

# **Ethernet Network Interface Card (NIC) Reference Manual**

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# Chapter 1

## Introduction

### In this Chapter . . .

- “Product Overview” on page 1-2
- “Protocol Support” on page 1-2
- “Terms” on page 1-2
- “Server Features” on page 1-2
- “How To Use This Manual” on page 1-4

## Product Overview

The Ethernet Network Interface Card (NICs) is a multi-protocol print server that provides shared network access to the printer for a variety of network protocols and operating systems. This print server cannot be used to initiate connections to hosts, it can only accept connections from hosts. It is intended solely for outputting data to the printer it is installed in.

Throughout this manual, the term **Server** refers to all NIC print servers unless otherwise noted.

## Protocol Support

The Server supports four 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 log-ins 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.

## 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.

<b>host</b>	A computer, sometimes referred to as a CPU, attached to the network. The term <b>host</b> generally denotes interactive computers, or computers that users can log into.
<b>node</b>	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 <i>not</i> nodes.
<b>service</b>	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.
<b>Local mode</b>	The Server user interface, which is used to issue configuration commands and establish sessions with services.

## 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.

■ **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 filesevers.

■ **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.

■ **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).

■ **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. Flash-ROM Servers store their operating software permanently on-board, so they do 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.

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

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■ **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.

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**NOTE:** See Help for more information.

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■ **Host-Initiated Connections**

The Server may be configured to provide its attached devices as services to other nodes, allowing hosts to share printers. AppleTalk, 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. This protocol also provides access to printer management functions via the SNMP Printer MIB (RFC 1759) which resides in the printer.

■ **Diagnostics**

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

## 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 5 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, *Using the Server*, introduces end-users to the Server.
- Chapters 6 through 9 cover protocol-specific issues and troubleshooting:
  - Chapter 6 covers TCP/IP Host Setup for LPR and RTEL printing.
  - Chapter 7 covers NetWare Host Setup needed for printing.
  - Chapter 8 covers LAT Host Setup for OpenVMS printing.
  - Chapter 9 covers AppleTalk Host Setup needed for printing.
- Chapter 10, *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 troubleshooting tips and a glossary of terms.

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

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# Chapter 2

## Concepts

### In this Chapter . . .

- “Services” on page 2-2
- “Network Protocols” on page 2-2
- “AppleTalk” on page 2-2
- “LAT” on page 2-4
- “TCP/IP” on page 2-5
- “NetWare” on page 2-9
- “PostScript” on page 2-10
- “Remote Configuration” on page 2-10
- “Security” on page 2-10

## 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.

## 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. [Figure 2-1: Supported Network Protocols](#) shows the protocol stacks supported by the Server.

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

AppleTalk	LAT	NetWare	TCP/IP
Printer Access Protocol	LAT	NCP	Telnet/ Rlogin/ RTEL/ lpd
ATP		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.

## 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 *Zones*, below). 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.

## 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.

## 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.

## Name Binding Protocol (NBP)

NBP is used by AppleTalk to advertise resources, such as printers and file servers, 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.

## 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.

---

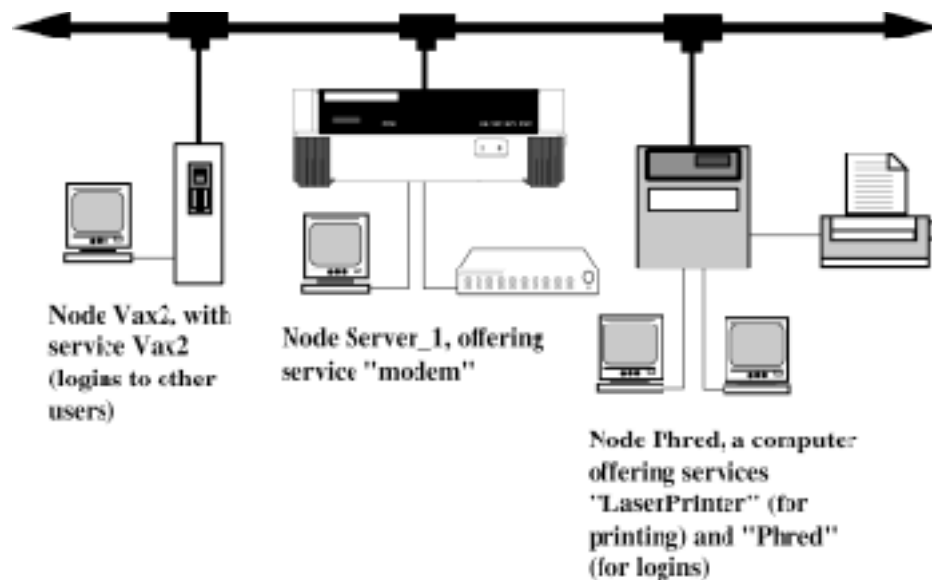
**NOTE:** If LAT is bridged across slow links, session time-outs and errors are likely.

---

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 serial or parallel ports; exceptions to this rule will be noted later. [Figure 2-2: Example of Network Services](#) shows an example of services offered on a network.

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



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

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

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

## TCP/IP

### 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)** for more information.

### Subnetworks

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

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

---

**NOTE:** See [“Set/Define Server Gateway” on page 10-17](#) for more information.

---

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

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**NOTE:** See [“Set/Define Server Subnet Mask” on page 10-30](#) for more information.

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### Dynamic Host Control Protocol (DHCP)

DHCP, an extension to BOOTP, allows network administrators to lease IP addresses to network nodes as needed. The Server offers 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 **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.

---

### 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 and Printer together support the following MIBs:

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

**Host Resource MIB (RFC 1514)**

Device Table and Printer Table.

**Printer MIB (RFC 1759)** General, Input, Extended Input, Input Media, Output, Extended Output, Output Dimensions, Output Features, Marker, Marker Colorant, Marker Supplies, Media Path, Channel, Interpreter, Console, Localization, Responsible Party, Alert Table. Alert Time is also supported.

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.

---

**NOTE:** See Set/Define SNMP 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 addition the printer will generate an **Alert Table** trap when a printer error occurs or is cleared, or when a configuration change occurs. In all cases, the trap will be directed to the IP address of the Server's traphost.

---

**NOTE:** To enable traps, use the Set/Define Protocol IP SNMPHost command, defined in Chapter 10 and reboot the printer.

---

### 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.

### 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, NetWare Host Setup](#), for more information.

---

### TCP/IP Utilities and Commands

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

<b>Finger</b>	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."

---

<b>Netstat</b>	Displays the status of the routing tables and current network sessions.
<b>Ping</b>	Sends a TCP/IP request for an echo packet to another network host to test network connections.

## 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.

---

**NOTE:** See [“Set/Define Server NetWare Loadhost” on page 10-23](#) 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).

## 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).

## 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) 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.

## 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.

## Remote Configuration

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

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

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

The Telnet console, NCP, and TSM all require the correct login password to be entered. The default password is **access**. It can be changed via the Set/Define Server Login Password command. See [“Set/Define Server Maintenance Password”](#) on page 10-22 for information on remote access control.

SNMP allows network hosts to query other hosts for counters and network statistics. In general, one host on a network will run an SNMP application that queries the other hosts on the network to collect statistics and other information and signal error conditions. The Server will not generate queries of its own; it can only respond to queries from other hosts. See the discussion of SNMP for more information.

## Security

Incoming logins can be selectively disabled and/or password protected via the [“Set/Define Server Incoming”](#) command.

For more information about security measures and restriction options, including some Server features that are used for more than security reasons, see [Chapter 4, Server Configuration](#).





# Chapter 3

## Getting Started

### In this Chapter . . .

- “About this Chapter” on page 3-2
- “Configuration Methods” on page 3-2
- “Maintenance Issues” on page 3-5

## About this Chapter

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.

## 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.

---

### 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:** A Java Virtual Machine is provided as part of the EZWebCon Installer Program for Windows platforms.

---

---

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

---

## 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 three ways to enter character mode:

1. Establish a Telnet or Rlogin connection to the Server from a TCP/IP host.
2. In EZWebCon, click the Terminal icon. The Local> prompt will be displayed in a terminal emulation window.
3. Establish a TCP/IP remote console connection by Telnetting to port 7000:

**Figure 3-1:** Remote Console Connection Example

```
% Telnet 192.0.1.166 7000
```

---

**NOTE:** Remote console logins are password protected via the server login password. See Login Password for more information.

---

### 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.

All keys used for entering and editing commands are listed in the Table below.

Key	Purpose
Return	Executes the current command line
Delete	Deletes the character before the cursor

Key	Purpose
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 <i>text</i>
!!	Recalls the last command

---

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

---

### *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.

### *Command Types*

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

#### *Set and Define*

<b>Set</b>	Makes an immediate but not permanent change. To make the change permanent, use the <b>Save</b> command after configuration is complete.
<b>Save</b>	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 for more information.

---

<b>Define</b>	Makes a permanent change that generally doesn’t take effect until the unit is rebooted.
---------------	---

**Show, Monitor, and List**

<b>Show</b>	Displays the current settings. Current settings include those made using the Set command but not yet Saved as permanent changes.
<b>Monitor</b>	Displays the current settings at regular intervals; information is updated every three seconds.
<b>List</b>	Displays the unit's permanent settings. Note that some settings that are Listed will not take effect until the unit is rebooted.

**Clear and Purge**

<b>Clear</b>	Removes an item immediately, but not permanently. When the unit is rebooted, the old setting will again be in effect.
<b>Purge</b>	Removes an item permanently, but generally does not take effect until the unit is rebooted.

**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 3-2: 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.

---

**Maintenance Issues**

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

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

```
Local>> DEFINE SERVER NAME "PrintServer"
```

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

---

**NOTE:** A server name of no more than 13 alphanumeric characters is recommended due to service name constraints.

---

## 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 3-4:** 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 10-25](#) 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 3-5: Prompt Examples](#) 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 3-5:** 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>%
```

## Rebooting the Server

To reboot the Server enter 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.

**Figure 3-6:** Rebooting the Server

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

---

**NOTE:** You must be the privileged user to use this command.

---

## 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. You can restore the Server to factory defaults one

of two ways. While powering up the printer, you can press the Test Button on the NIC I/O using a pointed object such as a paper clip. Also, as mentioned in [“Rebooting the Server” on page 3-6](#), you can use the **Initialize** command to reboot the server to its factory default settings.

**Figure 3-7:** Restoring Factory Defaults

```
Local>> INITIALIZE FACTORY
```

## 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 seconds. 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.

## 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 3-8:** 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.

---

## 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.

### Privileged Password

Changing any server 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 3-9:** 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 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 3-10:** 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.

### Login Password

The Server 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 Server. 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. 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 3-11:** 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.

### *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 3-12:** Defining a Maintenance Password

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

## **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 OpenVMS 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.

### *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.

### *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.

### **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 (those for services, Telnet hosts, SLIP, menu, dialback, and IP security) 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. An example configuration file is shown in [Figure 3-13: Configuration File](#).

**Figure 3-13: Configuration File**

```
#setting up the ports
DEFINE PORT SPEED 9600 PARITY NONE
DEFINE PORT 4 AUTOPROMPT ENABLED
DEFINE PORT 4 ACCESS DYNAMIC
#setting up a print service
DEFINE SERVICE print4 IDENTIFICATION "Printer on lab PRQ port 4" PORT 4
```

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).

### Configuring the Host

The configuration file can be downloaded from a TCP/IP host (via TFTP), from a OpenVMS 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 OpenVMS hosts. The service handler code is included on the distribution CD-ROM.
- For NetWare, put the configuration file in the fileserver's login directory.

### 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, OpenVMS, 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 3-14:** Downloading from a TCP/IP Host

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

---

**NOTE:** A nameserver must be defined if a text TCP/IP hostname is used. The Server will attempt to resolve the name at boot time; if it cannot resolve the name, the download will fail.

---

Figure 3-15: Downloading from a NetWare Fileserver 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 3-15:** Downloading from a NetWare Fileserver

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

Figure 3-16: Downloading from a OpenVMS Host displays the command needed to download the same startup file from OpenVMS host PIKE.

**Figure 3-16:** Downloading from a OpenVMS Host

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

### 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 3-17:** 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.



# Chapter 4

## Server Configuration

### In this Chapter . . .

- “Server Configuration” on page 4-2
- “General Server Parameters” on page 4-2
- “AppleTalk Server Parameters” on page 4-3
- “LAT Server Parameters” on page 4-3
- “NetWare Server Parameters” on page 4-4
- “TCP/IP Server Parameters” on page 4-5
- “Creating Services” on page 4-6
- “Security” on page 4-9

## 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 for instructions.

---

After configuring Server-wide parameters for your Server. 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.

## General Server Parameters

### 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](#).

---

### 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.

NCP and Telnet remote consoles are considered virtual logins, so they will also receive the template port's setup.

## 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](#).

---

## 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 4-2:** 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.

## 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.

### 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 4-3:** Defining Server Name

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

---

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

---

## 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 4-4:** Changing LAT Parameters

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

## 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 4-5:** Setting a Node Limit

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

## 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 4-6:** Defining a NetWare Loadhost

```
Local> DEFINE PROTOCOLS NETWARE LOADHOST "loadserv"
```

Other configurable parameters are discussed in the following sections.

## 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 file servers 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 4-7:** Setting Frame Types

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



By default, Routing is enabled and all applicable encapsulation types are supported. See [Chapter 2, Network Protocols](#) for more information on the various frame types.

### NetWare Access Lists

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

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

**Figure 4-8:** Setting NetWare Access

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

By default, the Server will only query local file servers, 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 file servers for pending jobs. This is useful after rebooting or after configuring new queues on the file servers to ensure that the Server recognizes queues directed to it.

Keep in mind that file servers cannot tell if the Server is not polling them due to access restrictions. There will be no error messages if a valid file server cannot print to the Server due to the access list.

## 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.

---

### IP Address

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

**Figure 4-9:** 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.

---

### 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 4-10:** 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 gateway fails.

**Figure 4-11:** Configuring Backup Hosts

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

### 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.

**Figure 4-12:** Setting a Host Limit

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

## 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 printer(s) to the network as services. A 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 4-13: Set Service Command](#) using a terminal as the print device.

The Server has **default** services. The service names are based on the last six digits of the unit's Ethernet address. Unlike services created via the command line, these default services have NetWare enabled and LAT disabled. These settings may be changed.

---

**NOTE:** The NIC has no method of connecting to a local service; the service must be tested from another LAT, TCP, NetWare, or AppleTalk node.

---

The NIC has two unique *default* printing services: one for text (PRQ\_XXXXXX\_TEXT), and one for Binary, PCL, and PostScript files (PRQ\_XXXXXX\_BIN).

---

**NOTE:** For more information on the available default services, see the *Services* chapter of your Installation Guide.

---

### Creating a Simple Service (Such As 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. [Figure 4-13: Set Service Command](#) shows the command needed to create a service called *dump\_port*.

**Figure 4-13: Set Service Command**

```
Local> SET SERVICE dump_port LAT ENABLED
```

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

**Figure 4-14: Show Service Command**

```
Local> SHOW SERVICE LOCAL CHARACTERISTICS

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

In [Figure 4-14: Show Service Command](#), 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 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 all port access modes, login statuses, and the services currently being offered.

### 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 4-15: Service Configuration Example**

```
Local> DEFINE SERVER GROUPS 1,2-5 ENABLED
Local> SET SERVICE "printer" IDENTIFICATION "LocalPrint"
Local> SAVE SERVICE "printer"
```

In order, the commands in [Figure 4-15: Service Configuration Example](#):

- Enable group 1 and groups 2 through 5 on the server and assign them to any local services.

---

**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).

---

- 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.

### **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.

## Enabling Other Service Options

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

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.
EOJ	If enabled, appends a user-configurable end-of-job string to every job.
Formfeed	If enabled, appends a Formfeed to print jobs.
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 file servers.
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.

## Security

Security measures are available to monitor users and to restrict users from unwanted activity. Security can be implemented server-wide.

## 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 4-16:** 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 4-17:** Configuring Password for Incoming Connections

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

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# Chapter 5

## Using the Server

### In this Chapter . . .

- “Logging into the Server” on page 5-2
- “Logging Out” on page 5-2
- “Status Displays” on page 5-2

## Logging into the Server

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 the Server's **Local mode**, and you can enter only the Server commands for which you are privileged. Type **Help** if you need information about the Server's command set.

## 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 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. Second, 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.

## 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 [Chapter 10, Command Reference](#) for full syntax.

---

<b>Netstat</b>	Shows currently active UDP/TCP/IP and LAT sessions.
<b>Show Nodes</b>	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.
<b>Show Ports</b>	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.
<b>Show Protocols</b>	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,



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.

<b>Show Queue</b>	Shows the jobs currently waiting in the Server's print queue(s).
<b>Show Server</b>	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.
<b>Show Services</b>	<p>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.</p> <p>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.</p>
<b>Show SNMP</b>	Shows the SNMP community names and access types.
<b>Show Users</b>	Displays the users on the Server. Each user is shown by name, along with his/her port number and current connection status.
<b>Show Verson</b>	Shows current operating characteristics of the targets.

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# Chapter 6

## TCP/IP Host Setup

### In this Chapter . . .

- “Introduction” on page 10-2
- “Selecting A Printing Method” on page 10-2
- “LPR” on page 10-3
- “TCP Socket Connections” on page 10-18

## Introduction

The EZWebCon configuration software is the easiest way to configure the 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 Server will 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.

---

## Selecting A Printing Method

The Server provides three major TCP/IP printing methods: Berkeley remote LPR, Reverse Telnet (RTEL) host software and sockets. LPR and RTEL 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.

### 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

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.

## LPR

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.

---



---

**NOTE:** Windows 95 does not support LPR directly, but there are third-party solutions available.

---

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 6-1:** Example printcap File Entry

```
PRQ_PRT|Printer on LAB PRQ:\
:rm=PRQ_XXXXXX:\
:rp=PRQ_XXXXXX_BIN:\
:sd=/usr/spool/lpd/PRQ_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 **PRQ\_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 6-2: Creating a Spooling Directory**

```
# mkdir /usr/spool/lpd/PRQ_PRT
# chmod 777 /usr/spool/lpd/PRQ_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 6-3: lpc Status Display**

```
% lpc status
PRQ_PRT:

    queuing is enabled
    printing is enabled
    no entries
    no daemon present
```

5. Print to the queue using normal **lpr** commands.

**Figure 6-4: Printing from a BSD system**

```
% lpr -PPRQ_PRT /etc/hosts
```

## Notes about LPR

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

- Because of the way the LPR protocol is typically implemented on the host, the processing options and the banner page are sent after the job data itself. Because of this, the 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.
- The Server cannot print multiple copies of the print job when using the **-#x** **lpr** option.
- If banners are not needed, they can be disabled on custom services.

**Figure 6-5: Disabling the LPD Banner Page**

```
Local>> DEFINE SERVICE service_name BANNER DISABLED
```

- By default, a formfeed is added to the end of each LPD job to force a page eject on laser

printers. If this formfeed is not wanted, it can be disabled.

**Figure 6-6:** Disabling the LPD Formfeed Characteristic

```
Local>> DEFINE SERVICE service_name FORMFEED DISABLED
```

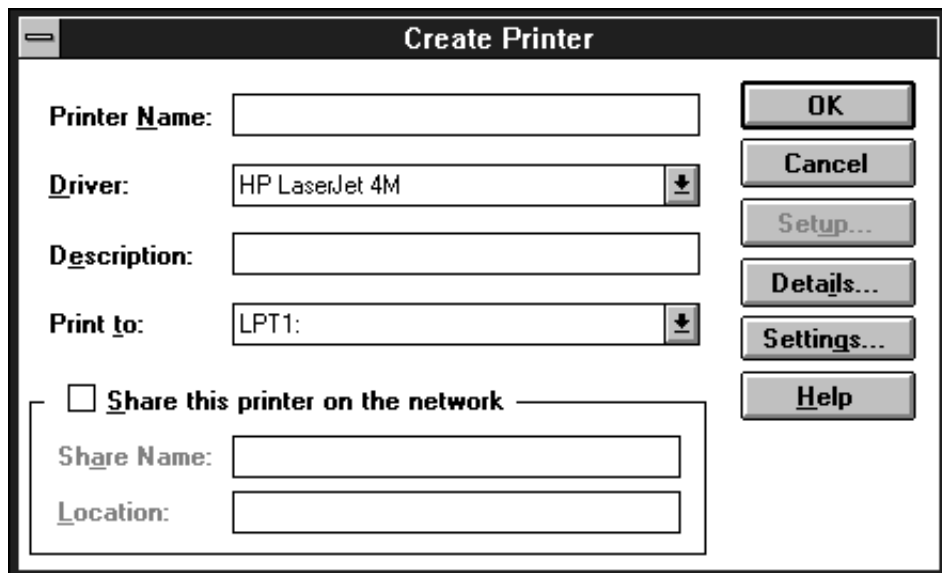
- Many LPR spoolers are not intelligent about using multiple queues on one host, so queues on the print host must use separate spooling directories.
- No special purpose input or output filters can be used when printing via LPR. If this functionality is necessary, use the named pipe interface program in the RTEL software.

### LPR on Windows NT 3.51 Hosts

The following procedure configures an lpr print queue. This installation assumes the TCP/IP protocol has been installed, and that the Simple TCP/IP Services and TCP/IP Print Server have both been installed and started on the NT host.

1. Open the NT Print Manager; its icon is located in the **Main** window on the desktop. In the **Printer** menu, choose **Create Printer**. The following dialog box will appear.

**Figure 6-7:** Create Printer Dialog Box

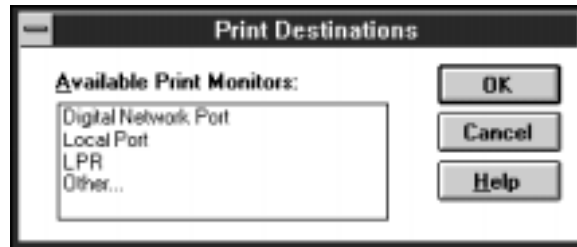


2. In the **Printer Name** field, enter the name of the queue on the NT host.
3. Click the **Driver** menu arrow and select the required printer driver from the pull-down menu. Enter a description string in the **Description** field if desired.

**NOTE:** If the printer driver isn't already installed, choose "other" from the driver list. Specify the location of the printer's Windows NT 3.51 driver.

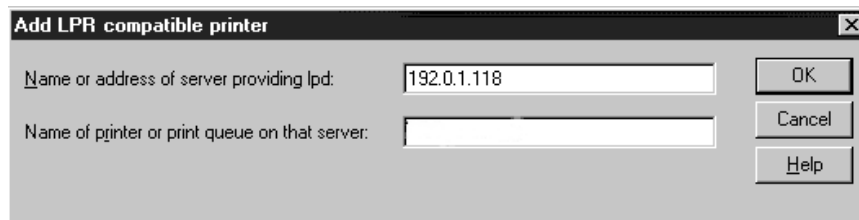
4. If applicable, choose the **Share this printer on the network** option. (This is not recommended until the print queue is confirmed to be running properly.)
5. Click the **Print To** menu arrow to view its pull-down menu. Scroll to select the **OTHER** option. The following dialog box will appear:

**Figure 6-8:** Print Destinations Dialog Box



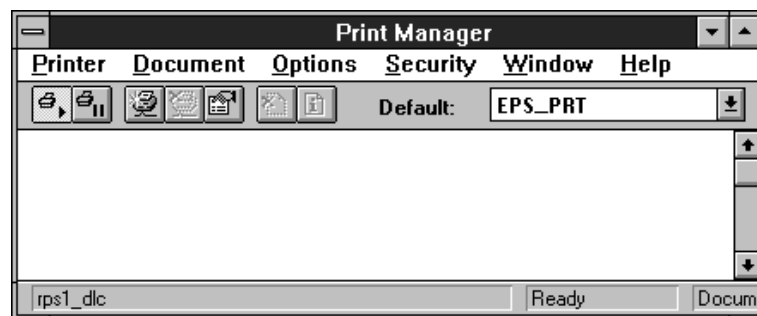
6. Choose **LPR Port** and click the **OK** button.  
If LPR Port is not one of the available options, you must install Microsoft TCP/IP printing from your Windows NT system disks.
7. In the resulting dialog box, provide the necessary information and click **OK**. For the host, enter the name or IP address of your Server. For the printer, enter the name of the service you created on your Server, Example: PRQ\_XXXXXX\_BIN.

**Figure 6-9:** LPR Dialog Box



8. In the printer-specific dialog box that appears, fill out the necessary information and click **OK**.
9. If you'd like this printer to be the default printer, click the default menu arrow on the Print Manager's title bar and scroll to the printer's name.

**Figure 6-10:** Print Manager Dialog Box





---

**NOTE:** Verify that you have read/write permissions on the NTFS file system.

---

## 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.

### 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 6-11:** Example AIX qconfig entry

```
PRQ_PRT:

    device = PRQ_PRTd
    up = TRUE
    host = PRQ_XXXXXX
    s_statfilter = /usr/lpd/bsdhort
    l_statfilter = /usr/lpd/bsdlong
    rq = PRQ_XXXXXX_BIN

PRQ_PRTd:

    backend = /usr/lpd/rembak -T 10
```

The device name is simply the queue name with a “d” added. Print to the queue using normal lp syntax.

**Figure 6-12:** Printing to a Queue

```
% lp -dPRQ_PRT filename
```

### 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**.

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:
  - The name of the print queue to add
  - The name of the Server unit
  - The name of the Server service
  - The type of print spooler on the remote server, and
  - 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 6-12: Printing to a Queue](#)).

### 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.

#### Using UNIX Commands

To configure and use a print queue using LPR:

1. Become the superuser.
2. Issue the following commands:

**Figure 6-13:** Configuring a Print Queue Using UNIX Commands

```
# /usr/lib/lpshut
# /usr/lib/lpadmin -pPRQ_PRT -v/dev/null -mrmodel \
-ocmrcmodel -osmrsmodel -ormPRQ_XXXXXX -orpPRQ_XXXXXX_BIN
# /usr/lib/accept PRQ_PRT
# /usr/bin/enable PRQ_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 queueing system.

3. Print to this queue using normal lpr syntax (see [Figure 6-12: Printing to a Queue](#)).

### 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 6-12: Printing to a Queue](#)).

### 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 6-14:** 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 6-15:** Creating the Remote Printer

```
# rlpconf
```

3. Configure the remote printer.

**Figure 6-16:** 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): PRQ_XXXXXX_BIN
Is printer PRQ_XXXXXX_BIN a remote printer or a local printer? (r/l) r
Please enter the name of the remote host that PRQ_XXXXXX_BIN is attached to:
host_name
The PRQ_XXXXXX_BIN is connected to host PRQ_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.equiv or /etc/hosts:lpd
file.
Make sure PRQ_XXXXXX_BIN appears in /etc/printcap (in BSD format).
Make sure PRQ_XXXXXX_BIN has a spool directory on PRQ_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 6-12: Printing to a Queue](#)).

### 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. Before proceeding with configuration, ensure that the queuing system is not in use.

**Figure 6-17:** Creating a BSD Print Queue

```
# lpshut
# /usr/lib/lpsystem -t bsd <printer node name>
# /usr/lib/lpadmin -p PRQ_PRT _s <printer node
name>!PRQ_XXXXXX_BIN -I any
# lpsched
# /usr/lib/accept PRQ_PRT
# enable PRQ_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 on your distribution CD-ROM.

---

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. RTEL binaries and source code are provided on your distribution CD-ROM.

---

## 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.

## Installing Reverse Telnet Software

RTEL software is provided on the distribution CD-ROM in tar format and can be restored into a local directory.

1. Install the RTEL software.
  - a. Set your current directory to the RTEL directory.

**Figure 6-18:** 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 and path to the rtel tar archive.

---

- b. Copy the tar archive file onto the host system, remembering to use binary mode during the copy.
    - c. Untar the archive.
    - d. Recompile the software on the target machine. This will be done automatically for supported systems.
    - e. Once all the files are in place, issue the command **./lpinstall**. This script moves every-

thing necessary to run the RTEL software into the /usr/spool/rtel directory tree.

**Figure 6-19: RTEL Installation**

```
# ./lpinstall
Installing the RTEL software package requires root privileges
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.

---

2. Create and install backend filter program, or set up a named pipe and start the RTELPD daemon process. For instructions on how to do this, consult the README files in the newly-installed RTEL directory.

### 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.

### 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 print server.

1. Become superuser.
2. Install the RTEL software according to [Figure 6-19: RTEL Installation](#).
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 6-20: Installing the Backend Filter**

```
# cd /usr/spool/rtel
# ./mkprt
Installing a print queue requires root privileged. Do you want to
continue 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 []: 1
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 6-1: Print Options](#).

**Table 6-1: 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).

**Table 6-1:** Print Options

Option	Functionality
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 6-21:** 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 6-22:** lpc status Information

```
% lpc status hp4
hp4:

    queueing is enabled
    printing is enabled
    no entries
    no daemons present
```

## 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 6-23: Installing the RTELPD Daemon Process](#).

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 6-23:** 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/rtp1.
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 appli-
cation, 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
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 []: 1

By default, a password is not needed to connect to a service
or a port. (Note that the word null actually means no pass-
word.)
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.

- a. Issue the command `/usr/spool/rtel/rtelpd -s` from a shell prompt.
- b. Check the RTEL setup by sending data into the named pipe and seeing if it appears at the printer.

**Figure 6-24:** 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.

3. Once the RTELPD daemon is running, configure a UNIX print queue using the named pipe as its output device.

This allows all the normal option processing associated with host-supplied or third-party backend programs.

### *Creating a BSD Print Queue Using RTELDP*

To create a generic BSD print queue using the RTELDP pipe daemon, first create a named pipe as shown in [Figure 6-23: Installing the RTELDP Daemon Process](#). Then edit the **/etc/printcap** file and insert an entry in the following form to create a simple queue.

**Figure 6-25:** Editing the /etc/printcap File

```
rtel_prt:\n\n        :lp=/dev/rtp1:|\n        :sd=/usr/spool/lpd:
```

---

**NOTE:** See the RTELDP man pages for specific examples of configuring a print queue for each supported system type.

---

To test the queue, ensure that the RTELDP daemon is running and print a job; the output should appear on the printer.

### *Creating a SYSV Print Queue Using RTELDP*

To create a generic SYSV print queue using the RTEL pipe daemon, first create a named pipe as shown in [Figure 6-23: Installing the RTELDP Daemon Process](#). Then issue the following commands to create a simple queue.

**Figure 6-26:** Creating a SYSV Print Queue

```
# /usr/lib/lpshut\n# /usr/lib/lpadmin -prtrel_prt \n\n        -i/usr/spool/lp/model/dumb \n        -v/dev/rtp1\n\n# /usr/bin/enable rtel_prt\n# /usr/lib/accept rtel_prt\n# /usr/lib/lpsched
```

To test the queue, ensure that the RTELDP daemon is running and print a job; the output should appear on the printer.

---

**NOTE:** See the RTELDP man pages for specific examples of configuring a print queue for each supported system type.

---

## **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 6-2: RTEL Errors](#).

**Table 6-2: RTEL Errors**

Error Name	Error
%Exxxxxx	Error reported by the host operating system itself. Error names generally correspond to values for <b>errno</b> .
%LAT_xxxx	A reject code from the server. Generally indicates a problem with the Server setup or the <b>server_hosts</b> file.
%RTEL_xxxxx	The host system could not initiate the connection to the server properly. The message should indicate the reason.

## TCP Socket Connections

If custom queueing software has been designed, raw TCP/IP (or Telnet) connections can be made directly to the printer. Opening a TCP session to port 9100 will attempt a direct connection the Server.

---

**NOTE:** The 9100 port is 8-bit clean. If Telnet IAC interpretation is needed, form a connection to the 2001 port.

---

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.

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 10-35](#) or [“Set/Define Service Telnetport” on page 10-35](#) for more information on socket connections.

---



# Chapter 7

## NetWare Host Setup

### In this Chapter . . .

- “Introduction” on page 7-2
- “Access Lists” on page 7-2
- “Printing” on page 7-2
- “PCL” on page 7-15
- “Troubleshooting” on page 7-15
- “NetWare Host Troubleshooting” on page 7-18

## Introduction

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.

---

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

## 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 7-1:** Enabling Non-local File Servers

```
Local>> DEFINE PROTOCOL NETWARE ACCESS filesaver
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.

---

## Printing

The Server can process NetWare print jobs either as a printserver (pservice) or via rprinter. When using the pservice 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 (pservice does).

---

**NOTE:** The pservice 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 pservice devices, while the fourth covers rprinter setup.

1. Pservice 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.

2. 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.
3. 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.
4. 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.
5. Rprinter is set up via the PCONSOLE utility on the file server(s). Again, basic familiarity with PCONSOLE is assumed in the examples.

### 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.

1. Configure the print server.

- a. Use the **Set/Define Protocols NetWare DSTree** command to define the directory service tree in which the print server is located.

**Figure 7-2:** 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 7-3:** Defining the Directory Service Context

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

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

The access list is set to Local by default, which includes all file servers attached to a local Ethernet segment (not accessed through a router). To add to this list, enter the **Set/Define Protocols NetWare Access** command.

**Figure 7-4:** Adding to the Access List

```
Local>> DEFINE PROTOCOL NETWARE ACCESS fileservers
```

2. Reboot the Server.

**Figure 7-5:** 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 7-6:** Quick Setup

```
Print Server: PRQ_XXXXXX
New Printer: PRQ_XXXXXX_BIN
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:** Step 3 must be completed on 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 *“QINST Print Queue Troubleshooting” on page 7-15*.

## 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.

---

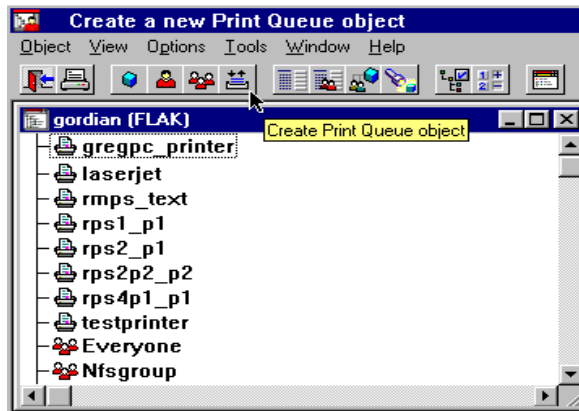
**NOTE:** NetWare Administrator can be used for both NDS and bindery print queues. See your NetWare documentation for more information.

---

1. Start NetWare Administrator.
2. In the **Directory Tree** windows, navigate to and select the context in which you want to install the printer.

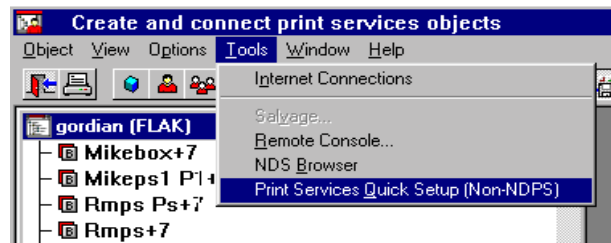


**Figure 7-7: Context Window**



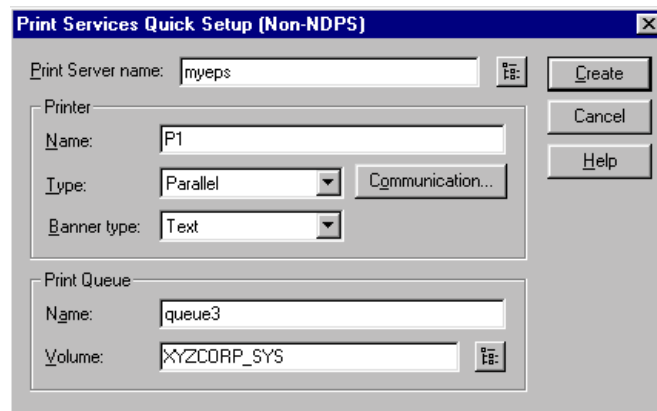
3. From the Menu Bar, select **Tools: Print Services Quick Setup**.

**Figure 7-8: Quick Setup Menu Option**



4. In the Quick Setup dialog box, enter the necessary information.

**Figure 7-9: Quick Setup Dialog Box**



- a. In the **Print Server Name** field, enter the name of your Server.
- b. In the **Printer Name** field, enter the name of the print service configured on your 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 Server configuration.
  - d. Leave all other defaults as-is.
  - e. Click **Create**.
5. Print a test document using the new print queue.

## 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.

---

1. Log into the target 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 a Server named **PRQ\_XXXXXX** with a service named **PRQ\_XXXXXX\_BIN**.

**Figure 7-10:** 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.
: PRQ_XXXXXX <CR>
Enter the name of the queue to create.
: PRQ_PRT <CR>
Adding print queue PRQ_PRT on volume GIZA_SYS
Enter the service name on PRQ_XXXXXX which will service this queue
: PRQ_XXXXXX_BIN <CR>
Adding print server PRQ_XXXXXX. Please wait...
Attaching PRQ_XXXXXX to PRQ_PRT
Adding print server PRQ_XXXXXX_BIN. Please wait...
Attaching PRQ_XXXXXX_BIN to PRQ_PRT

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

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

**Figure 7-11: NPRINT Command**

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

## 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 7-12: Starting PCONSOLE**

```
F:> PCONSOLE
```

3. Using the cursor keys, select **Print Server Information** from the **Available Options** menu, then press **Enter**.

**Figure 7-13: Print Server Information Option**

Available Options
Change Current File Server
Print Queue Information
<b>Print Server Information</b>

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 7-14: Entering Server Name**

```
Enter Print Server Name: LAB_PRQ
```

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 7-15: Entering Services**

```
Enter Print Server Name: LABPRT_S1
```

6. Press **Escape** to return to the Available Options menu.

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.

7. In the **Available Options** menu, highlight **Print Server Information** and press **Enter**.

**Figure 7-16:** Available Options Menu

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

8. Select the Server name (LAB\_PRQ) and press **Enter**. The menu shown in Figure 17 appears.

**Figure 7-17:** 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

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

**Figure 7-18:** Server Status Menu

Print Server Status/Control
File Servers Being Serviced
Notify List for Printer
Printer Status
Queues Services by Printer
Server Info

- Highlight **Current Server Status: Running** and press **Enter**.

**Figure 7-19:** 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.

---

- Select **Down** and press **Enter**.

**Figure 7-20:** 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.

- Press **Escape** repeatedly to return to the **Available Options** menu and the PCONSOLE utility.
- Test the queue by using nprint.

**Figure 7-21:** 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.

## 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.

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 4).

**Figure 7-22:** Setting the Printserver

```
Local>> SET PROTOCOL NETWARE PRINTSERVER pserver_name
Local>> DEFINE PROTOCOL NETWARE PRINTSERVER pserver_name
```

2. Create a print queue on the file server and associate it with the Server service.

- a. In the **Available Options** menu, select the **Print Queue Information** option and press **Enter**.

**Figure 7-23:** 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.

- b. Press **Insert** to create a new queue on the file server, type the new queue name, and press **Enter**.

**Figure 7-24:** 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.

- c. Highlight the queue you just entered and press **Enter** to configure the queue itself.
- d. 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 7-25:** 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

- e. Press **Insert**. The resources entered in the *Creating Bindery Print Queues with QINST* section should appear in a selection list:

**Figure 7-26:** Queue Options

Queue Server Candidates	
LAB_PRQ	(Print Server)
LABPRT_S1	(Print Server)

3. 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 7-27:** 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 7-28:** Available Print Servers

Print Servers
LAB_PRQ
LABPRT_S1

- d. Select **Print Server Configuration** and press **Enter**.

**Figure 7-29:** 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 7-30:** 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 7-31:** 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 7-32: Name Field**

Printer 2 Configuration
Name: LABPRT_S1
Type:
...

- h. Highlight the **Type** field and press **Enter**. You should see the following menu:

**Figure 7-33: 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.
- m. Select **Queues Serviced by Printer** and press **Enter**.

**Figure 7-34: Print Server Configuration Menu**

Print Server Configuration
File Servers to be Serviced
Notify List for Printer
Printer Configuration
Queues Serviced By Printer

- n. Highlight the desired rprinter from the list of configured rprinters and press **Enter**.

**Figure 7-35:** Defined Printers Menu

Defined Printers	
TEST_S1	0
LABPRT_S1	1
...	2

- a. Select the name of this file server and press **Enter** (or just press Enter if no file servers appear).

**Figure 7-36:** Selecting the File Server

File Server	Print Queue	Priority
eng_server	TESTQ	1
docserver	DOCQ	1
labserver	LABQ	1

- o. Highlight the name of the queue created in Step 2 and press **Enter** twice, leaving the priority at +1.
  - p. Exit PCONSOLE by repeatedly pressing **Escape**.
4. Restart the pserver VAP/NLM/process on the file server or PC.

To connect the **Server** port to the rprinter file server, complete **one** of the following steps, depending on how pserver is running:

- a. 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 7-37:** Restarting pserver as a VAP

```
: STOP pserver_name
: START pserver_name
```

- b. If pserver is running as an NLM, enter the following:

**Figure 7-38:** Restarting pserver as an NLM

```
: UNLOAD PSERVER pserver_name
: LOAD PSERVER pserver_name
```

- c. If pserver is running on a dedicated PC, start it by entering the following:

**Figure 7-39:** 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 Protocol NetWare Reset** command to force the Server to re-scan the NetWare connections.

## PCL

Printing PCL jobs requires an 8-bit clean data path between the NetWare file server and the printer. Enabling Binary

```
Local>> DEFINE SERVICE PRQ_XXXXXX_S1 BINARY ENABLED
```

## Troubleshooting

### 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 section *“Creating Bindery Print Queues with QINST” on page 7-6*.

**Table 7-1:** NetWare Host Troubleshooting

Things to Check	Suggestion
Verify that the server name appears and that it matches the server and service names.	Try PCONSOLE. (If you are using NetWare 4.0, use the F4 key to enter bindery emulation mode.)
Verify that the NetWare access table will allow access to the specified file server.	By default, only local (non-routed) file servers are scanned for queues. See <i>“Access Lists” on page 7-2</i> 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 <i>“Access Lists” on page 7-2</i> .

### 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 7-2: 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 Technical Support.
4	No printers found for the print server.	Check to make sure that there are printers for the print server and the printer names match the service names on the print server.
5	No queue found for the printer.	Check to make sure that the printers have associated queues.
6	Login failed.	Check to make sure there is a print server object configured with the same name as the print server.
7	Authentication failed.	Check that the login password on the print server is the same as the password for the print server object. If the login password on the print server is the default (access) then there should be no password for the print server object.
8	Print server cannot attach to queue.	Check the NDS partitions, replicas, and volumes to make sure that the file server where the queue actually lives has the information about the print server and printers.

The following errors may be received from the file server.

**Table 7-3: NDS Errors from the File Server**

Code	Failure code meaning	Remedy
0	OK.	None needed.
ffffda7	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.
ffffda5	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.
ffffd69	DS Database locked.	An administrator is probably updating the database. Wait a few minutes and issue the <b>Set Protocol NetWare Reset</b> command.

**Table 7-3:** NDS Errors from the File Server

Code	Failure code meaning	Remedy
ffffd63	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.
ffffd54	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.

## NetWare Host Troubleshooting

**Table 7-4:** 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 7-5:** 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 <b>NETSTAT</b> 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, the print server has successfully attached to the queue.
The DSTree, DSContext, and DSLicense	Type <b>Show Protocol NetWare NDS</b> . 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 <a href="#">yes</a> .
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.

◆ ◆ ◆

# Chapter 8

## LAT Host Setup

### In this Chapter . . .

- [“Introduction” on page 8-2](#)
- [“Printing from LAT” on page 8-2](#)
- [“PostScript Printing from LAT” on page 8-4](#)
- [“OpenVMS Printer Troubleshooting” on page 8-5](#)
- [“OpenVMS Host Troubleshooting” on page 8-6](#)

## Introduction

The EZWebCon configuration software is the easiest way to configure the Server. See your *Installation Guide* for more information on using the EZWebCon software.

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

## 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.

### Printing to an Application Port

Most OpenVMS 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 2 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 OpenVMS 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 OpenVMS system prompt:

**Figure 8-1:** 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, OpenVMS 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 8-2:** Creating and Starting the Queue

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

A print request would look like this:

**Figure 8-3:** Print Request

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



To connect to the Server service from the OpenVMS host, use a command similar to the following:

**Figure 8-4:** Connecting From OpenVMS Host

```
$ SET HOST/DTE lta45
```

### 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 OpenVMS prompt.

**Figure 8-5:** Set Term Command

```
$ SET TERM/PERM/ALTYPEAHD LTAAnnn
```

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

**Figure 8-6:** Keeping Form Feeds

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

---

**NOTE:** See your OpenVMS documentation for more information about terminal characteristics.

---

### 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 in Chapter 4](#) for an explanation of the Server commands used to complete this task.

**Figure 8-7:** 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 OpenVMS queue **remote\_prq**, enter the commands shown in [Figure 8-8: Creating LAT Device](#).

**Figure 8-8:** 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 8-9:** Setting Up Terminal Characteristics

```
$ SET TERM/PERM/NOBROAD/FORM/WIDTH=132 LTA1234
```

3. Create and start a OpenVMS queue.

**Figure 8-10:** Creating and Starting OpenVMS Queue

```
$ INIT/QUEUE/START/ON=LTA1234:/PROCESSOR=LATSYM/RETAIN=ERROR remote_prq
```

4. Print to the queue.

**Figure 8-11:** Print Request

```
$ PRINT/QUE=remote_prq filename.txt
```

## PostScript Printing from LAT

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 8-12:** 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 8-13:** Creating Reset Module

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

3. If the system device control library does not exist, create it.

**Figure 8-14:** 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 8-15:** Creating a Print Queue

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

5. Print to the queue.

**Figure 8-16:** Print Request

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

## OpenVMS Printer Troubleshooting

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

- Verify that the **LTA<sub>nnnn</sub>** device is mapped to the correct server and port/service name. Use the **LATCP Show Port LTA<sub>nnnn</sub>** 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 LTA<sub>nnnn</sub>**.
- On your Server, verify that the server and port/service names specified match the names obtained via **Show Port LTA<sub>nnnn</sub>**, and
- If using a service, verify that the service is available by issuing the following server command:

**Figure 8-17:** 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 port on the Server should be configured for Remote or Dynamic access with the **Define Port Access** command.

- Verify that the LAT characteristic is enabled on the service.

- Issue the following Server command to see if the host is attempting to make a LAT connection:

Figure 8-18: Monitor Queue Command

```
Local> MONITOR QUEUE
```

When a job is active, a queue entry from the OpenVMS 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 Technical Support for assistance.

OpenVMS Host Troubleshooting

By default, the LAT error message codes on the host are not translated into text error messages. If a LAT job fails and appears in the queue with an eight-digit hex result code, the code can be translated by issuing the commands in [Figure 8-19: Translating LAT Error Codes to Text](#).

Figure 8-19: 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 8-1: Configuring LAT on OpenVMS Host Using Port Name

Area to check	Explanation
The specified node name matches the server's node name	Use the <b>Show Server</b> command.
The specified port name matches the port's name	Use the <b>List Port 1</b> 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 8-2:** Configuring LAT on OpenVMS Host Using a Service

Area to check	Explanation
The specified node name matches the server's node name	Use the <b>Show Server</b> command.
The service name used matches the configured service name	Use the <b>Show Service Local Characteristics</b> command.
The service is available	Use the <b>Show Service Local Characteristics</b> command from a network login. If the service rating is zero, the parallel port is in use.
The LAT characteristic has been enabled on the service	Use the <b>Show Service Local Characteristics</b> command from a network login.
The LAT symbiont is specified as the queue process on the OpenVMS host	Use the OpenVMS command <b>Show Queue/Full queue_name</b> to see the queue characteristics.

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# Chapter 9

## AppleTalk Host Setup

### In this Chapter . . .

- “Introduction” on page 9-2
- “Initial Configuration” on page 9-2
- “Macintosh Service Configuration” on page 9-2
- “Printing from AppleTalk” on page 9-3
- “Troubleshooting Macintosh Printing” on page 9-3
- “AppleTalk Host Troubleshooting” on page 9-4

## Introduction

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

---

## Initial Configuration

Servers 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 9-1:** 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.

## Macintosh Service Configuration

To print from a Macintosh:

1. Create a service and enable both AppleTalk and PostScript. [Figure 9-2: Enabling AppleTalk and PostScript on a Service](#) shows a parallel service named prq\_prt.

**Figure 9-2:** Enabling AppleTalk and PostScript on a Service

```
Local>> DEFINE SERVICE prq_prt APPLETALK ENABLED POSTSCRIPT ENABLED
```

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.

2. Locate your Server printing service in the Chooser. Select it and complete the appropriate setup options.
3. Close the Chooser window.
4. Print a test page to verify that the print service is working.

## Using AppleTalk on UNIX or OpenVMS

If you are using third-party software that provides AppleTalk for UNIX or OpenVMS, 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.

## Printing from AppleTalk

### 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.

### Printing Bitmap Graphics

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.

## 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.

The table below 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*).

Problem	Possible Cause	Explanation/Remedy
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 <b>Show Port Counters</b> 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 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 <i>Error Messages</i> ). When the job is finished and the printer is idle, the LED is typically solidly lit.

---

**NOTE:** See your printer's documentation for more information on printer configuration and any printer-specific errors.

---

## 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 9-3:** 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.

## 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.

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# Chapter 10

## Command Reference

### In this Chapter . . .

- [“About this Chapter” on page 10-2](#)
- [“Command Line Interface” on page 10-2](#)
- [“Command Line Editing” on page 10-2](#)
- [“Print Server Commands” on page 10-3](#)

## About this Chapter

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 NIC print server may not support this full command set. Each command entry identifies if the command applies to the NIC.

---

**NOTE:** See “[Set Privileged/Noprivileged](#)” on page 10-9 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.

## 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.

## Command Line Editing

Table 10-1: [Line Editing Keys](#)” lists the special keys used for command line editing.

**Table 10-1:** 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

**Table 10-1:** Line Editing Keys

Key	Purpose
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

## Print Server Commands

### Clear/Purge Protocol NetWare Access

$\left\{ \begin{array}{l} \text{CLEAR} \\ \text{PURGE} \end{array} \right\} \text{ PROTOCOL NETWARE ACCESS } \left\{ \begin{array}{l} \text{ALL} \\ \text{fileserver} \end{array} \right\}$
---

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

<b>Restrictions</b>	You must be the privileged user to use this command.
<b>Errors</b>	An error is returned if the entry isn't found or if no entries are configured.
<b>Parameters</b>	<b>fileserver</b> Removes only the specified entry from the NetWare access list.
<b>Examples</b>	Local> PURGE PROTOCOL NETWARE ACCESS ALL Local> CLEAR PROTO NET ACC LAB_FS4
<b>See Also</b>	Set/Define Protocols NetWare Access; Show/Monitor/List Protocols; <i>NetWare Access Lists</i> ; <i>Access Lists</i> .

### Clear/Purge Service

$\left\{ \begin{array}{l} \text{CLEAR} \\ \text{PURGE} \end{array} \right\} \text{ SERVICE } \left\{ \begin{array}{l} \text{LOCAL} \\ \text{service} \end{array} \right\}$
--

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.

<b>Restrictions</b>	You must be the privileged user to use this command.
<b>Errors</b>	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 <b>Port</b> and commands.
<b>Parameters</b>	<b>Local</b> 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 beginning with Set/Define Service AppleTalk; Show/Monitor/List Services; *Creating Services*.

## Crash 451

CRASH 451

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

#### Restrictions

You must be the privileged user to use this command.

#### See Also

Initialize; *Rebooting the Server*.

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.

## 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.

#### 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."

---

<b>Examples</b>	<pre>Local&gt; FINGER Local&gt; FINGER bob Local&gt; FINGER @hydra Local&gt; FINGER bob@hydra Local&gt; FINGER FINGER</pre>
<b>See Also</b>	Show/Monitor Users.

Help

HELP [*command* [*parameter*] ]

Lets you access the online Help system. Enter **Help** with no parameters to see a list of all available commands.

<b>Restrictions</b>	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.
<b>Parameters</b>	<p><b>command</b> Gives general information about the command, and lists any parameters.</p> <p><b>parameter</b> 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.</p>
<b>Examples</b>	Local> HELP DEFINE SERVER BROADCAST

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.

<b>Restrictions</b>	You must be the privileged user to use this command.
<b>Parameters</b>	<p><b>Cancel</b> Cancels any impending Initialize command. Cancel and Delay cannot be used together.</p>

**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 the NIC.

**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; Show/Monitor/List Server Status; *Rebooting the Server*.

**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.

**Logout**

`LOGOUT [PORT PortNum]`

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

**Restrictions**

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

**Examples**

```
Local> LOGOUT
Local> LOGOUT PORT 2
```

**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.



Netstat

NETSTAT

The Netstat command shows the currently active network connections. Information is displayed for the AppleTalk, LAT, NetWare and TCP/IP protocols. This information is primarily meant for debugging network problems.

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.

<b>Parameters</b>	<b>hostname</b> Enter either a text hostname or IP address.
<b>Examples</b>	Local> PING 192.0.1.23 Local> PING hydra.local.net

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.

Remove Queue

REMOVE QUEUE

ALL

ENTRY *number*

NODE *NodeName*

SERVICE *ServiceName*

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

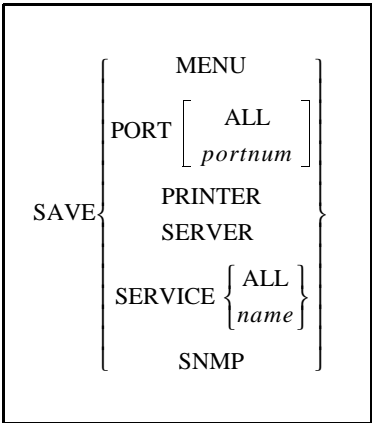
<b>Restrictions</b>	You must be the privileged user to use this command.
<b>Parameters</b>	<b>All</b> Removes all requests in the local Server queue.

- 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.

Save



Saves current configurations into the permanent database, essentially Defining everything that has been configured so far using Set commands. Instead of issuing a Define for each Set command to make your changes permanent, you can just issue the Save command after you have configured a port, service, server or printer. For example, Save Service "print4me" will save any options configured with Set commands for a service named "print4me" since the Server booted.

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

- Restrictions**  
You must be the privileged user to use this command.
- Errors**  
Save without a parameter is invalid.
- Parameters**

**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 does not apply to the NIC.

**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*

**Set Privileged/Noprivileged**

SET { PRIVILEGED[OVERRIDE] }  
          NOPRIVELEGED }

Changes the current port's privilege status, provided the correct privileged password is entered. The factory default privileged password is **system**; this password can be changed with the **Set 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.

<b>Restrictions</b>	The user must know the privileged password. Secure users cannot become privileged.
<b>Parameters</b>	<b>Override</b> Forces the current port to become the privileged port; the previously privileged port loses the privilege.
<b>Examples</b>	Local> SET NOPRIVILEGED Password> system (not echoed) Local> SET PRIVILEGED OVERRIDE Password> system (not echoed)
<b>See Also</b>	Set/Define Server Privileged Password; <i>Privileged Password</i> .

**Define Protocols AppleTalk**

{ SET } PROTOCOLS APPLETALK { { ENABLED }  
{ DEFINE } { DISABLED }  
  DEVICETYPE name  
  ZONE ZoneName }

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.

<b>Restrictions</b>	You must be the privileged user to use this command.
<b>Errors</b>	If the zone specified cannot be confirmed by a router, the command will fail.  Enabled and Disabled must be configured with Define.
<b>Parameters</b>	<p><b>Devicetype</b> Changes what NBP type is used to advertise the attached printer. The default is to advertise printers as LaserWriters.</p> <p><b>name</b> Enter the new NBP type enclosed in quotes.</p> <p><b>ZoneName</b> Name of the zone to move the Server into.</p>
<b>Examples</b>	Local> DEFINE PROTOCOL APPLETALK ZONE "AcctZone"
<b>See Also</b>	Show/Monitor/List Protocols; <i>AppleTalk Server Parameters</i> .

## Define Protocols IP

{ SET DEFINE }	PROTOCOLS IP	{	[SECONDARY]	{	GATEWAY <i>host</i> LOADHOST <i>address</i> NAMESERVER <i>address</i>	}	}
					TCPKEEPALIVE { ENABLED DISABLED }		
					TIMESERVER { ENABLED DISABLED }		

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.

<b>Restrictions</b>	You must be the privileged user to use this command.
<b>Errors</b>	Enabled/Disabled parameters must be defined.
<b>Parameters</b>	<p><b>TCPKeepalive</b> 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.</p>



## Set/Define Protocols NetWare

<div><div>SET</div><div>DEFINE</div></div> PROTOCOLS NETWORK	{	{		ENABLED	}			
		{		DISABLED	}			
		ACCESS	{	ALL	}			
			{	fileserver	}			
			{	LOCAL	}			
		DSCONTEXT context						
		DSTREE treeString						
		ENCAPSULATION	{	802_2	{	{	ENABLED	}
				ETHER_II				
				NATIVE				
				SNAP				
				{		DISABLED	}	
INTERNAL [NETWORK] netnum								
		LOADHOST	{	fileserver	}			
				NONE				
POLLnum								
		PRINTSERVER	{	pserver	}			
				NONE				
RESET								
		{	RIP	{	ENABLED	}		
							{	SAP
		ROUTING	{	ENABLED	}			
				{		DISABLED	}	

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

### 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 file servers that the Server will contact for print jobs. By default, only file servers on the local network will be queried; this command can be used to add or remove additional file servers.

#### All

All file servers will be contacted, including those on routed networks.

#### fileserver

An individual file server to be queried. The name can be up to 8 characters long.

**Local**

Only file servers on the local network will be queried.

**DSTContext**

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.

**DSLlicense**

Configures the NetWare Directory Service license needed to enable NDS on the Server.

**LicenseString**

Enter the license string 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,” “Set/Define Server NetWare Loadhost,” “Set/Define Server NetWare Printserver,” “Set/Define Server Software,” “Show/Monitor/List Protocols,” NetWare Server Parameters; Creating NDS Print Queues with PCONSOLE; Installing a Print Queue Using PCONSOLE.*

## Set/Define Server Announcements

$\left\{ \begin{array}{c} \text{SET} \\ \text{DEFINE} \end{array} \right\}$	SERVER ANNOUNCEMENTS	$\left\{ \begin{array}{c} \text{ENABLED} \\ \text{DISABLED} \end{array} \right\}$
---	----------------------	---

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

**Restrictions**

You must be the privileged user to use this command.

## Set/Define Server Bootgateway

$\left\{ \begin{array}{c} \text{SET} \\ \text{DEFINE} \end{array} \right\}$	SERVER BOOTGATEWAY <i>IPaddress</i>
---	-------------------------------------

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.

**Restrictions**

You must be the privileged user to use this command.

**See Also**

*Editing the Boot Parameters.*

## Set/Define Server BOOTP

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

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

**Restrictions**

You must be the privileged user to use this command.

**See Also**

Set/Define Server RARP; *Editing the Boot Parameters.*

## Set/Define Server Buffering

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

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.

<b>Restrictions</b>	You must be the privileged user to use this command.
<b>Parameters</b>	<b>buffersize</b> Acceptable buffer sizes range from 128 bytes to 4096 bytes. For the NIC, the default is 4096.
<b>Examples</b>	Local> SET SERVER BUFFERING 1024

## Set/Define Server Circuit Timer

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

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.

<b>Restrictions</b>	You must be the privileged user to use this command.
<b>Parameters</b>	<b>TimerValue</b> Specify a timer value from 30 to 200 milliseconds. The default is 80 milliseconds.
<b>Examples</b>	Local> SET SERVER CIRCUIT TIMER 55
<b>See Also</b>	LAT.

## Set/Define Server DHCP

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

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

<b>Restrictions</b>	You must be the privileged user to use this command.
<b>Errors</b>	Configuring an IP address will automatically disable DHCP.

Enabling DHCP will remove the IP address saved in NVR.

**See Also**

“Set/Define Server BOOTP,” “Set/Define Server IPaddress,” Set/Define Server RARP; *Dynamic Host Control Protocol (DHCP)*; *Editing the Boot Parameters*.

## Set/Define Server Gateway

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

Specifies the host to be used as a TCP/IP gateway between networks. Packets destined for a different network will be directed to the gateway for forwarding.

**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; Show/Monitor/List Protocols IP; *TCP/IP*; *TCP/IP Server Parameters*.

## Set/Define Server Host Limit

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

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.

**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 IP; *Host Limit*.

## Set/Define Server Identification

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

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.

**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," Show/Monitor/List Protocols; Show/  
 Monitor/List Server; *Server Identification*.

## Set/Define Server Inactivity Timer

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

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

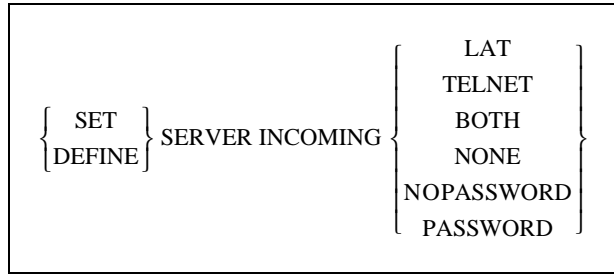
**Restrictions** You must be the privileged user to use this command.

**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; Show/Monitor/List Server; *Inactivity Logout*.

## Set/Define Server Incoming



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.

### 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 sessions 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; *System Passwords*.

## Set/Define Server IPaddress

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

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.

---

<b>Restrictions</b>	You must be the privileged user to use this command.
<b>Errors</b>	Configuring an IP address will automatically disable DHCP.
<b>Parameters</b>	<b>IPaddress</b> Enter the address in standard numeric format.
<b>Examples</b>	Local> SET SERVER IPADDRESS 192.0.1.49
<b>See Also</b>	"Set/Define Server DHCP," Set/Define Server Subnet Mask; Show/Monitor/List Server; Show/Monitor/List Protocols IP; <i>TCP/IP</i> ; Dynamic Host Control Protocol (DHCP).

## Set/Define Server Keepalive Timer

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

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

<b>Restrictions</b>	You must be the privileged user to use this command.
<b>Parameters</b>	<b>time</b> Enter a number from 10 to 180.
<b>Examples</b>	Local> SET SERVER KEEPALIVE TIMER 30
<b>See Also</b>	Show/Monitor/List Server.

## Set/Define Server Loadhost

```
{ SET }  
{ DEFINE } SERVER [SECONDARY] LOADHOST IPaddress
```

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

**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** Editing the Boot Parameters; Show/Monitor/List Server; *Reloading Operational Software*.

## Set/Define Server Login Password

```
{ SET }  
{ DEFINE } 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.

**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; *Login Password*.

## Set/Define Server Maintenance Password

```
{ SET }  
{ DEFINE } 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.

**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.*

## Set/Define Server Multicast Timer

```
{ SET }  
{ DEFINE } 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.

**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; *LAT*.

## Set/Define Server Name

```
{ SET }  
{ DEFINE } SERVER NAME ServerName
```

Specifies the name of the Server.

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



**Parameters**

**ServerName**

Enter a string of up to 16 alphanumeric characters. The Server name is restricted further by service name constraints. Print service names, typically **servername\_text** or **servername\_p1**, may be no more than 16 characters including the suffix.

---

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

---

**See Also**

Show/Monitor/List Server; *Changing the Server Name*.

## Set/Define Server NetWare Loadhost

$\left\{ \begin{array}{c} \text{SET} \\ \text{DEFINE} \end{array} \right\} \text{SERVER NETWARE LOADHOST} \left\{ \begin{array}{c} \text{ServerName} \\ \text{NONE} \end{array} \right\}$
---

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

**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; Show/Monitor/List Protocols NetWare; *Editing the Boot Parameters*.

## Set/Define Server NetWare Printserver

$\left\{ \begin{array}{c} \text{SET} \\ \text{DEFINE} \end{array} \right\} \text{SERVER NETWARE PRINTSERVER} \left\{ \begin{array}{c} \text{ServerName} \\ \text{NONE} \end{array} \right\}$
--

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.

**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; Show/Monitor/List Protocols NetWare.

## 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.

**Restrictions**

You must be the privileged user to use this command.

**Examples**

Local> SET SERVER NETWARE RESET

**See Also**

Set/Define Protocols NetWare Reset; Show/Monitor/List Protocols NetWare.

## Set/Define Server Node Limit

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

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.

**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; *Node Limit*.

## Set/Define Server Password Limit

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

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.

Restrictions	You must be the privileged user to use this command.
Parameters	<b>limit</b> 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.  <b>None</b> Changes the retry limit to 0 (no limit).
Examples	Local> SET SERVER PASSWORD LIMIT 10
See Also	“Set Privileged/Noprivileged,” “Set/Define Server Password Limit,” <i>System Passwords</i> .

Set/Define Server Privileged Password

SET

DEFINE

SERVER PRIVILEGED[PASSWORD][*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).

Restrictions	You must be the privileged user to use this command.
Parameters	<b>passwd</b> Enter a password of up to 6 alphanumeric characters.
Examples	Local> SET SERVER PRIVILEGED PASSWORD “yodel”
See Also	“Set Privileged/Noprivileged,” “Set/Define Server Password Limit,” <i>System Passwords</i> .

Set/Define Server Prompt

SET

DEFINE

SERVER PROMPT *PromptString*

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

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 10-2:

String	Substituted Value	String	Substituted Value
%p	port name	%C	manufacturer name
%n	port number	%D	product name (NIC)
%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!"
PRQ8P: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.*

## Set/Define Server Queue Limit

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

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.

## 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; "Show/Monitor Queue".

## 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.

<b>Restrictions</b>	You must be the privileged user to use this command.
<b>See Also</b>	Set/Define Server BOOTP; <i>Editing the Boot Parameters</i> . Initialize Reload; <i>Reloading Operational Software</i> .

## Set/Define Server Retransmit Limit

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

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.

<b>Restrictions</b>	You must be the privileged user to use this command.
<b>Parameters</b>	<b>RetransLimit</b> Enter a value between 4 and 100. The default is 50 retries.
<b>Examples</b>	Local> SET SERVER RETRANSMIT LIMIT 5
<b>See Also</b>	Show/Monitor/List Protocols.

## Set/Define Server Secondary

Allows you to set a secondary IP gateway or loadhost in case the primary one fails. Please see the entries for Set/Define Server Gateway and Set/Define Server Loadhost.

## Set/Define Server Service Groups

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

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).

<b>Restrictions</b>	You must be the privileged user to use this command.
<b>Parameters</b>	<b>All</b> All group numbers are provided or disabled.  <b>GroupList</b> 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

### Set/Define Server Software

$\left\{ \begin{array}{l} \text{SET} \\ \text{DEFINE} \end{array} \right\} \text{SERVER SOFTWARE } \textit{filename}$
---

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.

---

#### 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"
```

#### See Also

Set/Define Server Loadhost; *Reloading Operational Software*

## Set/Define Server Startupfile

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

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.

### 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 STARTUPFILE hevax::start.com
Local> DEFINE SERVER STARTUPFILE
engfs\sys:\login\start.cmd"
```

### See Also

Set/Define Server Loadhost; *Reloading Operational Software*

## Set/Define Server Subnet Mask

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

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.

<b>Restrictions</b>	You must be the privileged user to use this command.
<b>Parameters</b>	<p><b>mask</b></p> <p>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.</p>
<b>Examples</b>	Local> SET SERVER SUBNET MASK 255.255.192.0
<b>See Also</b>	Set/Define Server IPaddress; Set/Define Server Gateway; <i>TCP/IP; IP Address.</i>

## Set/Define Service

$\left\{ \begin{array}{c} \text{SET} \\ \text{DEFINE} \end{array} \right\} \text{SERVICE ServiceName}$
--

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.

---

<b>Restrictions</b>	You must be the privileged user to use this command.
<b>Parameters</b>	<p><b>ServiceName</b></p> <p>For the NIC enter a service name of up to 12 alphanumeric characters. The default service name is based on the Server name.</p>
<b>See Also</b>	Clear/Purge Service; Show/Monitor/List Services; <i>Creating Services.</i>



## Set/Define Service AppleTalk

$\left\{ \begin{array}{c} \text{SET} \\ \text{DEFINE} \end{array} \right\}$ SERVICE <i>ServiceName</i> APPLETALK $\left\{ \begin{array}{c} \text{ENABLED} \\ \text{DISABLED} \end{array} \right\}$
--

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.

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

**See Also** Clear/Purge Service; Show/Monitor/List Services; *Macintosh Service Configuration*.

## Set/Define Service Banner

$\left\{ \begin{array}{c} \text{SET} \\ \text{DEFINE} \end{array} \right\}$ SERVICE <i>ServiceName</i> BANNER $\left\{ \begin{array}{c} \text{ENABLED} \\ \text{DISABLED} \end{array} \right\}$
---

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.

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

**See Also** Clear/Purge Service; Show/Monitor/List Services.

## Set/Define Service Binary

$\left\{ \begin{array}{c} \text{SET} \\ \text{DEFINE} \end{array} \right\}$ SERVICE <i>ServiceName</i> BINARY $\left\{ \begin{array}{c} \text{ENABLED} \\ \text{DISABLED} \end{array} \right\}$
---

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.

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

**See Also** Clear/Purge Service; Show/Monitor/List Services.

## Set/Define Service EOJ

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

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

**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,” “Set/Define Service SOJ,” Show/Monitor/List Services.

## Set/Define Service Formfeed

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

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

**See Also** Clear/Purge Service; Show/Monitor/List Services.

## Set/Define Service Identification

$$\left\{ \begin{array}{c} \text{SET} \\ \text{DEFINE} \end{array} \right\} \text{SERVICE } \textit{ServiceName} \text{IDENTIFICATION} \left\{ \begin{array}{c} \textit{IDstring} \\ \text{NONE} \end{array} \right\}$$

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

**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; Show/Monitor/List Services.

## Set/Define Service LAT

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

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

**Restrictions**

You must be the privileged user to use this command.

**See Also**

Clear/Purge Service; Show/Monitor/List Services; *Printing from LAT*.

## Set/Define Service NetWare

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

Enables or disables NetWare access to the specified service.

**Restrictions**

You must be the privileged user to use this command.

**See Also**

Clear/Purge Service; Netstat; Set/Define Protocols NetWare Access; Show/Monitor/List Services.

## Set/Define Service Password

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

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.

**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; Show/Monitor/List Services.

## Set/Define Service PSConvert

$\left\{ \begin{array}{c} \text{SET} \\ \text{DEFINE} \end{array} \right\} \text{SERVICE PSConvert} \left\{ \begin{array}{c} \text{ENABLED} \\ \text{DISABLED} \end{array} \right\}$
--

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.

**See Also**

Clear/Purge Service; Show/Monitor/List Services.

## Set/Define Service RTEL

$\left\{ \begin{array}{c} \text{SET} \\ \text{DEFINE} \end{array} \right\} \text{SERVICE ServiceName RTEL} \left\{ \begin{array}{c} \text{ENABLED} \\ \text{DISABLED} \end{array} \right\}$
---

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

**Restrictions**

You must be the privileged user to use this command.

**See Also**

Clear/Purge Service; Show/Monitor/List Services; *Reverse Telnet (RTEL)*.

## Set/Define Service SOJ

$\left\{ \begin{array}{c} \text{SET} \\ \text{DEFINE} \end{array} \right\} \text{SERVICE ServiceName SOJ} \left\{ \begin{array}{c} \text{StartString} \\ \text{NONE} \end{array} \right\}$
--

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

**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; "Set/Define Service EOJ," Show/Monitor/List Services.

## Set/Define Service TCPport

$\left\{ \begin{array}{c} \text{SET} \\ \text{DEFINE} \end{array} \right\} \text{SERVICES } \textit{ServiceName} \text{ TCPPORT } \left\{ \begin{array}{c} \textit{portnum} \\ \text{NONE} \end{array} \right\}$
--

Specifies a TCP listener socket for this service. TCP connections to the socket are accepted or rejected based on the availability of the service.

**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; "Set/Define Service Telnetport," Show/Monitor/List Services; *TCP/Telnet Service Sockets*.

## Set/Define Service Telnetport

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

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.

**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; "Set/Define Service TCPport," Show/Monitor/List Services; *TCP/Telnet Service Sockets*.

## Set/Define SNMP

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

Configures a community name and 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 for syntax.

---

<b>Restrictions</b>	You must be the privileged user to use this command.
<b>Parameters</b>	<p><b>CommName</b> Enter a text community name of up to 16 characters long. This string is not case sensitive. This parameter does not apply to the NIC.</p> <p><b>Access</b> Choose Read access, Both read and write access, or None (no SNMP requests allowed).</p>
<b>Examples</b>	Local> SET SNMP COMMUNITY group2 ACCESS BOTH
<b>See Also</b>	Clear/Purge SNMP; "Show/Monitor/List SNMP," <i>Simple Network Management Protocol (SNMP)</i> ; <i>SNMP Security</i> .

## Show/Monitor/List Ports

$\left\{ \begin{array}{c} \text{SHOW} \\ \text{MONITOR} \\ \text{LIST} \end{array} \right\} \text{PORTS} \left[ \begin{array}{c} \text{ALL} \\ \text{portnum} \end{array} \right] \left[ \begin{array}{c} \text{CHARACTERISTICS} \\ \text{COUNTERS} \\ \text{STATUS} \\ \text{SUMMARY} \end{array} \right]$
---

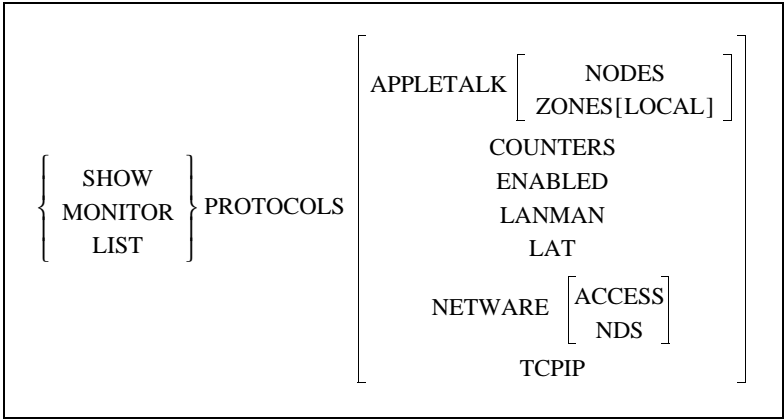
Displays information about the Server's ports. The current port is the default, unless an optional port designation is specified.

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.

<b>Restrictions</b>	<p>You must be the privileged user to use the Monitor Ports command.</p> <p>Secure users cannot Show or List ports other than their own.</p>
<b>Errors</b>	<p>Status and Counters parameters are not valid with List.</p> <p>Counters is also not valid for virtual ports.</p>

<b>Parameters</b>	<b>All</b> Displays information about all ports.
	<b>Access</b> Displays information about all local ports having a particular access type .
	<b>portnum</b> Displays information about a specified port.
	<b>Characteristics</b> Displays the port’s settings, such as baud rate, parity, preferred services, name, username, and group codes.
	<b>Counters</b> Displays the port’s local and remote accesses, as well as the communication errors on the device.
	<b>Status</b> 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.
	<b>Summary</b> Displays the access type, offered services, and the login status of the port.
<b>Examples</b>	Local> LIST Port ACCESS DYNAMIC SUMMARY
<b>See Also</b>	Set/Define Ports commands, beginning with Define Port Access; <i>Status Displays.</i>

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.	
<b>Restrictions</b>	You must be the privileged user to use this command.
<b>Errors</b>	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.

### 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 10-3: IPX Error Reasons](#).

**Table 10-3: 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.



**Table 10-3: IPX Error Reasons**

Bit	Meaning	Explanation
6	Fileserver did not accept the Server' 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.
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 filesevers.

#### **NDS**

Displays NDS error reason counters to help diagnose NDS-related problems. They are listed in the following table.

**Table 10-4: 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 10-5: 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 APPLETLK ZONES

#### See Also

Netstat; Clear/Purge Protocol NetWare Access; Set/Define Protocols commands, beginning with Define Protocols AppleTalk; *Status Displays*.

## Show/Monitor Queue

<div> <div> SHOW MONITOR </div> <div> </div> </div>	<div> <div> </div> <div> QUEUE </div> </div>	<div> <div> ALL </div> <div> NODE <i>nodename</i> </div> <div> PORT <i>portnum</i> </div> <div> SERVICE <i>servicename</i> </div> </div>
---	--	--

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.

#### 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.

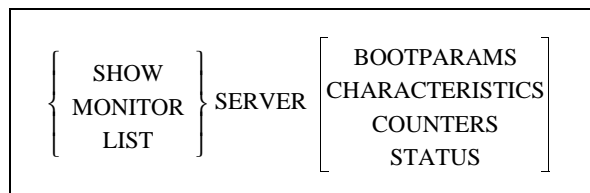
**Examples**

```
Local> SHOW QUEUE Port 2
Local> MONITOR QUEUE Service lab5
```

**See Also**

Set/Define Server Queue Limit; *Status Displays*.

**Show/Monitor/List Server**



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.

**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 10-6:** Counter 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.

**Table 10-6:** Counter Display Fields

Field	Meaning of Counter
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. See Table .

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 shows the Server failure reasons and their meanings.

**Table 10-7:** 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

**Table 10-7:** Failure Reasons

Bit	Send Failure Reason	Receive Failure Reason	Connect Failure Reason	Invalid Packet Reason
6	Serve 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

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, beginning with Set/Define Server Announcements; *General Server Parameters*; *Status Displays*.

**Show/Monitor/List Services**

$\left\{ \begin{array}{c} \text{SHOW} \\ \text{MONITOR} \\ \text{LIST} \end{array} \right\}$	SERVICES	$\left[ \begin{array}{c} \text{LOCAL} \\ \text{service} \\ \text{ALL} \end{array} \right]$	$\left[ \begin{array}{c} \text{CHARACTERISTICS} \\ \text{STATUS} \\ \text{SUMMARY} \end{array} \right]$
--	----------	--	---

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.

**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; Set/Define Service commands, beginning with Set/Define Service; *Creating Services*; *Status Displays*.

## Show/Monitor/List SNMP

$\left\{ \begin{array}{c} \text{SHOW} \\ \text{MONITOR} \\ \text{LIST} \end{array} \right\}$	SNMP
--	------

Displays the current or saved SNMP security table entries.

### Restrictions

You must be the privileged user to use this command.

### See Also

Clear/Purge SNMP, “Set/Define SNMP,” *Simple Network Management Protocol (SNMP)*; *SNMP Security*; *Status Displays*.

## Show/Monitor Users

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

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

### Restrictions

You must be the privileged user to use the Monitor users command.

### See Also

Set/Define Port Username; *Status Displays*.

## Show Version

SHOW VERSION
--------------

Displays operating software version information.

### See Also

Set/Define Server Software; *Reloading Operational Software*; *Status Displays*.

## Source

SOURCE	$\left[ \begin{array}{c} \textit{hostname:filename} \\ \textit{node::filename} \\ \textit{hostname\sys:login\filename} \end{array} \right]$	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.

### 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\PRQ.COM
```

### See Also

Set/Define Server Software.

## Test Loop

TEST LOOP <i>address</i>	$\left[ \text{HELP} \left\{ \begin{array}{c} \text{RECEIVE} \\ \text{TRANSMIT} \\ \text{FULL} \end{array} \right\} \text{ASSISTANT } \textit{address} \right]$
--------------------------	--

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).

### 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
```

## Test Port

TEST PORT [ <i>portnum</i> ]	<div> COUNT <i>count</i>  DTR [DELAY <i>time</i>]  POSTSCRIPT  WIDTH <i>width</i> </div>
------------------------------	--

Tests a serial 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.

### 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.



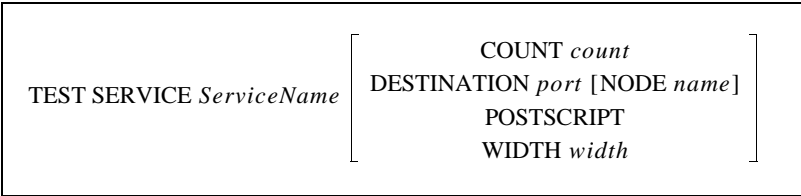
**Width**

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
```

**Test Service**



Tests a connection to a LAT service. A continuous stream of ASCII alphabetic characters is sent to the service and (hopefully) echoed back until the number of lines specified by Count is reached; the test can be stopped at any time by pressing a key. The 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 `count` command.

**NOTE:** 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.

<b>Restrictions</b>	You must be the privileged user to test a port other than your own.
<b>Parameters</b>	<div><b>Count</b> Governs the number of test lines that will be sent. Generally, the <i>count</i> 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.</div> <div><b>Destination</b> The test stream will be sent to the specified port on the LAT device.</div> <div><b>Node</b> The test stream will be sent to the specified node of the LAT destination port.</div> <div><b>PostScript</b> Performs a bidirectional data test of the interface between the Server and 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.</div>

**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.

## Zero Counters

ZERO COUNTERS $\left[ \begin{array}{c} \text{ALL} \\ \text{PORT } \textit{portnum} \end{array} \right]$
---

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.

### 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,”



# Appendix A

## Troubleshooting

### In this Chapter . . .

- “Power-Up Troubleshooting” on page A-2
- “Printing Problems” on page A-2
- “DHCP Troubleshooting” on page A-2
- “BOOTP Troubleshooting” on page A-3
- “RARP Troubleshooting” on page A-3
- “PostScript Problems” on page A-4
- “Contact Information” on page A-4

## Power-Up Troubleshooting

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

Power/Error Message	Diagnosis/Remedy
Power-up diagnostic failure (hardware failure)	Note which LED is blinking and its color, then contact your dealer or point of purchase Technical Support.
The Server boots but does not try to load the Flash ROM code	Press the Test/Reset button. A brief description of the problem will be printed.
Network Error: The ACT LED will blink yellow 2-3 times per second	A boot failure has occurred. Reboot the server.
	Reload Flash ROM.

## Printing Problems

Area to Check	Explanation
Service characteristics	Use the <b>Show Service Local Characteristics</b> command from a network login 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 will occur when there are duplicate IP addresses on the network.
Queue Status and Port counters	Use the <b>Monitor Queue</b> command to ensure queue entries appear in the job list. If an entry does not appear, refer to the appropriate host section in this Appendix. Use the <b>Monitor Port 1 Counters</b> command to verify that the counter is incrementing with each job. If it is not, verify the connection between the Server and the printer.

## DHCP Troubleshooting

Area to Check	Explanation
DHCP is enabled on the Server.	Use the <b>Define Server DHCP Enabled</b> 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.
Did the Server get its IP address from the DHCP server?	Refer to the <b>DHCP Manager</b> on your DHCP server for information about addresses currently in use. If the DHCP server does not list your Server's IP address, there may be a problem.

## BOOTP Troubleshooting

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

Area to Check	Explanation
BOOTP is in your system's <b>/etc/services</b> file	BOOTP must be an uncommented line in the <b>/etc/services</b> file.
The Server is in the loadhost's <b>/etc/hosts</b> 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.

## RARP Troubleshooting

Area to Check	Explanation
The Server's name and hardware address in the host's <b>/etc/ethers</b> file	The Server's name and hardware address must be in this file for the host to answer a RARP request.
The Server's name and IP address in the <b>/etc/hosts</b> file	The Server's 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 <b>ps</b> command to see if there is a RARPD process running.

## PostScript Problems

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

Area to Check	Explanation
The Server is communicating with the printer	To test a PostScript printer use the <b>Test Port 1 PostScript Count 2</b> . This command will send 2 pages of PostScript data to the printer. Watch the indicators on the printer to verify that the Server is communicating with the printer.
Service Characteristics	Issue the <b>Show Service Characteristics</b> 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 <b>Show Port 1 Counters</b> command.

## Bitmap Graphics

If files that contain embedded bitmap graphics print incorrectly, it is 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.

## Contact Information

If you are experiencing an error that is not listed in the Troubleshooting appendix of your *Installation Guide*, or you are unable to fix the error, contact your dealer or point of purchase Technical Support at the address or phone number listed in your printer User Manual.

If you are experiencing problems with your Server or have suggestions for improving the product, please contact your point of purchase Technical Support.

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

- Your name, company name, address, and phone number
- Product name
- model number
- Server serial number
- Software version (use the **Show Version** command to display)
- Network configuration including the output from a **Netstat** command
- Description of the problem
- Unit status when the problem occurred (please try to include information on user and network activity at the time of the problem)



# 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.

## **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.

<b>BOOTP</b>	<p>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.</p> <p>BOOTP implementations usually have a configuration file (such as <code>/usr/etc/bootptab</code>) 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.</p>
<b>DHCP</b>	<p>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.</p>
<b>download</b>	<p>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.</p>
<b>Fast Ethernet</b>	<p>High-speed Ethernet. See <b>100BASE-T</b>.</p>
<b>flash ROM</b>	<p>See <b>ROM</b>.</p>
<b>gateway</b>	<p>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 <b>subnet mask</b>.</p>
<b>hardware address</b>	<p>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 <b>network address</b>.</p>



<b>host</b>	Generally a node on a network that can be used interactively, or logged into, usually an interactive computer. In the Server command set, host is used to refer to a TCP/IP node, rather than TCP/IP and LAT nodes.
<b>ICMP</b>	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.
<b>IP address</b>	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 <b>network address</b> .
<b>LAT</b>	<p>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.</p> <p>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.</p>
<b>login service</b>	Created when the Server is configured to allow users to log in from the network.
<b>MAU</b>	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.
<b>MOP</b>	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.

	<p>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.</p>
<b>MTU</b>	<p>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.</p>
<b>multicast</b>	<p>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.</p>
<b>nameserver</b>	<p>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.</p>
<b>NCP</b>	<p>Network Control Program. NCP is a program run on OpenVMS 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 OpenVMS system.</p>
<b>NetWare</b>	<p>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.</p>
<b>network address</b>	<p>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 <b>hardware address</b> and <b>IP address</b>.</p>
<b>node</b>	<p>Any intelligent device connected to the network. This includes terminal servers, host computers, and any other devices that are directly connected to the network.</p>

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 <http://www.internic.net>.

**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.

<b>ROM</b>	<p>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.</p>
<b>router</b>	<p>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.</p>
<b>rwwho</b>	<p>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.</p> <p>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.</p>
<b>SAP</b>	<p>Service Advertising Protocol. SAP packets, along with <b>RIP</b> packets, allow the Server to broadcast its known routes and services to the network and obtain this information from other routers on the network.</p>
<b>service</b>	<p>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.</p> <p>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.</p>
<b>SNMP</b>	<p>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.</p>

<b>subnet mask</b>	<p>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’ 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.</p> <p>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.</p> <p>If the subnet mask is not set explicitly with the Set/Define Server Subnet Mask command, the Server will assume a mask based on the Server 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.</p>
<b>tap</b>	<p>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.</p>
<b>TCP/IP</b>	<p>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 OpenVMS machines.</p>
<b>Telnet</b>	<p>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.</p>
<b>10BASE2</b>	Thinwire network cable.
<b>10BASE5</b>	Thickwire network cable.
<b>100BASE-T</b>	<b>Fast Ethernet</b> cable. It is similar physically to 10BASE-T, but capable of higher speeds.

<b>10BASE-T</b>	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.
<b>TFTP</b>	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.
<b>Thickwire</b>	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.
<b>Thinwire</b>	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.
<b>transceiver</b>	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.
<b>TSM</b>	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 OpenVMS systems running MOP and is incompatible with TCP/IP-only networks.

