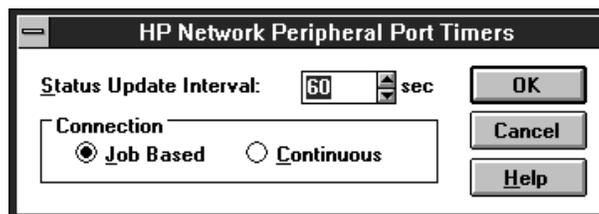
10 Click the **Job Based** radio button and click **OK**.

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
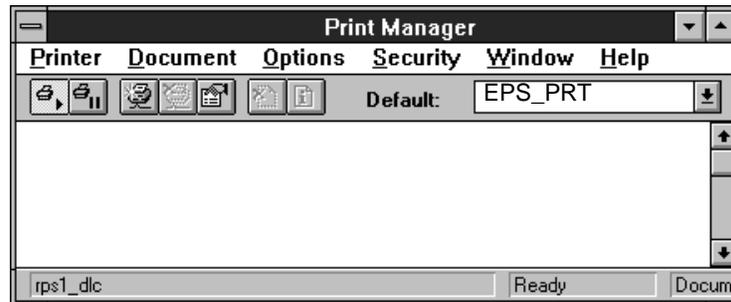
13 The printer is now ready to accept jobs.

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 Server a name.

Figure 11-7: Enabling LAN Manager

```
Local_1>> SET SERVER NAME GRAPHICSERVER
Local_1>> SET SERVICE NTX LANMANAGER ENABLED PORT 1
```

11.1.2.1   Redirecting a Port

Redirecting allows a user to use a service on the Server as if the Server 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 Server service. In the example below, **GRAPHICSERVER** is the name of the Server 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 Server; 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 Server.

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 Server. 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 Server and NT AppleTalk implementations are not compatible at this time; the Server cannot accept AppleTalk jobs from Windows NT hosts.

12: Command Reference

12.1 Overview

This chapter describes the Server command set. Each command and its syntax is shown, as well as whether or not the command is restricted to the privileged user. The print server models do not support the full Lantronix ETS/EPS command set; each command entry contains a list of the units on which the command can be used.

> **Note:** *See Set Privileged/Noprivileged on page 12-28 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 Server to complete a partially-typed command for you, which can both save time and reduce errors. If the user-entered characters are ambiguous, the Server will alert you with a beep. Command completion is disabled by default.

> **Note:** *See Set/Define Port Command Completion on page 12-17 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 Server
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 Server
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   Clear/Purge Commands

12.3.1 Clear/Purge IPsecurity

$$
\begin{Bmatrix} \text{CLEAR} \\ \text{PURGE} \end{Bmatrix} \text{IPSECURITY} \begin{Bmatrix} \text{ALL} \\ \textit{IPaddress} \end{Bmatrix}
$$

Removes an entry, or all entries, from the IP security table.

    Applies To   EPS1, EPS2, EPS2-100, EPS4-100

    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 12-12; Show/Monitor/List IPsecurity, page 12-62;
                        IP Security Table, page 4-11.

12.3.2 Clear/Purge Protocol NetWare Access

$$\begin{Bmatrix} \text{CLEAR} \\ \text{PURGE} \end{Bmatrix} \text{PROTOCOL NETWARE ACCESS} \begin{Bmatrix} \text{ALL} \\ \textit{fileserver} \end{Bmatrix}$$

Clears one or more of the currently specified entries in the NetWare access list.

Applies To   EPS1, EPS2, EPS2-100, EPS4-100, MPS1, MPS100, LPS1

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 12-31; Show/Monitor/List
                        Protocols, page 12-64; *NetWare Access Lists*, page 4-4; *Access Lists*, page 8-1.

12.3.3 Clear/Purge Service

$$\begin{Bmatrix} \text{CLEAR} \\ \text{PURGE} \end{Bmatrix} \text{SERVICE} \begin{Bmatrix} \text{LOCAL} \\ \textit{service} \end{Bmatrix}$$

Removes a defined service from the Server. The login service can not be deleted via the Clear/Purge
commands—you must use **Set/Define Server Incoming** to remove them.

Applies To   EPS1, EPS2, EPS2-100, EPS4-100, MPS1, MPS100, LPS1

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.

> **Note:**   *MPS default services cannot be deleted; they can only be disabled.*

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 12-53; Show/Monitor/List
Services, page 12-72; *Creating Services*, page 4-6.

12.3.4   Clear/Purge SNMP

$$\begin{Bmatrix} \text{CLEAR} \\ \text{PURGE} \end{Bmatrix} \text{SNMP} \begin{Bmatrix} \text{ALL} \\ CommunityName \end{Bmatrix}$$
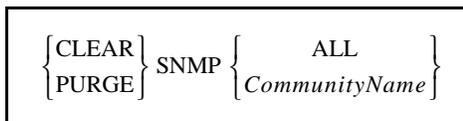
Removes entries from the SNMP security table.

Applies To   EPS1, EPS2, EPS2-100, EPS4-100, MPS1, MPS100, LPS1

Restrictions   You must be the privileged user to use this command.

Parameters   **All**
Removes all table entries.

CommunityName
The only valid community name is *public*.

Examples   `Local> CLEAR SNMP public`

See Also   Set/Define SNMP, page 12-61; Show/Monitor/List SNMP, page 12-72; *Simple
Network Management Protocol (SNMP)*, page 2-6.

12.4   Cls

CLS
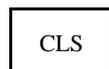
Clears the screen on your terminal device if the port is configured as Type ANSI.

Applies To   EPS4-100

See Also   Set/Define Port Type, page 12-25.

12.5   Crash 451

```
CRASH  451
```

Immediately reboots the Server. If upline dumping is enabled, the Server generates a dump file on the VMS load host before rebooting.

Applies To	EPS1, EPS2, EPS2-100, EPS4-100, MPS1, MPS100, LPS1
Restrictions	You must be the privileged user to use this command.
See Also	Initialize, page 12-7; *Rebooting the Server*, page 3-6.

12.6   Define

Define is equivalent to Set, but Define changes the permanent characteristics of ports, servers, and services. Define Port settings do not take effect until after the current user logs out. Define Server and Define Service settings remain unchanged until the Server 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.

12.7   Fg

```
FG
```

Fg is functionally equivalent to the **Finger** command. It is provided for UNIX compatibility.

12.8   Finger

```
FINGER [ [username] [@host] ]
```

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 Server.

Applies To	EPS1, EPS2, EPS2-100, EPS4-100, MPS1, MPS100, LPS1
Errors	An error is displayed if the host cannot be accessed.
Parameters	**username** Shows information about user *username* on the Server.

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 Server, 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 12-73.

12.9 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   EPS1, EPS2, EPS2-100, EPS4-100, MPS1, MPS100, LPS1

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

12.10   Initialize

INITIALIZE [SERVER]   CANCEL
DELAY *delay*
FACTORY
NOBOOT
RELOAD

Resets the Server or cancels a pending Initialization. When reset, the Server 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   EPS1, EPS2, EPS2-100, EPS4-100, MPS1, MPS100, LPS1

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 Server 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 Server to remain in the Boot Configuration Program (BCP) instead of booting. This option is only supported on ROM versions 2.0 or later, and does not apply to MPS or LPS models.

Reload
For flash-ROM units, this option forces the Server 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 12-5; Show/Monitor/List Server Status, page 12-68;
                            Rebooting the Server, page 3-6.

12.11   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 Server is initialized. Each List command is documented together with its corresponding Show command.

12.12   Logout

> LOGOUT [PORT *PortNum*]

Logs out the current port, or another port if specified.

Applies To   EPS1, EPS2, EPS2-100, EPS4-100, MPS1, MPS100, LPS1

Restrictions   You must be the privileged user to logout a port other than your own.

Examples   Local> LOGOUT

                            Local> LOGOUT PORT 2

12.13   Man

The Man command is functionally identical to the Help command on page 12-6. It is provided for UNIX compatibility.

12.14   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   EPS1, EPS2, EPS2-100, EPS4-100

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 12-15.

12.15   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.

12.16   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   EPS1, EPS2, EPS2-100, EPS4-100, MPS1, MPS100, LPS1

12.17   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   EPS1, EPS2, EPS2-100, EPS4-100, MPS1, MPS100, LPS1

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*.

12.18 Purge

Purge commands permanently remove an entry (service or IP host) from the Server's database when the unit is rebooted. Purge does not affect the current operating characteristics.

Because Purge is similar to Clear, Purge commands are explained together with their corresponding Clear commands.

12.19 Remove Queue

```
                     ┌                          ┐
                     │          ALL             │
                     │   ENTRY number           │
REMOVE  QUEUE        │   NODE NodeName          │
                     │   SERVICE ServiceName    │
                     └                          ┘
```

Removes requests for local services from that service's queue.

Applies To	EPS1, EPS2, EPS2-100, EPS4-100, MPS1, MPS100, LPS1

Restrictions	You must be the privileged user to use this command.

Parameters	**All**
	Removes all requests in the local Server 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 12-64.

12.20 Save

```
        ┌                    ┐
        │    IPSECURITY      │
        │    MENU            │
        │         ┌ ALL    ┐ │
        │   PORT  │ portnum│ │
        │         └        ┘ │
  SAVE ⟨    PRINTER          ⟩
        │    SERVER          │
        │         ┌ ALL  ┐   │
        │  SERVICE│ name │   │
        │         └      ┘   │
        │    SNMP            │
        └                    ┘
```
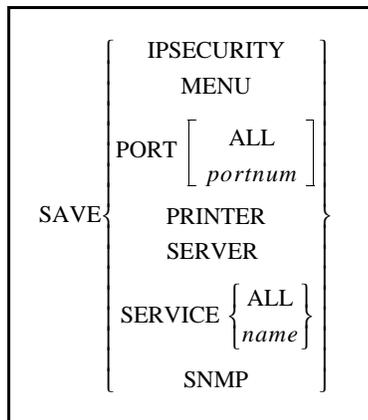
Saves current configurations into the permanent database, essentially Defining everything that has been configured so far using Set commands. Instead of issuing a Define for each Set command to make your changes permanent, you can just issue the Save command after you have configured a port, service, server or printer. For example, **Save Service "print4me"** will save any options configured with Set commands for a service named "print4me" since the Server booted.

> **Note:**   *You cannot save the login service; you must use the Define Server Incoming command to make it permanent.*

Applies To   EPS1, EPS2, EPS2-100, EPS4P1,EPS4-100, MPS1, MPS100, LPS1

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.

Printer
Saves the current printer port settings. This option applies only to the EPS models.

Server
Saves the current Server 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.

12.21 Set/Define IPsecurity

$$
\begin{Bmatrix} \text{SET} \\ \text{DEFINE} \end{Bmatrix} \text{IPSECURITY [ADDRESS] } \textit{IPaddress} \begin{Bmatrix} \begin{bmatrix} \text{BOTH} \\ \text{INCOMING} \\ \text{OUTGOING} \\ \text{PRINTING} \\ \text{SLIP} \end{bmatrix} \begin{Bmatrix} \text{ENABLED} \\ \text{DISABLED} \end{Bmatrix} \\ \text{PORTS } \textit{portlist} \end{Bmatrix}
$$
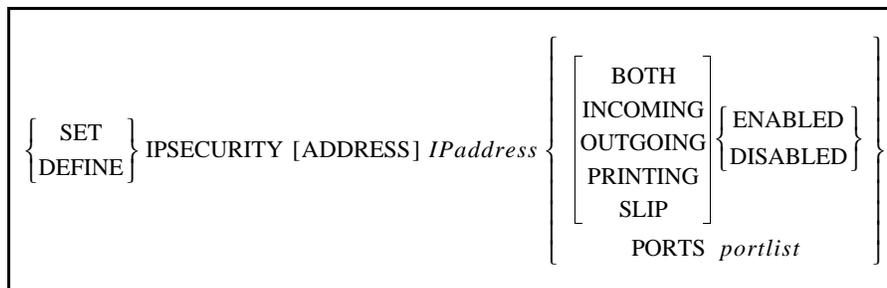
This command is used to add or change entries in the IP security table. A port number of 0 is used to denote the virtual (incoming login) ports. Unless noted, IPsecurity features are disabled by default.

Applies To   EPS1, EPS2, EPS2-100, EPS4-100

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 Server and Telnet sessions to the network from the Server.

Incoming
Restricts logins from the network into the Server, and connections to the serial port.

Outgoing
Restricts Telnet sessions to the network from the Server.

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 12-2; Show/Monitor/List IPsecurity, page 12-62; *IP Security Table*, page 4-11.

12.22   Set/Define Logging
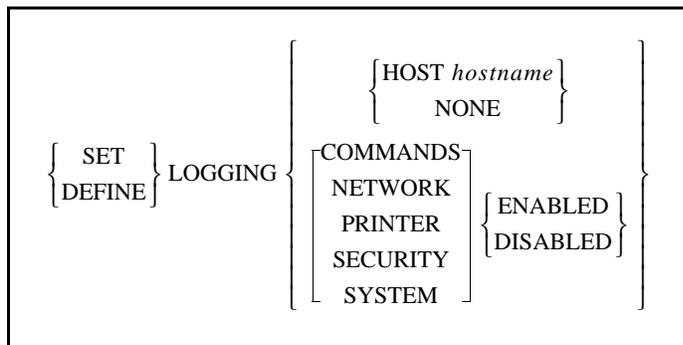
Controls error and event logging on the Server. A destination host must be defined before logging levels can be configured. If the host is disabled, the configured logging events will be saved, and will take effect when the host is re-enabled.

Applies To   EPS1, EPS2, EPS2-100, EPS4-100

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 4-13 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 Server 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 12-62; *Event Logging*, page 4-13.

12.23 Set Noprivileged

Removes privileges from the current session. See *Set Privileged/Noprivileged* on page 12-28.

12.24   Set/Define Port Commands

12.24.1   Define Port Access

DEFINE PORT $\begin{bmatrix} PortList \\ ALL \end{bmatrix}$ ACCESS $\begin{Bmatrix} DYNAMIC \\ LOCAL \\ NONE \\ REMOTE \end{Bmatrix}$

Sets the type of connections allowed to the port.

Note: *Autobaud must be disabled for Remote and Dynamic ports.*

Applies To   EPS1, EPS2, EPS2-100, EPS4-100

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   Show/Monitor/List Ports, page 12-63; *Port Access*, page 5-1.

12.24.2   Set/Define Port Bitronics

$$\begin{Bmatrix} \text{SET} \\ \text{DEFINE} \end{Bmatrix} \text{PORT} \begin{bmatrix} PortList \\ \text{ALL} \end{bmatrix} \text{BITRONICS} \begin{Bmatrix} \text{ENABLED} \\ \text{DISABLED} \end{Bmatrix}$$

Controls bidirectional parallel port functionality. The attached printer must also support Bitronics.

Applies To	EPS1, EPS2, EPS2-100, EPS4-100, MPS1, MPS100, LPS1
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> DEFINE PORT 2 BITRONICS ENABLED
See Also	*Bitronics Interface*, page 10-1.

12.24.3   Set/Define Port Character Size

$$\begin{Bmatrix} \text{SET} \\ \text{DEFINE} \end{Bmatrix} \text{PORT} \begin{bmatrix} PortList \\ \text{ALL} \end{bmatrix} \text{CHARACTER [SIZE]} \begin{Bmatrix} 7 \\ 8 \end{Bmatrix}$$

Sets the number of bits per character for the serial port. Character size defaults to 8 bits.

Applies To	EPS1, EPS2, EPS2-100, EPS4-100
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 Stop, page 12-25; Show/Monitor/List Ports, page 12-63;
                          Parity, Character Size, and Stop Bits, page 5-4.

12.24.4   Set/Define Port Command Completion

$$
\left\{ {SET \atop DEFINE} \right\} PORT \left[{PortList \atop ALL} \right] COMMAND\ [COMPLETION] \left\{ {ENABLED \atop DISABLED} \right\}
$$

Enables or disables the command completion feature. If enabled, the Server 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 Server 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-
                          63;*Command Line Interface*, page 1-3.

12.24.5   Set/Define Port DSRlogout

$$
\left\{ {SET \atop DEFINE} \right\} PORT \left[{PortList \atop ALL} \right] DSRLOGOUT \left\{ {ENABLED \atop DISABLED} \right\}
$$

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. Any open connections will be closed
before logging out.

Applies To   EPS1, EPS2, EPS2-100, EPS4-100, MPS1, MPS100, LPS1

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   Show/Monitor/List Ports, page 12-63; *DSRlogout*, page 5-6.

12.24.6   Set/Define Port DTRwait

$$
\begin{Bmatrix} \text{SET} \\ \text{DEFINE} \end{Bmatrix} \text{PORT} \begin{bmatrix} PortList \\ \text{ALL} \end{bmatrix} \text{DTRWAIT} \begin{Bmatrix} \text{ENABLED} \\ \text{DISABLED} \end{Bmatrix}
$$

If enabled, the Server 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   EPS1, EPS2, EPS2-100, EPS4-100

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 12-20; Set/Define Port Flow Control, page
                      12-19; Show/Monitor/List Ports, page 12-63; *DTR (Data Terminal Ready)*,
                      page -HIDDEN; *DTRwait*, page 5-5.

12.24.7   Set/Define Port Flow Control

$$\left\{ \begin{array}{c} \text{SET} \\ \text{DEFINE} \end{array} \right\} \text{PORT} \left[\begin{array}{c} PortList \\ \text{ALL} \end{array} \right] \text{FLOW [CONTROL]} \left\{ \begin{array}{c} \text{CTS} \\ \text{DISABLED} \\ \text{ENABLED} \\ \text{NONE} \\ \text{XON} \end{array} \right\}$$

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	EPS1, EPS2, EPS2-100, EPS4-100
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 12-63; *Flow Control*, page 5-2.

12.24.8 Set/Define Port Inactivity Logout

$$\left\{ \begin{array}{c} \text{SET} \\ \text{DEFINE} \end{array} \right\} \text{PORT} \left[\begin{array}{c} PortList \\ \text{ALL} \end{array} \right] \text{INACTIVITY [LOGOUT]} \left\{ \begin{array}{c} \text{ENABLED} \\ \text{DISABLED} \end{array} \right\}$$

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.

Applies To	EPS1, EPS2, EPS2-100, EPS4-100, MPS1, MPS100, LPS1
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 12-38; Show/Monitor/List Ports, page 12-63; *Inactivity Logout*, page 5-6.

12.24.9 Define Port Modem Control

$$\text{DEFINE PORT} \left[\begin{array}{c} PortList \\ \text{ALL} \end{array} \right] \text{MODEM [CONTROL]} \left\{ \begin{array}{c} \text{ENABLED} \\ \text{DISABLED} \end{array} \right\}$$

Specifies whether modem control lines are to be used. Modem Control must be disabled to use DSRlogout. Modem Control implies DSRlogout, in that the Server will attempt to log out any connections if the port's DSR signal drops.

Applies To	EPS1, EPS2, EPS2-100, EPS4-100
	The EPS1 and EPS2 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 12-17; Show/Monitor/List Ports, page 12-63.

12.24.10   Set/Define Port Name

$$\left\{ \begin{array}{c} \text{SET} \\ \text{DEFINE} \end{array} \right\} \text{PORT} \left[\begin{array}{c} PortList \\ \text{ALL} \end{array} \right] \text{NAME } portname$$

Sets a unique name for each port. Remote LAT connections to the Server can use either a service name or the port name to identify a port for connection purposes.

Applies To   EPS1, EPS2, EPS2-100, EPS4-100, MPS1, MPS100, LPS1

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 12-63; *Port Names*, page 5-5.

12.24.11   Set/Define Port Parity

$$\left\{ \begin{array}{c} \text{SET} \\ \text{DEFINE} \end{array} \right\} \text{PORT} \left[\begin{array}{c} PortList \\ \text{ALL} \end{array} \right] \text{PARITY} \left\{ \begin{array}{c} \text{ODD} \\ \text{EVEN} \\ \text{MARK} \\ \text{SPACE} \\ \text{NONE} \end{array} \right\}$$

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   EPS1, EPS2, EPS2-100, EPS4-100

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 Character Size, page 12-16; Set/Define Port Stop, page 12-25; Show/Monitor/List Ports, page 12-63; *Parity, Character Size, and Stop Bits*, page 5-4.

12.24.12   Set/Define Port Passflow

$$
\left\{ \begin{array}{c} \text{SET} \\ \text{DEFINE} \end{array} \right\} \text{PORT} \left[\begin{array}{c} PortList \\ \text{ALL} \end{array} \right] \text{PASSFLOW} \left\{ \begin{array}{c} \text{ENABLED} \\ \text{DISABLED} \end{array} \right\}
$$

Specifies whether the Server 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	EPS1, EPS2, EPS2-100, EPS4-100
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.

12.24.13   Set/Define Port Password

$$
\left\{ \begin{array}{c} \text{SET} \\ \text{DEFINE} \end{array} \right\} \text{PORT} \left[\begin{array}{c} PortList \\ \text{ALL} \end{array} \right] \text{PASSWORD} \left\{ \begin{array}{c} \text{ENABLED} \\ \text{DISABLED} \end{array} \right\}
$$

Controls whether a password is needed to log into the Server from this port. The **Set/Define Server Login Password** command is used to set the password itself.

Applies To	EPS1, EPS2, EPS2-100, EPS4-100, MPS1, MPS100, LPS1
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 12-42; Show/Monitor/List Ports, page 12-63; *System Passwords*, page 3-8; *Password Restrictions*, page 5-5.

12.24.14 Set/Define Port Printer

$$\left\{ \begin{array}{c} \text{SET} \\ \text{DEFINE} \end{array} \right\} \text{PORT} \left[\begin{array}{c} PortList \\ \text{ALL} \end{array} \right] \text{PRINTER} \left\{ \begin{array}{c} \text{ENABLED} \\ \text{DISABLED} \end{array} \right\}$$

Controls whether the Server 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	EPS1, EPS2, EPS2-100, EPS4-100, MPS1, MPS100, LPS1
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.*

12.24.15 Set/Define Port Signal Check

$$\left\{ \begin{array}{c} \text{SET} \\ \text{DEFINE} \end{array} \right\} \text{PORT} \left[\begin{array}{c} PortList \\ \text{ALL} \end{array} \right] \text{SIGNAL [CHECK]} \left\{ \begin{array}{c} \text{ENABLED} \\ \text{DISABLED} \end{array} \right\}$$

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	EPS1, EPS2, EPS2-100, EPS4-100, MPS1, MPS100, LPS1
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 12-63.

12.24.16   Set/Define Port Speed

$$\left\{ \begin{array}{c} \text{SET} \\ \text{DEFINE} \end{array} \right\} \text{PORT} \left[\begin{array}{c} \textit{PortList} \\ \text{ALL} \end{array} \right] \text{SPEED } \textit{baudrate}$$

Configures what baud rate will be used for connections to and from this port.

Applies To	EPS1, EPS2, EPS2-100, EPS4-100
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	Show/Monitor/List Ports, page 12-63; *Baud Rate*, page 5-2.

12.24.17 Set/Define Port Stop

$$\left\{ \begin{array}{c} \text{SET} \\ \text{DEFINE} \end{array} \right\} \text{PORT} \left[\begin{array}{c} PortList \\ \text{ALL} \end{array} \right] \text{STOP} \left\{ \begin{array}{c} 1 \\ 2 \end{array} \right\}$$

Configures whether the port will use one or two stop bits. The default is to use one stop bit.

Applies To   EPS1, EPS2, EPS2-100, EPS4-100

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 12-21; Set/Define Port Character Size, page 12-
                      16; Show/Monitor/List Ports, page 12-63; *Parity, Character Size, and Stop
                      Bits*, page 5-4.

12.24.18 Set/Define Port Type

$$\left\{ \begin{array}{c} \text{SET} \\ \text{DEFINE} \end{array} \right\} \text{PORT} \left[\begin{array}{c} PortList \\ \text{ALL} \end{array} \right] \text{TYPE} \left\{ \begin{array}{c} \text{ANSI} \\ \text{SOFTCOPY} \\ \text{HARDCOPY} \end{array} \right\}$$

Describes the type of device connected to the port.

Applies To   EPS2-100, EPS4-100

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 12-63; *Other Port Characteristics*, page 5-5.

12.24.19 Set/Define Port Username

$$\begin{Bmatrix} SET \\ DEFINE \end{Bmatrix} PORT \begin{bmatrix} PortList \\ ALL \end{bmatrix} USERNAME \begin{Bmatrix} username \\ NONE \end{Bmatrix}$$

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   EPS2-100, EPS4-100

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 12-63; *Port Names*, page 5-5.

12.24.20 Set/Define Port Verification

$$\begin{Bmatrix} SET \\ DEFINE \end{Bmatrix} PORT \begin{bmatrix} PortList \\ ALL \end{bmatrix} VERIFICATION \begin{Bmatrix} ENABLED \\ DISABLED \end{Bmatrix}$$

Determines whether the Server 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 -HIDDEN for more information.

Applies To   EPS2-100, EPS4-100

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 12-63; *Other Port Characteristics*, page 5-5; *Port Messages*, page -HIDDEN.

12.25   Set/Define Printer Type

$$\left\{ \begin{array}{l} \text{SET} \\ \text{DEFINE} \end{array} \right\} \text{PRINTER TYPE} \left\{ \begin{array}{l} \text{AUTO} \\ \text{CENTRONICS} \\ \text{DATAPRODUCTS} \end{array} \right\}$$

Sets the printer type for the parallel port(s).

Applies To   EPS1, EPS2

Restrictions   You must be the privileged user to use this command.

Parameters   **Auto**
                            The Server will attempt to automatically select the printer type based on the signals seen on the parallel port.

                            Centronics
                            The parallel port is treated as a Centronics-compatible port.

                            Dataproducts
                            The parallel port is treated as a Dataproducts-compatible port.

12.26   Set Privileged/Noprivileged

$$SET \begin{Bmatrix} PRIVILEGED[OVERRIDE] \\ NOPRIVELEGED \end{Bmatrix}$$

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 Server Privileged Password** command. If the password is forgotten, the Server can be reset to factory defaults.

> **Note:**   *Only one port on the Server can be privileged at any time.*

Applies To   EPS1, EPS2, EPS2-100, EPS4-100, MPS1, MPS100, LPS1

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 12-46; *Privileged Password*, page 3-8.

12.27   Set/Define Protocols Commands

12.27.1   Define Protocols AppleTalk

$$\begin{Bmatrix} SET \\ DEFINE \end{Bmatrix} PROTOCOLS\ APPLETALK \begin{Bmatrix} \begin{Bmatrix} ENABLED \\ DISABLED \end{Bmatrix} \\ DEVICETYPE\ name \\ ZONE\ ZoneName \end{Bmatrix}$$

Enables or Disables the AppleTalk protocol on the Server, and allows placement of the Server into a zone other than the default when there is more than one available AppleTalk zone.

Applies To   EPS1, EPS2, EPS2-100, EPS4-100, MPS1, MPS100

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 Server into.
Examples	`Local> DEFINE PROTOCOL APPLETALK ZONE "AcctZone"`
See Also	Show/Monitor/List Protocols, page 12-64; *AppleTalk Server Parameters*, page 4-2.

12.27.2 Define Protocols IP

$$
\left\{ \begin{array}{c} \text{SET} \\ \text{DEFINE} \end{array} \right\} \text{PROTOCOLS IP} \left\{ \begin{array}{c} \left\{ \begin{array}{c} \text{ENABLED} \\ \text{DISABLED} \end{array} \right\} \\ \text{IPADDRESS } \textit{address} \\ \text{[SECONDARY]} \left\{ \begin{array}{c} \text{GATEWAY } \textit{host} \\ \text{LOADHOST } \textit{address} \\ \text{NAMESERVER } \textit{address} \end{array} \right\} \\ \text{TCPKEEPALIVE} \left\{ \begin{array}{c} \text{ENABLED} \\ \text{DISABLED} \end{array} \right\} \\ \text{TIMESERVER} \left\{ \begin{array}{c} \text{ENABLED} \\ \text{DISABLED} \end{array} \right\} \end{array} \right\}
$$
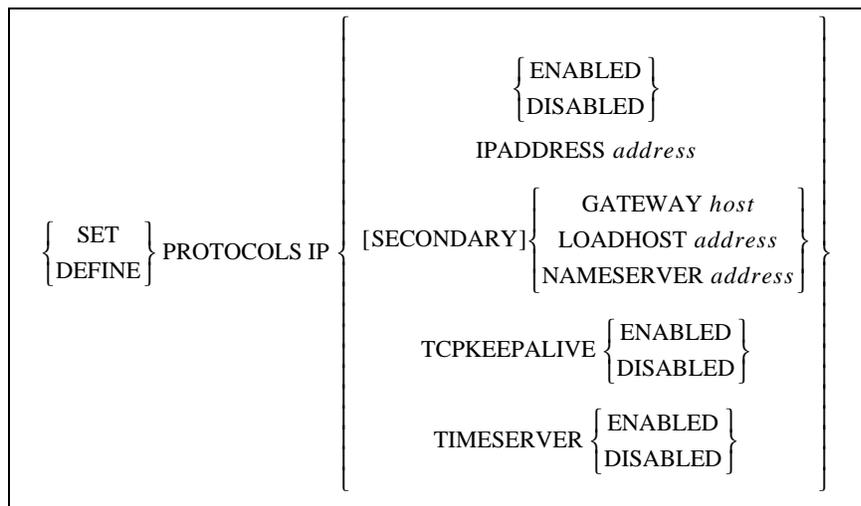
Enables or Disables the IP protocol, and allows configuration of other IP parameters. Some parameters may be duplicates of **Set Server** commands; the functionality is identical. See the Set Server commands for descriptions of the parameters not explained here.

Applies To	EPS1, EPS2, EPS2-100, EPS4-100, MPS1, MPS100, LPS1
Restrictions	You must be the privileged user to use this command.
Errors	Enabled/Disabled parameters must be defined.

Parameters   **TCPKeepalive**
Controls whether the Server 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 Server will send IP daytime request packets. It is enabled by default.

See Also   Set/Define Server IPaddress, page 12-40; Set/Define Server Gateway, page 12-37; Set/Define Server Loadhost, page 12-41; *TCP/IP Server Parameters*, page 4-5; *Installation Guide*.

12.27.3   Define Protocols LAN Manager

DEFINE PROTOCOLS LANMAN $\left\{ \begin{array}{l} \text{ENABLED} \\ \text{DISABLED} \end{array} \right\}$

Enables or Disables the LAN Manager protocol.

Applies To   EPS1, EPS2, EPS2-100, EPS4-100, MPS1, MPS100

Restrictions   You must be the privileged user to use this command.

See Also   *LAN Manager*, page 2-3.

12.27.4   Set/Define Protocols LAT

$\left\{ \begin{array}{l} \text{SET} \\ \text{DEFINE} \end{array} \right\}$ PROTOCOLS LAT $\left\{ \begin{array}{l} \left\{ \begin{array}{l} \text{ENABLED} \\ \text{DISABLED} \end{array} \right\} \\ \textit{LicenseString} \end{array} \right\}$

Enables or Disables the LAT protocol, and allows the Server administrator to enter the string needed to enable LAT functionality. The license number must be entered before any LAT functionality is available.

Applies To   EPS1, EPS2, EPS2-100, EPS4-100, MPS1, MPS100

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 2-4.

12.27.5 Set/Define Protocols NetWare

$$
\left\{ {SET \atop DEFINE} \right\} PROTOCOLS\ NETWARE \left[\begin{array}{l} \left\{ ENABLED \atop DISABLED \right\} \\ ACCESS \left\{ \begin{array}{c} ALL \\ fileserver \\ LOCAL \end{array} \right\} \\ DSCONTEXT\ context \\ DSLICENSE\ LicenseString \\ DSTREE\ treeString \\ ENCAPSULATION \left\{ \begin{array}{c} 802\_2 \\ ETHER\_II \\ NATIVE \\ SNAP \end{array} \right\} \left\{ ENABLED \atop DISABLED \right\} \\ INTERNAL\ [NETWORK]\ netnum \\ LOADHOST \left\{ fileserver \atop NONE \right\} \\ POLLnum \\ PRINTSERVER \left\{ pserver \atop NONE \right\} \\ RESET \\ \left\{ RIP \atop SAP \right\} \left\{ ENABLED \atop DISABLED \right\} \\ ROUTING \left\{ ENABLED \atop DISABLED \right\} \end{array} \right]
$$

Enables or disables the NetWare protocol, and configures NetWare-related settings.

Applies To	EPS1, EPS2, EPS2-100, EPS4-100, MPS1, MPS100, LPS1
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 Server 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 Server is located.

context
Specify the NDS context where the Server 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 Server.

LicenseString
Enter the license string obtained from Lantronix to enable NDS on your Server.

DSTree
Configures the NetWare Directory Service tree in which the Server 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 Server 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 Server uses 802.2 frame format with NetWare SAPs.

Ether_II
The Server uses Ethernet v2 frame format.

Native
The Server uses "native mode" NetWare frame format.

Snap
The Server uses 802.2 frame format with SNAP SAPs.

Network
Sets the internal network number for the Server. This number becomes the
Server'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 Server 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 Server 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 Server will act as an internal router. If routing is enabled, the Server 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 12-31; Set/Define Server NetWare Loadhost, page 12-43; Set/Define Server NetWare Printserver, page 12-44; Set/Define Server Software, page 12-50; Show/Monitor/List Protocols, page 12-64; *NetWare*, page 2-8; *NetWare Server Parameters*, page 4-4; *Creating NDS Print Queues with PCONSOLE*, page 8-3; *Installing a Print Queue Using PCONSOLE*, page 8-7.

12.28   Set/Define Server Commands

12.28.1   Set/Define Server Announcements

$$\begin{Bmatrix} \text{SET} \\ \text{DEFINE} \end{Bmatrix} \text{SERVER ANNOUNCEMENTS} \begin{Bmatrix} \text{ENABLED} \\ \text{DISABLED} \end{Bmatrix}$$

Governs whether the Server will send service advertising messages and MOP remote console announcements over the network.

Applies To   EPS1, EPS2, EPS2-100, EPS4-100, MPS1, MPS100, LPS1

Restrictions   You must be the privileged user to use this command.

12.28.2   Set/Define Server Bootgateway

$$\left\{ \begin{array}{l} \text{SET} \\ \text{DEFINE} \end{array} \right\} \text{SERVER BOOTGATEWAY } \textit{IPaddress}$$

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	EPS1, EPS2, EPS2-100, EPS4-100, MPS1, MPS100
Restrictions	You must be the privileged user to use this command.
See Also	*Editing the Boot Parameters*, page 3-7.

12.28.3   Set/Define Server BOOTP

$$\left\{ \begin{array}{l} \text{SET} \\ \text{DEFINE} \end{array} \right\} \text{SERVER BOOTP } \left\{ \begin{array}{l} \text{ENABLED} \\ \text{DISABLED} \end{array} \right\}$$

Enables or disables querying for a BOOTP host at system boot time.

Applies To	EPS1, EPS2, EPS2-100, EPS4-100, MPS1, MPS100, LPS1
Restrictions	You must be the privileged user to use this command.
See Also	Set/Define Server RARP, page 12-48; *Editing the Boot Parameters*, page 3-7.

12.28.4   Set/Define Server Buffering

$$\left\{ \begin{array}{l} \text{SET} \\ \text{DEFINE} \end{array} \right\} \text{SERVER BUFFERING } \textit{buffersize}$$

Specifies the size of buffer (in bytes) to use for network connections. The Server'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	EPS1, EPS2, EPS2-100, EPS4-100, MPS1, MPS100, LPS1
Restrictions	You must be the privileged user to use this command.
Parameters	**buffersize** Acceptable buffer sizes range from 128 bytes to 4096 bytes.

Defaults	EPS1 and MPS1: 4096
	EPS2P, EPS2-100, EPS4P, EPS4-100, and MPS100: 2048
	Other units: 512
Examples	Local> SET SERVER BUFFERING 1024

12.28.5 Set/Define Server Circuit Timer

$$\left\{\begin{array}{l} \text{SET} \\ \text{DEFINE} \end{array}\right\} \text{SERVER CIRCUIT [TIMER] } \textit{TimerValue}$$

Specifies the delay between LAT messages transmissions from the Server 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	EPS1, EPS2, EPS2-100, EPS2-100, MPS1, MPS100, LPS1
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 2-4.

12.28.6 Set/Define Server DHCP

$$\left\{\begin{array}{l} \text{SET} \\ \text{DEFINE} \end{array}\right\} \text{SERVER DHCP } \left\{\begin{array}{l} \text{ENABLED} \\ \text{DISABLED} \end{array}\right\}$$

Enables or disables querying for a DHCP host at system boot time.

|	
Applies To	EPS1, EPS2, EPS2-100, EPS4-100, MPS1, MPS100, LPS1
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 12-35; Set/Define Server IPaddress, page 12-40; Set/Define Server RARP, page 12-48; *Dynamic Host Control Protocol (DHCP)*, page 2-6; *Editing the Boot Parameters*, page 3-7.

12.28.7 Set/Define Server Gateway

$$\left\{ \begin{array}{c} \text{SET} \\ \text{DEFINE} \end{array} \right\} \text{SERVER [SECONDARY] GATEWAY } \textit{IPaddress}$$

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	EPS1, EPS2, EPS2-100, EPS4-100, MPS1, MPS100, LPS1
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 Subnet Mask, page 12-52; Show/Monitor/List Protocols, page 12-64; *TCP/IP*, page 2-5; *TCP/IP Server Parameters*, page 4-5.

12.28.8 Set/Define Server Host Limit

$$\left\{ \begin{array}{c} \text{SET} \\ \text{DEFINE} \end{array} \right\} \text{SERVER HOST [LIMIT]} \left\{ \begin{array}{c} \textit{limit} \\ \text{NONE} \end{array} \right\}$$

Configures the maximum number of TCP/IP hosts about which the Server will keep information. Only hosts seen with rwho broadcasts are subject to this limit.

Applies To	EPS1, EPS2, EPS2-100, EPS4-100, MPS1, MPS100, LPS1
Restrictions	You must be the privileged user to use this command.
Parameters	**limit** The Server 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	Show/Monitor/List Protocols, page 12-64; *Host Limit*, page 4-6.

12.28.9 Set/Define Server Identification

$\left\{ \begin{array}{c} \text{SET} \\ \text{DEFINE} \end{array} \right\}$ SERVER IDENTIFICATION *IDstring*

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	EPS1, EPS2, EPS2-100, EPS4-100, MPS1, MPS100, LPS1
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 12-30; Show/Monitor/List Protocols, page 12-64; Show/Monitor/List Server, page 12-68; *Server Identification*, page 4-3.

12.28.10 Set/Define Server Inactivity Timer

$\left\{ \begin{array}{c} \text{SET} \\ \text{DEFINE} \end{array} \right\}$ SERVER INACTIVITY [TIMER] *limit*

Sets the period of time after which a port with Inactivity Logout enabled is considered inactive and automatically logged out.

Applies To	EPS1, EPS2, EPS2-100, EPS4-100, MPS1, MPS100, LPS1
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 12-20; Show/Monitor/List Server, page 12-68; *Inactivity Logout, page 5-6*.

12.28.11   Set/Define Server Incoming

```
                                        ⎧   LAT     ⎫
                                        ⎪  TELNET   ⎪
⎧  SET   ⎫                              ⎪   BOTH    ⎪
⎨        ⎬ SERVER INCOMING ⎨           ⎬
⎩ DEFINE ⎭                              ⎪   NONE    ⎪
                                        ⎪ NOPASSWORD⎪
                                        ⎩ PASSWORD  ⎭
```
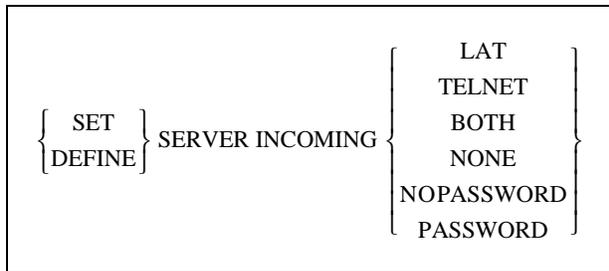
Allows or denies incoming LAT or Telnet connections and enforces password protection, if desired. The Show Server command shows the status of incoming connection parameters.

Applies To	EPS1, EPS2, EPS2-100, EPS4-100, MPS1, MPS100, LPS1
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 Server.

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 Server.

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 Server 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 12-68; *System Passwords, page 3-8*.

12.28.12   Set/Define Server IPaddress

$$\left\{ \begin{array}{l} \text{SET} \\ \text{DEFINE} \end{array} \right\} \text{SERVER IPADDRESS } \textit{IPaddress}$$

Sets the Server'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 Server Subnet Mask command.

Note:	*If the IP address is cleared after a reboot but List Server still shows the address, there is some other node on the network responding to that IP address.*

Applies To	EPS1, EPS2, EPS2-100, EPS4-100, MPS1, MPS100, LPS1
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 -HIDDEN; Set/Define Server Subnet Mask, page 12-52; Show/Monitor/List Server, page 12-68; Show/Monitor/List Protocols, page 12-64; *TCP/IP*, page 2-5; *Dynamic Host Control Protocol (DHCP)*, page 2-6.

12.28.13   Set/Define Server Keepalive Timer

$$\left\{ \begin{array}{l} \text{SET} \\ \text{DEFINE} \end{array} \right\} \text{SERVER KEEPALIVE[TIMER]}\textit{time}$$

Sets the period in seconds between "hello" messages on active, but quiet, LAT sessions.

Applies To	EPS1, EPS2, EPS2-100, EPS4, EPS4-100, MPS1, MPS100, LPS1
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 12-68.

12.28.14 Set/Define Server Loadhost

$$\begin{Bmatrix} \text{SET} \\ \text{DEFINE} \end{Bmatrix} \text{SERVER [SECONDARY] LOADHOST } \textit{IPaddress}$$

Specifies the TCP/IP host from which the Server requests its runtime code. For LAT-loading Servers, this command has no function.

Applies To	EPS1, EPS2, EPS2-100, EPS4-100, MPS1, MPS100, LPS1
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 12-68; *Reloading Operational Software*, page 3-7; *Editing the Boot Parameters*, page 3-7.

12.28.15 Set/Define Server Lock

$$\begin{Bmatrix} \text{SET} \\ \text{DEFINE} \end{Bmatrix} \text{SERVER LOCK} \begin{Bmatrix} \text{ENABLED} \\ \text{DISABLED} \end{Bmatrix}$$

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	EPS2-100, EPS4-100
Restrictions	You must be the privileged user to use this command.

12.28.16   Set/Define Server Login Password

$\left\{ \begin{array}{l} \text{SET} \\ \text{DEFINE} \end{array} \right\}$ SERVER LOGIN [PASSWORD][*passwd*]

Specifies the password that is used to log into the Server 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	EPS1, EPS2, EPS2-100, EPS4-100, MPS1, MPS100, LPS1
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 12-22; *Login Password*, page 3-9.

12.28.17   Set/Define Server Maintenance Password

$\left\{ \begin{array}{l} \text{SET} \\ \text{DEFINE} \end{array} \right\}$ SERVER MAINTENANCE [PASSWORD][*passwd*]

Specifies the password that allows remote NCP connections to the Server. The maintenance password is only used by the MOP protocol itself; it is not needed for user-level logins.

Applies To	EPS1, EPS2, EPS2-100, EPS4-100, MPS1, MPS100, LPS1
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.

12.28.18   Set/Define Server Multicast Timer

$\begin{Bmatrix} \text{SET} \\ \text{DEFINE} \end{Bmatrix}$ SERVER MULTICAST[TIMER] *timer*

Specifies the length of time between Server service announcement broadcasts for LAT circuits. This parameter should not need to be changed under normal circumstances.

Applies To	EPS1, EPS2, EPS2-100, EPS4-100, MPS1, MPS100, LPS1
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 12-68; *LAT*, page 2-4.

12.28.19   Set/Define Server Name

$\begin{Bmatrix} \text{SET} \\ \text{DEFINE} \end{Bmatrix}$ SERVER NAME *ServerName*

Specifies the name of the Server.

Applies To	EPS1, EPS2, EPS2-100, EPS4-100, MPS1, MPS100, LPS1
Restrictions	You must be the privileged user to use this command.
Parameters	**ServerName** Enter a string of up to 16 alphanumeric characters. Print server names are restricted further by service name constraints. They're typically **servername_text** or **servername_p1**, but they may not exceed 16 characters including the suffix.

> **Note:**   *The Server name string must be enclosed in quotes to preserve case.*

See Also	Show/Monitor/List Server, page 12-68; *Changing the Server Name*, page 3-6.

12.28.20   Set/Define Server NetWare Loadhost

Used to specify the name of the NetWare file server to be used for downloading new software.

Applies To	EPS1, EPS2, EPS2-100, EPS4-100, MPS1, MPS100, LPS1

$$\begin{Bmatrix} SET \\ DEFINE \end{Bmatrix} SERVER\ NETWARE\ LOADHOST \begin{Bmatrix} ServerName \\ NONE \end{Bmatrix}$$

Restrictions	You must be the privileged user to use this command.
Parameters	**ServerName** 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 12-31; Show/Monitor/List Protocols, page 12-64; *Editing the Boot Parameters*, page 3-7.

12.28.21   Set/Define Server NetWare Printserver

$$\begin{Bmatrix} SET \\ DEFINE \end{Bmatrix} SERVER\ NETWARE\ \ PRINTSERVER \begin{Bmatrix} ServerName \\ NONE \end{Bmatrix}$$

Used to specify the name of the print server VAP/NLM running on the NetWare file server. This is necessary when setting up the Server as an RPRINTER client.

Applies To	EPS1, EPS2, EPS2-100, EPS4-100, MPS1, MPS100, LPS1
Restrictions	You must be the privileged user to use this command.
Parameters	**ServerName** 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 12-31; Show/Monitor/List Protocols, page 12-64.

12.28.22   Set Server NetWare Reset

SET SERVER NETWARE   RESET

Instructs the Print Server module to immediately rescan the network for new connections. This is typically necessary when setting up queues or print servers using PCONSOLE.

Applies To	EPS1, EPS2, EPS2-100, EPS4-100, MPS1, MPS100, LPS1
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 12-31; Show/Monitor/List Protocols, page 12-64.

12.28.23   Set/Define Server Node Limit

$$\left\{\begin{array}{c} \text{SET} \\ \text{DEFINE} \end{array}\right\} \text{SERVER NODE [LIMIT]} \left\{\begin{array}{c} limit \\ \text{NONE} \end{array}\right\}$$

Sets the maximum number of LAT service nodes about which the Server 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	EPS1, EPS2, EPS2-100, EPS4-100, MPS1, MPS100, LPS1
Restrictions	You must be the privileged user to use this command.
Parameters	**limit** The Server 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 12-68; *Node Limit*, page 4-3.

12.28.24   Set/Define Server Password Limit

$$\left\{\begin{array}{c} \text{SET} \\ \text{DEFINE} \end{array}\right\} \text{SERVER PASSWORD [LIMIT]} \left\{\begin{array}{c} limit \\ \text{NONE} \end{array}\right\}$$

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	EPS1, EPS2, EPS2-100, EPS4-100, MPS1, MPS100, LPS1
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 12-28; Set/Define Server Privileged
                        Password, page 12-46; *System Passwords*, page 3-8.

12.28.25 Set/Define Server Privileged Password

$$\begin{Bmatrix} \text{SET} \\ \text{DEFINE} \end{Bmatrix} \text{SERVER PRIVILEGED[PASSWORD][}\mathit{passwd}]$$

Sets the password for becoming the privileged user or "superuser" of the Server. If the password is not
specified on the command line, the user will be prompted for it (it will not be displayed).

Applies To   EPS1, EPS2, EPS2-100, EPS4-100, MPS1, MPS100, LPS1

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 12-28; Set/Define Server Password Limit,
                        page 12-45; *System Passwords*, page 3-8.

12.28.26 Set/Define Server Prompt

$$\begin{Bmatrix} \text{SET} \\ \text{DEFINE} \end{Bmatrix} \text{SERVER PROMPT } \mathit{PromptString}$$

Allows the system administrator to change the prompt that users see (the default is **Local_x>**).

Applies To   EPS1, EPS2, EPS2-100, EPS4-100, MPS1, MPS100, LPS1

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 12-2: Server 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!"
Server: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.

12.28.27   Set/Define Server Queue Limit

$$\begin{Bmatrix} \text{SET} \\ \text{DEFINE} \end{Bmatrix} \text{SERVER QUEUE [LIMIT]} \begin{Bmatrix} \mathit{limit} \\ \text{NONE} \end{Bmatrix}$$

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   EPS1, EPS2, EPS2-100, EPS4-100, MPS1, MPS100, LPS1

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 Server's memory constraints.

Examples   Local> DEFINE SERVER QUEUE LIMIT 4

See Also   Show/Monitor/List Server, page 12-68; Show/Monitor Queue, page 12-67.

12.28.28   Set/Define Server RARP

$$\left\{ \begin{array}{l} \text{SET} \\ \text{DEFINE} \end{array} \right\} \text{SERVER RARP} \left\{ \begin{array}{l} \text{ENABLED} \\ \text{DISABLED} \end{array} \right\}$$

Enables or disables querying for a RARP host at system boot time.

Applies To	EPS1, EPS2, EPS2-100, EPS4-100, MPS1, MPS100, LPS1
Restrictions	You must be the privileged user to use this command.
See Also	Set/Define Server BOOTP, page 12-35; *Editing the Boot Parameters*, page 3-7.

12.28.29   Set/Define Server Reload

$$\left\{ \begin{array}{l} \text{SET} \\ \text{DEFINE} \end{array} \right\} \text{SERVER RELOAD} \left\{ \begin{array}{l} \text{ALWAYS} \\ \text{DEFAULT} \end{array} \right\}$$

Specifies when to reload the code in the flash ROM.

Applies To	EPS1, EPS2, EPS2-100, EPS4-100, MPS1, MPS100, LPS1
Restrictions	You must be the privileged user to use this command.
Parameters	**Always** The Server will reload flash each time it boots.
	Default The Server will only reload flash when told to do so (the default).
See Also	Initialize, page 12-7; *Reloading Operational Software*, page 3-7.

12.28.30   Set/Define Server Retransmit Limit

$$\left\{ \begin{array}{l} \text{SET} \\ \text{DEFINE} \end{array} \right\} \text{SERVER RETRANSMIT [LIMIT]} \; RetransLimit$$

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	EPS1, EPS2, EPS2-100, EPS4-100, MPS1, MPS100, LPS1
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 12-64.

12.28.31   Set/Define Server Secondary

Please see the entries for Set/Define Server Gateway on page 12-37and Set/Define Server Loadhost on page 12-41.

12.28.32   Set/Define Server Serial Delay

$$\left\{ \begin{array}{l} \text{SET} \\ \text{DEFINE} \end{array} \right\} \text{SERVER SERIALDELAY} \textit{num}$$

Changes the amount of time the Server 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	EPS1, EPS2, EPS2-100, EPS4-100
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.

12.28.33   Set/Define Server Service Groups

$$\left\{ \begin{array}{l} \text{SET} \\ \text{DEFINE} \end{array} \right\} \text{SERVER [SERVICE]GROUPS} \left\{ \begin{array}{l} \text{ALL} \\ \textit{GroupList} \end{array} \right\} \left\{ \begin{array}{l} \text{ENABLED} \\ \text{DISABLED} \end{array} \right\}$$

Establishes the LAT group numbers of the services provided by this Server, and whether groups should be added to the list (Enabled) or removed from the list (Disabled).

Applies To	EPS1, EPS2, EPS2-100, EPS4-100, MPS1, MPS100
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 Server'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 Server's list of service groups.

Disabled
The group numbers are removed from the Server'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   Show/Monitor/List Server, page 12-68; *LAT*, page 2-4.

12.28.34 Define Server Silentboot

$$\begin{Bmatrix} \text{SET} \\ \text{DEFINE} \end{Bmatrix} \text{SERVER SILENTBOOT} \begin{Bmatrix} \text{ENABLED} \\ \text{DISABLED} \end{Bmatrix}$$

Causes the unit to attempt to boot without sending any status messages to the console port (unless there are errors). By default, the Server prints status messages.

Note: *This command only works with BOOT ROM versions.*

Applies To   EPS2-100, EPS4-100

Restrictions   You must be the privileged user to use this command.

See Also   Show/Monitor/List Server, page 12-68; *Editing the Boot Parameters*, page 3-7.

12.28.35 Set/Define Server Software

$$\begin{Bmatrix} \text{SET} \\ \text{DEFINE} \end{Bmatrix} \text{SERVER SOFTWARE } filename$$

Specifies the name of the download software file (if any) that the Server 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	EPS1, EPS2, EPS2-100, EPS4-100, MPS1, MPS100, LPS1
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 Server 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 Server`
	
	`Local> DEFINE SERVER SOFTWARE "SYS:\LOGIN\PS1.SYS"`
	
	`Local> DEFINE SERVER SOFTWARE "/tftpboot/tscode"`

12.28.36   Set/Define Server Startupfile

$$
\left\{ \begin{array}{l} \text{SET} \\ \text{DEFINE} \end{array} \right\} \text{SERVER STARTUPFILE} \left[\begin{array}{c} \left[\begin{array}{c} host{:}filename \\ node{::}filename \\ node\backslash sys{:}\backslash login\backslash filename \end{array} \right] [\text{RETRY } num] \\ \text{NONE} \end{array} \right]
$$

Configures the startup configuration file that the Server will attempt to download at boot time. This file contains the Server commands that will configure the Server 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 Server attempts to download the startupfile; if there is a problem with the download, you can still log into the Server and determine what went wrong.

Applies To	EPS1, EPS2, EPS2-100, EPS4-100, MPS1, MPS100, LPS1
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 Server 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 12-41; *Reloading Operational Software*, page 3-7; *Installation Guide*.

12.28.37   Set/Define Server Subnet Mask

$\left\{ \begin{array}{c} \text{SET} \\ \text{DEFINE} \end{array} \right\}$ SERVER SUBNET [MASK] *mask*

Sets an IP subnet mask for the Server, 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 Server's gateway host will be accessed to provide the connection.

Applies To   EPS1, EPS2, EPS2-100, EPS4-100, MPS1, MPS100, LPS1

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 12-40; Set/Define Server Gateway, page 12-37; *TCP/IP*, page 2-5; *IP Address*, page 4-5.

12.29   Set/Define Service Commands

12.29.1   Set/Define Service

$$\begin{Bmatrix} \text{SET} \\ \text{DEFINE} \end{Bmatrix} \text{SERVICE } \textit{ServiceName}$$

Creates a local service. A maximum of 16 services may be configured for the Server. Additional service parameters are discussed in the following pages.

> **Note:**   *Services have no default parameters; all options must be configured manually.*

Applies To   EPS1, EPS2, EPS2-100, EPS4-100, MPS1, MPS100, LPS1

Restrictions   You must be the privileged user to use this command.

Parameters   **ServiceName**
                        For EPS models, enter a service name of up to 14 alphanumeric characters. For
                        MPS and LPS models, enter a service name of up to 12 alphanumeric
                        characters. The default service name is based on the Server name.

See Also   Clear/Purge Service, page 12-3; Show/Monitor/List Services, page 12-72;
                        Creating Services, page 4-6.

12.29.2   Set/Define Service AppleTalk

$$\begin{Bmatrix} \text{SET} \\ \text{DEFINE} \end{Bmatrix} \text{SERVICE } \textit{ServiceName} \text{ APPLETALK} \begin{Bmatrix} \text{ENABLED} \\ \text{DISABLED} \end{Bmatrix}$$

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   EPS1, EPS2, EPS2-100, EPS4-100, MPS1, MPS100

Restrictions   You must be the privileged user to use this command.

See Also   Clear/Purge Service, page 12-3; Show/Monitor/List Services, page 12-72;
                        Macintosh Service Configuration, page 10-2.

12.29.3   Set/Define Service Banner

$$\begin{Bmatrix} \text{SET} \\ \text{DEFINE} \end{Bmatrix} \text{SERVICE } \textit{ServiceName} \text{ BANNER} \begin{Bmatrix} \text{ENABLED} \\ \text{DISABLED} \end{Bmatrix}$$

Specifies whether the Server 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   EPS1, EPS2, EPS2-100, EPS4-100, MPS1, MPS100, LPS1

Restrictions   You must be the privileged user to use this command.

See Also   Clear/Purge Service, page 12-3; Show/Monitor/List Services, page 12-72.

12.29.4   Set/Define Service Binary

$$\begin{Bmatrix} \text{SET} \\ \text{DEFINE} \end{Bmatrix} \text{SERVICE } \textit{ServiceName} \text{ BINARY} \begin{Bmatrix} \text{ENABLED} \\ \text{DISABLED} \end{Bmatrix}$$

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   EPS1, EPS2, EPS2-100, EPS4-100, MPS1, MPS100, LPS1

Restrictions   You must be the privileged user to use this command.

See Also   Clear/Purge Service, page 12-3; Show/Monitor/List Services, page 12-72.

12.29.5   Set/Define Service Default

$$\begin{Bmatrix} \text{SET} \\ \text{DEFINE} \end{Bmatrix} \text{SERVICE DEFAULT} \begin{Bmatrix} \text{DLC} \begin{Bmatrix} \text{DISABLED} \\ \text{PCL} \\ \text{POSTSCRIPT} \\ \text{TEXT} \end{Bmatrix} \\ \begin{bmatrix} \text{PCL} \\ \text{POSTSCRIPT} \\ \text{TEXT} \end{bmatrix} \begin{Bmatrix} \text{ENABLED} \\ \text{DISABLED} \end{Bmatrix} \end{Bmatrix}$$

Configures which of the Server default services are enabled, and which service, if any, has DLC enabled. If a particular default service is disabled, it will not be created at boot time. If it is enabled, it will be created, but will not prevent the use of any other custom services.

> **Note:**   *The default service names (Server_xxxxxx_PCL, Server_xxxxxx_PS, and Server_xxxxxx_TEXT) are based on the Server name; if you wish to change the Server name, be sure to choose a name of up to 12 characters.*

Applies To   MPS1, MPS100, LPS1

Restrictions   You must be the privileged user to use this command.

Parameters   **DLC**
Sets this service as the handler for Windows NT DLC print connections. Only
one Server service can have DLC enabled.

PCL
Enables or disables the Server_*xxxxxx*_PCL service, which accommodates
binary print jobs (for example, plotter or PCL files).

POSTSCRIPT
Enables or disables the Server_*xxxxxx*_PS service, which accommodates
PostScript print jobs.

TEXT
Enables or disables the Server_*xxxxxx*_TEXT service, which accommodates
text print jobs.

Examples   Local>> DEFINE SERVICE DEFAULT DLC POSTSCRIPT

Local>> DEFINE SERVICE DEFAULT PCL DISABLED

See Also   Set/Define Server Name, page 12-43; Set/Define Service DLC, page 12-55;
Creating Services, page 4-6; *Installation Guide*.

12.29.6 Set/Define Service DLC

$$\left\{ \begin{array}{l} \text{SET} \\ \text{DEFINE} \end{array} \right\} \text{SERVICE } \textit{ServiceName} \text{ DLC} \left\{ \begin{array}{l} \text{ENABLED} \\ \text{DISABLED} \end{array} \right\}$$

Specifies that the service will handle DLC print requests from Windows NT hosts. Note that only one
service on the Server can have DLC enabled at any time.

Applies To   EPS1, EPS2, EPS2-100, EPS4-100, MPS1, MPS100, LPS1

Restrictions   You must be the privileged user to use this command.

See Also   Clear/Purge Service, page 12-3; Show/Monitor/List Services, page 12-72;
DLC, page 11-1.

12.29.7 Set/Define Service EOJ

$$\left\{ \begin{array}{l} \text{SET} \\ \text{DEFINE} \end{array} \right\} \text{SERVICE } \textit{ServiceName} \text{ EOJ} \left\{ \begin{array}{l} \textit{EndString} \\ \text{NONE} \end{array} \right\}$$

Specifies a string to be sent to the attached device at the end of every job regardless of network protocol.

Applies To   EPS1, EPS2, EPS2-100, EPS4-100, MPS1, MPS100, LPS1

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 12-3; Set/Define Service SOJ, page 12-60; Show/Monitor/List Services, page 12-72.

12.29.8   Set/Define Service Formfeed

$$\begin{Bmatrix} \text{SET} \\ \text{DEFINE} \end{Bmatrix} \text{SERVICE } \textit{ServiceName} \text{ FORMFEED} \begin{Bmatrix} \text{ENABLED} \\ \text{DISABLED} \end{Bmatrix}$$

Determines whether the Server will append a formfeed to the end of any LPR print jobs.

Applies To	EPS1, EPS2, EPS2-100, EPS4-100, MPS1, MPS100, LPS1
See Also	Clear/Purge Service, page 12-3; Show/Monitor/List Services, page 12-72.

12.29.9   Set/Define Service Identification

$$\begin{Bmatrix} \text{SET} \\ \text{DEFINE} \end{Bmatrix} \text{SERVICE } \textit{ServiceName} \text{ IDENTIFICATION} \begin{Bmatrix} \textit{IDstring} \\ \text{NONE} \end{Bmatrix}$$

Specifies an identification string for this service to be sent by the Server in multicast messages.

Applies To	EPS1, EPS2, EPS2-100, EPS4-100, MPS1, MPS100, LPS1
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 12-3; Show/Monitor/List Services, page 12-72.

12.29.10   Set/Define Service LAN Manager

$$\left\{ \begin{array}{l} \text{SET} \\ \text{DEFINE} \end{array} \right\} \text{SERVICE } \textit{ServiceName} \text{ LANMANAGER} \left\{ \begin{array}{l} \text{ENABLED} \\ \text{DISABLED} \end{array} \right\}$$

Enables or disables LAN Manager (NetBIOS) access to the specified service.

Applies To	EPS1, EPS2, EPS2-100, EPS4-100, MPS1, MPS100
Restrictions	You must be the privileged user to use this command.
See Also	Clear/Purge Service, page 12-3; Show/Monitor/List Services, page 12-72; *NetBIOS*, page 11-3.

12.29.11   Set/Define Service LAT

$$\left\{ \begin{array}{l} \text{SET} \\ \text{DEFINE} \end{array} \right\} \text{SERVICE } \textit{ServiceName} \text{ LAT} \left\{ \begin{array}{l} \text{ENABLED} \\ \text{DISABLED} \end{array} \right\}$$

Enables or disables LAT access to the specified service. LAT must be licensed to use LAT functionality on multiport Server's.

Applies To	EPS1, EPS2, EPS2-100, EPS4-100, MPS1, MPS100
Restrictions	You must be the privileged user to use this command.
See Also	Clear/Purge Service, page 12-3; Show/Monitor/List Services, page 12-72; *Printing from LAT*, page 9-1.

12.29.12   Set/Define Service NetWare

$$\left\{ \begin{array}{l} \text{SET} \\ \text{DEFINE} \end{array} \right\} \text{SERVICE } \textit{ServiceName} \text{ NETWARE} \left\{ \begin{array}{l} \text{ENABLED} \\ \text{DISABLED} \end{array} \right\}$$

Enables or disables NetWare access to the specified service.

Applies To	EPS1, EPS2, EPS2-100, EPS4-100, MPS1, MPS100, LPS1
Restrictions	You must be the privileged user to use this command.
See Also	Clear/Purge Service, page 12-3; Netstat, page 12-9; Set/Define Protocols NetWare Access, page 12-31; Show/Monitor/List Services, page 12-72.

12.29.13   Set/Define Service Password

$$\left\{ \begin{array}{l} \text{SET} \\ \text{DEFINE} \end{array} \right\} \text{SERVICE } \textit{ServiceName} \text{ PASSWORD} \left\{ \begin{array}{l} \textit{passwd} \\ \text{NONE} \end{array} \right\}$$

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	EPS1, EPS2, EPS2-100, EPS4-100, MPS1, MPS100, LPS1
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 12-3; Show/Monitor/List Services, page 12-72.

12.29.14   Set/Define Service Ports

$$\left\{ \begin{array}{l} \text{SET} \\ \text{DEFINE} \end{array} \right\} \text{SERVICE } \textit{ServiceName} \text{ PORTS} \left\{ \begin{array}{l} \textit{PortList} \\ \text{ALL} \end{array} \right\} \left[\begin{array}{l} \text{ENABLED} \\ \text{DISABLED} \end{array} \right]$$

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	EPS1, EPS2, EPS2-100, EPS4-100, MPS1, MPS100, LPS1
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 12-3; Define Port Access, page 12-15; Show/Monitor/List Services, page 12-72; *Creating Services* on page 4-6.

12.29.15 Set/Define Service PostScript

$$\left\{\begin{matrix} \text{SET} \\ \text{DEFINE} \end{matrix}\right\} \text{SERVICE } \textit{ServiceName} \text{ POSTSCRIPT} \left\{\begin{matrix} \text{ENABLED} \\ \text{DISABLED} \end{matrix}\right\}$$

Determines how the Server will handle PostScript print jobs. If enabled, the Server 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	EPS1, EPS2, EPS2-100, EPS4-100, MPS1, MPS100, LPS1
Restrictions	You must be the privileged user to use this command.
See Also	Clear/Purge Service, page 12-3; Show/Monitor/List Services, page 12-72.

12.29.16 Set/Define Service PSConvert

$$\left\{\begin{matrix} \text{SET} \\ \text{DEFINE} \end{matrix}\right\} \text{SERVICE PSCONVERT} \left\{\begin{matrix} \text{ENABLED} \\ \text{DISABLED} \end{matrix}\right\}$$

Controls whether the Server will place a PostScript wrapper around each job. The Server will try to detect if the job is already PostScript, in which case it would not add an additional wrapper.

Applies To	EPS1, EPS2, EPS2-100, EPS4-100, MPS1, MPS100, LPS1
See Also	Clear/Purge Service, page 12-3; Show/Monitor/List Services, page 12-72.

12.29.17 Set/Define Service RTEL

$$\left\{\begin{matrix} \text{SET} \\ \text{DEFINE} \end{matrix}\right\} \text{SERVICE } \textit{ServiceName} \text{ RTEL} \left\{\begin{matrix} \text{ENABLED} \\ \text{DISABLED} \end{matrix}\right\}$$

Enables or disables TCP/IP access to the specified service.

Applies To	EPS1, EPS2, EPS2-100, EPS4-100, MPS1, MPS100, LPS1
Restrictions	You must be the privileged user to use this command.
See Also	Clear/Purge Service, page 12-3; Show/Monitor/List Services, page 12-72; *Reverse Telnet (RTEL)*, page 2-7.

12.29.18   Set/Define Service SOJ

$$\begin{Bmatrix} \text{SET} \\ \text{DEFINE} \end{Bmatrix} \text{SERVICE } \textit{ServiceName} \text{ SOJ} \begin{Bmatrix} \textit{StartString} \\ \text{NONE} \end{Bmatrix}$$

Specifies a string to be sent to the attached device at the start of every access, regardless of network protocol.

Applies To	EPS1, EPS2, EPS2-100, EPS4-100, MPS1, MPS100, LPS1
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 12-3; Set/Define Service EOJ, page 12-55; Show/Monitor/List Services, page 12-72.

12.29.19   Set/Define Service TCPport

$$\begin{Bmatrix} \text{SET} \\ \text{DEFINE} \end{Bmatrix} \text{SERVICES } \textit{ServiceName} \text{ TCPPORT} \begin{Bmatrix} \textit{portnum} \\ \text{NONE} \end{Bmatrix}$$

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	EPS1, EPS2, EPS2-100, EPS4-100, MPS1, MPS100, LPS1
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 12-3; Show/Monitor/List Services, page 12-72; *TCP/Telnet Service Sockets*, page 4-8.

12.29.20   Set/Define Service Telnetport

$$\left\{ \begin{array}{l} \text{SET} \\ \text{DEFINE} \end{array} \right\} \text{SERVICE } \textit{ServiceName} \text{ TELNETPORT} \left\{ \begin{array}{l} \textit{portnum} \\ \text{NONE} \end{array} \right\}$$

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	EPS1, EPS2, EPS2-100, EPS4-100, MPS1, MPS100, LPS1
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 12-3; Set/Define Service TCPport, page 12-60; Show/Monitor/List Services, page 12-72; *TCP/Telnet Service Sockets*, page 4-8.

12.30   Set/Define SNMP

$$\left\{ \begin{array}{l} \text{SET} \\ \text{DEFINE} \end{array} \right\} \text{SNMP COMMUNITY} \left\{ \begin{array}{l} \textit{CommName} \\ \text{PUBLIC} \end{array} \right\} \text{ACCESS} \left\{ \begin{array}{l} \text{BOTH} \\ \text{NONE} \\ \text{READ} \end{array} \right\}$$

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 Server.* *See the Set/Define Server Loadhost command on page 12-41 for syntax.*
Applies To	EPS1, EPS2, EPS2-100, EPS4-100, MPS1, MPS100
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. This parameter does not apply to the MPS.

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 12-4; Show/Monitor/List SNMP, page 12-72; *Simple Network Management Protocol (SNMP)*, page 2-6; *SNMP Security*, page 4-13.

12.31   Show/Monitor/List Commands

12.31.1   Show/Monitor/List IPsecurity

```
⎰ SHOW    ⎱
⎱ MONITOR ⎰  IPSECURITY
  LIST
```
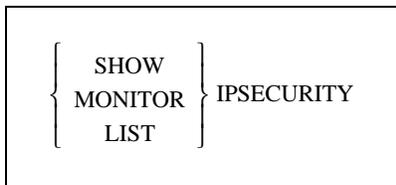
Displays the current or saved TCP/IP security table. Each address or address range is displayed including the direction of concern and the list of ports affected by the entry.

Applies To   EPS1, EPS2, EPS2-100, EPS4-100

Errors   An error is returned if there are no IP security table entries.

See Also   Clear/Purge IPsecurity, page 12-2; Set/Define IPsecurity, page 12-12; *Security*, page 2-10; *IP Security Table*, page 4-11; *Status Displays*, page 6-2.

12.31.2   Show/Monitor/List Logging

```
⎰ SHOW    ⎱
⎱ MONITOR ⎰  LOGGING
  LIST
```
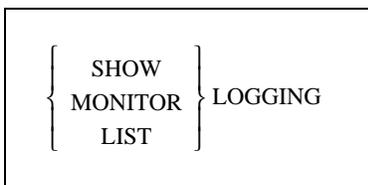
Displays the current or saved event logging configuration.

Applies To   EPS1, EPS2, EPS2-100, EPS4-100

Errors   Node information cannot be Listed.

See Also   Set/Define Logging, page 12-13; *Event Reporting/Logging*, page 2-10; *Event Logging*, page 4-13; *Status Displays*, page 6-2.

12.31.3 Show/Monitor/List Ports

```
┌ SHOW    ┐           ┌ ALL     ┐  ┌ CHARACTERISTICS ┐
│ MONITOR │  PORTS    │         │  │ COUNTERS        │
│ LIST    │           │ portnum │  │ STATUS          │
└         ┘           └         ┘  └ SUMMARY         ┘
```
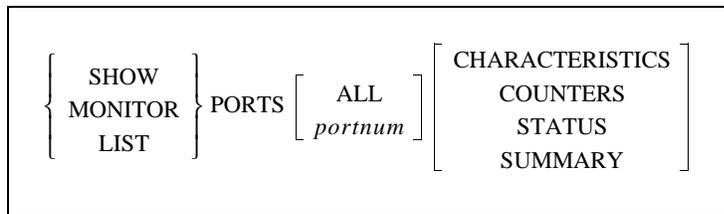
Displays information about the Server's ports. The current port is the default, unless an optional port designation is specified.

Applies To	EPS1, EPS2, EPS2-100, EPS4-100, MPS1, MPS100, LPS1
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 12-15; Chapter 5, *Ports*; *Status Displays*, page 6-2.

12.31.4 Show/Monitor/List Protocols
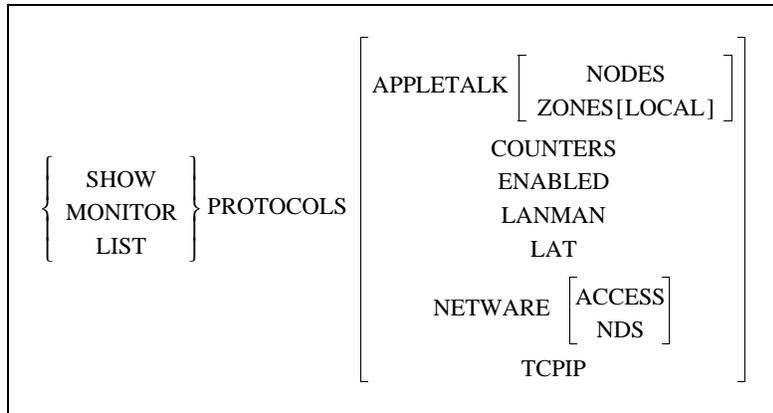
Displays a summary screen of all supported protocols. General figures, such as packet counts and error status, will be shown. Individual protocol options show what is happening in greater detail. Also refer to the Netstat command, which shows currently active network socket connections.

Applies To	EPS1, EPS2, EPS2-100, EPS4-100, MPS1, MPS100, LPS1
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 Server'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 12-3.

Table 12-3: 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 Server attaches to the fileserver. If the Server can't attach, it can't service the queue.
3	Couldn't connect to a fileserver.	If the Server 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 Server name and password credentials from fileserver during login.	Login fails.
6	Fileserver did not accept the Server's server name and password credentials.	If the login password is "access" (the default), the Server 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 Server checks the memberships of various objects; this is not generally a problem.
9	Couldn't map user to trustee.	This is where the Server tries to get rights to access the print queue; login fails.
10	Couldn't attach to print queue on fileserver.	Same as bit 2.

Table 12-3: IPX Error Reasons, cont.

Bit	Meaning	Explanation
11	Couldn't service the print queue or job.	There is a print job on the fileserver that the Server 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 12-4: 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 12-5: 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 12-9; Clear/Purge Protocol NetWare Access, page 12-3; Set/
                          Define Protocols Commands, page 12-28; *Status Displays*, page 6-2.

12.31.5 Show/Monitor Queue

$$
\left\{ \begin{array}{c} \text{SHOW} \\ \text{MONITOR} \end{array} \right\} \text{QUEUE} \left\{ \begin{array}{c} \text{ALL} \\ \text{NODE } \textit{nodename} \\ \text{PORT } \textit{portnum} \\ \text{SERVICE } \textit{servicename} \end{array} \right\}
$$

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   EPS1, EPS2, EPS2-100, EPS4-100, MPS1, MPS100, LPS1

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 Server 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 12-47; *Status Displays*, page 6-2.

12.31.6 Show/Monitor/List Server

```
┌ SHOW   ┐         ┌ BOOTPARAMS     ┐
│ MONITOR│ SERVER  │ CHARACTERISTICS│
│ LIST   │         │ COUNTERS       │
└        ┘         └ STATUS         ┘
```
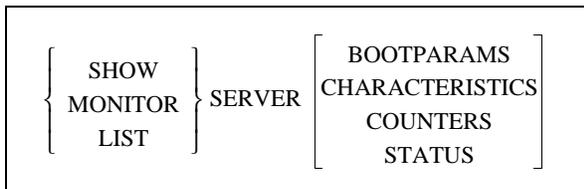
Displays the global attributes or counters for the Server itself, and the software version number and the time
since the last reboot. The Counter fields are described below.

Applies To   EPS1, EPS2, EPS2-100, EPS4-100, MPS1, MPS100, LPS1

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 Server'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 12-6: 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 Server 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 12-7 shows the Server failure reasons and their meanings.

Table 12-7: 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	Server 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 Server use, such as active ports, services, and circuits.

Examples   Local> SHOW SERVER STATUS

                        Local> MONITOR SERVER COUNTERS

See Also   Set/Define Server Commands, page 12-34; *General Server Parameters*, page
                        4-1; *Status Displays*, page 6-2.

12.31.7 Show/Monitor/List Services

$$\left\{ \begin{array}{l} \text{SHOW} \\ \text{MONITOR} \\ \text{LIST} \end{array} \right\} \text{SERVICES} \left[\begin{array}{l} \text{LOCAL} \\ \textit{service} \\ \text{ALL} \end{array} \right] \left[\begin{array}{l} \text{CHARACTERISTICS} \\ \text{STATUS} \\ \text{SUMMARY} \end{array} \right]$$
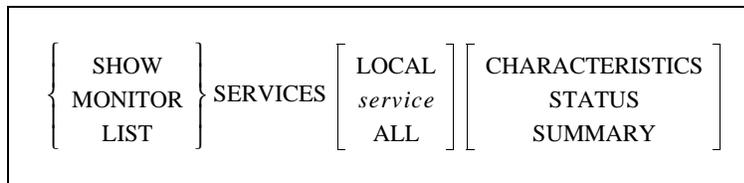
Displays characteristics of the services on the network. Remember that the service list is masked by the service groups that this port is eligible to see, which means users will not see information about services to which they cannot connect.

Applies To	EPS1, EPS2, EPS2-100, EPS4-100, MPS1, MPS100, LPS1
Restrictions	You must be the privileged user to use the Monitor Services command.

Parameters **Local**
Displays those services provided by this Server, 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 12-3; Set/Define Server Commands, page 12-34; *Creating Services*, page 4-6; *Status Displays*, page 6-2.

12.31.8 Show/Monitor/List SNMP

$$\left\{ \begin{array}{l} \text{SHOW} \\ \text{MONITOR} \\ \text{LIST} \end{array} \right\} \text{SNMP}$$
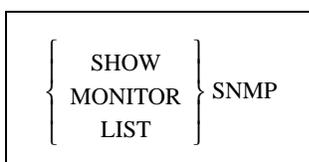
Displays the current or saved SNMP security table entries.

Applies To	EPS1, EPS2, EPS2-100, EPS4100, MPS1, MPS100, LPS1
Restrictions	You must be the privileged user to use this command.
See Also	Clear/Purge SNMP, page 12-4; Set/Define SNMP, page 12-61; *Simple Network Management Protocol (SNMP)*, page 2-6; *SNMP Security*, page 4-13; *Status Displays*, page 6-2.

12.31.9   Show/Monitor Users

$$\left\{ \begin{array}{c} \text{SHOW} \\ \text{MONITOR} \end{array} \right\} \text{USERS } [username]$$

Displays the current users logged onto the Server. If a username is given, only information for that user is shown.

Applies To	EPS1, EPS2, EPS2-100, EPS4-100, MPS1, MPS100, LPS1
Restrictions	You must be the privileged user to use the Monitor users command.
See Also	Set/Define Port Username, page 12-26; *Status Displays*, page 6-2.

12.31.10   Show Version

SHOW VERSION

Displays operating software version information.

Applies To	EPS1, EPS2, EPS2-100, EPS4-100, MPS1, MPS100, LPS1
See Also	Set/Define Server Software, page 12-50; *Reloading Operational Software*, page 3-7; *Status Displays*, page 6-2.

12.32   Source

$$\text{SOURCE} \left[\begin{array}{c} hostname{:}filename \\ node{::}filename \\ hostname\backslash sys{:}login\backslash filename \end{array} \right] \text{VERIFY}$$

Attempts to download a configuration file from a MOP, TFTP, or NetWare host. The file is assumed to contain lines of Server 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   EPS1, EPS2, EPS2-100, EPS4-100, MPS1, MPS100, LPS1

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\Server.COM
                        ```

**See Also**            Set/Define Server Software, page 12-50; *Installation Guide*.

# 12.33   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 12-15;
                        Show/Monitor/List Ports, page 12-63.

12.34   Su

The Su command is functionally identical to the Set Privileged/Noprivileged command detailed on page 12-
28. It is provided for UNIX compatibility.

12.35   Test Loop

$$\text{TEST LOOP } address \left[\text{HELP} \left\{ \begin{array}{c} \text{RECEIVE} \\ \text{TRANSMIT} \\ \text{FULL} \end{array} \right\} \text{ASSISTANT } address \right]$$

Tests the network connections to MOP hosts. A simple loopback service verifies that the remote node is receiving the Server's transmissions. An Assistant or "helper" node can be specified to forward one or both of the transmissions (outbound or incoming).

Applies To	EPS1, EPS2, EPS2-100, EPS4-100, MPS1, MPS100, LPS1
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`

12.36   Test Port

$$\text{TEST PORT } [portnum] \left[\begin{array}{l} \text{COUNT } count \\ \text{DTR } [\text{DELAY } time] \\ \text{POSTSCRIPT} \\ \text{WIDTH } width \end{array} \right]$$

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 Server will produce 70-character lines until a key is pressed to stop the test.

Applies To	EPS1, EPS2, EPS2-100, EPS4-100, MPS1, MPS100, LPS1
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 Server 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
Server 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

12.37 Test Service

```
                                    COUNT count
                          DESTINATION port [NODE name]
TEST SERVICE ServiceName          POSTSCRIPT
                                    WIDTH width
```

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 Server 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   EPS1, EPS2, EPS2-100, EPS4-100, MPS1, MPS100, LPS1

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 Server 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 Serverand the printer. This test will not generate any paper output. Instead it should echo the PostScript data back to the Server 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 12-39.

12.38   Who

The Who command is functionally identical to the Show/Monitor Users command on page 12-73. It is provided for UNIX compatibility.

12.39   Zero Counters

```
                        ┌─      ALL      ─┐
ZERO COUNTERS  │                 │
                        └─ PORT portnum ─┘
```

Resets the counters for errors and other network and Server events. If no parameter is added to the command, only the port counters for the current port will be reset.

Applies To	EPS1, EPS2, EPS2-100, EPS4-100, MPS1, MPS100, LPS1
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 12-63.

# 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 Server model number

- ◆   Lantronix Server 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 Server, 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 Server has a unique IP address before proceeding.

If you are having problems operating the Server in a wireless Ethernet network, it may help to connect the Server to a wired Ethernet network for troubleshooting.

## B.1  Power-up Troubleshooting

There are several possible error situations if the LEDs do not flash.

**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. |
| The Server boots but does not try to load the Flash ROM code | Press the **Test/Reset** button. Set DIP switch 4 to Verbose mode. A brief description of the problem will be queued to the parallel port and printed. |
| Network Error: The ACT LED will blink yellow 2-3 times per second | A. Make sure the Ethernet network cable is properly connected and reboot the Server.<br><br>B. If option A fails to resolve the problem, reload Flash ROM. Refer to *Appendix D:*. |
| 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 Server. 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 Server. | Use the **Set Server DHCP Enabled** command. If you manually enter an IP address, DHCP is automatically disabled. |
| Make sure the DHCP server is operational. | Check to see that the DHCP server is on and is functioning correctly. |
| The Server 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 Server 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 Server is in the load-host's **/etc/hosts** file | The Server 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 Server 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 Server in the same IP network as the host. |

# B.4   RARP Troubleshooting

**Table B-4:**  RARP Troubleshooting

| Area to Check | Explanation |
|---|---|
| The Server name and hardware address in the host's **/etc/ethers** file | The Server name and hardware address must be in this file for the host to answer a RARP request. |
| The Server name and IP address in the **/etc/hosts** file | The Server 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   Printing Problems

**Table B-5:**  General Printing Problems

| Area to Check | Explanation |
|---|---|
| Physical connections | To test a non-PostScript printer, use the **Test Port Server Count 100** command. This command will send 100 lines of test data out the parallel port so you can see if the printer is receiving data. |
| Service characteristics | Use the **Show Service Local Characteristics** command from the Server Local> prompt to see if the desired service is available and to verify that the appropriate protocols are enabled on the service. |
| The IP address | The IP address must be unique on the network. Many problems can occur when there are duplicate IP addresses. |
| Queue Status and Port counters | Use the **Monitor Queue** command to ensure queue entries appear in the job list.<br>Use the **Monitor Port 1 Counters** command to verify that the counter is incrementing with each job. If it is not, verify the connection between the Server and the printer. |

# B.6   PostScript Problems

PostScript printers will silently abort jobs if they detect an error.

**Table B-6:**  PostScript Troubleshooting

| Area to Check | Explanation |
| --- | --- |
| The Server is communicating with the printer | To test a PostScript printer, use the T**est Port 1 PostScript Count 2** command. This command will send 2 pages of PostScript data out the parallel port. Watch the indicators on the printer to verify that the Server is communicating with the printer.<br>If the printer is capable of bidirectional communication, use the **Test Service** Server_*xxxxxx*_PS **PostScript Count 5** command. This will transfer data both to and from the printer. Autoselection must be disabled and the printer must be configured as a PostScript printer for this test to succeed. |
| The printer is configured to use 8-bit characters | If special characters or bitmaps are not printing correctly, the printer may be incorrectly configured to use 7-bit characters. |
| Service Characteristics | Issue the **Show Service Characteristics** command. If the service rating is zero, the parallel port is in use. Verify that the PostScript characteristic and appropriate protocols have been enabled on the service. |
| Port Counters | If PostScript jobs appear to print but nothing comes out of the printer, verify the amount of data sent from the host. Issue the appropriate print command from the host system. After the job has completed, use the **Show Port 1 Counters** command.<br>The **bytes output** value should be approximately 171 bytes greater than the size of the file on the host system. These numbers are only approximate, but will show that data is flowing to the printer. |

## B.6.1  Bitmap Graphics

If files that contain embedded bitmap graphics do not print correctly, it is probably because the bitmaps are being sent as actual binary data 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 port or parallel port). If your application does not have this provision, ask the application vendor for an upgrade version or "patch" that will add the hex postscript function.

# C:  Updating Software

Current software files (MPS.SYS) are available on the distribution CD. Software updates and release notes for the Server 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 MPS.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 **Print Servers: EPS, MPS, LPS**.

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 Server-related firmware and software.

5   From the available files, select **Latest firmware for EPS1, EPS2, EPS2-100, EPS4-100, MPS-100, and LPS1 Ethernet Print Servers**.

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 EPS1, EPS2, EPS2-100, EPS4-100, MPS-100, and LPS1 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 Server 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 Server 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, **MPS.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.

◆   Define commands must be used because Set configurations are cleared when the Server boots. Use the **List Server Boot** command to check settings before rebooting.

> **Note:**   *It is very important to check Server 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 Server, the Server will request assistance from a DHCP, BOOTP, or RARP server before starting the download attempts. The Server 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 Server can be rebooted with the code still in Flash ROM. The OK/ACT LED will blink quickly while the Server 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-8.*

C.2.1.1 TCP/IP

Before the Server downloads the new software, it will send DHCP, BOOTP, and/or RARP queries (all are enabled by default). Next, the Server will attempt to download the MPS.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 Server IP address (all methods) and loadhost information (BOOTP and RARP only). Add the Server 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 MPS.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 MPS.SYS file in a directory.

If BOOTP cannot be used to configure the Server 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/MPS.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 Server, or use the bootgateway feature. For more information, see **Define Bootgateway** in the *Commands* chapter.

C.2.1.2 NetWare

The MPS.SYS file should be placed in the login directory on the NetWare file server. The Server 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 Server, 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\ MPS.SYS
Local>> INITIALIZE RELOAD
```

C.2.1.3 MOP

The MPS.SYS filename is the only parameter that the Server needs to reload via MOP. Make sure the service characteristic is enabled on the host's Ethernet circuit, copy the MPS.SYS file to the MOM$LOAD directory, and reload the Server using the **Initialize Reload** command.

> **Note:**   *If an error message is displayed indicating an invalid record size on the VAX console, re-transfer the MPS.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 Server 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 MPS.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 Server and a **MAU**.

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.

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.
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 Server 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 Server 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 Server command set, host is used to refer to a TCP/IP node, rather than TCP/IP and LAT nodes.
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 Server 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 Server 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 Server is configured to allow users to log in from the network (as opposed to logging in from the serial ports).

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.

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, 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 Server, 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 Server 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 Server), 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).

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 Server 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.
	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.
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 Server supports Telnet connections across networks through the use of **gateways**, using gateway hosts to forward messages across network boundaries. The Server uses the subnet mask as a filter; if the Server'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 Server 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.

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 Server 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.

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