

ELS NetWare®
Level II

Installation

NOVELL
Installation
for ELS Level II

NetWare®





NOVELL

Installation

for ELS Level II

NetWare[®]

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Novell, Incorporated
122 East 1700 South
Provo, Utah 84606 USA

May 1989 Edition
Manual Revision 1.0
For ELS NetWare Level II v2.15
Novell Part # 100-000550-001

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Software Registration and Support

Software registration

To ensure continued support and updated information on NetWare products, complete and mail in the "Software Registration and Hardware Warranty Registration" card included with the NetWare installation software package.

Novell Services and Support

The Novell Services and Systems Group (NSSG) provides a complete service and support program designed to answer the needs of NetWare users. Most services are provided for a fee.

NSSG provides everything from a 24-hour hot line to on-site installation and maintenance. The Novell Services package includes software upgrades and technical literature.

For more information about NSSG, call 1-800-LANSWER from within the United States.

NetWire

NetWire, an on-line information service hosted by CompuServe's electronic bulletin board system, provides you with the most recent

- Technical bulletins
- Program files (OS and Shell Drivers, Utility Programs, and Patches and Fixes)
- Independent product testing bulletins
- Press releases

Specialists from each of Novell's technical divisions work together to supply *NetWire* with in-depth information that is current and accurate.

NetWire's question-and-answer bulletin board gives you both a responsive investigating tool and a valuable resource that is enlarged and updated continually.

Technical bulletins and product information reports keep you informed of the latest developments in NetWare, including hardware and software compatibility. General company information and current press releases let you know what is new with Novell.

You can also access libraries of drivers and utility programs, documentation updates, and information about other Novell publications.

For more information about *NetWire*, call Novell at (801) 379-5900.

What to do before calling service support

The following sections contain questions about your network. When you call your Novell representative, you should have the answers to these questions ready. This information will enable the representative to more quickly understand your problem and better assist in its resolution.

Most of the hardware information should be recorded on the NetWare installation worksheets (copies are provided at the back of this manual). Keep the information on the worksheets as accurate and up-to-date as possible.

File server hardware

1. How many file servers are on your network? What is the brand and model of each?
2. How much memory does each file server have? If you have installed add-on memory boards, what kind are they, and what are their settings?
3. How many internal hard disk drives does each file server have? What brand and model are they, and what is their storage capacity? What kind of controller board (brand and model) are the hard disks attached to?
4. What type of network board is installed in each file server (brand and revision number)? What are the hardware configuration settings on each board?
5. What other add-on hardware has been installed in each file server, and how is this hardware set?
6. Are you currently using any value-added processes (VAPs) or other options (such as the IBM asynchronous remote connection) in your system?

Workstation hardware

1. How many workstations are attached to the network? What is the brand and model of each?
2. How much memory does each workstation have? If you have installed any add-on memory boards, what kind are they, and how are they set?
3. What type of network board (brand and revision number) is installed in each workstation? What are the hardware configuration settings on each board?
4. What other add-on hardware has been installed in each workstation, and how is this hardware set?

NetWare operating system

1. What type of NetWare operating system is running in the file server? You will need to know the release number and version (ELS NetWare 286 Level II Nondedicated v2.15, for example).
2. What is the operating system configuration? You will need to know the network addresses, the network board settings, and other information displayed when you enter the CONFIG command at the file server console.
3. What are the current settings for the following system parameters?
 - Number of open files
 - Number of indexed files
 - Limit disk space (yes or no)
 - Number of bindery objects
4. What are the current settings for the following volume parameters on each volume?
 - Volume size
 - Number of directory entries
 - Directory caching (yes or no)
5. How many and what kinds of printers are attached to the file server? What are the hardware communication parameters for serial printers?

Record the problem

- 1. If the problem produces an error message, write down the exact error message that appears on the screen. Indicate whether the message was received at the file server console or at a workstation.**
- 2. Did the problem occur during a new installation or during an upgrade?**
- 3. Were any changes made to the system prior to the occurrence of the problem?**
- 4. Did the problem occur while you were trying to boot the file server or a workstation? If so, how did the booting process proceed before the problem occurred?**
- 5. If the problem occurred when an application program was running, can the problem be reproduced with no application running?**

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How to Use This Manual

This manual explains how to install the necessary hardware and software for an ELS Netware 286 Level II v2.15 network. The instructions in this manual can be used either for a first-time NetWare installation or for upgrading from a previous version of NetWare.

This manual describes how to plan for and do the following:

- Prepare the network hardware for installation – this includes the file server, network workstations, and printers.
- Generate the NetWare workstation shells and boot diskettes for the workstations and remote workstations.
- Generate the NetWare operating system for the file server.
- Connect the file server and workstations to the network and attach the shared network peripherals to the file server.
- Install NetWare on the file server and initialize the network hard disks for use by NetWare.
- Create directory structure, create users and groups, and assign network security.
- Customize your printing environment (optional).
- Create login scripts for users.
- Create a menu system to make it easier for users to access applications on the network.
- Install the accounting option so that you can charge users for using network resources such as disk storage.

Where to start

This manual can be used in different ways, according to your experience in installing ELS NetWare.

Beginning installers

If you are a beginning installer, we suggest that you read the Planning Modules first. These will help you learn NetWare concepts and guide you in making decisions about your installation. As you plan, you can record your decisions on the worksheets found at the back of this manual, then refer to them as you follow the step-by-step instructions given in the Installation Steps section. The worksheets also serve as a record of your installation.

Experienced installers

If you have installed NetWare before and are familiar with the basic concepts, you can skip the Planning Modules and begin with the Installation Steps. If you need additional information to perform a step in the installation, you can refer to the Planning Module that explains the step. Use the worksheets found at the back of this manual as a record of your installation.

Other manuals you will need

As you install the network, you may need to use one or more of the following manuals in conjunction with this manual.

Novell manuals

If you have a Novell file server, you will need the *Guide to Operations* manual that came with it.

If you have a Novell file server and need to install an additional Novell hard disk, you will need the *NetWare Hard Disk and Tape Drive Installation* manual.

For each type of network board you plan to install in the file server and workstations, you will need the corresponding NetWare installation supplement (for example, the *Installation Supplement for Novell RX-Net* for Novell RX-Net boards). For your convenience, we've provided a place in the Installation Steps section to insert the appropriate supplement(s) for the type of board(s) you are using.

If you will be connecting your file server to a remote bridge or another file server, you will need the *NetWare External Bridges* manual.

For an explanation of any error messages that may appear while you are installing the network, see the *NetWare System Messages* manual.

Third-party documentation

You should be familiar with the user manuals and other instructions supplied with the personal computers you will be using as network workstations and non-Novell file servers—especially the operating system and *Guide to Operations* (or similarly titled) manuals.

You will also need the vendor's documentation for any third-party products you will be using on your network.

Conventions used in this manual

Icons

This manual uses a number of icons to alert you to important information and special procedures.



In the Planning Modules section, this icon designates a point in the planning process at which you should record your decision on the appropriate worksheet.

In the Installation Steps section, however, this icon appears at points where you may need to refer to the Planning Modules for additional information if you have not used the modules to prepare your worksheets.



This icon marks an explanation or instruction that is critical for a successful installation.



This icon marks information for installers who are using 5.25-inch diskettes in their installation.



This icon marks information for installers who are using 3.5-inch diskettes in their installation.

Key names

Words enclosed in by angle brackets designate a key on the computer keyboard. For example, <Enter> designates the Enter, or Return, key. Key names differ among keyboard manufacturers. To view the key assignments for your computer, press <F1> twice from within any NetWare menu utility.

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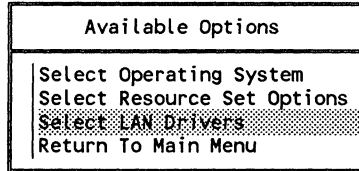
Key names

Words enclosed by angle brackets designate a key on the computer keyboard. For example, <Enter> designates the Enter, or Return, key. Key names differ among keyboard manufacturers. To view the key assignments for your computer, press <F1> twice from within any NetWare menu utility.

Menu options

The NetWare installation utilities are menu-based. To select an option from a menu, use the arrow keys to highlight the option and then press the Enter key. In this manual, these instructions are abbreviated as shown in the following example.

Highlight:



Then press <Enter>.

For this example, you would use either the Down-arrow key or the Up-arrow key (depending on which option is already highlighted on your screen) to highlight "Select LAN Drivers." Then you would press the Enter key to activate the option.

If the window contains a long list of options, you can use Page Up and Page Down keys to quickly scroll to the top or bottom of the list. You can also quickly move to an option by typing the first letters of the desired option.

Whenever one of the options is highlighted for you in the manual, you should select that option. If no option is highlighted in the manual, you must select options according to your individual situation.

How to Use the Planning Modules

The Planning Modules can be used in two ways:

- As a planning guide
- As an installation reference

As a planning guide

If you are using this section as a planning guide, read the modules consecutively, beginning with the introduction on page 3. If you find that some modules are not applicable to your installation, skip them. For example, if you are not installing a remote workstation on your network, skip the Remote Workstation module.

As you go through each module, you will be given information to help you make decisions about how you want to set up your network. We have provided a number of worksheets at the back of this manual for recording your decisions.

After you have completed all the applicable planning modules and filled in the worksheets, use your worksheets as you install your network. The worksheets can also be used as a record of your installation for future reference.

As an installation reference

If you are an experienced installer, you can skip the Planning Modules and use them only as a reference during installation. References that refer to the appropriate planning module are provided in the Installation Step lists.

We have also tried to refer you to the appropriate worksheet at critical places in the installation procedure. These worksheets can also be used as a record of your installation for future reference.

Notes

Introducing ELS NetWare Level II

This module begins with an overview of what a network is and then explains the components of a network. It also explains what is involved in setting up the network environment. If you are already familiar with all of the items listed below, you can skip this module.

Components of an ELS NetWare network

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What is a network?

A network connects personal computers so that they can communicate and share resources. Novell's Entry Level Solution (ELS) NetWare operating system is a high-performance local area network control program designed to provide sophisticated networking capabilities for small businesses or corporate workgroups.

Up to eight users at a time can share network resources (such as hard disks, printers, software applications, and data files); users can access any services the network provides.

Components of an ELS NetWare network

A basic network is made up of at least two personal computers connected to each other via network boards and cabling. An ELS NetWare Level II network typically includes additional components.


You may not be installing all of the components described in this module, but we suggest that you read through the following explanations. They will help clarify the terminology used throughout this and related NetWare manuals.

File server

The file server is a microcomputer that serves as the heart of a NetWare network. The ELS NetWare operating system software runs in the file server.

The NetWare operating system makes it possible for the file server to regulate communications between the other personal computers attached to it and to manage any shared equipment that may be connected. The file server may be dedicated (used to run just the operating system) or nondedicated (used to run the operating system and as a workstation).

Information about the kinds of computers that can be used as file servers, their memory requirements, and the operating system you will generate can be found in the File Server module on page 23.



Hard disks

A file server in an ELS NetWare network must have at least one internal hard disk. A second internal hard disk can be used, if desired, to expand network disk storage. The internal hard disks are controlled by the file server's hard disk controller board.

Hard disks in the file server are divided into "volumes." A volume is a fixed amount of disk storage space that you can use to create directories, subdirectories, and files.

Information about planning hard disk storage needs and NetWare volumes is given in the Hard Disk module on page 53.



Workstations

Workstations are the personal computers operated by the network users. Workstations are used much like ordinary, standalone computers—each workstation processes its own files using its own operating system (DOS or OS/2 or, if you have purchased NetWare for Macintosh, AppleShare).

A NetWare software program called a "shell" is loaded into each workstation to enable the workstation to communicate with the file server and the other workstations on the network.

Information about the types of computers you can use as workstations, their memory requirements, and the shells that you will generate is given in the Workstations module on page 69.

Remote Reset

Remote Reset allows workstations to boot from a file on the file server's hard disk rather than from a boot diskette in a local drive. Most types of workstations can use Remote Reset, but it is especially useful if you are planning to use diskless workstations on your network.

To prepare the network for using Remote Reset, you must install Remote Reset PROMs or enable Remote Reset switches or jumpers on the network boards.

Before you can boot a workstation using Remote Reset, you must place a remote boot file in the SYS:LOGIN directory. This file contains the same information that would be on the boot diskette if the workstation booted from a boot diskette.

Information about installing Remote Reset is given in the Remote Reset module on page 95.

Remote workstation

ELS NetWare supports the use of an asynchronous (ASYNC) communication connection in the file server. This connection allows the file server to communicate over telephone lines, using modems, with a remote workstation (or another file server).

ASYNC communication circuitry is built in to most computers as a serial port (COM1 or COM2). If your file server or remote workstation does not have a built-in serial port, you will need to install an add-on IBM ASYNC COM1/COM2 board in the computer if you plan to use remote workstations.

Information about planning for a remote workstation can be found in the Remote Workstation module on page 101.

Networking hardware

The term "networking hardware" in this and other NetWare manuals refers to network boards, cables, connectors, wiring boxes, hubs, transceivers, and any other pieces of hardware used to physically connect the network stations. The specific networking hardware and the connection schemes vary from one kind of network board to another.

The workstations are connected to each other and to the file server by coaxial, fiber-optic, or other types of cables. The cables connect to network boards installed in the workstations and then to a similar (often identical) network board inside the file server.

Information specific to each kind of network board is given in the appropriate installation supplement. You can insert the supplement(s) you need in the Network Boards module (beginning on page 117) for easier reference as you install your network.

Network printers

Network printers are attached to the file server. They can be shared by all network users.

The ELS NetWare operating system supports up to five printers; as many as three of these can be parallel printers and as many as four can be serial printers.

The exact number and types of printers that you can attach to your file server will correspond to the number and types of printer ports physically available in your file server. The serial ports are labeled as devices COM1, COM2, etc.; the parallel ports as devices LPT1, LPT2, etc.

Most computers used as ELS NetWare file servers have at least one serial port and one parallel port built in. If you want to attach more printers than there are built-in printer ports on the file server, you can add printer port expansion boards. Instructions for doing this are usually found in the *Guide to Operations* or *Quick Reference* manual that comes with the computer.

Printers can also be attached to workstations, but these printers can be used only by the workstations to which they are physically attached.

Information about setting up network printers is given in the Network Printers module on page 119.

Uninterruptible power supply

An uninterruptible power supply (UPS) is a backup power unit. The UPS supplies uninterrupted power if commercial power is interrupted.

NetWare-approved UPS systems are designed for use with file servers, but they can also be used effectively with workstations and other types of servers.

Information about setting up a UPS is given in the Uninterruptible Power Supply module on page 145.

Other types of servers

In addition to file servers, ELS NetWare supports specialized servers such as print servers, database servers, and archive servers. If you are installing any of these servers on your network, refer to the installation instructions provided with the server.

The network environment

Directory structure

All network information is stored in files on a file server's hard disk. These files are organized in a directory structure to make them easy to locate. The NetWare directory structure has several levels. The hard disk is divided logically into one or more

- Volumes, which are divided into
- Directories, which are divided into
- Subdirectories.

The way your information needs to be organized will help you determine how many levels and how many directories you need to create in your directory structure. You may need a very simple directory structure or you may need one with several levels.

Information about planning your directory structure is given in the Directory Structure module on page 155.

Users and groups

Network users are the people who will be working at workstations on the network. NetWare recognizes three types of users:

- Users or groups of users
- Operators
- Supervisors

Before a person can use the network, a user identity for him or her must be created on the file server. You can do this if you have supervisor privileges. The user can then log in to the file server and gain access to files stored on the file server and to network peripherals.

Additional rights and responsibilities can be given to a special network user called an operator.

The network supervisor can set up the network and is usually responsible for maintaining the working environment of the network after its installation.

When several network users have similar needs for information or perform similar tasks, users can be assigned as members of a network "group." If users are organized as groups, the members of the group can be managed collectively rather than individually.

Groups can be created to fit the way a business is organized, the tasks that must be performed, and the information needed to perform those tasks. Each group must be assigned a name, just as a username is assigned to each network user.

Information about creating network users and groups is given in the Network Users and Groups module on page 169.

Network security

Because security is often a concern in a multiuser environment, NetWare provides an extensive security system to protect your data. NetWare allows network supervisors to control not only who may access particular directories and files and but also what tasks users may perform within those directories and files. By setting up effective security, you can prevent users from corrupting data in shared files and prevent unauthorized users from accessing restricted files.

NetWare network security is managed at four levels:

- Login/password security
- Trustee security
- Directory security
- File attributes security

These levels of security are generally used in combination.

Information about setting up network security is given in the Network Security module on page 179.

Login scripts

A login script is a set of instructions that directs the computer to perform specific actions when a user logs in to the network. There are two types of login scripts: the system login script and individual user login scripts.

A system login script instructs all workstations on the network to perform the same actions upon login. Supervisor privileges are required to create and modify a system login script.

A user login script executes after the system login script and instructs a user's workstation to perform certain tasks specific to that user's needs. Such a script might specify the user's drive mappings, for example. Either the user or someone with supervisor privileges can create or modify a user login script.

Information about creating login scripts is given in the Planning Login Scripts module on page 205.

Menu system

Customized menus to suit your networking needs can be created using the NetWare MENU utility. After the menu is created with a text editor, the menu can be executed with the MENU utility.

A customized menu can be used to centralize the tasks or tools you use daily by categories, such as software applications or database files. Menus can also be used to issue commands to start applications so that you can access software tools more quickly.

Information about creating a menu system is given in the Planning Menus module on page 259.

Accounting option

ELS NetWare provides an accounting option so that users can be charged for the network resources they use.

The following accounting features can be installed:

- Tracking when each user logs in and out of the file server
- Charging users for the amount of file server disk space they are using
- Charging users for the amount of time they use the file server, as well as the amount of work they ask the file server to do

The file server can be set up to charge for one, several, or all of these services.

Information about setting up the accounting option is given in the Accounting Option module on page 283.

Upgrading to ELS NetWare

This module outlines the steps that are necessary to upgrade an existing NetWare network to ELS NetWare Level II v2.15. It is divided into three sections:

- How to upgrade from ELS NetWare Level II v2.12. This section begins on page 14.
- How to upgrade from NetWare v2.0 or v2.0a. This section begins on page 16.
- How to upgrade from versions of NetWare earlier than v2.0. This section begins on page 20.

Upgrade from ELS NetWare Level II v2.12

How ELS Level II v2.15 differs

The primary difference between ELS NetWare Level II v2.15 and v2.12 is that v2.15 allows you to insert a third network board in the file server, so that you can connect a NetWare for Macintosh network. This board is referred to as LAN B if you are not inserting an IBM ASYNC COM1/COM2 board to connect a remote workstation or as LAN C if you are inserting an ASYNC board.

NetWare trustee rights have also changed slightly: you no longer need parental rights to create or delete directories. Create and delete rights are sufficient.

If you plan to connect a NetWare for Macintosh network to your file server, refer to the *NetWare for Macintosh: Installation Supplement* before starting your installation.

Preliminary preparation

Before starting your upgrade, you should determine whether your existing hardware is compatible with ELS NetWare Level II v2.15 and back up your data on hard disk.

Check hardware compatibility

To determine whether your existing hardware is compatible with ELS NetWare Level II v2.15, refer to the File Server, Hard Disks, Workstations, and Network Boards planning modules.

Back up data on hard disk

If all your existing hardware is supported by ELS NetWare Level II, no data should be lost during an upgrade. However, you should always back up all data as a precaution.

If you will be replacing any hard disks during the upgrade, you must archive (back up) data on your network hard disks before you start the actual upgrade. You will need your backups to restore data after the upgrade is completed.

Instructions for using NetWare archiving utilities can be found in the *Reference for ELS NetWare Level II*.

If you are replacing a non-PS/2 file server with an IBM PS/2 file server, you must take the following precautions as you back up the data on your hard disks:

- If you use a tape backup, make sure your backup hardware and software are compatible with both your old file server and the PS/2 file server.
- If you use the NetWare LARCHIVE utility, you must restore the data from a workstation on the network. Archive your data to the media the workstation uses (3.5-inch or 5.25-inch diskettes), and restore the data from that workstation to the network after the upgrade. In this case, we recommend making two backup copies of your data files.

Upgrade

When you are ready to upgrade your network, complete the steps in the Installation Steps section of this manual as if you were completing a first-time installation. If you need help planning your network before you install it, refer to the other modules in this manual that apply to your situation.

Restore data to network hard disks

If you have replaced hard disks or changed from an 86 or 286 file server, you should restore data to the network hard disks. Instructions for using NetWare archive and restore utilities can be found in the *Reference for ELS NetWare Level II*.

Upgrade from NetWare v2.0 or v2.0a

How ELS Level II v2.15 differs

ELS NetWare Level II v2.15 allows you to insert a third network board in the file server, so that you can connect a NetWare for Macintosh network. This board is referred to as LAN B if you are not inserting an IBM ASYNC COM1/COM2 board to connect a remote workstation or as LAN C if you are inserting an ASYNC board.

ELS NetWare v2.15 no longer uses a keycard to serialize the operating system. All serialization is controlled in the ELS NetWare operating system and by the GENDATA diskette.

ELS NetWare v2.15 also includes a new feature that allows third-party developers to develop application interfaces. These new interfaces allow value-added processes (VAPs) to be developed for NetWare networks. VAPs enable network file servers to use various multitasking applications, such as printing, archiving, and batch job processing. VAPs are run in the file server and use the file server memory and microprocessor. Once a VAP is loaded and functioning, it can address the NetWare queuing protocols and can be executed from the file server while the network is operating.

NetWare trustee rights have also changed slightly: you no longer need parental rights to create or delete directories. Create and delete rights are sufficient.

If you plan to connect a NetWare for Macintosh network to your file server, refer to the *NetWare for Macintosh: Installation Supplement* before starting your installation.

Workstation shell changes

The functions of the NetWare workstation shell, which were previously included in the ANET3.COM program, have been divided into two programs: IPX.COM and NET3.COM. The NetWare Internetwork Packet Exchange (IPX.COM) program directs messages from the file server or another workstation to the appropriate destination on the network. The NET3.COM program (for workstations running DOS 3.x) now directs workstation requests to the appropriate operating system (DOS or NetWare) for handling.

ELS NetWare v2.15 workstation shells are now configurable. SHGEN, the new shell generation program, allows you to select a configuration option other than the default (option 0) for the network board in a workstation.

File server installation changes

The GENOS, PREPARE, and INSTALL utilities used to install the file server in previous versions of NetWare have been combined into one program called ELSGEN. (ELSGEN is a simplified version of the NETGEN program used in SFT and Advanced NetWare v2.1 and above.) COMPSURF, a utility used to analyze hard disk surfaces, is available as a menu option from within the ELSGEN program.

The list below shows which ELSGEN options correspond with the utilities used in previous versions of NetWare. Note that the options that correspond to the old PREPARE utility are available in the "NetWare Installation" part of ELSGEN.

Previous Utility	ELSGEN Option
GENOS	Select Network Configuration
COMPSURF	Run Disk Surface Analysis
INSTALL	NetWare Installation
PREPARE	Modify Hot Fix Redirection Tables

You can run ELSGEN from floppy disks, from a combination of floppy disks and a RAM disk, from a local hard disk, or from a network drive (previous versions only allowed the installation program to be run from floppy disks). ELSGEN will ask you which method you are using and will prompt you for the proper diskettes. If you choose to use a hard disk or network drive, ELSGEN will create the necessary directories on the hard disk or network drive and upload the files to them automatically.

Preliminary preparation

Before starting your upgrade, you should determine whether your existing hardware is compatible with ELS NetWare Level II v2.15 and back up your data on hard disk.

Check hardware compatibility

To check whether your existing hardware is compatible with ELS NetWare Level II v2.15, refer to the File Server, Hard Disks, Workstations, and Network Boards planning modules.

Upgrading to ELS NetWare Level II from NetWare 86 or 286 v2.0 or above requires at least 5MB of free disk space on the SYS volume. Before you bring down the file server to upgrade the network, run the VOLINFO utility from a workstation to make sure at least 5MB is available.

If 5MB is not available, copy files from the SYS volume to another volume or, after you have backed up the files (as described in the next section), erase and purge them from the SYS volume.

Back up data on hard disk

If all your existing hardware is supported by ELS NetWare Level II, no data should be lost during an upgrade. However, you should always back up all data as a precaution.

If you will be replacing any hard disks during the upgrade, you must archive (back up) data on your network hard disks before you start the actual upgrade. You will need your backups to restore data after the upgrade is completed.

Instructions for using NetWare archiving utilities can be found in the *Reference for ELS NetWare Level II*.

If you are replacing a non-PS/2 file server with an IBM PS/2 file server, you must take the following precautions as you back up the data on your hard disks:

- If you use a tape backup, make sure your backup hardware and software are compatible with both your old file server and the PS/2 file server.
- If you use the NetWare LARCHIVE utility, you must restore the data from a workstation on the network. Archive your data to the media the workstation uses (3.5-inch or 5.25-inch diskettes), and restore the data from that workstation to the network after the upgrade. In this case, we recommend making two backup copies of your data files.

Upgrade

When you start to do the actual upgrade, go through the step lists provided in this manual as if you were completing a first-time installation. If it is helpful, you might want to use the Planning Modules to plan your network prior to upgrading.

Many of the NetWare utility files that had .COM filename extensions in previous versions of NetWare have .EXE extensions in ELS NetWare Level II. For example, what was LOGIN.COM in previous versions is now LOGIN.EXE.

When the ELSGEN utility loads new system, login, and public files, any .COM files that have the same filename as the new .EXE files are renamed with a .20A extension. These .20A files remain in the SYS volume; you can delete them if you want.

Restore data to network hard disks

If you have replaced hard disks or changed from an 86 or 286 file server, you should restore data to the network hard disks. Instructions for using the NetWare archive and restore utilities can be found in the *Reference for ELS NetWare Level II*.

Upgrade from NetWare versions earlier than v2.0

How ELS NetWare Level II v2.15 differs

The differences between v2.15 and versions of NetWare earlier than v2.0 are the same as those between v2.15 and v2.0a. Refer to "How ELS NetWare Level II v2.15 differs" on page 16 for a complete description and then return to the section below for instructions for upgrading your network.

Preliminary preparation

Before starting your upgrade, you should determine whether your existing hardware is compatible with ELS NetWare Level II v2.15 and back up your data on hard disk.

Check hardware compatibility

To determine whether your existing hardware is compatible with ELS NetWare Level II v2.15, refer to the File Server, Hard Disks, Workstations, and Network Boards planning modules.

Back up data on hard disk

If all your existing hardware is supported by ELS NetWare Level II, no data should be lost during an upgrade. However, you should always back up all data as a precaution.

Before you start the actual upgrade, you must archive (back up) your current application and data files (non-NetWare files) so that you can restore them after you have reformatted your disks. In this case, we recommend that you make two backup copies of your data files.

Non-NetWare data files and applications are those that have been copied into SYS volume directories from any source other than the NetWare installation diskettes. The files may include word processing programs, spreadsheet programs, and data files.



If you are upgrading from NetWare 86 or 286 below v2.0, make a list of or copy all the non-NetWare data files and program applications in the SYS volume. After the upgrade is finished, you will need to restore these non-NetWare files and applications to the SYS volume.

Consider all mail files in the SYS:MAIL directory as NetWare files.

If you are upgrading from NetWare v4.61, your SYS:SUPER directory will be replaced by a SYS:SYSTEM directory on your ELS NetWare Level II file server.

Instructions for using the NetWare archive and restore utilities can be found in the *Reference for ELS NetWare Level II*.

If you are replacing a non-PS/2 file server with an IBM PS/2 file server, you must take the following precautions as you back up the data on your hard disks:

- If you use a tape backup, make sure your backup hardware and software are compatible with both your old file server and the PS/2 file server.
- If you use the NetWare LARCHIVE utility, you must restore the data from a workstation on the network. Archive your data to the media the workstation uses (3.5-inch or 5.25-inch diskettes), and restore the data from that workstation to the network after the upgrade. In this case, we recommend making two backup copies of your data files.

Upgrade

When you are ready to upgrade your network, complete the steps in the **Installation Steps** section of this manual as if you were completing a first-time installation. If you need help planning your network before you upgrade, refer to the other modules in this manual that apply to your situation.

Restore data to network hard disks

If you have replaced hard disks or changed from an 86 or 286 file server, you should restore data to the network hard disks. Instructions for using the NetWare archive and restore utilities can be found in the *Reference for ELS NetWare Level II*.

The File Server

For the file server to monitor and regulate communications between workstations, you must first generate and install the ELS NetWare operating system. This is accomplished by running the ELSGEN installation program.

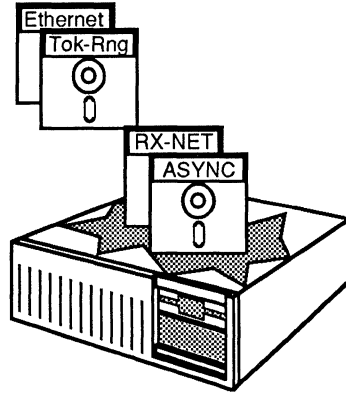
This module begins with an overview of the ELSGEN installation program. It also contains information to help you make the following decisions:

Decision	Page
Which type of computer to use as a file server	27
Which ELSGEN run method to use	29
Which operating system type to use	33
Which resource sets to select	35
Which LAN drivers to select	39
Which network addresses to set	40
How many communication buffers to assign	41
Whether to use the automatic configuration	42
What to name the file server	46
Whether to use default or custom installation options	47
How many open files to specify	51
How many indexed files to specify	52

ELSGEN

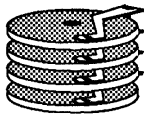
1 Configure and generate the operating system

■ Select LAN Driver

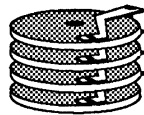


■ Generate Operating System

2 Install NetWare on the file server's hard disk



**FIRST
HARD DISK**
"System" disk;
NetWare Utilities



**SECOND
HARD DISK
(OPTIONAL)**
Network
directories
and files

The ELSGEN Installation Program

In ELSGEN, you configure, generate, and install the operating system. You must select and configure the drivers for your network boards before generating the operating system. NetWare is then installed on the network hard disks.

File server installation overview

The ELSGEN installation program generates the ELS NetWare operating system. The operating system enables the file server to monitor and regulate communications between workstations. The operating system also allows users to store files on or retrieve files from network hard disks or to print documents on network printers.

The ELSGEN program has two main parts: the Network Configuration utility and the NetWare Installation utility.

The Network Configuration utility

The Network Configuration utility configures and generates the operating system. You should run this part of ELSGEN before you set network boards to a particular configuration and insert them into the file server.

Select the drivers

Since you can use a wide variety of network boards and each board has its own method of communicating, you need to select a "driver" for each type of board so that the board can interface with the operating system.

When you run ELSGEN, you select drivers for the types of network boards (such as ARCNET or Ethernet) that will be installed in your file server. If you plan to use one of the COM ports for an asynchronous remote connection (or if you install an IBM ASYNC COM1/COM2 board), you must also select a driver for this. This process of selecting the driver(s) is called "configuring" the network.

Generate the operating system

Once the network configuration has been specified in ELSGEN, the indicated driver(s) are linked with a NetWare operating system file to generate a fully operational system. The installation program will load the resulting NetWare operating system onto the file server to make your network operational.

The NetWare Installation utility

After the operating system has been generated and all of the hardware is installed in the file server, the next step is to "install" NetWare on the network hard disks. The NetWare Installation utility sets up the first hard disk as a "system" disk that contains all of the NetWare utilities and command files, along with the applications and data files you will need. The second hard disk (if your file server has one) must also be initialized using the installation program so that network directories and files can be stored.

Which type of computer to use as a file server

The file server in an ELS NetWare Level II network must be either an IBM PC AT compatible or an IBM PS/2 compatible personal computer with an 80286 or 80386 microprocessor. NetWare supports both the PC AT bus and the Micro Channel bus.



ELS NetWare Level II v2.15 no longer supports 8086- or 8088-based file servers (such as the IBM PC XT and compatibles or the IBM PS/2 Model 30). If you are upgrading from any version of NetWare 86, you must replace your file server with one of the personal computers listed below.

FCC regulations require that personal computers used as file servers be UL-recognized and pass certain tests. Specific brands that have been tested and approved by Novell for use with ELS NetWare Level II (dedicated or nondedicated) are listed below. (Updated lists are provided to Novell Authorized Resellers as new types of computers are approved.)

PC AT bus computers

- IBM PC AT
- IBM XT/286
- Acer 910 (requires a KB101A keyboard)
- Acer 1100 (requires a KB101A keyboard)
- COMPAQ 286 (older models may require a ROM upgrade and a keyboard controller change)
- COMPAQ 386
- Epson Equity II+
- Epson Equity III+
- Hewlett-Packard Vectra ES/12
- Hewlett-Packard Vectra RS/20
- Hyundai SUPER-286
- Hyundai SUPER-286C
- Mitsubishi MP286 (must use an enhanced keyboard—contact Mitsubishi)
- Mitsubishi MP386 (must use an enhanced keyboard—contact Mitsubishi)

NCR Model 8 (with firmware revision 4.42)
NEC APC IV PowerMate 1 (requires a Phoenix BIOS 3.07.02)
NEC APC IV PowerMate 2 (requires a Phoenix BIOS 3.07.02)
Novell NetWare 286A (requires a BIOS Rev. 2.61 and an RT101 keyboard)
Novell NetWare 386A (requires the most current version of the BIOS and the motherboard)
WYSE WY2112
WYSE WY3216
Zenith Z300

Micro Channel bus computers

IBM PS/2 Model 30/286 (dedicated only)
IBM PS/2 Model 50
IBM PS/2 Model 50Z
IBM PS/2 Model 60
IBM PS/2 Model 70
IBM PS/2 Model 80



On the File Server Configuration Worksheet, record the type of file server you will be installing. It will also be useful to record the type of floppy drives your file server has; formatting and write compatibility problems can occur if you try to mix normal and high capacity diskettes.

Which ELSGEN run method to use

You can run ELSGEN using any one of four methods: Standard Floppy Disk, RAM Disk, Hard Disk, or Network Drive. The method you choose will depend on the available hardware and your purpose for running ELSGEN. ELSGEN is provided to you on floppy diskettes, and each method requires the use of these diskettes, either for running ELSGEN or for uploading ELSGEN files onto a hard disk or network drive.

Standard Floppy Disk method

This method can be used by anyone installing NetWare on any network, but it is best suited to those who are installing only one network.

To run ELSGEN using the Standard Floppy Disk method, you will need a personal computer that

- Has at least 640KB of base memory;
- Runs DOS 3.0 or above;
- Is booted with the DOS CONFIG.SYS file set to FILES = 20 and BUFFERS = 15;
- Has at least one, but preferably two, floppy disk drive that is compatible with the main format (5.25-inch or 3.5-inch) of your NetWare installation diskettes.

Although you can run ELSGEN on any computer that meets these requirements, it is more efficient to use the computer you plan to use as the file server.

RAM Disk method

This method can be used by anyone installing NetWare on any network, but it is best suited for those who are installing only one network. This method is simpler and faster than the Standard Floppy Disk method and is especially advantageous if the personal computer you are using has only one floppy disk drive.

Before you run ELSGEN using this method, you must set aside part of the computer's extended memory (above the 1MB boundary) to function as a RAM (virtual) disk. For more information about virtual disks, see your DOS manual.

To run ELSGEN using the RAM Disk method, you will need a personal computer that

- Has 640KB of base memory, plus enough extended memory (above the 1MB boundary) to hold one diskette's worth of data—360KB for 5.25-inch diskettes, 720KB for 3.5-inch diskettes;
- Runs DOS 3.0 or above;
- Has at least one floppy disk drive that is compatible with the main format (5.25-inch or 3.5-inch) of your NetWare installation diskettes;
- Is booted with the DOS CONFIG.SYS file set to FILES = 20 and BUFFERS = 15;
- Has a device driver that sets up a virtual disk (such as VDISK.SYS).

Be sure to set up the virtual disk in extended memory. For example, with MS-DOS v3.3 you would include the following command in the CONFIG.SYS file:

```
device=a:vdisk.sys 360 512 16 /E
```

In this command, "360" specifies the size of the RAM disk (use 720 for 3.5-inch diskettes), "512" is the sector size, "16" is the number of directory entries, and "/E" indicates that the RAM disk will be created in extended memory. The VDISK.SYS file must be on your DOS boot diskette.

Although you can run ELSGEN on any computer that meets these requirements, it is more efficient to use the computer you plan to use as the file server.

Hard Disk method

The Hard Disk method is best suited to Novell Authorized Resellers who configure and generate operating systems for their customers, or to others who run the operating system configuration and generation portion of ELSGEN several times for different file servers.

ELSGEN transfers the files it needs from the installation diskettes to a local hard disk for permanent storage. The hard disk can be any hard disk, whether in a network workstation or in a standalone personal computer. This method is much simpler and quicker than the Standard Floppy Disk method for running the portions of ELSGEN that link and configure the operating system.

ELSGEN cannot install the operating system from the hard disk. You must use floppy diskettes to install the operating system on the computer that will be used as the file server.

To run ELSGEN using the Hard Disk method, you will need a personal computer that

- Has at least 640KB of memory;
- Has an internal hard disk with at least 4MB of free disk space;
- Runs DOS 3.0 or above;
- Is booted with the DOS CONFIG.SYS file set to FILES = 20 and BUFFERS = 15;
- Has at least one floppy disk drive that is compatible with the main format (5.25-inch or 3.5-inch) of your NetWare installation diskettes.



If you use the Hard Disk method to generate several operating systems, you must keep serialization in mind. Each copy of the ELS NetWare operating system is serialized to match its own *GENDATA* diskette. All of the other diskettes can be used for more than one operating system generation, but you must never generate two operating systems with the same *GENDATA* diskette.

Network Drive method

You can use the Network Drive method only if you have an existing network running any version of NetWare. This method is suited to Novell Authorized Resellers who configure and generate operating systems for their customers.

The Network Drive method eliminates the need to swap floppy disks. ELSGEN transfers the files it needs from the installation diskettes to a network drive for permanent storage.

To run ELSGEN using the Network Drive method, you should use the computer that you plan to use as the file server.

- The file server must be connected to an internetwork (or multiple file server network) as a workstation.
- The file server on the internetwork that will contain the ELSGEN files must have at least 7MB of free storage space.



If you use the Network Drive method to generate several operating systems, you must keep serialization in mind. Each copy of the ELS NetWare operating system is serialized to match its own *GENDATA* diskette. All of the other diskettes can be used for more than one operating system generation, but you must never generate two operating systems with the same *GENDATA* diskette.



On the File Server Configuration Worksheet, record the method you will use to generate your operating system.

Which operating system type to use

ELS NetWare Level II v2.15 supports either a dedicated or nondedicated operating system for the file server. A dedicated file server functions only as a file server; a nondedicated file server functions simultaneously as both a file server and a workstation.

Consider the following points as you decide whether to install a dedicated or a nondedicated operating system.

Performance considerations

The dedicated operating system provides superior network performance because all of the file server's memory and microprocessor resources are used to service the network.

In a nondedicated operating system, access to the microprocessor must be shared by the workstation and network operations. This slows access to the file server for all workstations on the network.

If you are using a nondedicated file server, you could encounter another problem. Whenever an application program being run from the workstation portion of a file server causes the computer to lock up (hang), you will have to reboot the file server. All data on the network (from both the file server and all workstations) that has not been saved to the hard disk will be lost.

Hardware and memory requirements

The dedicated operating system will run on an IBM PC AT, an IBM PS/2 Model 50 and above, and most AT compatibles. The file server must have a minimum of 640KB of memory. If you plan to install the NetWare for Macintosh VAPs in the file server, you will need 2MB of memory.

Not all computers will run as nondedicated file servers. The computers listed in "Which type of computer to use as a file server" on page 28 have been tested and approved to run nondedicated ELS NetWare. The file server must have 640KB of base memory, plus a minimum of 1.5MB of extended memory (above the 1MB level). If you plan to install the NetWare for Macintosh VAPs in the file server, you will need 2.5MB of memory.

Cost considerations

If you use a nondedicated operating system, you must weigh the cost of the extra memory that will be required to run the nondedicated operating system against the cost of a separate computer that could run the dedicated operating system with less memory.



On the File Server Configuration Worksheet, record whether you will install a dedicated or a nondedicated operating system for your file server. Also record whether you will need to install additional memory.

Which resource sets to select

One of the most common causes of installation failure is a hardware conflict within the file server. Selecting resource sets provides a way to decrease the possibility of conflicts between the network boards and other file server hardware.

When to include resource sets

Selecting resource sets is an optional step, to be used mainly in the following situations.

With add-on hardware

You should include resource sets when configuring a file server that contains any of the following:

- AST clock/calendar card
- Color Graphics Adapter
- Enhanced Graphics Adapter
- COM port
- Hercules Monochrome Adapter
- IBM SDLC Adapter
- Monochrome adapter
- Novell standalone UPS monitor board
- LPT port

With non-PS/2 file servers

You should include a resource set for any file server other than an IBM PS/2 file server. A program on the IBM REFERENCE diskette that comes with the PS/2 machine prevents hardware conflicts. Specifying resource sets in ELSGEN provides the same protection for non-PS/2 file servers.

For example, you could ensure that nothing will conflict with the AT auxiliary ROM addresses, the AT hard drive controller, and the floppy disk drive controller by selecting the "AT Compatible File Server" resource set.

With network boards that have limited options

You should include resource sets when configuring a file server that uses a network board with a limited number of available configuration options (for example, a board that has only two possible interrupt line settings). The potential for conflicts is much greater with such boards.

If you plan to include resource sets when you run ELSGEN, continue with this section. If not, skip to "Which LAN drivers to select" on page 39.

What is a resource?

A resource is any device, feature, circuit board, or built-in circuitry that can be defined by the I/O addresses, memory addresses, interrupt lines, and DMA lines it uses. The type of bus the resource is compatible with—PC AT bus or Micro Channel bus—is also part of the resource definition.

A resource can be either configurable (have more than one possible setting) or nonconfigurable (always uses specific addresses, interrupt lines, etc.). The I/O addresses, memory addresses, interrupt lines, and DMA lines used by a resource cannot be used by other hardware.

What is a resource set?

A resource set is one or more related resources that are grouped together and assigned an identifying name. Usually a resource set consists of only one defined resource, and the name of the resource set is the same as that of the resource. For example, a COM1 port is a resource set that consists of only one defined resource.

Sometimes, however, a single physical piece of hardware consists of several individual resources. It is more convenient to group these individual resources as a resource set so that they can all be selected at once, rather than selecting each resource individually.

For example, the "AT Compatible File Server" is a resource set that consists of the following resources: an auxiliary ROM chip, an AT hard drive controller, and a floppy disk drive controller. If you wanted to tell ELSGEN that you will be using such a file server, you would simply select "AT Compatible File Server" instead of selecting each component resource separately.

A standard set of predefined file server resources, grouped together into the appropriate resource sets, is provided on your NetWare diskettes.

Experienced installers may want to define additional resources and resource sets not included in the standard definitions for hardware. Instructions for doing this are found in the Appendix of the *Maintenance for ELS NetWare Level II* manual.

How do resource sets prevent hardware conflicts?

The file server's microprocessor has a limited number of I/O addresses, memory addresses, interrupt lines, and DMA lines. As you select resource sets in your file server configuration, ELSGEN will keep track of which addresses and lines are "spoken for" and will eliminate incompatible options from any further menus or lists. As a result, the more hardware you include as part of your file server configuration, the more restricted your choices will become.

You should select your resource sets before you select the LAN drivers. Most resources are not configurable; they always use specific addresses, interrupt lines, etc., making these configurations unavailable to the networking hardware. Choosing resource sets first will allow ELSGEN to reserve the required interrupt lines and addresses for these unchangeable resources; then, as you choose your LAN drivers, the program will offer only those options that are compatible with the resource sets already specified.

Be aware, however, that when you are ready to select a LAN driver, the driver you want might not be available if all of the addresses or interrupts it can possibly use have already been taken by the resource sets you have chosen. If this happens, you will need to deselect some of your resource sets until the needed LAN driver appears in the list of available LAN drivers. After selecting a LAN driver configuration, choose new configurations for the resource sets you deselected.

If you select resource sets that contain configurable resources, the ELSGEN program will select a configuration setting for you. You can then decide whether to accept or reject the automatic configuration. In some cases, automatic settings may not fit your needs. Refer to "Whether to use the automatic configuration" on page 42 for more information about customizing resource set configurations.



On the File Server Configuration Worksheet, record the resource set(s) you want to include in your operating system configuration.

Which LAN drivers to select

The ELS NetWare operating system you will generate is designed to run with a wide variety of network boards. To communicate with any one type of network board, the operating system uses a specialized piece of software referred to as a "LAN driver."

For PC workstations

A file server in an ELS NetWare network must contain at least one network board. Each PC workstation must also contain one network board of the same type. This board should be the first network board in the file server and its driver is referred to as LAN A.

For Macintosh workstations

If you have purchased NetWare for Macintosh and will be attaching Macintosh workstations to your network, you must also install an AppleTalk-compatible board in the file server and select the appropriate LAN driver in ELSGEN. This network board should be selected as LAN B.

Some boards, such as the 3C505 Ethernet board, support both PC and Macintosh workstations. If you are installing such a board, you should specify its driver as LAN A.

For a remote connection

If a remote workstation or file server will be connected to your file server, the file server must also contain built-in asynchronous communication circuitry such as a serial port or an IBM ASYNC COM1/COM2 board. The IBM ASYNC COM1/COM2 driver for the remote connection must be the last one selected in ELSGEN, so it will be either LAN B or LAN C.



On the File Server Configuration Worksheet, record the LAN drivers you need to configure in the operating system in the order for selection described above.

Which network addresses to set

You must assign network addresses for the network boards installed in the file server (and for the asynchronous communication port, if applicable). A network address is simply a unique identifying number that the NetWare operating system uses to route data to the appropriate place on the network.

If you are installing a nondedicated file server, you must also assign a network address to the nondedicated server's DOS process, or "workstation side." This allows the operating system to separate data intended for the file server side from data intended for the workstation side.

Rules for network addresses

Network addresses must be unique to each network. If you are connecting your ELS Level II file server to a remote file server via the asynchronous communications port, you must ensure that the network addresses you assign are different than those used in the remote network.

Refer to the following chart to determine the valid characters and values for network addresses.

Default	none
Minimum Value	1
Maximum Value	FFFFFFFE
Valid Characters	digits 0-9, letters A-F
Invalid Characters	any other characters, including comma and period



On the File Server Configuration Worksheet, record the network addresses you will assign to the file server's network boards and to the asynchronous communications port and nondedicated server process, if applicable.

How many communication buffers to assign

Communication buffers are areas in the file server's memory set aside to store information or data "packets" arriving from workstations until the file server has time to process the information. When the file server is ready to process the packets, it sends them to their destination on the network. These buffers are sometimes referred to as "routing buffers."

Rules for communication buffers

The following chart provides information about the number of communication buffers you can assign.

Default	15
Minimum	10
Maximum	150
Memory Used	500 bytes per buffer

When to change the default number

We recommend that you assign the default number of 15 communication buffers. If you anticipate heavy use of your file server, you should increase the number of buffers.

If you ever need to free up memory space, you can decrease the number of communication buffers by rerunning ELSGEN. For example, changing the number of communication buffers from 25 to 15 would free 5KB of memory.



On the File Server Configuration Worksheet, record the number of communication buffers you want to specify.

Whether to use the automatic configuration

After you select your resource sets and LAN drivers, and specify network addresses and the number of communication buffers, ELSGEN will automatically choose a configuration setting for each configurable item you selected. Whenever possible, ELSGEN will choose the default option (option 0). In most cases, the automatic selection should be acceptable.

When to reject the automatic configuration

In only a few instances will you need to reject the ELSGEN configuration.

With IBM PC Network Adapters

Some of the configuration options for the IBM PC Network Adapter, for example, are for the standard AT bus adapter, and other options are for the Micro Channel adapter. You must make sure the selected option is appropriate for the adapter being installed in your file server.

If you select a resource set for your file server, ELSGEN will list only compatible options. That is, if you are installing a PS/2 file server and you choose the corresponding resource set for your PS/2 file server, ELSGEN will select only options that are compatible with the Micro Channel bus. The setting ELSGEN automatically selects—which may or may not be option 0—should be acceptable.

With the IBM ASYNC driver

If you are using one of your serial ports for remote communication, you must select the option for the IBM ASYNC (COM1/COM2) driver in ELSGEN. The configuration of that serial port must indicate that the port is to be used exclusively by the ASYNC driver.

With IBM PS/2 file servers

A program on the *REFERENCE* diskette that comes with IBM PS/2 file servers lets you configure all of the internal hardware. If you change any of the default settings when you run this program, the automatic configuration ELSGEN provides may not match the settings you made. In this case, you must either rerun the program on the *REFERENCE* diskette to match ELSGEN, or reject ELSGEN's settings and change them to match those set with the *REFERENCE* diskette program.

Obviously, you cannot decide whether to accept or reject an automatic configuration until you see what it is, but applying the explanation above to your situation should indicate whether the default configuration is suitable.



On the File Server Configuration Worksheet, record whether you intend to accept or reject the automatic configuration.

The next two headings contain information about choosing your own configurations for the LAN drivers and resource sets. If you need to reject the automatic configuration, you will be referred to these headings when you get to that step in the Installation Steps section of this manual.

Customize resource set configurations

If you reject the automatic configuration ELSDEN provides, a list will appear on the computer screen containing the possible configurations for the resource you are configuring.

Each combination of hardware settings (such as interrupt line, I/O address, and DMA) is numbered. These numbers, called the "configuration option numbers," are used as a convenient, shorthand way of referring to the corresponding combination of hardware settings.

Some of the possible resource set configuration options may not be listed as only those options that are compatible with previously selected hardware configurations are shown. For example, if you have already selected a configuration for some other piece of hardware in the file server and that configuration specified the use of memory address C000h (RAM = C000:0h), any subsequent listing of available configurations for other hardware will not include those options that use memory address C000h.

If you are not certain which configuration option to select, consider the following points:

- Choose the default configuration (usually option 0) if it is available. If you choose the default configuration, you will not have to change any of the settings on the hardware (assuming the corresponding hardware is still at the factory default setting).
- If you are choosing a configuration for a parallel printer port (LPT1, LPT2, etc.), refer to the file server's *Guide to Operations* or similar manual for information about which I/O address to select.

Customize LAN driver configurations

If you reject the automatic configuration ELSGEN provides, a list will appear on the computer screen containing several combinations of hardware settings (interrupt line, I/O address, DMA, memory address). Each combination is assigned a number, called the "configuration option number."

LAN driver configuration options are numbered starting with zero (0), the default setting for any particular network board.

Some of the possible LAN driver configuration options may not be listed, as only those options that are compatible with all previously selected hardware configurations are shown. For example, if you have already selected a configuration for some other piece of hardware in the file server and that configuration specified the use of interrupt request line 2 (IRQ = 2), any subsequent listing of available configurations for other hardware will not include those options that use interrupt line 2.

If you are not certain which configuration option to select, consider the following points:

- Choose the default configuration (option 0) if it is available. By choosing the default configuration, you eliminate the need to change any of the settings on the board (assuming the board is still at the factory default setting).
- Pay particular attention to any information given in addition to the actual hardware settings. A configuration might only be valid for certain variations of boards (such as primary or alternate) or for a board that will be inserted in an 8-bit slot.

What to name the file server

You must name the ELS NetWare file server. This name identifies the file server and is used when logging in.

Rules for file server name

Consider the following rules as you determine an appropriate file server name:

Default	none
Minimum Length	2 characters
Maximum Length	45 characters
Valid Characters	alphanumeric (A-Z, 0-9) underline (_)
Invalid Characters	any other characters



On the File Server Configuration Worksheet and the NetWare Installation Worksheet, record the file server's name. You may also want to record the file server's name on the rest of the worksheets.

Whether to use default or custom installation options

After the operating system has been generated and all of the hardware is installed in the file server, you must decide whether to install NetWare using the default or the custom method of the NetWare Installation utility.

When to use the default installation options

ELSGEN automatically sets as many options as it can to the default settings explained below. These are sufficient for most networks. We recommend that first-time installers choose this option.

If the defaults will suffice for your network, choose the "Default Installation Options" in the NetWare Installation utility (the following options will be explained more thoroughly in other sections of this manual).

Number of open files

This parameter sets the maximum number of files that can be open simultaneously in the file server. The default number is 60.

Number of indexed files

This parameter sets the maximum number of indexed files that can be open simultaneously in the file server. When an indexed file is opened, the file server builds an index in memory of the file's location on the disk. This index significantly speeds up random reads and writes to large files. The default number is 5.

Limit disk space

This parameter specifies whether you will limit the amount of network hard disk storage space available to each user on the file server. The default setting is "No."

Hot Fix Redirection Area

Before the network hard disks can be used by NetWare, the Hot Fix feature must be installed on each disk. Hot Fix, a standard NetWare feature, protects data against hard disk media defects. Whenever the operating system is unable to write data successfully to a particular data storage block, Hot Fix "redirects" the data to a reserved portion of the disk, the "Hot Fix Redirection Area."

The size of this area depends on how much of the disk is set aside for regular data storage (the "logical disk size"). By default, the logical disk size is about 98 percent of the total disk space, and the Hot Fix area about 2 percent.

Volumes per hard disk

The ELSGEN program will automatically set up and initialize each hard disk as a single NetWare "volume." A volume is the largest physical division that can be made on a NetWare hard disk. Volumes are fixed in size; later, directories and subdirectories can be created within the volumes by the network supervisor and users.

Volume names

The first hard disk is always named "SYS" and cannot be changed. By default, the volume name on the second hard disk, if there is one, is "VOL1."

Volume size

This parameter sets the amount of physical disk space assigned to the volume, measured in megabytes (MB). Maximum volume size is 255MB. The default volume size is the total number of megabytes on the hard disk or 255MB, whichever is less.

Number of directory entries

This parameter determines how many directories, subdirectories, and files can be created within the volume. The default number is based on the size of the volume. In most cases, this default number will suffice.

Directory caching

When a volume's directory is cached, a copy of the directory is kept in the file server's memory. This allows a directory search to be performed in memory, which is much faster than reading the disk to search a directory. The default is to cache all volume directories.

Printer numbers

The spooled printer number is used by the print server function within the file server to identify the devices to which it can send files to be printed.

A default printer number from 0 to 4 will be shown for each parallel or serial printer

Serial printer parameters

The default parameters for serial printers are as follows:

Baud Rate	9600
Word Length	8 bits
Stop Bits	1 bit
Parity	None
XON/XOFF Protocol	No

Load the operating system

If the flag for this parameter is set (the default), the new operating system will be loaded into the SYS:SYSTEM directory after NetWare installation is complete. Whether you are performing a new NetWare installation or upgrading from a previous version of NetWare, the new NetWare operating system must be loaded onto the file server's system hard disk.

Load the system and public files

If the flag for this parameter is set (the default), files from the various *SYSTEM* and *PUBLIC* diskettes will be copied into the appropriate directory in volume SYS after the NetWare installation is complete. Whether you are performing a new NetWare installation or upgrading from a previous version of NetWare, the system, login, and public files needed to operate the network must be loaded onto the file server's system hard disk.

When to use the custom installation options

If any of the defaults listed above will not work for your network, you should choose "Custom Installation Options" when you run the NetWare Installation utility in ELSGEN.

When you are installing NetWare with custom options, ELSGEN still makes as many decisions as possible for you. However, you can change some of the automatic settings to suit the needs of your particular network. We strongly recommend that only experienced NetWare installers choose this option.



On the NetWare Installation Parameters Worksheet, record whether you will install NetWare with default or custom options.

If you plan to install with default options, you have finished this module. If you plan to install with custom options, continue with the rest of the decisions in this module.

How many open files to specify

Consider the following limitations as you set the maximum number of open files for your particular network.

Default	60
Minimum Value	20
Maximum Value	1,000
Memory Used	100 bytes per open file

To calculate the number of open files you will need, multiply the average number of network users by the number of open files needed for the applications they will be using. For example, some word processing programs require 20 open files per user (refer to your application documentation to find the number of open files the program uses). If you have eight users on the network using such a word processing program, you would need 160 open files.

If you are installing NetWare for Macintosh, you will need at least four open files per Macintosh workstation attached to the network.

If a file is opened by more than one workstation simultaneously, slightly less memory is required. Therefore, if your file server will be used primarily to process database files (which are often shared simultaneously), the number of open files can be somewhat smaller than if the file server were used primarily for word processing files (which are rarely shared simultaneously).

The maximum number of open files you select can be changed later, if necessary, by rerunning ELSGEN.



On the NetWare Installation Worksheet, record the number of open files you want to set.

How many indexed files to specify

Usually, the only files that benefit from being indexed are sizable database files (2MB or larger).

Consider the following limitations as you set the maximum number of indexed files for your particular network:

Default	5
Minimum	0
Maximum	1,000
Memory Used	1,034 bytes per file

The maximum number of indexed files set during installation need not be any greater than the total number of large files that will be marked as indexed. If you don't plan to use indexed files, you can change the number to 0 to free up more file server memory for other uses.

The number of indexed files you select can be changed later, if necessary, by rerunning ELSGEN.



On the NetWare Installation Worksheet, record the number of indexed files you want to set.

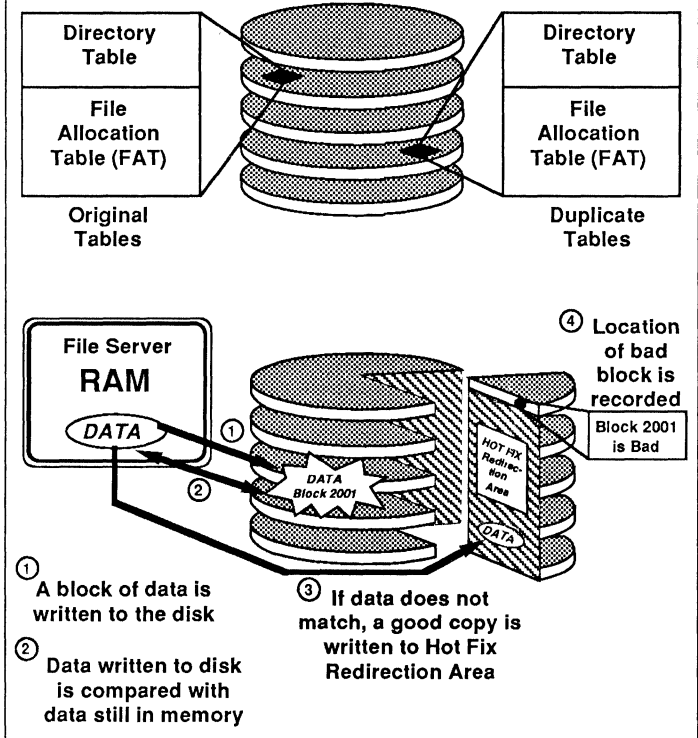
Hard Disks

This module explains how ELS NetWare protects the data stored on network hard disks. It also contains information that will help you make decisions about the following:

Decision	Page
How to determine disk storage needs	57
Whether to run COMPSURF	58
Which interleave value to select	60
Whether to limit disk space	61
How many bindery objects to specify	62
How much area to reserve for Hot Fix	63
What size volumes to define	64
What to name each volume	65
How many directory entries to specify	66
Whether to cache volume directories	67

ELS NetWare Features:

**Duplicate Files
Hot Fix Redirection Areas
Read-After-Write Verification**



Protecting Data with NetWare

NetWare greatly reduces the possibility of losing data by maintaining duplicate copies of directory entries and the File Allocation Tables. NetWare also prevents data from being written to unreliable disk areas by using Hot Fix and Read-After-Write verification.

How to protect data with ELS NetWare

The most serious malfunction in a network is generally a failure of the hard disks and their related hardware, since every network user depends on continual access to the data they store. Although a hard disk is a reliable and durable storage medium, areas of the hard disk's magnetic surface can, over time, lose the ability to store data reliably.

If the area on the disk that stores the disk's directory is damaged, data may be lost from a file by being allocated to the wrong file, or entire files may be lost.

To protect against failure in these areas, ELS NetWare has many built-in data-protection features. These features are explained in the next two sections.

Directory table duplication

Directory and File Allocation Table duplication is an automatic feature of ELS NetWare Level II.

A hard disk's directory tables are extremely important because they contain the address and mapping information the operating system needs to determine where to store or retrieve data. If any of the data storage blocks containing these tables become damaged, some or all of the data on the disk may be irretrievable.

NetWare greatly reduces the possibility of losing this information by maintaining duplicate copies of both the directory entries and the File Allocation Tables on separate areas of the hard disk.

If one of the data storage blocks in the original tables is damaged, the operating system automatically switches to the duplicate tables to get the data it needs. The faulty sector is then listed in the disk's "Bad Block table," and the data it contained is stored in a reliable location elsewhere on the disk. Every time the file server is powered on, the operating system performs a consistency check on both sets of directory entries and File Allocation Tables to verify that the two copies are identical.

Hot Fix and read-after-write verification

NetWare hard disks store data in 4,096-byte blocks. These blocks are specific data storage locations on the disk's magnetic surface. Because data is constantly read from and written to the disk, some of these storage blocks can eventually lose their capacity to store data reliably.

NetWare prevents data from being written to blocks that are unreliable by employing two complementary features known as Hot Fix and read-after-write verification.

After initial installation, Hot Fix and read-after-write verification are completely user-transparent and take place automatically.

Hot Fix

When the Hot Fix feature is activated, a small portion of a disk's storage space is set aside as the "Hot Fix Redirection Area." This area holds data blocks that are "redirected" there from faulty blocks in the main data storage area of the disk.

Read-after-write verification

Once a block of data is written to a hard disk, the data is immediately read back from the disk and compared to the original data that is still in memory. If the data from the disk matches the data in memory, the write operation is considered successful. The data in memory is released, and the next file server operation takes place.

If the data from the disk does not match the data in memory, the NetWare operating system determines (after making appropriate retries) that the disk storage block is defective. If this happens, the Hot Fix feature moves the original block of data (which is still in memory) to the Hot Fix Redirection Area, where the data can be stored correctly. The NetWare operating system records the address of the defective block in a section of the Hot Fix area reserved for that purpose, and the file server will not attempt to store data in that block again.

How to determine disk storage needs

Before installing your network, you should determine the data storage needs of the network, the number of hard disks that will be used, and which hard disk drives are compatible with NetWare.

Compatible hard disks

Internal hard disk drives attached to IBM or Western Digital controller boards are fully compatible with ELS NetWare Level II.

Internal hard disks in IBM PS/2 file servers that are attached to MFM or ESDI controllers are also supported.

No other internal or external hard disks are supported by ELS NetWare Level II.

Storage capacity

The actual disk drive storage capacity that you can connect to your network depends on the capacity of each drive and the amount of memory in the file server.

If your hard disks have a higher storage capacity than 255 MB, you should create more than one volume per disk so that storage space will not be wasted. (A volume can be a maximum of 255 MB and the maximum number of volumes per file server is 32.)



Refer to your hard disk manufacturer's documentation and record the following on the NetWare Installation Worksheet:

- The type of hard disk controller in your file server
- The brand and type of hard disk(s) you will be using
- The storage capacity of each hard disk

Whether to run COMPSURF

The NetWare COMPSURF (COMPrehensive SURFace analysis) utility is used to format and test the hard disk drives used in ELS NetWare Level II networks. You must run COMPSURF prior to running the NetWare Installation part of ELSGEN, except in the situations explained below.

When not to run COMPSURF

You do not need to run COMPSURF in the following situations:

- If you are installing any hard disk drives you received directly from Novell, including hard disks in all Novell file servers. These disks are formatted and tested extensively prior to shipment.
- If you are upgrading from NetWare 286 v2.0 or above and you are not installing any new hard disks in the file server. These disks have already been formatted and tested with COMPSURF.
- If you are upgrading from a version of NetWare that did not have the Hot Fix feature.



On the NetWare Installation Worksheet, record whether you will need to run COMPSURF for each hard disk.

If you don't need to run COMPSURF and you will be installing NetWare with default options, you have finished this module.

If you don't need to run COMPSURF and you will be installing NetWare with custom options, skip to "Whether to limit disk space" on page 61.

If you need to run COMPSURF, continue with the following heading.

What you need to run COMPSURF

To do the COMPSURF testing, you will need to complete the tasks below.

Locate the disk manufacturer's test printout

Most manufacturer's ship a bad block list with their disks that identifies by head number and cylinder number any bad blocks the manufacturer has found prior to shipment. If such a list is available for the hard disk you will be formatting with COMPSURF, enter the bad blocks from the list before testing begins. COMPSURF will prompt you to enter these blocks.

Note: The manufacturer's bad block list, if there is one, is usually printed on a sticker attached to the hard disk housing. Often the list will be duplicated on a printout supplied with the disk. If you do not have a printout of the bad block list, you may have to remove the cover from the file server to locate the bad block list sticker on the disk itself.

Attach a parallel printer

If you want to print the list of bad blocks found by the COMPSURF utility, a parallel printer must be connected to the first parallel port (LPT1) on the file server. COMPSURF will run without a parallel printer; however, you must be careful not to select any option that prints the test results or COMPSURF may hang.

Know disk configuration information

Use the SETUP (or similar) utility supplied by the computer manufacturer (see your *Guide to Operations* or similarly titled manual) to identify your internal disk drives.

Which interleave value to select

When you run COMPSURF on a hard disk that requires an interleave value, you will be prompted to specify this value when you start COMPSURF.

What is interleave?

"Interleave" is a feature that increases the efficiency with which data is written to a disk. It greatly increases the likelihood that the transfer of data from memory can "keep up" with the pace of the rotating disk.

Blocks of data are written to sectors ("pie wedges") on hard disk drives. Each sector on the disk has a specified starting point for writing data. If the file server attempted to write data to each consecutive sector on the disk and the data transfer process lagged behind slightly (as is often the case), the starting point on the next consecutive sector would be missed. The disk would have to make one complete revolution to reposition itself.

If you specify an interleave value of 2, data is written to every other sector on the disk. (An interleave value of 3 specifies every third sector, and so forth.) Skipping sectors gives the data transfer process sufficient time to "catch up" without having to wait for a complete disk rotation.

Determining the correct interleave value

For greatest efficiency, we recommend that you select interleave values according to the type of disk you are formatting.

AT compatible file servers

For internal hard disks in all Novell file servers and in IBM PC AT-type file servers that use IBM or Western Digital controllers, accept the default interleave value of 2.

IBM PS/2 file servers

For internal hard disks in IBM PS/2 file servers, select an interleave value of 1.



On the NetWare Installation Worksheet, record the interleave value you should assign to the disk for COMPSURF testing.

If you plan to install NetWare using the default options, you have finished this module.

If you plan to install NetWare using the custom options, continue with the next decision.

Whether to limit disk space

ELS NetWare allows you to limit the amount of network hard disk storage space available to each file server user. The default setting is to not limit disk space.

Limiting disk space is an effective way to prevent any one user from using a disproportionate share of disk storage space.

If you decide to limit disk space, answering "Yes" to the "Limit Disk Space" option in ELSGEN is only the first step:

- You must later specify how much disk space to allocate to each user (using the USERDEF or the SYSCON utility).
- You must also use the custom installation options when you run the ELSGEN installation utility.



On the NetWare Installation Worksheet, record whether you want to limit the disk space available to the file server users.

If you don't intend to limit disk space, skip to "How much area to reserve for Hot Fix" on page 63. Otherwise, continue with the following decision.

How many bindery objects to specify

You need to specify the maximum number of bindery objects (users and groups) only if you have decided to limit disk space (as explained in the previous decision).

If you are going to limit the disk space each user will be able to use on the network, you must also set a limit on the number of users and groups (bindery objects) that can be defined on the file server.

Rules for bindery objects

The following chart provides information about the number of bindery objects.

Default	500
Minimum	500
Maximum	5,000

The number you select now can be changed later, if necessary, by rerunning ELSGEN.



Because ELS Level II is an eight-user operating system, the default number of 500 bindery objects should be more than enough for all the users and groups you might create. You should never have to increase the number of bindery objects.



On the NetWare Installation Worksheet, record the number of bindery objects you want to specify.

How much area to reserve for Hot Fix

Before network hard disks can be used by NetWare, Hot Fix must be installed on each disk. The portion of a hard disk's storage space reserved for storing redirected blocks of data is called the "Hot Fix Redirection Area." The size of this area depends on how much of the disk will be used for regular data storage (the "logical disk size"). By default, the logical disk size is about 98 percent of the total disk space, and the Hot Fix area about 2 percent.

Note: The logical disk size is specified in "blocks" instead of bytes. A block is 4KB, or 4,096 bytes, of data. For example, if a disk shows a physical size of 10,000 blocks, its storage capacity is about 40MB (40,000KB).

The default installation options in ELSGEN automatically set all disks to the default logical size.

When to customize the Hot Fix area size

You may want to set your own logical disk size in either of the following situations:

- If you are installing a small hard disk and want to maximize storage space, increase the logical disk size (thus decreasing the Hot Fix Redirection Area size).
- If you are installing a hard disk that has a number of bad blocks (found through COMPSURF testing), decrease the logical disk size (thus increasing the Hot Fix Redirection Area size).

You must use the custom installation options in ELSGEN to set your own logical disk size.



On the NetWare Installation Worksheet, record whether you want to accept the default or customize the logical size of the network disks. If you want to customize, record the size you want to set. (You may want to wait until you are running ELSGEN and can see the sizes in blocks.)

What size volumes to define

A NetWare volume is a physical amount of hard disk storage space. The volume size is the amount of physical disk space assigned to volume, measured in megabytes (MB). Because a volume is fixed in size, it is the highest level in the NetWare directory structure (on the same level as a DOS root directory). A hard disk can be divided into one or more volumes during installation; these volumes can later be divided into directories and subdirectories by network users.

Each network hard disk can be divided into as many as 16 logical Netware volumes. However, we recommend that each disk contain only one volume. This makes it easier to keep track of which volume is on which disk.

Rules for volume size

Consider the following guidelines to determine an appropriate volume size:

Default	Total disk storage capacity (MB)
Minimum	10MB
Maximum	255MB

If you want to define only one volume per hard disk, use the default volume size.

When to customize volume size

You should customize the volume size in the following situations:

- If you need to create more than one volume because the disk drive is larger than 255MB.
- If you want to create several smaller volumes on a disk less than 255MB in size.

If you are defining several volumes on a disk, the total of all the volume sizes must equal (but cannot exceed) the full storage capacity of the disk. All disk space must be allocated to a NetWare volume.



On the NetWare Installation Worksheet, record the size of each volume you want to define.

What to name each volume

Each volume must have a unique name. The first volume on the system hard disk will be automatically assigned the name SYS. This name cannot be changed, nor can it be used for any other volume.

If you use the default installation options, any subsequent volumes will automatically be named VOL1, VOL2, and so on.

If you use the custom installation options, you must name any subsequent volumes.

Rules for volume names

Consider the following rules as you determine an appropriate volume name:

Minimum Length	2 characters
Maximum Length	15 characters
Valid Characters	alphanumeric (A-Z, 0-9)
Invalid Characters	any other characters



On the NetWare Installation Worksheet, record the names of the volumes you plan to define on each network hard disk.

How many directory entries to specify

A "directory entry" can be a directory name, subdirectory name, or a filename. In addition, a directory's "trustee list" (the list of users and groups who have rights to the files within the directory) can take up one or more directory entries, depending on how large the list is.

The number of directory entries specified for a volume determines how many directories, subdirectories, and files can be created within the volume. When you define a volume in ELSGEN, the program figures a default number of directory entries, based on the size of the volume. In most cases, this default number will suffice.

If you want to specify more or fewer directory entries, consider the following guidelines:

- A volume's directory area is sized in "blocks" (a block is 4KB, or 4,096 bytes, of data). Since a directory entry is always 32 bytes long, each block in the directory area can hold 128 directory entries (4,096 divided by 32). Accordingly, the number of directory entries will be rounded up to the nearest multiple of 128.
- The default (recommended) number of directory entries for a volume is determined by figuring a minimum of four blocks, plus one additional block for every two megabytes of volume size.

For example, a 20MB volume would be allocated 14 directory blocks (4 plus 10), which translates into 1,792 directory entries (14 times 128).

- You should not specify many more than the recommended number of directory entries, especially if you have a limited amount of memory in the file server and you plan to cache the volume's directory. You can adjust the number of directory entries later, if needed, by rerunning ELSGEN.



On the NetWare Installation Worksheet, record the number of directory entries you want to specify for each volume.

Whether to cache volume directories

When a volume's directory is cached, a copy of the directory is kept in the file server memory. This allows any directory searches to be performed in memory, which is much faster than reading the disk to search a directory. The default is to cache the directory.

If you are not sure whether you want to cache the volume's directory, consider the following guidelines:

- The directory of volume SYS should always be cached.
- We strongly recommend that all other volume directories be cached as well. Since any updated directory entry is written to disk within seconds of being changed, there is little risk of an entry's being lost between the time it is changed in memory and the time it is written to disk.
- If your file server has little more than the minimum amount of memory required to run the network, enough memory may not be available to cache all the volume directories if you have two large disks. In this case, you must choose either not to cache the directories of all the volumes or to add more memory to the file server. Adding memory will significantly improve network performance.



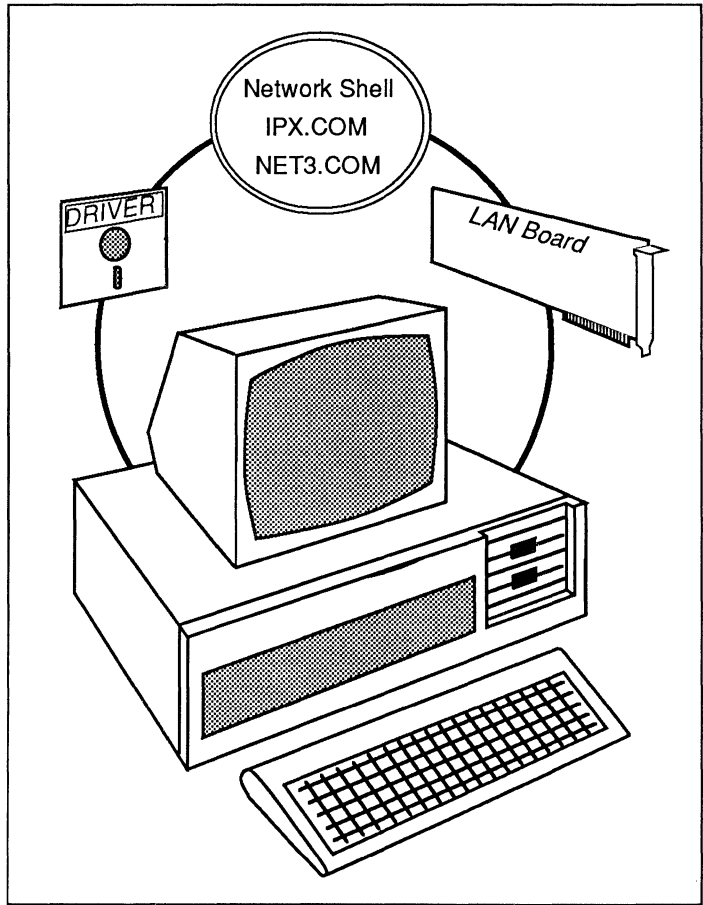
On the NetWare Installation Worksheet, record whether you want to cache each volume's directory.



Workstations

This module begins with an overview of SHGEN, a program that generates the workstation shell. The module also contains information to help you make decisions about the following:

Decision	Page
What type of computer to use as a workstation	73
How much memory workstations need	73
Which SHGEN level to use	74
Which SHGEN run method to use	76
Which resource sets to select	78
Which LAN driver to select	80
Which files to include on the boot diskettes	82
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Workstation Shell Files

The network shell is a customized piece of software that allows workstations to "talk" to one another and to the file server. Two files govern these activities. The IPX.COM file manages communications between the various network stations. The NETx.COM file redirects messages from the workstation to DOS.

Workstation installation overview

The installation program used to generate the workstation shell is called SHGEN. The NetWare workstation shell performs two functions:

- It sends requests from the workstation to the appropriate operating system (DOS in the workstation or NetWare in the file server).
- It sends messages from the file server or another workstation to the appropriate destination on the network using a file called the NetWare Internetwork Packet Exchange (IPX.COM).

Note: If you plan to install NetWare for Macintosh, you will be attaching Macintosh workstations running AppleShare to your file server. Refer to your NetWare for Macintosh documentation for information about connecting Macintoshes to your network.

Selecting the driver

NetWare workstations can run with a wide variety of network boards. However, each of these boards has its own protocol or language for communicating. To use the services of IPX, each board must have a customized piece of software called a "LAN driver" that helps manage communications between the board and those in the workstations.

Before you generate the shell for each workstation, you must specify in SHGEN the LAN driver that works with the network board being used in that workstation. SHGEN then links this communication driver with the NetWare IPX file to generate an IPX.COM file for that workstation.

Generating the workstation shell

After you specify which LAN driver will be used for your workstation hardware and choose a configuration for each configurable item, the next step is to generate the IPX.COM shell file.

This generation process consists of two parts: linking and configuring. If you select the Default or Intermediate level of SHGEN, all of the required linking and configuring is done automatically. If you select the Custom level of SHGEN, you will have to select several options to complete this process.

Only the IPX.COM file is linked and configured by the SHGEN program.

In addition to the IPX.COM file, the following "generic" NetWare shell files are provided on the *SHGEN-2* diskette (5.25-inch version) or the *SHGEN-1* diskette (3.5-inch version):

NET4.COM	NetWare shell redirector file for DOS 4.x.
NET3.COM	NetWare shell redirector file for DOS 3.x.
NET2.COM	NetWare shell redirector file for DOS 2.x.
NETBIOS.EXE	NetWare NetBIOS emulator program that allows workstations to run applications written for IBM-type networks.
INT2F.COM	An additional program that must be used whenever the NetBIOS emulator program is used.

What type of computer to use as a workstation

You can use any of the following computers as workstations:

- IBM PC or compatible
- IBM PC XT or compatible
- IBM PC AT or compatible
- IBM Personal System/2 (any model)

If you intend to use an IBM PC, PC XT, or PC AT compatible as a workstation, make sure the model you have selected is approved for use with ELS NetWare.

Note: If you have purchased NetWare for Macintosh, you can also attach Macintosh workstations to your network. Refer to your NetWare for Macintosh documentation for complete information.



Make a photocopy of the Workstation Configuration Worksheet for each workstation you will install. On each workstation's worksheet, record the type of computer you will be using for that workstation. It will also be useful to record the type of floppy drives your workstations have; formatting and write compatibility problems can occur if you try to mix normal diskettes and high capacity diskettes.

How much memory workstations need

Each workstation in an ELS NetWare network must have at least 384KB of memory to load the NetWare shell files. We recommend that workstations have at least 512KB of memory so that most application programs and NetWare menu utilities can be run.



On each workstation's worksheet, record the amount of memory installed in that workstation.

Which SHGEN level to use

You can run the SHGEN program at one of three levels: Default, Intermediate, or Custom. Your selection will depend on the needs of your network and your installation experience. The three levels are explained below.

Default level

If you can leave the workstation's network board configuration at the factory, or default, settings, you should choose the Default level of SHGEN. If you have not installed or do not plan to install any other hardware in your workstation other than the network board or if the configuration settings of the hardware in your workstation do not conflict with settings on your network board, you can leave the network board configuration settings at their default values.

Intermediate level

If you need to set a workstation's network board to a configuration other than the default setting (to avoid conflicts with other hardware in the workstation), you should use the Intermediate level of SHGEN.

Custom level

If you plan to use LAN drivers that are not in the NetWare "core," you must use the Custom level. The NetWare core consists of any drivers that are on the NetWare *LAN_DRV_ELS* diskette. Any drivers on other diskettes (labeled *LAN_DRV_* any numbers or letters other than "ELS") or third-party drivers on other similarly labeled diskettes are not part of the NetWare core. (For example, if you are installing NetWare for Macintosh, you must use the Custom level to load the drivers provided on the *LAN_DRV_180* diskette.)

We recommend that only experienced NetWare installers use the Custom level of SHGEN. The Custom level allows you to configure workstations in complex cases where the probability of hardware conflicts is high. Conflicts usually occur when more than the usual amount of workstation hardware must compete for the microprocessor's interrupt lines, I/O addresses, DMA lines, and memory addresses.

When you use the Custom level of SHGEN, you select the LAN driver that you need for the workstation. In addition, you can select resource sets to ensure that no hardware conflict will occur with non-network-related hardware in the workstation.



On the Workstation Configuration Worksheets, record the SHGEN level you plan to use to generate each workstation shell.

Which SHGEN run method to use

You can run SHGEN using any one of three run methods: Standard Floppy Disk, Hard Disk, or Network Drive. The method you choose will depend on the hardware you are using and your purpose for running SHGEN.

Standard Floppy Disk method

This method can be used by anyone generating workstation shells, but it is best suited to those who are generating only one or a few shells.

To run SHGEN using the Standard Floppy Disk method, you will need a standalone personal computer or workstation that

- Has at least 640KB of memory;
- Runs DOS 3.0 or above;
- Has at least one (but preferably two) floppy disk drive that is compatible with the main format (5.25-inch or 3.5-inch) of your NetWare installation diskettes.

Hard Disk method

This method is best suited to resellers who generate shells for their customers, or others who run SHGEN several times for different workstation configurations. The Hard Disk method is quicker than the Standard Floppy Disk method and eliminates the need to swap floppy disks. In this method, SHGEN transfers the files it needs from diskettes to a local hard disk for permanent storage. The hard disk can be any hard disk, whether in a network workstation or in a standalone personal computer.

To run SHGEN using the Hard Disk method, you will need a personal computer that

- Has at least 640KB of memory;
- Has an internal hard disk with at least 1.5MB of free disk space;

- Runs DOS 3.0 or above;
- Has at least one floppy disk drive that is compatible with the main format (5.25-inch or 3.5-inch) of your NetWare installation diskettes.

Network Drive method

This method can be used only if you have an existing network running NetWare v2.1 or above. This method is suited to resellers who generate shells for their customers, or others who run SHGEN several times for different workstation configurations. The Network Drive method is quicker than the Standard Floppy Disk method and eliminates the need to swap floppy disks. In this method, SHGEN transfers the files it needs from diskettes to a network drive for permanent storage.

To run SHGEN using the Network Drive method, you will need a personal computer that

- Is connected to a network running NetWare v2.1 or above, with at least 1.5MB of free network storage space;
- Runs DOS 3.0 or above;
- Has at least one floppy disk drive that is compatible with the main format (5.25-inch or 3.5-inch) of your NetWare installation diskettes.

When you select the Network Drive method, SHGEN creates a work directory named NETWORK. SHGEN divides this work directory into several subdirectories and copies all the files it needs from the diskettes included with your operating system.



On the Workstation Configuration Worksheets, record the method you want to use to run SHGEN for each workstation.

If you are using the Default or Intermediate level of SHGEN, skip to "Which LAN driver to select" on page 80.

If you are using the Custom level of SHGEN, continue with "Which resource sets to select."

Which resource sets to select

One of the most common causes of installation failure is hardware conflicts. Resource sets provide a way to decrease the possibility of conflicts between the network boards and other workstation hardware. The SHGEN program reserves the lines and addresses used by resource sets to ensure that no hardware conflict will occur. Specifying resource sets for workstations is exactly the same process as specifying them for file servers. For a definition of resource sets and an explanation of how they work, see page 37.

When to include resource sets

Selecting resource sets is an optional step to be used mainly in the following situations.

With add-on hardware

You should include resource sets when configuring a workstation that contains any of the following:

- AST clock/calendar card
- Color Graphics Adapter
- Enhanced Graphics Adapter
- COM port
- Hercules Monochrome Adapter
- IBM SDLC Adapter
- Monochrome Adapter
- LPT port

By including these additional "resources" in the workstation configuration process, you can essentially eliminate the possibility that other hardware will conflict with them.

With network boards that have limited options

You should include resource sets when configuring a workstation that uses a network board with a limited number of available configuration options (for example, a board that has only two possible interrupt line settings). The potential for conflicts is much greater with such boards.

When not to include resource sets

If you are installing any Micro Channel adapters in IBM PS/2 model 50, 60, or 80 workstations, you do not need to select resource set definitions. The Micro Channel adapters will configure themselves to accommodate the default resource set definitions.



On the Workstation Configuration Worksheet(s), record the resource sets you plan to select and the configuration you want to choose for each workstation.

Which LAN driver to select

Every workstation in an ELS NetWare network must contain a network board to enable it to communicate on the network. The communication interface between the Internetwork Packet Exchange (IPX) shell function and a specific kind of network board is provided by a specialized piece of software referred to as a "LAN driver."

When you use the Default level of SHGEN, you select the appropriate LAN driver for the network board that will be installed in the particular workstation. SHGEN will then automatically select the default configuration option (option 0) for that driver.

When you use the Intermediate level or Custom level of SHGEN, you must select both the appropriate LAN driver and a configuration option for the network board that will be installed in a particular workstation.



On the Workstation Configuration Worksheet(s), record the type of LAN driver you need to specify in SHGEN.

If you want to choose your own LAN driver configuration, continue with this section.

Customize the LAN driver configuration

In the SHGEN program, each combination of hardware settings (interrupt line, I/O address, DMA, memory address) is numbered. These numbers, called the "configuration option numbers," are used as a convenient way of referring to the corresponding combination of hardware settings. LAN driver configuration options are numbered starting with zero (0); option 0 is the default setting for each particular network board.

Some LAN driver configuration options may not be listed as only those options that are compatible with all previously selected hardware configurations will be shown. For example, if you have already selected a configuration for some other piece of hardware in the workstation, and that configuration specified the use of interrupt request line 2 (IRQ = 2), any subsequent listing of available configurations for other hardware will not include those options that use interrupt line 2.

If you are not certain which configuration option to select, consider the following points:

- If the workstation for which you are generating the shell will use Remote Reset, you must choose the default configuration (option 0).
- If it is available, choose the default configuration (option 0). Doing so eliminates the need to change any of the settings on the board (assuming the board is still at the factory default setting).
- If a configuration is valid for only certain variations of boards (i.e., primary or alternate) or for a board that will be inserted into an 8-bit slot, pay particular attention to any information given on the screen in addition to the actual hardware settings.
- If you are choosing a configuration for any IBM PC Network II or PC Network Baseband adapter, make sure you choose a configuration that is appropriate for the type of bus the board is designed to use. "Standard bus" refers to the standard IBM PC 8- or 16-bit bus structure used in IBM PC AT and IBM PC XT and compatibles and in the IBM PS/2 Model 25 and 30; "Micro Channel bus" refers to the Micro Channel structure used in IBM PS/2 Model 50 and above computers.
- If you are installing IBM Token-Ring adapters, you must select a configuration option that is for primary adapters (since you can have only one Token-Ring adapter per workstation). You should never select a configuration option that is for alternate adapters in SHGEN.

Which files to include on the boot diskettes

You need to create a boot diskette for each workstation on your network.



The following instructions will apply to most hardware. However, some network boards require special boot diskettes. In this case, check your installation supplement for instructions to replace this section.

The boot diskette must contain the following:

- DOS system files (including two hidden DOS files).
When you format your boot diskettes using the /S parameter, the COMMAND.COM file and two hidden files, IBMBIO.COM and IBMDOS.COM, will automatically be copied onto the boot diskette.
- The NetWare shell files that correspond to the DOS version (either NET2.COM, NET3.COM, or NET4.COM) and type of network board (IPX.COM) used in the workstation.
- The NETBIOS.EXE and INT2F.COM files, if you will be running an application requiring NetBIOS.
- Any additional boot files or firmware files that the particular networking hardware may require. Check the installation supplement for your hardware if you are unsure whether additional files are required.

You may also need to include the following on your boot diskette:

- A CONFIG.SYS file, as well as any device driver files. (See your DOS documentation for a complete explanation.)
- An AUTOEXEC.BAT file. (How to create an AUTOEXEC.BAT file is described in the Installation Steps portion of this manual.)

- A SHELL.CFG (shell configuration file), if you are using any non-IBM machines on your network or if you need to customize some features of the shell. (The SHELL.CFG file is explained under "Which options to include in the SHELL.CFG file" below.)



On the Workstation Configuration Worksheet(s), record the files you need to include on the boot diskette for each workstation.

Which options to include in the SHELL.CFG file

Certain applications may use the IPX.COM and the NETx.COM programs differently. Check the documentation for your applications to determine whether you need to include any of the options listed below in a SHELL.CFG file. The NETBIOS.EXE file options are also included in the list below.

If you create a SHELL.CFG file, you should include it on the boot diskette so whatever options you specify will take effect when the shell files are loaded. Individual users can create SHELL.CFG files for their own workstations.

SHELL.CFG files can be created using the COPY CON command (refer to your DOS manual) or an ASCII text editor.

IPX.COM file options

The following options can be used with IPX.COM.

IPX SOCKETS = *n*

This option specifies the maximum number of sockets that IPX can have open at the workstation.

Default: 20 sockets

IPX RETRY COUNT = *n*

This option sets the number of times that the workstation should resend a packet. On networks that lose many packets, this retry count may need to be increased. IPX does not actually retry to send a packet. It uses this count to recommend the number of retries to the DOS shell, SPX, and NetBIOS. Increasing this number will cause a longer delay for some network functions such as establishing a NetBIOS session or registering a NetBIOS name.

Default: 20 retries

SPX CONNECTIONS = *n*

This option specifies the maximum number of SPX connections a workstation can use at the same time.

Default: 15 connections

SPX ABORT TIMEOUT = *n*

This option allows the user to adjust the amount of time that SPX will wait, without receiving any response from the other side of the connection, before it terminates the session. The timeout number is in ticks (there are 18.21 ticks per second on IBM PCs and compatibles).

Default: 540 ticks (approximately 30 seconds)

SPX VERIFY TIMEOUT = *n*

This option allows the user to adjust the frequency at which SPX sends a packet to the other side of a connection to inform it that its side is still alive. If no packets are being exchanged on the SPX connection by the software that established the session, SPX will send packets at regular intervals to make sure that the connection is still working. The timeout number is in ticks (there are 18.21 ticks per second on IBM PCs and compatibles).

Default: 540 ticks (approximately 30 seconds)

SPX LISTEN TIMEOUT = *n*

This option allows the user to adjust the amount of time that SPX will allow to pass, without receiving a packet from the other side of the connection, before it starts requesting the other side to send it a packet to assure SPX that the connection is still valid. If SPX has not heard from the other side of the connection within this time period, it will send packets to the other side asking for verification that the connection exists. The timeout number is in ticks (there are 18.21 ticks per second on IBM PCs and compatibles).

Default: 108 ticks (6 seconds)

IPATCH = *byte offset, value*

This option allows any location in the IPX.COM file to be patched with any value.

NETx.COM file options

The following options can be used with the shell (NET2.COM, NET3.COM, or NET4.COM).

CACHE BUFFERS = *n*

This option sets how many 512-byte buffers the shell will use for local caching of nonshared, nontransaction-tracked files.

Default: 5 cache buffers

FILE HANDLES = *n*

This option sets how many files a workstation can have open on the network at the same time.

Default: 40 open files

PRINT HEADER = n

This option sets the size of the buffer that holds the escape characters sent to the printer before a print job.

Default: 64 bytes

PRINT TAIL = n

This option sets the size of the buffer that holds the escape characters that reset the printer after a print job.

Default: 16 characters

EOJ = ON/OFF

This option specifies whether files, locks, semaphores, etc., will be closed automatically at the end of a job.

Default: On

HOLD = ON/OFF

This option sets whether workstation files should be held open if they were accessed and then closed. If this option is "On," all files opened by a program will be held open until the program exits.

See the *Reference for ELS NetWare Level II v2.15* for an explanation of the HOLDON and HOLDOFF command line utilities.

Default: Off

SHARE = ON/OFF

This option sets whether the child process will inherit the parent process's file handle (or a copy). If this option is "On," the child process will inherit the same file handle. If it is "Off," a new file handle will be created for the child process.

Default: On

LONG MACHINE TYPE = *name*

This option sets the long machine name. This name is used by the login program when the %MACHINE variable (see the Login Scripts module) is used. It is most frequently used to set the machine's search path to the correct version of DOS.

Default: IBM_PC

SHORT MACHINE TYPE = *name*

This option sets the short machine name. This name cannot be longer than four characters and is used by the login program when the %SMACHINE variable is used (see the Login Scripts module). It is also used to load the correct overlay file (IBM\$RUN.OVL) for the windowing utilities.

Setting the short machine type to CMPQ loads the CMPQ\$RUN.OVL file, which uses black and white colors as the default color palette for NetWare menus.

Default: IBM

LOCK RETRIES = n

This specifies the number of times the shell should attempt to get a lock on the network. This number is used for lock types that do not have a wait ability. For locks that have a wait ability, this number is multiplied by the LOCK DELAY number and then multiplied by 2. The resulting number is used as the time the workstation will wait for the lock.

Default: 3

LOCK DELAY = n

This specifies the amount of time (in ticks) the shell should wait before again trying to get a lock. This number is used for lock types that do not have a wait ability. For locks that have a wait ability, this number is multiplied by the LOCK RETRIES number and then multiplied by 2. The resulting number is used as the time the workstation will wait for the lock.

Default: 1

READ-ONLY COMPATIBILITY = ON/OFF

This option determines whether a file marked as Read-Only can be opened with a write access call. Prior to NetWare v2.1, a program could open a Read-Only file with write access without getting an error, though any attempt to write to the file would produce an error. To be compatible with DOS, Advanced NetWare v2.1 and above will not allow a Read-Only file to be opened for write access. Setting the READ ONLY COMPATIBILITY to "On" will cause the shell to revert to the old mode and allow the open request to succeed.

Default: Off

LOCAL PRINTERS = *n*

This option overrides the number of local printers on the workstation, which is normally determined by the BIOS. The BIOS says there is a local printer for each parallel port. By setting the number of local printers to 0, the user can prevent his or her workstation from hanging if the Shift and Print Screen keys are hit while he or she is not spooling and does not have a local printer.

SEARCH MODE = *n*

This option alters the way that the shell will search for a file if it is not found in the current directory. Most .EXE and .COM files use a specific search mode to locate needed files in the directory structure. When using the SEARCH MODE option, the user should select the search mode that works correctly with the majority of the .EXE and .COM files. The user should then use the SMODE command to alter the search mode of any files requiring another mode. SMODE is documented in the *Reference for ELS NetWare v2.15* manual.

Default: 1

The valid search modes are listed below.

- 0 No search instructions.
- 1 Search only the path specified in the executable file itself. If a path is not specified, search the default directory and then all search drives.
- 2 Search only the default directory.
- 3 Search only the path leading to the data file specified in the executable file itself. If a path is not specified and the executable file opens data files as Read-Only, search the default directory and then all search drives.
- 4 Reserved.

- 5 Search the default directory and all search drives whether or not the path is specified in the executable file.
- 6 Reserved.
- 7 Search the default directory and all search drives whether or not the path is specified in the executable file, if the executable file opens data files Read-Only.

MAXIMUM TASKS = *n*

This option configures the maximum number of tasks that can be active at the same time. The minimum is 8; the maximum is 50.

Default: 31

PATCH = *byte offset, value*

This option allows any address in the shell to be patched with any value.

TASK MODE = *n*

This option determines the way in which the shell creates, switches, and destroys tasks. If you are using Windows 386 or any multitasking program, set the TASK MODE to 1. If you are not, set the TASK MODE to 0.

Default: 1

NETBIOS.EXE file options

The following options can be used with NETBIOS.EXE.

NETBIOS SESSIONS = *n*

This option configures the maximum number of sessions that NetBIOS can support at the same time. The user can specify any value from 4 to 100.

Default: 10 sessions

NETBIOS SEND BUFFERS = *n*

This option configures the number of send buffers that NetBIOS uses. The user can specify any value from 4 to 20.

Default: 6 buffers

NETBIOS RECEIVE BUFFERS = *n*

This option configures the number of receive buffers that NetBIOS uses. The user can specify any value from 4 to 20.

Default: 6 buffers

NETBIOS RETRY DELAY = *n*

This option configures the delay (in ticks) between each packet that NetBIOS sends out during an attempt to register a name or to establish a session with a particular name.

NetBIOS must broadcast packets to every station on the internetwork while it attempts to register or find a name. It will broadcast the request the number of times recommended by the IPX RETRY COUNT (see page 84). Then it will wait the amount of time specified by this option before each retry.

Default: 10 ticks (.5 second)

NETBIOS ABORT TIMEOUT = *n*

This option adjusts the amount of time that NetBIOS will wait, without receiving any response from the other side of a session, before it terminates the session. The timeout number is in ticks (there are 18.21 ticks per second on IBM PCs and compatibles).

Default: 540 ticks (approximately 30 seconds)

NETBIOS VERIFY TIMEOUT = *n*

This option adjusts the frequency at which NetBIOS sends a packet to the other side of a session to indicate its side is still alive. If no packets are being exchanged on the NetBIOS session by the software that established the session, NetBIOS will send packets at regular intervals to make sure that the session is still valid. The timeout number is in ticks (there are 18.21 ticks per second on IBM PCs and compatibles).

Default: 54 ticks (3 seconds)

NETBIOS LISTEN TIMEOUT = *n*

This option adjusts the amount of time that NetBIOS will allow to pass, without receiving a packet from the other side of a session, before it requests that other side send a packet to assure NetBIOS that the session is still valid. If NetBIOS has not heard from the other side of the session within this time period, it will indicate in each of the verify packets it sends that the other side must respond immediately. The timeout number is in ticks (there are 18.21 ticks per second on IBM PCs and compatibles).

Default: 108 ticks (approximately 6 seconds)

NPATCH = *byte offset, value*

This option patches any location in the NETBIOS.EXE data segment with any value.



On the Workstation Configuration Worksheets, record the options you want to include in the SHELL.CFG file for each workstation.

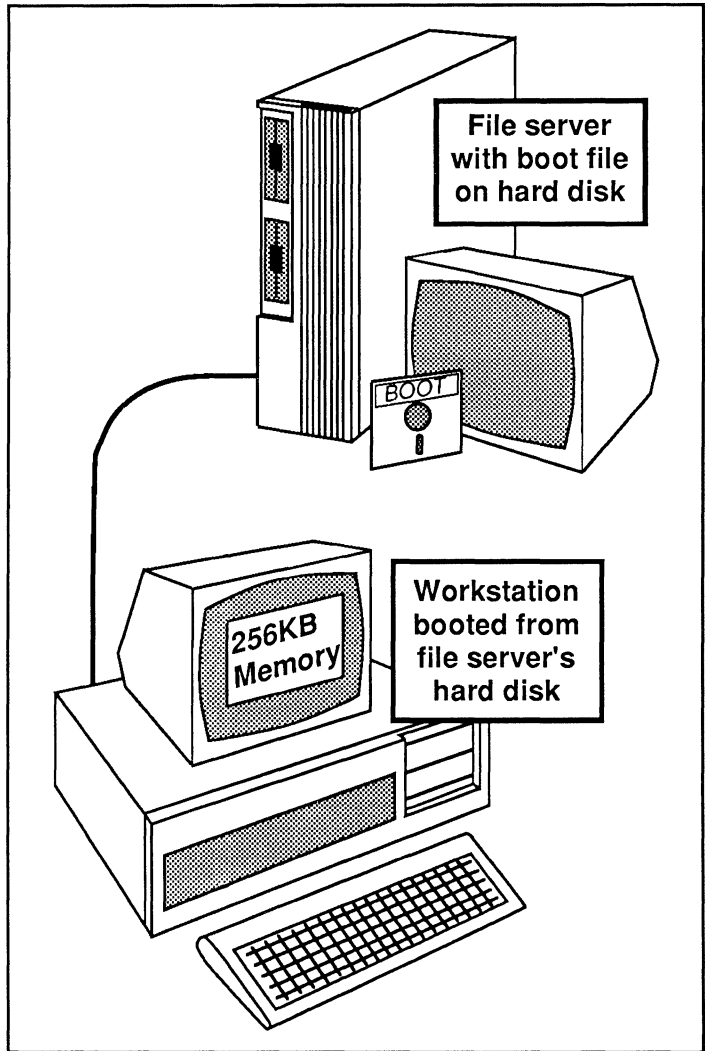
Notes



Remote Reset

This module explains Remote Reset. It also contains information to help you make decisions about the following:

Decision	Page
What to name the remote boot files	98
How to set up the BOOTCONF.SYS file	99



Installing Remote Reset

If Remote Reset is installed on your network, workstations can boot from a file on the file server's hard disk rather than from a boot diskette in a local drive.

Remote Reset overview

Remote Reset allows workstations to boot from a file on the file server's hard disk rather than from a boot diskette in a local diskette drive. Most types of workstations can use Remote Reset, although it is used primarily for diskless workstations.

For the Remote Reset file to be loaded properly, the workstation must have at least 256KB of memory. However, if the workstation is using IBM Token-Ring networking hardware, 640KB of memory is required.

To prepare the network for using Remote Reset, you must install Remote Reset PROMs or enable Remote Reset switches or jumpers on the network boards. Instructions for enabling Remote Reset are contained in the NetWare installation supplements. Boards must be set to option 0 (the default).



If you install Remote Reset, make sure you comply with all copyright laws. Each workstation must be properly licensed to load DOS, even though the workstation is booting from DOS on the network.

What to name the remote boot files

Before you can boot a workstation using remote reset, you must place a remote boot file (containing the same information you copied onto the boot diskettes) in the SYS:LOGIN directory. Although you created a boot diskette for each workstation, you will need to create only one remote boot file for each type of boot diskette. You create remote boot files with the DOSGEN utility.

If all your workstations can boot from identical boot diskettes (same DOS version, same NetWare shell files, same SHELL.CFG file, same AUTOEXEC.BAT file, and so on), you will need to create only one remote boot file with DOSGEN. Otherwise, you will need to create additional remote boot files.

For example, if Workstations #1 and #2 can boot from identical boot diskettes, but Workstation #3 is running a different version of DOS, you would need to create two remote boot files.

If you create multiple remote boot files, each file must have a unique name. Each file must also have a .SYS extension. For example, you could name Workstation #3's customized boot file WKST3.SYS.



On the Network Boards Worksheet, list the workstations you will install on your network. Then record the names of the remote boot files.

If you need to create only one remote boot file, record NET\$DOS.SYS as the remote boot file name. You have completed this module.

If you need to create multiple remote boot files, continue with the next decision.

How to set up the BOOTCONF.SYS file

If you create multiple remote boot files, you must also include a BOOTCONF.SYS file in the SYS:LOGIN directory.

When a remote reset workstation sends a request for a boot file, the system searches the BOOTCONF.SYS file in SYS:LOGIN for an entry with the workstation's network and node addresses.

If a matching entry is found, the BOOTCONF.SYS file indicates which customized boot file Remote Reset should use to boot the workstation.

If no matching entry is found, Remote Reset uses the default boot file (NET\$DOS.SYS) to boot the workstation.

If your network has more than one file server, a workstation may attach initially to any one of the file servers on the network. You must make duplicate copies of the boot files in the SYS:LOGIN directory of each file server.

The BOOTCONF.SYS file contains a list of

- All customized Remote Reset boot files, not including the default NET\$DOS.SYS file;
- The network address and station (node) address of each workstation needing to access the customized boot files.

Node addresses for different boards are assigned in different ways.

- For ARCNET boards, the node address is set manually when the board is installed.
- For Ethernet and IBM Token-Ring boards, the node address is hard-coded into the board. You should be able to locate the node address on the board or in the documentation accompanying the board.
- For boards with unknown addresses, you must install the board in a workstation that has a disk drive and whose shell is loaded and type the USERLIST command. A list of node addresses will be displayed on the workstation screen.

For example, if you created a customized remote boot file named WKST3.SYS for workstation #3, whose network address is 1 and whose node address is 10005a003b77, your BOOTCONF.SYS file would contain the following entry:

```
0x1,10005a003b77=WKST3.SYS
```

(0x indicates that the following numbers are in hexadecimal notation.)

Remember, the BOOTCONF.SYS file must contain an entry for each customized boot file you create.

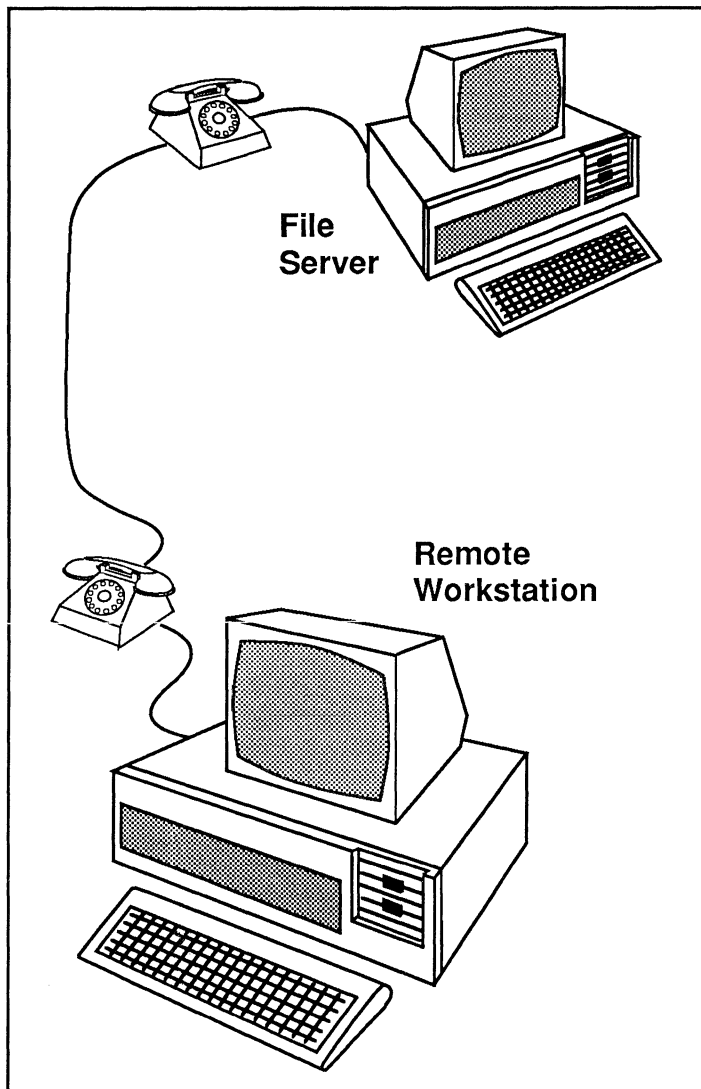


On the Network Boards Worksheet, record the network address and node address of each workstation that will access a customized remote boot file. Record the same information on each Workstation Configuration Worksheet.

Remote Workstation

This module begins with an overview of how to install a remote workstation using the ARCONFIG utility. It also contains information to help you make decisions about the following:

Decision	Page
What type computer to use as a remote workstation	105
How much memory the remote workstation needs	105
Which resource sets to select	106
Which LAN driver to select	107
Which COM port to use	107
Whether to specify an ID string	108
Which workstation ID to specify	109
What to name the bridge server	110
Whether to specify a control password	111
Which modem type to specify	112
Which baud rate to specify	113
Which Hayes modem parameters to specify	114
Whether to enable auto connect	116



Installing a Remote Workstation

Installing a remote workstation allows you to connect your network to and communicate with a distant workstation. An intermediate transmission medium (generally telephone lines) makes this connection possible.

Remote workstation installation overview

The instructions in this module explain how to set up an asynchronous communication connection between the file server and a remote workstation.

Note: If you plan to connect your file server to a remote bridge or another file server using the asynchronous communication connection, follow the instructions in the *NetWare External Bridges* manual.

If you are setting up a remote workstation, you will select the "IBM ASYNC (COM1/COM2)" LAN driver option for the shell and for the operating system driver when you generate the workstation shells and the file server operating system with SHGEN and ELSGEN, respectively.

After you have generated the IPX.COM file (for the workstation) and the NET\$OS.EX1 file (for the file server), you must run the ARCONFIG utility to configure these files for the asynchronous communications parameters that you plan to use. (This means that you must run ARCONFIG twice--once for the workstation and once for the file server.) These communications parameters include the following:

- Various identifiers and passwords for the connections between the file server and the remote workstation
- The type of modem that you will use
- The baud rate that the modem will use
- The COM port (COM1: or COM2:) that the modem will be attached to
- The phone number that the modem will dial to establish a connection (optional)

You will need to refer to the instructions for your modem to plan your remote connection.

You must also configure the NetWare operating system to communicate with a remote workstation. You can configure the NetWare operating system using the ARCONFIG utility as soon as you have generated it with ELSGEN (explained in the File Server module). Or, you can reconfigure the NetWare operating system at any time after the initial network installation.

If you select the ARCONFIG utility as a menu option in the ELSGEN program, ARCONFIG will start automatically without any additional preparation.

What type computer to use as a remote workstation

You can use any of the following computers as a remote workstation:

- IBM PC or compatible
- IBM PC XT or compatible
- IBM PC AT or compatible
- IBM Personal System/2 (any model)

If you intend to use an IBM PC, PC XT, or PC AT compatible as a workstation, make sure the model you have is approved for use with ELS NetWare.

In addition, your remote workstation must have a serial communication port. Most computers have built-in serial ports; if yours does not, you must install an add-on board.



On the Remote Workstation Worksheet, record the type of computer you will be using for the remote workstation.

How much memory the remote workstation needs

Each remote workstation in an ELS NetWare network must have at least 384KB of memory to load the NetWare shell files. We recommend that workstations have at least 512KB of memory to run most application programs and NetWare menu utilities.



On the Remote Workstation Worksheet, record the amount of memory that is installed in the computer you will use as a remote workstation.

Which resource sets to select

One of the most common causes of installation failure is hardware conflicts. Selecting resource sets provides a way to decrease the possibility of conflicts between the network boards and other workstation hardware. The SHGEN program reserves the lines and addresses used by resource sets to ensure that no hardware conflict will occur. For a definition of resource sets and an explanation of how they work, see page 37.

By including these additional "resources" in the workstation configuration process, you can essentially eliminate the possibility that other hardware will conflict with them.

When to include resource sets

Selecting resource sets is an optional step, to be used mainly when configuring a remote workstation that contains any of the following:

- AST clock/calendar card
- Color Graphics Adapter
- COM port
- IBM SDLC Adapter
- Monochrome adapter
- Enhanced Graphics Adapter
- LPT port



On the Remote Workstation Worksheet, record the resource sets you plan to select and the configurations you want to choose.

Which LAN driver to select

When installing a remote workstation, you must select the IBM ASYNC driver as your LAN driver. You can configure this driver to use COM1 (option 0) or COM2 (option 1).



On the Remote Workstation Worksheet, record the configuration you will choose for the IBM ASYNCH driver.

Which COM port to use

The remote shell must be configured to use the same COM port as the IBM ASYNC (COM1/COM2) driver is configured to use in SHGEN. This will be the COM port you connect the modem to. The default COM port number is COM1.



On the Remote Workstation Worksheet, record the COM port number you will use for the asynchronous remote connection in the workstation.

Whether to specify an ID string

The ID string is an optional security feature; however, we recommend that you specify an ID string to control access to your network.

If you specify an ID string for your remote workstation, the file server software must be configured with an identical ID string; otherwise, the remote location will not be able to establish a connection with the server. If you do not specify an ID string in the remote workstation shell, you must not specify an ID string for the file server software.

Rules for the ID string

Consider the following rules as you determine an ID string:

Default	None
Minimum Length	1 character
Maximum Length	9 characters
Valid Characters	alphanumeric (A-Z, 0-9)



You must use the same combination of upper- and lower-case characters for both the remote workstation and the file server ID strings. For example, "ABC" and "abc" are not recognized as the same string.



On the Remote Workstation Worksheet, record the ID string you plan to specify for both the remote workstation and the file server.

Which workstation ID to specify

The workstation ID identifies the remote workstation. To make the ID easily recognizable, use one that indicates the location of the remote workstation. For example, a remote workstation located in Chicago might be called REMOTE_CHICAGO.

Rules for the workstation ID

Consider the following rules as you determine an appropriate workstation ID:

Default	none
Minimum Length	2 characters
Maximum Length	45 characters
Valid Characters	alphanumeric (A-Z, 0-9) underline character
Invalid Characters	any other characters



On the Remote Workstation Worksheet, record the workstation ID you plan to specify.

What to name the bridge server

The asynchronous communications software uses the name of the bridge server to identify the connection to the file server. This name will also appear when you run LCONSOLE to establish the remote connection. (The "bridge server" name is independent of the name you have selected or will select for your file server during the Network Installation part of ELSGEN.)

Rules for bridge server name

Consider the following rules as you determine an appropriate bridge server name:

Default	None
Minimum Length	2 characters
Maximum Length	45 characters
Valid Characters	alphanumeric (A-Z, 0-9) underline
Invalid Characters	any other characters

We suggest using your company name and location; for example, NOVELL_PROVO.



On the Remote Workstation Worksheet, record the name you've chosen for the bridge server.

Whether to specify a control password

Specifying a control password is another optional security feature, but we recommend that you use it to control access to your network. If you specify a control password, the LCONSOLE utility will ask for it when you try to establish or terminate connections. (The LCONSOLE utility is explained in the *Using ELS NetWare Level II* guide.)

Rules for the control password

Consider the following rules as you determine an appropriate control password:

Default	None
Minimum Length	3 characters
Maximum Length	128 characters
Valid Characters	alphanumeric (A-Z, 0-9) underline
Invalid Characters	any other characters



You must specify the same combination of upper- and lower-case letters in LCONSOLE that you specify here.



On the Remote Workstation Worksheet, record the control password you want to specify for the file server.

Which modem type to specify

NetWare asynchronous communications software allows you to select one of two modem types: Hayes compatible or special configuration.

Hayes Compatible

The "Hayes Compatible" option refers to a Hayes or Hayes compatible modem. If you use this option, the NetWare software will set all the line parameters, such as phone numbers.

Special Configuration

The "Special Configuration" option is an all-purpose option that you can use with almost any modem, including a Hayes or Hayes compatible.

This option allows you to use a remote connection in more diverse ways. For example, you can use a Hayes or Hayes compatible with a leased line, a satellite transceiver system, or any other hardware that stays in a communication-ready state at all times.

If you use this option, the NetWare software will not set any parameters except the baud rate. All answering of and connecting to incoming calls must be handled through some other means.



On the Remote Workstation Worksheet, record whether you want to specify "Hayes Compatible" or "Special Configuration" for the file server and workstation modems. (The two do not have to use the same modem type.)

Which baud rate to specify

You must specify a baud rate for the workstation modem and for the file server modem. Refer to the documentation that came with your modems as you determine the appropriate baud rates.

Workstation modem baud rate

The baud rate for the remote workstation should be determined as follows:

- If you are using a Hayes or compatible modem at the file server end of the connection, set a baud rate for the remote workstation's modem that does not exceed the baud rate that the file server's modem will use.
- If you are using a modem other than a Hayes or compatible at the file server, set the same baud rate for both the remote workstation and the file server's modems.

File server modem baud rate

The baud rate for the file server should be determined as follows:

- If you are using a Hayes or compatible modem at the file server, set the baud rate to the highest rate the modem will support.
- If you are using a modem other than a Hayes or compatible at the file server, set the baud rate to the highest common denominator of all the modems you are using (regardless of their respective locations). For example, if you are using two non-Hayes modems with baud rates of 1200 and 300, the baud rate at the file server must be set at 300, the highest common denominator of the two.



On the Remote Workstation Worksheet, record the baud rates you plan to specify for the remote workstation and file server modems.

Which Hayes modem parameters to specify

If you select the "Hayes Compatible" modem type, you must specify the phone number and dial mode necessary for the NetWare software to make the remote connection.

If you are not using the "Hayes Compatible" modem type, skip to "Whether to enable auto connect" on page 116.

Phone number

You must specify the phone numbers of the locations your modems will be calling.

Several characters will appear on the "Phone Number" field when you are configuring your file server and remote workstation software. The exact characters that appear depend on the baud rate you select. These characters make up the first part of your phone number command string and cannot be edited.

You will enter the remainder of the phone number command string after these preliminary characters. As you type this number, keep the following in mind:

- You can enter up to 35 numbers in the modem command string.
- You must include the outside line access number (usually a 9), if you are dialing an outside number from a PBX (Private Branch Exchange) telephone system. The outside line access number should be followed by a comma, which provides a two-second pause in the dialing sequence.

The remainder of the command string should include the phone number of the remote connection you want to call, plus any other characters specified by the documentation that accompanied your modem.

Dial mode

You should start the command string with a "P" if you will be using a pulse dial mode, or with a "T" if you will using a touch-tone dial mode.



On the Remote Workstation Worksheet, record the phone numbers of the file server modem and the remote workstation modem. Also specify whether you will be using a touch-tone or pulse dial phone at the remote workstation modem.

Whether to enable auto connect

The "Auto Connect" option determines whether the file server automatically establishes a connection with a remote station when the file server is booted.

- If you select "No" for this option, you will have to instruct the file server to establish a connection to a remote station manually.
- If you select "Yes," the file server will immediately establish a connection with a remote station when the file server is booted. You must also specify "Life Class" and, depending on the option you select for "Life Class," "Idle Time-Out."

Life Class

The "Life Class" option allows you to specify whether the line connection will be continuous or timed.

- If the connection is continuous, it must be terminated manually. (You will generally select the continuous connection if you have a direct connect line or leased telephone line.)
- If the connection is timed, it will be terminated automatically when no activity has occurred between the file server and the remote connection for a specific period of time. (See "Idle Time-Out" below.)

Idle Time-Out

If your remote connection is timed, you must specify how long a connection can be idle (no data is being transferred) before it is automatically terminated. You can specify from 1 to 59 minutes.



On the Remote Workstation Worksheet, record whether you want to enable the "Auto Connect" option. If you do, record the "Life Class" and the "Idle Time-Out" (if applicable).

Network Boards

For your convenience, we suggest that you insert the installation supplements for the network boards you will be using in this section of this manual. In the Installation Steps portion of this manual, you will be referred to this section to find your board settings.

The ELS NetWare Level II v2.15 operating system supports several types of network boards. Most of the network boards supported by previous versions of NetWare are still supported. In addition, several new boards are also supported.

If you are upgrading and you are using a network board that was previously supported by NetWare but is not supported by ELS NetWare v2.15, contact the network hardware manufacturer for the necessary drivers.

Because the list of supported network boards is constantly changing, the list is not supplied in this manual. Novell Authorized Resellers should periodically receive up-to-date lists of supported networking hardware.



On the Network Boards Worksheet, record

- The types of network boards you will be installing in the file server and your workstations.
- The type of cabling and other hardware you will be using.

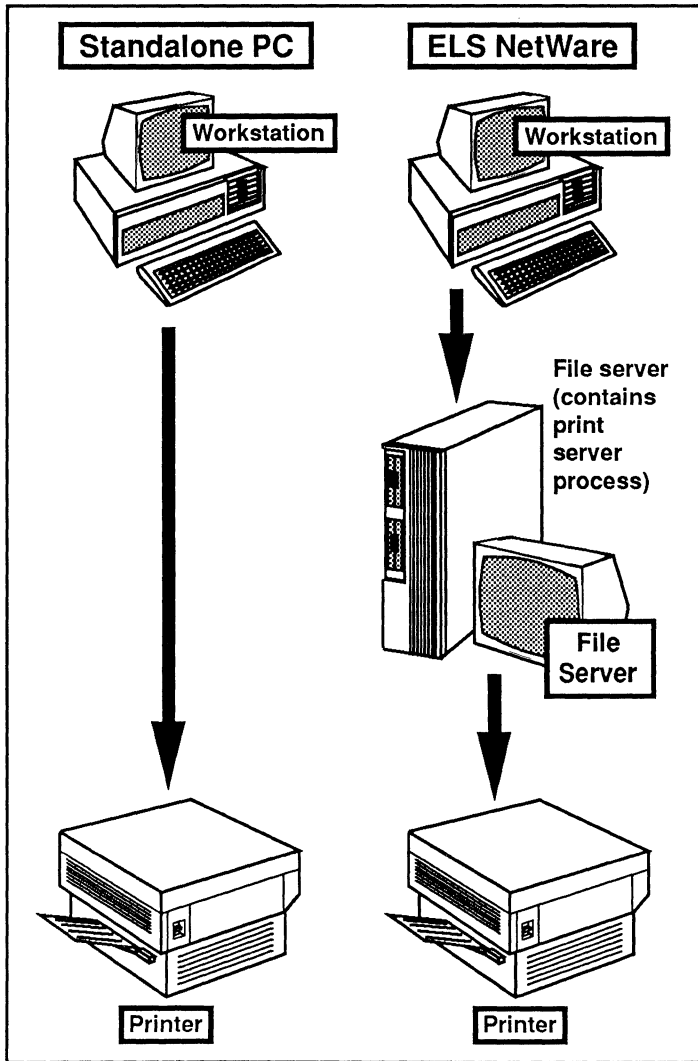
Notes



Network Printers

This module explains how to plan your printing environment and set the printer hardware parameters. It explains the basics of printing on the network using the default printing setup. It also contains information to help you make decisions about the following:

Decision	Page
Which types of printers to use	127
Whether to use default printer numbers	128
Which serial printer parameters to specify	129
Whether to use PRINTDEF	131
What print device functions to define	133
What modes to create	134
Whether to create forms	135
Whether to create additional print queues	136
Whether to assign new queue users	137
Whether to assign queue operators	137
Whether to create an AUTOEXEC.SYS file	138
Whether to set up print job configurations	139



Printing to Network Printers

NetWare allows you to print to a network printer connected to the file server as if you were printing to a printer connected to your workstation.

Network printing overview

To network users, printing on an ELS NetWare Level II network will seem the same as printing from a standalone workstation, but there are differences.

When a standalone workstation sends a print request to its locally attached printer, the request is sent directly to the printer for processing.

When a network workstation sends a print request to a network printer, the request is first placed in a print queue on the file server. The print queue stores the print request until the printer can service that request.

When the printer is ready to service a request, a print server process within the file server moves the request from the queue to the printer.

The default printing setup

The ELS NetWare Level II operating system automatically creates a default printing environment that allows users to print on the network without setting up any special options.

Read through the description of the default setup in this section to see if it is appropriate for your printing needs. If it is not, you can change the default printing setup using the PRINTCON, PRINTDEF, and PCONSOLE utilities. (Changing defaults is discussed in "Customizing your printing environment" on page 123.)

Print queues

When the file server is first booted, the operating system automatically assigns one print queue to each printer attached to the file server. This one-to-one correspondence between print queue and printer is known as a print queue mapping.

For example, if you had two printers attached to your file server, the operating system would create a queue called `PRINTQ_0` for printer 0 and a queue called `PRINTQ_1` for printer 1. You assign the printer numbers in `ELSGEN`.

Queue users

To send print requests to a queue, a network user must be designated a print queue user. The operating system automatically assigns the group `EVERYONE` as a print queue user of each print queue. As a result, all network users (as members of the group `EVERYONE`) can send print requests to the system-created print queue(s).

Queue operators

The user `SUPERVISOR` is automatically assigned as print queue operator for system-created print queues. The supervisor can assign other operators as necessary. Printers normally service print requests on a first-come, first-served basis. However, users designated as print queue operators have special privileges. They can edit any other user's print queue entry information, delete any entry from the queue (even if it is being printed), and modify the queue status by changing the operator flags. Queue operators can also change the order in which print jobs will be serviced.

Print definitions

Files containing standard print definitions for many commonly used printers are provided with ELS NetWare Level II.

Print job configurations

Print job configurations that use these standard print definitions can be copied for all network users when you run the `PRINTCON` utility. If you use `USERDEF` to set up your network, each user will also have access to these predefined print job configurations.

In the absence of these predefined print job configurations, the system creates a default print job configuration. This configuration will print one copy of a file; a banner (a page that specifies the username of the user making the print request as well as the name of the file) will also be printed. The file will be printed according to the default printing parameters set directly on the printer.

Customizing your printing environment

If the system defaults do not meet your network needs, or if you want to allow more flexibility in printing, you can customize network printing in the following ways:

- You can change your printer's default parameters by setting up various print definitions that determine how print job requests will be printed.
- You can create new print queues, rename the default print queues, or change the default print queue and spooler mappings.
- You can change users' printing privileges by changing the default queue users.
- You can assign print queue operators to manage queue operations.

To customize your printing environment, you must use the printing utilities `PRINTDEF`, `PRINTCON`, and `PCONSOLE`. These utilities are discussed later in this module and instructions for using them can be found in the Customizing NetWork Printing step list on page 550.

PRINTDEF

The `PRINTDEF` (Printer Definition) utility allows a supervisor to define printers that are not included with your network operating system. A list of printer definitions that are included with NetWare can be found under "Whether to use `PRINTDEF`" on page 131.

To define a new printer, you must

- List the functions, or printer commands, that control line spacing, pitch, character set, and font and point size.
- Combine these functions into modes (a sequence of printer commands that tells the printer how to print a particular job).

For example, you could create a "Final Print Out" mode that would include the printer commands for 10 characters per inch (cpi), emphasized printing, and near-letter quality printing.

PRINTDEF also allows you to specify which forms your printer will use. For example, you may want to use continuous-feed paper for some print jobs and 8 1/2- by 11-inch sheets of paper for others. Other forms include address labels, checks, and green-bar paper.

PRINTCON

The PRINTCON (Print Configuration) utility allows users to set up job configurations that control the way print requests will be printed. This utility allows users to select a job configuration set up by the supervisor or create an individual job configuration.

More specifically, users set up print job configurations using PRINTCON by selecting from the modes and forms created by the supervisor in PRINTDEF and by specifying other options such as the number of copies, the type of banner, and the print queue.

For example, a supervisor could set up a print configuration called REPORTS for printing daily sales reports. A specific user might also want to set up a print configuration named PROGRAM that specifies how the user wants programming files to be printed: how many copies to make, which queue or printer to send the job to, which form to print the job with, etc. Then, any time the user wants to print a job using this configuration, he or she would type PROGRAM and the print job would be printed according to the specifications in that configuration.

PCONSOLE

The PCONSOLE (Print Console) utility allows queue users to print by putting a print job in a queue. PCONSOLE also allows queue users to choose from the job configurations created in PRINTCON.

You can choose to allow only certain users to access a given print queue by designating only those individuals as queue users. You can also set up queue operators, and thus control who will be given special privileges to control the queue.

You can also create new queues with PCONSOLE. When you create a new queue, the user SUPERVISOR is automatically assigned as a queue operator, and the group EVERYONE is automatically assigned as a queue user.

You must also map the new queue to a printer using the PRINTER console command and assign a spooler to the new print queue using the SPOOL console command. You can save these commands in the AUTOEXEC.SYS file if you want the mappings saved permanently.

Spooler mappings

ELS NetWare v2.15 uses spooler mappings to provide compatibility with previous NetWare versions and to enable the NPRINT and CAPTURE commands to function properly. Unless you specify otherwise, NetWare automatically assigns one spooler to each print queue.

You can use NetWare v2.15 to print a job from networks running previous versions of NetWare. For example, to send a NetWare v2.0a print job to a printer on a network running NetWare v2.15, the following series of events must take place:

- You must enter the SPOOL command at the file server console.
- NetWare v2.15 will send the print request to a print queue on the file server.

- The spooler mappings will assign a spooler to the print queue.
- The request will be serviced by the printer attached to that queue.

However, if you want to send files from a file server running NetWare v2.15 to a printer attached to a server running NetWare v2.0a or below, you must copy the files from the v2.15 server to the v2.0a server before you can print the files.

If you create new print queues using either PCONSOLE or the QUEUE console command, you must also create a new spooler mapping with the SPOOL console command.

Printer mappings

A print queue must be mapped to a printer before print jobs sent to that queue can be serviced. NetWare automatically maps any print queues it creates to a printer. If you create additional print queues, you must map those queues to a printer.

If you need only temporary printer mappings (the mappings are deleted when you log out), you can use the PCONSOLE utility or the QUEUE console command to create them.

If you need to establish permanent printer mappings, you must enter the appropriate map commands, along with corresponding spooler mappings, in the AUTOEXEC.SYS file.

When the file server first comes up, it looks for an AUTOEXEC.SYS file. If the file does not exist, the file server will automatically create one print queue for each printer and map the queue to the printer. If an AUTOEXEC.SYS file does exist, the system will read the file to set up print queue mappings.

Which types of printers to use

The ELS NetWare operating system can support up to five printers; as many as three of these can be parallel printers and as many as four can be serial printers. The exact number and types of printers that you can attach to your file server will correspond to the number and types of printer ports physically available in your file server.

Most computers that are used as ELS NetWare file servers have at least one serial port and one parallel port built in. The serial ports are referred to as COM1, COM2, etc.; the parallel ports are devices LPT1, LPT2, etc.

You can add printer port expansion boards if you want to attach more printers than there are built-in printer ports on the file server. Instructions for doing this are usually found in the *Guide to Operations* or *Quick Reference* manual that comes with the computer.

Printers can also be attached to workstations, but these printers will be available only for local use by the workstations to which they are physically attached.

You should decide before installing the network how many network printers will be connected to the file server and whether they will be serial or parallel printers. If you are using either the COM1 or COM2 port for an asynchronous remote connection, do not connect a printer to that port.



On the NetWare Installation Worksheet, record the name and model of each network printer. Be sure to write the printer information on the line that corresponds to the device (port) that you will connect the printer to. You might also want to record whether you will need to install additional printer port expansion boards in the file server.

Whether to use default printer numbers

The spooled printer number is used by the print server function within the file server to identify the devices (ports) to which it can send files to be printed.

ELSGEN will assign printer numbers in the order you define the printers in the NetWare Installation utility.

If you want to change the default printer number assigned by the software, consider the following guidelines:

- The printer number can be from 0 to 4.
- If only one printer is being defined, it must be assigned printer number 0.
- If several printers are being defined, printer numbers must be assigned in order from 0 up to 4, without duplicates or skips in the sequence. However, printer 0 does not always need to be assigned to LPT1, printer 1 to LPT2, etc. You can define the printer ports in any sequential order.
- The printer numbers assigned during installation can be changed later, if necessary.



On the NetWare Installation Worksheet, record which printer numbers will be assigned to each network printer.

Which serial printer parameters to specify

Different types of printers use slightly different protocols or languages for transferring data from the host microprocessor to the printer. The ELS NetWare operating system must know about each printer's particular protocol so that the NetWare internal print server function can communicate properly with the printer.

For parallel printers, no hardware communication settings are necessary to communicate with the file server.

Serial printer parameters

For serial printers, the data-transfer protocol is defined by the following parameters:

Baud rate

Baud rate refers to the speed at which data is transferred over the printer interface cable. Letter-quality printers usually require a slower baud rate than laser printers.

Word length

Word length is the number of significant data bits in each "word" sent across the printer cable; also called "transmission word size" or "character length."

Stop bits

Stop bits are the number of bits used to indicate the end of the data being transmitted.

Parity

Parity is a method of checking each character as it is received by the printer to determine if an error has occurred in the transmission of data.

XON/XOFF protocol

This software protocol is used to keep the host microprocessor from sending data to the printer faster than the printer can accept it.

Default serial printer parameters

Whenever possible, you should set serial network printers to run with the ELS NetWare default printer parameters listed below. This will make it easier to define the network printers when you run ELSGEN.

The default parameters for ELS NetWare serial printers are as follows:

Baud Rate	9600
Word Length	8 bits
Stop Bits	1 bit
Parity	None
XON/XOFF Protocol	No

The process of setting serial printer communication parameters is specific to the type of printer(s) and printer interface board(s) you are installing. Refer to the printer documentation for more information.



On the NetWare Installation Worksheet, record the parameters you plan to specify for each serial printer that will be attached to the network.

If you plan to use the default settings for your printing environment, you have finished this module.

If you want to customize your printing environment using the NetWare print utilities, continue with the next decision.

Whether to use PRINTDEF

ELS NetWare Level II includes print device definitions for the commonly-used printers listed below. (Print devices are equipment used to print, such as printers and plotters.) The print device definitions are automatically placed in the SYS:PUBLIC directory when you install NetWare.

You can also import print definitions from another file server.

If you have a printer that is not on this list, you must set up your own printer definitions using the PRINTDEF utility.

- Apple Imagewriter II
- Apple Laserwriter I/Plus
- Citizen 120-D
- Citizen 20
- Citizen 224
- CItoh 310/315
- CItoh 600
- Diablo 630
- Epson FX80/FX100
- Epson EX-800
- Epson FX86e/FX286e
- Epson LD-2500
- Epson LQ-800/LQ-1000
- Epson LX-80
- Epson LX-800
- Hewlett-Packard LaserJet I/II
- IBM ProPrinter 4201
- IBM ProPrinter II/XL
- NEC Spinwriter 2050/3050
- NEC Spinwriter 8810/8830
- NEC Pinwriter P-6
- Okidata Microline 192/193
- Okidata 290
- Okidata 390
- Okidata Laserline 6
- Panasonic 1080/1080i
- Panasonic 1091/1091i
- Star NX-1000
- Star Gemini 10X
- Toshiba P321



Make a photocopy of the Printer Worksheet for each printer you will install. On each Printer Worksheet, record whether you will use the printer definitions provided with ELS NetWare or if you need to use the PRINTDEF utility to set up your own printer definitions.

If you can use the printer definitions provided with ELS NetWare, skip to "Whether to create forms" on page 135.

If you need to set up your own printer definitions, continue with the next decision.

What print device functions to define

To set up your own printer definitions, you first need to define printer functions. Printer functions give the printer directions on how to print. To define a printer's functions, you enter escape sequences or printer commands into the PRINTDEF database.

Print device name

When defining functions, you must give the print device (printer) a unique name. The name should be recognizable to other users (for example, a brand-name such as LaserJet or IBM ProPrinter), and cannot be longer than 32 characters.

Device functions

You must also define the device function by entering the escape sequences or printer commands for your printer into the PRINTDEF database. Usually the printer documentation will have a chapter or section explaining printer commands. Consult that documentation.



When you are entering the print functions, be sure to include the reset escape sequence.

When you enter the escape sequences, you must type each character including the angle brackets < >.

For example, to enter the HP LaserJet print function for reset, you would type

<ESC>e



On the Printer Worksheet, record the print device name and the escape sequences you will use to define your print device functions.

What modes to create

Once you have defined the functions for a print device, you must combine these functions into modes. A mode is a sequence of print functions that tells the printer how to print a particular job.

For example, you could create several modes for your HP LaserJet printer, such as "Final Print Out," "Draft," or "Re-initialize."

For each mode you create, you must also include the functions you defined for that particular mode. For example, you could create a "Final Print Out" mode for the HP LaserJet that would include the functions for 10 characters per inch, emphasized printing, and near-letter quality printing.

The order of the functions in the functions list may be important to the printer. Normally, any function you add can be placed at the end of the list. Consult your printer documentation for more information.



On the Printer Worksheet, record the modes you want to create and the functions you want to include in each mode.

Whether to create forms

Print forms are the type of paper you will print on. For example, you might want some jobs to be printed on 8 1/2-by 11-inch paper and others on green-bar, continuous feed paper. Print forms are defined using PRINTDEF. These forms are then used to set up print job configurations with the PRINTCON utility.

Form name

Consider the following rules as you determine an appropriate form name:

Default	None
Minimum Length	2 characters
Maximum Length	12 characters
Valid Characters	alphanumeric (A-Z, 0-9) underline character
Invalid Characters	any other characters

The first character of the form name must be alphabetic, and can be either upper- or lower-case. Examples of form names include White_8x11, Continuous, Checks, and Green_Bar.

Form number

You must give each form a number (between 0 and 255). You will probably want to assign the most commonly used form as form 0, since 0 is the default.

Page length

You must also specify a page length and width for each form. Page length is specified in lines and must be a number between 1 and 255. For example, an 8 1/2 x 11 sheet of paper has 66 lines.

Page width

Page width is specified in characters and must be a number between 1 and 999. For example, an 8 1/2 x 11 sheet using 10 characters per inch has 80 characters per line.

When you send a print request that requires a special form, the file server will not print the job until that form is mounted in the printer (refer to the **PRINTER** console command described in the *Reference for ELS NetWare Level II* manual for mounting instructions).



On the Printer Worksheet, record the forms you want to create. For each one, record the name of the form, the form number, the length of the form in lines per page, and the width of the form in characters per line.

Whether to create additional print queues

When the file server first comes up, the system automatically creates one print queue for each printer attached to the file server. However, a printer can service more than one queue. (Conversely, a queue can service multiple printers.) If you will be attaching additional printers, you must create additional queues using the **PCONSOLE** utility.

Print queue names can be no longer than 47 characters and cannot include spaces, backslashes, commas, question marks, or other illegal DOS characters. We suggest you keep queue names simple.



On the Printer Worksheet, record the names of any additional print queues you want to create.

Whether to assign new queue users

When you create a queue using PCONSOLE, you must also specify which users can place print jobs in the queue by assigning queue users. The group EVERYONE is automatically assigned as a queue user.



On the Printer Worksheet, record which users or groups you want to assign as queue users.

Whether to assign queue operators

When you create a queue using PCONSOLE, you must also specify which users can control the queue by assigning queue operators. The user SUPERVISOR is automatically assigned as a queue operator.

Users designated as print queue operators can edit any other user's print queue entry information, delete any entry from the queue (even if it is being printed), and modify the queue status by changing the operator flags. Queue operators can also change the order in which print jobs will be serviced.



On the Printer Worksheet, record the users or groups you want to designate as queue operators.

Whether to create an AUTOEXEC.SYS file

The AUTOEXEC.SYS file contains a list of console commands that you want the file server to execute each time it is booted. You can create this file by using the COPY CON command or by using the "Supervisor Options" in the SYSCON utility (this is explained in the Customizing Network Printing step list on page 549).

Any print queues that you create, either with PCONSOLE or with the QUEUE console command, must be mapped to a printer. To set up permanent mappings between new print queues and printers, you should put the mapping commands in the AUTOEXEC.SYS file. The AUTOEXEC.SYS file must also include the spooler mappings.



If you create an AUTOEXEC.SYS file, you must include at least the default print queue and spooler mappings. You must also include any print queue mappings or spooler mappings that you want set up automatically each time the file server comes up. Unless mappings are put in the AUTOEXEC.SYS file, they will not be in effect the next time the file server is booted.

Descriptions of and formats for some of the important console printing commands are listed below. Complete explanations for the console commands can be found in the *Reference for ELS NetWare Level II*.

Note: If you are installing NetWare for Macintosh, refer to your NetWare for Macintosh documentation for information about additional printer commands for Apple printers.

You can include the following console commands in your AUTOEXEC.SYS file. (The information in brackets is optional.)

- To create a queue

Q[UEUE] *name* CREATE

- To map a queue to a printer

P[RINTER] *n* ADD [QUEUE] *name*

- To map a spooler to a queue

S[POOL] *n* = *name*



On the NetWare Installation Worksheet, record the console commands you need to include in the AUTOEXEC.SYS file.

Whether to set up print job configurations

A print job configuration controls the way a job is printed. These configurations are set up using the PRINTCON utility.

As you set up printing on your network, you can

- Create print job configurations for all users, using the forms, devices, and modes defined in PRINTDEF;
- Select the default print job configuration;
- Copy print job configurations from one user to another.

A primary advantage of setting up print job configurations is that when users print a file using PCONSOLE, CAPTURE, or NPRINT, they can choose a print job configuration instead of manually entering all the print job specifications each time they want to print. The printer will be returned to its default settings after the print job is completed.

Supervisors can set up print job configurations for any user. In addition, users can set up their own print job configurations.

Print job configuration options

The information that you can specify in a print job configuration is explained below.

Number of copies

To specify the number of copies, enter a number from 1 to 65,000.

Suppress form feed

If form feed is enabled, the printer will start printing at the beginning of the next form. To reposition the printer head, the printer inserts a blank piece of paper after each print job.

Enter "Yes" if you do not want a sheet of paper to be fed through the printer after your document is printed. Some applications already have a form feed at the end of the file, so adding another form feed causes two blank pages to be printed.

File contents

This option allows you to specify whether your document should be printed as a text or byte stream document.

Choose "Text" when you want all special formatting characters, such as tabs, to be interpreted and formatted by the print server. (Choose "Text" to print ASCII text.)

Choose "Byte Stream" if you are printing from within an application, and you want the application to tell the printer how to print the document.

Tab size

To specify tab size, specify a number from 1 to 18 (the default is 8 spaces). All tabs in the document you are printing will be set to the tab size specified here. If "File Contents" is set to "Byte Stream," this field will be blank.

Form name

Specify a form you have already defined with the PRINTDEF utility. If you have not defined forms in PRINTDEF, you cannot change this field from the default.

Print banner

Choose "Yes" if you want a banner printed before the actual file is printed. A banner is a printed sheet indicating the name of the print file and the person submitting the job request.

Banner name

If you choose to print a banner, you must decide whether to give the banner a name. You can use the default banner name, which is the username you logged in with, or you can type in any text, up to 12 characters long.

Banner file

Enter a name for the file being printed (up to 12 characters) in this space. This allows you to specify a name other than the filename. If you leave the space blank, the actual name of the file you are printing will be printed in the banner.

Local printer

(Only used with the CAPTURE command.) Enter the local printer port (1, 2, or 3) that the captured file will be recorded from.

Auto endcap

(Only used with the CAPTURE command.) If you choose "Yes," the file you are capturing will be printed whenever you exit a program or when the program closes the print device. If you choose "No," the file you are capturing will only be printed after you issue the ENDCAP command (unless you specify a printer timeout).

Enable timeout

(Only used with the CAPTURE command.) If you choose "Yes," the data you have captured will be sent to the print queue after the number of seconds you define as the Timeout count. If you choose "No," captured data will be printed according to the setting in the "Auto Endcap" field.

Timeout count

(Only used with the CAPTURE command.) Enter a number from 1 to 1,000 (the default is 5). This is the number of seconds the shell waits before queuing the saved file. If you use the ENDCAP command, you do not need to specify a timeout count.

File server

Specify the file server you want to print from. Forms must be defined for the server you choose.

Print queue

Choose the print queue on the file server to which the print job should be sent. The queue you choose must be mapped to the file server specified above.

Device

Specify the print device (printer or plotter) you want to print on. (The device you choose must be mapped to the queue you chose above.)

Mode

Specify the mode for the chosen print device. A mode is a predefined set of print functions that tells the printer how to print a particular job. For example, a mode might specify 15 characters per inch (compressed mode).



On the Print Job Configuration Worksheet, record the print job configurations you plan to set up. Designate which will be the default configuration.

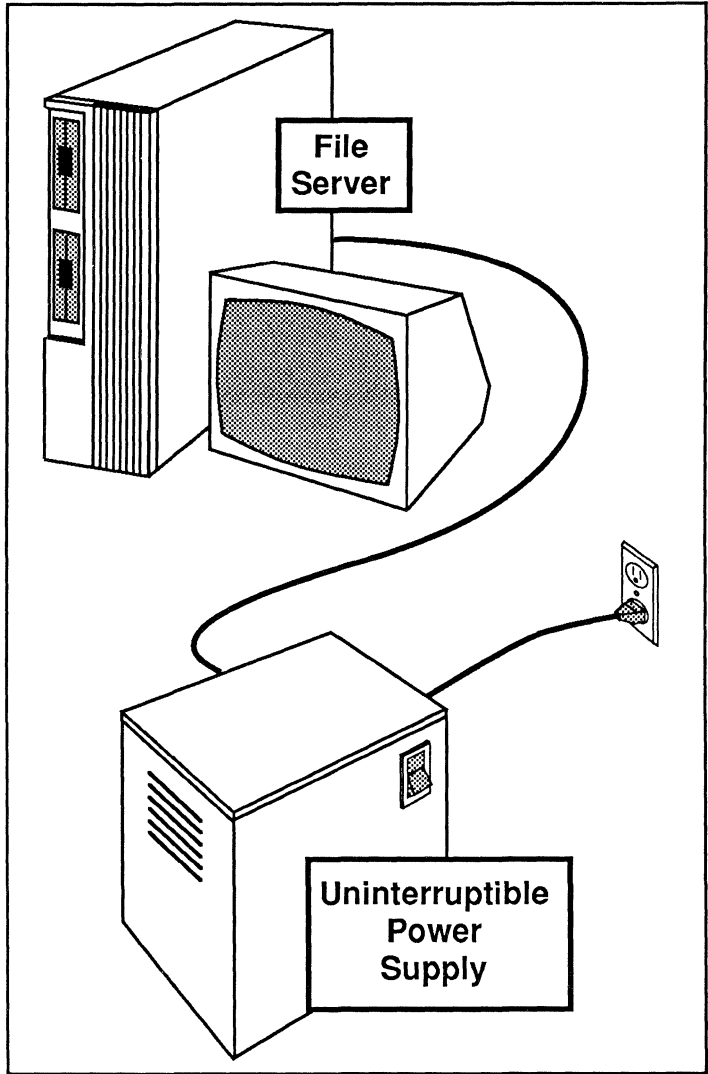
Notes



Uninterruptible Power Supply

This module begins with an explanation of an uninterruptible power supply (UPS). It also contains information to help you make decisions about the following:

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Which type of UPS monitoring hardware to specify	150
Which I/O address to use for UPS hardware	151
Which UPS down time to specify	152
Which UPS wait time to specify	153
Which VAP wait time to specify	154



Attaching a UPS to Your File Server

Attaching a UPS to your file server will provide a temporary power supply whenever there is a commercial power fluctuation or failure.

What is an uninterruptible power supply?

An uninterruptible power supply (UPS) is a backup power unit that supplies uninterrupted power if a commercial power outage occurs.

NetWare-approved UPS systems are designed to be used with file servers, but they can also be used effectively with workstations and other types of servers.

How power failure affects file servers

Power outages can damage electrical components and destroy data in any microcomputer system. Damage of this type to a file server is especially harmful, because the file server is a key component in the local area network. Attaching a UPS to your file server will provide temporary power whenever commercial power fluctuates or fails.

In addition to providing a backup power supply, the ELS NetWare operating system also offers UPS monitoring to protect data. Since the life of the UPS battery is limited, the file server must shut down if commercial power is not restored within a predetermined length of time. When the file server switches to UPS power, it sends a message to any workstations that are still operating, either from a separate power source or their own UPS units, to inform them that the server is running on auxiliary power. The message also tells users how much time they have to log out before the file server shuts itself down.

If commercial power has not been restored before the specified time has elapsed, the file server closes all open files, writes all data in memory to disk, and shuts itself down.

If the UPS battery begins to run down before the specified time has elapsed, UPS monitoring alerts the file server. When the file server receives this signal, it brings itself down, allowing the UPS to shut off the power generation circuits to avoid draining the battery completely. When the commercial power is again available, the UPS batteries begin recharging, the file server automatically reboots (providing it can boot from a hard disk), and users are again able to log in to the file server.

How power failure affects workstations

For a workstation to receive the UPS messages from the file server, the workstation must get its power from a source other than the one that failed the file server. A workstation could be attached to a separate source of commercial power or to its own UPS. It is important for workstations to receive UPS messages, because any open files on a workstation might lose data when the file server goes down. A UPS can be attached to workstations on the network without installing any kind of UPS monitoring hardware in the file server.

The SERVER.CFG text file

So that the file server will know what to do in the event of a power outage, you must provide instructions in the SERVER.CFG text file if you are attaching a UPS.

Each time the file server is booted, the ELS NetWare operating system searches the SYS:SYSTEM directory for the SERVER.CFG text file.

Specifically, the SERVER.CFG text file provides the operating system with the following information:

- The type of UPS monitoring hardware being used in the file server;
- The UPS monitoring hardware's I/O address (if applicable);
- How long the UPS should run before the file server shuts itself down;

- How long the commercial power can be off before workstations will be notified that the UPS is supplying temporary power to the server;
- How long the server should wait, as it is being booted, before automatically loading VAPs.

To create or modify the SERVER.CFG file, you must be logged in to the file server as SUPERVISOR and have one of your network drives mapped to the SYS:SYSTEM directory.

The SERVER.CFG file is a text file that can be created with the DOS COPY CON command or with almost any ASCII text editor (such as a word processor that can create and edit nondocument files). Refer to the DOS manual or the documentation provided with your word processing application for instructions for creating text files.

Which type of UPS monitoring hardware to specify

To specify which type of UPS monitoring hardware you are using with your UPS, type the following command in your SERVER.CFG text file:

T[TYPE] =x

Replace the variable *x* with the type number of the UPS monitoring hardware you are using in your file server. Be sure not to add any spaces within the command as you type it. The numbers for the supported types of UPS monitoring hardware are listed below:

UPS Monitoring Hardware	Type No.
UPS Standalone Board	1
SS Keycard	3
Mouse Port (PS/2)	4

Although NetWare v2.15 does not require the SS keycard for serialization, you can still use the keycard as your UPS monitoring hardware.



On the NetWare Installation Worksheet, record the type number of the UPS monitoring hardware you are using in your file server.

Which I/O address to use for UPS hardware

The SERVER.CFG text file must indicate the I/O address of the UPS monitoring hardware. Use the following format for this line:

```
UPS IO=xxx
```

Replace the variable *xxx* with the I/O address of the UPS monitoring hardware, according to the guidelines below:

- If you are using the mouse port for UPS monitoring (on an IBM Personal System/2 file server), you do not need to enter an I/O address in the SERVER.CFG text file.
- If you are using a standalone UPS monitor board, the I/O address can be set to either 240h or 231h (whichever is available).
- If you are using an SS keycard for UPS monitoring, the I/O address is 230h.

The *h* at the end of an I/O address indicates that the address is in hexadecimal notation. Do not include the *h* when you type the I/O address in the UPS text file.



On the NetWare Installation Worksheet, record the I/O address of your UPS monitoring hardware (if applicable).

Which UPS down time to specify

The SERVER.CFG text file specifies the "down time" for the UPS. This is the number of minutes users have to log out of the file server after the UPS begins supplying power but before the operating system brings down the file server.

Include the following command to specify the UPS down time:

```
D[OWN]=xx
```

Replace the variable *xx* with a down time that is reasonable for your situation. Consider the following guidelines:

Default	3 minutes
Minimum	1 minute
Maximum	30 minutes

Choose a down time that will give users enough time to log out, but that will not unduly drain the UPS battery.

If you specify a down time that is too long and the power goes down more than once in a short period of time, your battery may not be recharged when it begins supplying power to the system the second time.

In estimating the life of your UPS battery, consider how many pieces of hardware will draw on the battery. A battery that is supplying power only to a file server will last longer than a battery that is supplying power to a file server and several workstations.

Should you happen to specify a down time that exceeds the UPS battery life, the operating system will bring down the file server within one minute after it receives the "battery low" signal from the UPS.



On the NetWare Installation Worksheet, record the UPS down time you want to specify.

Which UPS wait time to specify

The SERVER.CFG text file specifies the "wait time" for the UPS. The UPS will wait the number of seconds you specify before signaling the file server to notify users that the power is off.


Notifying users each time there is a short power fluctuation is neither necessary nor desirable. However, if the power is off for more than a few seconds, users should be notified so that they can log out.

The command format for specifying the UPS wait time is as follows:

W[AIT]=xxx

Replace the variable xxx with a wait time that is reasonable for your situation. Consider the following guidelines:

Default	15 seconds
Minimum	15 second
Maximum	300 seconds (5 minutes)
Must be less than the down time	

 On the NetWare Installation Worksheet, record the UPS wait time you want to specify.

Which VAP wait time to specify

To specify the amount of time the file server should wait before automatically loading VAPs, include the following command in the SERVER.CFG text file:

VAP WAIT *xxx*

Replace *xxx* with the number of seconds you want the file server to wait.

Default	10 seconds
Minimum	10 seconds
Maximum	360 seconds

If you press any key during the wait time, the automatic VAP loading will be aborted.

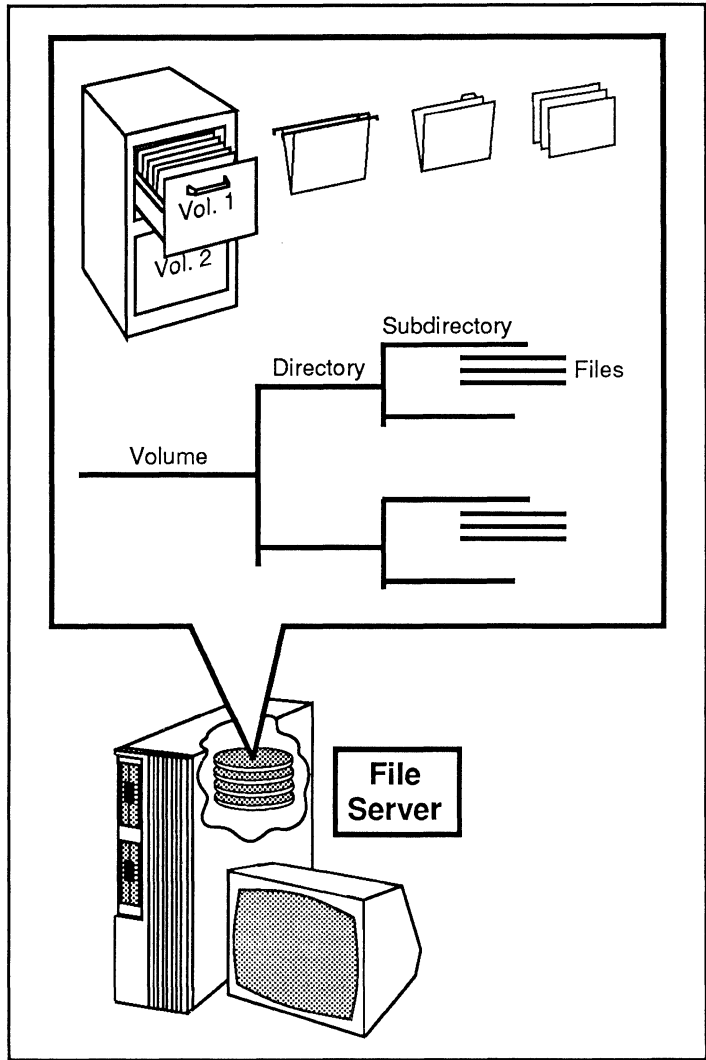


On the NetWare Installation Worksheet, record the VAP wait time you want to specify.

Directory Structure

This module begins with an explanation of directory structure and drive mappings. It also contains information to help you make decisions about the following:

Decision	Page
Where to create DOS directories	163
Where to create application directories	165
Where to create home directories	168



How Files Are Stored on the Network

Volumes, directories, and subdirectories make up the network's directory structure. This information is then stored on the file server's hard disk.

How are files stored on the file server?

All network information is stored on a file server's hard disk in files. For example, a file might contain a report, a letter, a list of addresses, or a computer program.

The files stored on a file server's hard disk are organized to make them easy to locate. The system for organizing this stored information is called the directory structure. This NetWare file storage system has several levels. The hard disk is divided into one or more

- Volumes, which are divided into
- Directories, which are divided into
- Subdirectories.

Note: The NetWare directory structure is much like the DOS directory structure. Refer to your DOS manual for more explanation.

Directory paths

These levels are referred to as a directory path, a route through the levels of directory structure that leads to a particular location. For example, to locate a file called REPORTS in the TRENDS subdirectory of the RESEARCH directory in the SYS volume on the file server ORACLE, you would specify the entire directory path, as follows:

```
ORACLE\SYS:RESEARCH\TRENDS\REPORTS
```

This directory path is also referred to as the directory name.

The way your information is organized will help you determine how many levels and how many directories you need to create. You may need a very simple directory structure or one with several levels.

Once you have created your directory structure, you can copy files to or create files in any directory or subdirectory. A directory can contain any number of both files and subdirectories.

How drives are mapped

Like DOS, NetWare uses the letters of the alphabet to represent various data storage locations, or "drives." For example in DOS, drive A usually refers to the first floppy diskette drive; drive B refers to the second floppy diskette drive (if there is one). Depending on your workstation type, drive C might refer to a local hard disk.

Network drive mappings match a drive letter (F, G, H, and so on) to a particular location in the file server's directory structure so that you can easily access information found at that location.

NetWare recognizes three types of drive mappings: network drive mappings, search drive mappings, and local drive mappings.

Network drive mappings

When you map a network drive to a directory, you assign a drive letter to represent the drive and then specify a particular directory path that leads to the desired point in the directory structure.

When drives are mapped to directories, changing from one directory to another is more convenient because you can type in the drive letter (with a colon following) instead of typing the entire directory path.

For example, if you assigned drive letter G to the directory SYS:PROJECTS/CHRIS on the file server ORACLE, you could enter G: at the DOS prompt. The file server would know that the directory path you want is ORACLE/SYS:PROJECTS/CHRIS.

In this example, the DOS prompt would then be displayed as

```
G:\PROJECTS\CHRIS>
```

Each network user can assign different drive mappings to a particular drive letter. For example, user Chris might map drive G on her workstation to SYS:PROJECTS/CHRIS on the file server ORACLE, while another user Steve might map drive G on his workstation to SYS:HOME/STEVE/MYSTUFF.

Since network users assign drive letters differently, you need to specify the full directory name when you tell another user where a particular file is located. For example, you should say, "The file is in SYS:PROJECTS/CHRIS," not "The file is on drive G." (Although the file server name is a part of the full directory name, you do not need to mention it if you have only one file server.)

Search drive mappings

When you specify a file you want, the file server looks for the file in the directory to which you are currently mapped. If the file is not in that directory, you will see the message "File not found" or "Bad command or file name" on your screen.

However, you may need to access DOS or application files from many different directories. If you copied all needed files to each directory, the duplicate copies of files would take up too much disk space. In addition, you need immediate access to some files without having to move through the directory structure.

To solve this problem, NetWare uses search drive mappings that tell the file server to look for command or program files in a particular directory when it cannot find them in your current directory. You can put files in a specific directory and map a search drive to that directory. Then, if you request a file the file server cannot find in your current directory, the file server will look in any directory to which a search drive is mapped.

You should at least map search drives to directories that contain application files. Generally, the letters X, Y, and Z are reserved for search drives.

Suppose, for example, that word processing files are located in SYS:PUBLIC\WORDPROC on your file server and that you have mapped search drive X to this directory. Because a search drive has been mapped to the needed file, you can call up the word processing program no matter which drive in the directory structure you are working on.

Or suppose that the DOS command files are located in SYS:PUBLIC/IBM_PC/MSDOS/V3.30 and that you have mapped search drive Y to this directory. Whenever you enter a DOS command, the operating system will automatically look in the search drive directories to locate the DOS file and then execute your command.

Local drive mappings

Network drives and search drives, as discussed above, point to specific locations in the directory structure of the file server's hard disk.

Local drive mappings, on the other hand, point to disk drives installed in or attached to your workstation. These disk drives may be floppy diskette drives or hard disk drives.

DOS always reserves a certain number of drive letters (A, B, C, and so on) for any local drives on your workstation. (If you want to change the number of drive letters reserved for local drives, see your DOS manual for an explanation of the DOS LASTDRIVE command.)

Basic directory structure

NetWare automatically creates much of the necessary directory structure for you, but you can modify or add to this structure as needed. The directory structure you create in addition to the system-created directories will reflect

- The needs and structure of your organization or business;
- The way the information you work with is organized and the tasks you want to perform;
- Which users need to access what information.

System-created directories

The following directories are created automatically during network installation and cannot be deleted.

- The SYS:SYSTEM directory usually contains programs and files that are used only by the network supervisor.
- The SYS:LOGIN directory contains programs necessary for logging in.
- The SYS:MAIL directory contains a directory for each user that stores information such as the user's login script.
- The SYS:PUBLIC directory contains files that everyone needs to access. A system-created search drive is mapped to SYS:PUBLIC, and all users are granted Read, Open, and Search rights to this directory.

Directories you should create

In addition to the system-created directories, we suggest that you create the following directories:

- One or more DOS directories
- One or more application directories
- A "home" directory for each user

Each of these is explained under the corresponding headings in the remaining decisions in this module.

Ways to create directories

To create your network's directory structure, you can use either USERDEF, the FILER utility, or the DOS CD (Change Directory) and MD (Make Directory) commands.

With the USERDEF utility

The basic setup in USERDEF creates users' home directories as directories in SYS (SYS:BRUCE, SYS:RANDY, and so on).

If you want to create the users' home directories as subdirectories of another directory (such as SYS:HOME), you must create the parent directory using FILER and then create the home directories using the custom setup in USERDEF.

With the FILER utility

FILER allows more flexibility in creating directories than USERDEF. FILER is also menu driven so it may appeal to users who are more comfortable using menu utilities rather than utilities that are typed at the command line, such as CD and MD.

With the CD and MD commands

The DOS CD and MD commands also allow more flexibility in creating directories than USERDEF. These commands are entered at the command line.

Where to create DOS directories

If your users will need access to DOS files in order to use DOS commands on the network, we suggest that you create at least one DOS directory and copy the needed DOS files into it. DOS directories are created as subdirectories in SYS:PUBLIC so that they can be accessed by all network users.

Two factors determine how many DOS directories you will need on your network:

- How many workstation types you will be using
- How many different versions of DOS you will be using

It is simpler if all workstations are the same type and if they run identical versions of DOS. This way, you need only one DOS directory on the network. If possible, we recommend that you use only one version of DOS.

So that users can access DOS files, you should map a search drive to the appropriate DOS subdirectory. As members of the group EVERYONE, all users have Read, Open, and Search rights to subdirectories of the SYS:PUBLIC directory. These rights are required to use a program or command file.

Naming conventions

You must determine a unique name for each DOS directory you create. Part of this name will include a six-letter name to substitute for the long machine name for each workstation.

Long machine name

The NetWare shell and the LOGIN utility use the long machine name to identify the workstation and set a search path to the correct version of DOS for the machine. The six-letter name you select is also used in the name of the DOS directory.

Use the following rules in formulating an appropriate long machine name:

- No spaces should be used. If you want, use the underscore character (`_`) to indicate a space.
- All IBM brand workstation types must use the name "IBM_PC" as the long machine name. (This is the default long machine name.)
- For other workstation types, use any six characters that will readily identify the type of workstation. For example, "COMPAQ" might identify a Compaq workstation; "CORONA" might identify a Corona workstation.

DOS directory names

DOS directories are named according to the following convention:

```
SYS:PUBLIC\long machine name\MSDOS\DOS version
```

For *long machine name*, substitute the six-letter name you assign to each workstation type.

Always use "MSDOS" (even if you are using PC-DOS) for the directory level between the long machine name and the DOS version.

For *DOS version*, substitute the DOS version number used by that particular workstation using the format `Vx.xx` (for example, `V3.30` or `V2.10`).

For example, the DOS directory name for an IBM PC workstation running MS-DOS v3.20 would be

```
SYS:PUBLIC/IBM_PC/MSDOS/V3.20
```



On the Directories Worksheet, record the DOS directories you plan to create. (The standard naming convention for DOS directories is indicated on the worksheet.)

Where to create application directories

Users will need to access the applications you install on your network. Check the documentation that accompanies each application for suggestions for using the application on a network and for the information you need before installing the application.

Users are given access to application files in much the same way they are given access to DOS files: you should map a search drive to the directory containing the application files, and users must have Read, Open, and Search rights in the directory.

Application program files can be copied into your directory structure in several ways. Each has advantages and disadvantages, as summarized below.

Copy the application files directly into SYS:PUBLIC

The main advantage of this method is that you do not have to map a separate search drive or assign rights for each user; NetWare automatically maps a search drive to SYS:PUBLIC and gives users Read, Open, and Search rights to that directory.

The disadvantage of this method is that third-party application files will be intermixed with the NetWare utilities in SYS:PUBLIC, making it more difficult to upgrade your network later. There is also the possibility of an application file's having the same filename as a NetWare utility file or another application's file. (Two files with the same filename cannot coexist in the same directory; one will overwrite the other.)

If you set up your network environment using the USERDEF utility, the USERDEF defaults work best with this method of handling application files. Users are automatically assigned a basic login script that contains a search drive mapping to SYS:PUBLIC.

Copy each application into separate subdirectories of SYS:PUBLIC

The advantage to this method is that each application's files are separated from the NetWare utilities in SYS:PUBLIC, making it easier to upgrade both NetWare and the applications. If you place the subdirectories in SYS:PUBLIC, you do not have to assign trustee rights to each application directory; the Read, Open, and Search rights granted to the group EVERYONE in SYS:PUBLIC extend down to all subdirectories.

The disadvantage of this method is that setting up your network is slightly more involved. You will have to include a search drive mapping to each application directory either in the system login script or in the login script of every user who will use the applications.

If you want to use this method, you must customize the default login script in USERDEF to include additional search drive mappings to the separate application directories.

Create separate directories in the SYS volume

A third way to copy applications is to create a separate directory in the SYS volume (for instance, SYS:APPS) and then create subdirectories under this directory for each application. Or, you could create separate directories in the SYS volume for applications whose access you want to restrict (for instance, SYS:ACCTG for accounting applications that will be used only by accountants).

The advantage of this method is that each application's files are separated not only from the NetWare utilities in SYS:PUBLIC but from the other applications, making upgrading both NetWare and the applications easier. With this method, you can assign additional rights (besides Read, Open, and Search) in the application directories to allow data files to be created and modified in the directories.

The disadvantage is that you must ensure that each user's search drive mappings and trustee rights are assigned appropriately.

If you want to use this method, you must customize the default login script in USERDEF to include additional search drive mappings to the separate application directories. If you set up your network environment using the SYSCON and FILER utilities, you can create a system login script that includes the additional drive mappings you will need.

Whatever utility you use to set up the network, you will have to make appropriate trustee rights assignments using either the SYSCON menu utility or the GRANT command line utility.



On the Directories Worksheet, record the directories you will create for your applications.

Where to create home directories

It is usually a good idea to create a home directory for each network user. For easy identification, usernames should be assigned as home directory names. The directories can be created either in the SYS volume (for instance, SYS:CRAIG) or in a subdirectory of the SYS volume (for instance, SYS:HOME/CRAIG).

If you plan to use the default setup of USERDEF to create your network environment, USERDEF will create home directories in the SYS volume (this is explained in more depth in the Planning the Network Environment module on page 197).

Users are granted all trustee rights in their own home directories. Each user can then protect files in his or her individual home directory. With all rights, the users can create subdirectories in their own home directories, copy selected files to the subdirectories, set the maximum rights mask, and even grant other users access to the subdirectories. However, the users cannot restrict the user SUPERVISOR, who has all rights to all directories.

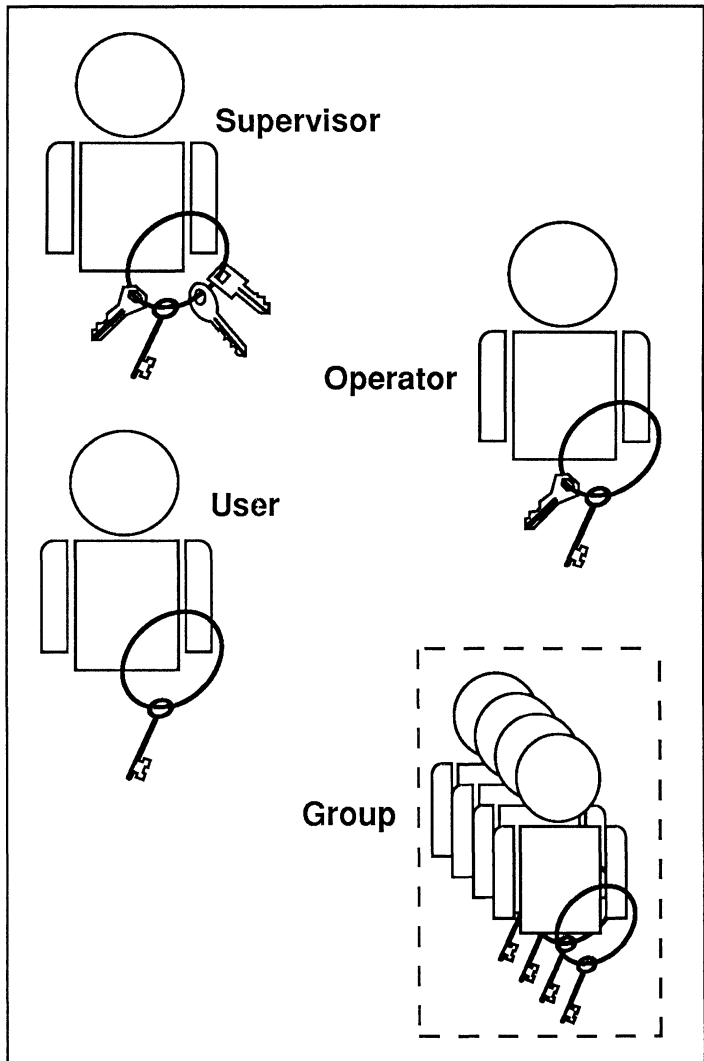


On the Directories Worksheet, record the home directories you plan to create.

Network Users and Groups

This module begins with an explanation of the different types of network users. It contains information about groups and suggests reasons for creating them. It also contains information to help you make decisions about the following:

Decision	Page
Which users and groups to create	176
Whether to designate users as operators	177



Network Users

There are three types of network users: the supervisor, users, and operators. Users can be organized into groups.

Types of network users

Network users are the persons who will be working at workstations on the network. You will create user identities on the file server. The users can then log in to the file server and gain access to files stored on the file server and to network peripherals.

Users can be assigned various levels of responsibility on the network:

- Regular network users
- Operators
- Network supervisor

Regular network users can run applications and work with files according to the rights you assign them.

If needed, you can delegate rights and additional responsibilities to a network user by designating that user as an operator.

The network supervisor may be responsible for setting up the network and generally maintains the working environment of the network after its installation.

Automatically created users

The system automatically creates two users: SUPERVISOR and GUEST.

The user SUPERVISOR

The user SUPERVISOR has all rights in all directories. These rights cannot be revoked, nor can the user SUPERVISOR be deleted or renamed.

Because the user SUPERVISOR initially has no corresponding password, the network supervisor can log in to the file server when setting up the network environment.

The user SUPERVISOR can grant other users a supervisor security equivalence, thus granting them all rights to all directories.

The user GUEST

The user GUEST is created for anyone who needs temporary access to a file server.

User GUEST is automatically made a member of the group EVERYONE and has only those rights granted to EVERYONE. As long as no Write, Delete, or Parental rights are granted to GUEST, guest users cannot change or delete files.

You can

- Assign a password for GUEST;
- Change GUEST's trustee rights;
- Delete GUEST as a user on the file server.

Ways to create users

As network supervisor, you create all users not created by the system. ELS NetWare Level II provides three different utilities for creating users: USERDEF, SYSCON, and MAKEUSER.

Whichever method you use to create users, the new users are automatically granted all rights except the Parental right in their own "mailboxes" in the SYS:MAIL directory where user login scripts are stored. They are also assigned to the group EVERYONE and have the corresponding rights granted to that group.

With the USERDEF utility

You can create multiple users all at one time using the USERDEF utility.

When users are created with the defaults provided in USERDEF, each new user is automatically given a basic login script with search drives mapped to SYS:PUBLIC and the appropriate DOS directory, and with the first network drive mapped to the user's default directory.

USERDEF also supplies new users with a username, an initial password, and other information necessary to begin work on the network.

You can also customize the way USERDEF creates new users.

With the SYSCON utility

You can create users individually with the "User Information" option in the SYSCON utility. No matter which utility you use to create users, you will need to use the SYSCON utility to modify user accounts for existing users or to delete existing users.

With the MAKEUSER utility

Users can also be created with the MAKEUSER utility. This method is recommended only for experienced network supervisors who want to create multiple users without the limitations of using USERDEF. MAKEUSER is documented in the *Reference for ELS NetWare Level II*.

What are groups and how are they useful?

When several network users have similar needs for information or perform similar tasks, you can assign the users to a network "group." By organizing your users into groups, you can deal with the members of the group collectively rather than individually.

System-created group

One group, EVERYONE, is automatically created to allow you this functionality. When users are created, they automatically become members of the group EVERYONE.

The group EVERYONE is automatically assigned Read, Open, and Search rights in SYS:PUBLIC and Write and Create rights in SYS:MAIL.

As user SUPERVISOR, you can

- Delete any user from the group EVERYONE;
- Change the group EVERYONE's trustee rights in any directory (including rights automatically granted by the system).

Supervisor-created groups

You can create other groups that fit the way your business is organized, the tasks that must be performed, and the information needed to perform those tasks. You will assign a name to each group you create, just as you assign a username to each network user.

Ways to create groups

You create groups using the "Group Information" option of the SYSCON utility. You must assign a name to the group; you can also assign a full name, if you choose, to identify the group more completely.

Groups are first created without any members. You can then assign members to a group in several ways:

- When you create a new group in SYSCON, you can assign any existing users to the group.
- When you create a new user in SYSCON, you can assign the user to any existing group.
- When you run the USERDEF utility using a customized template, you can create multiple users and assign them all to any existing groups.

In all cases, groups are created using the SYSCON utility before the users are added.

Which users and groups to create

As network supervisor, you will create the users and groups you need in your network environment. When individual users are created, they are automatically granted all rights except the Parental right in their own mailbox directories in SYS:MAIL. New users are also assigned to the group EVERYONE and have the corresponding rights granted to that group.

Although ELS NetWare Level II is an 8-user system, there is no practical limit to the number of users you can create. Only 8 users, however, can be logged in at the same time.

If you think of the users on your network in terms of groups, setting up trustee security will be much easier. Users can be classified into groups by the tasks they perform and by the information they need.

Consider these questions:

- Who are the users?
- What functions do they perform?
- What information do they need?
- What directories do they need access to?
- Will some users have the same functions and information needs so they can be classified as a group?



On the Users and Groups Worksheet, record the users you plan to create. Then record the usernames you will assign, what applications each user will use, and what directories they will need access to. Based on these decisions, also record the groups you want to create and the users that will be in each group. (Users can belong to more than one group.)

Whether to designate users as operators

Part of your responsibility as network supervisor is to control the activity on the network and keep the network running smoothly. You may prefer to delegate part of this responsibility to other users by designating them as print queue operators or file server console operators. Assigning users to be operators is entirely optional.

Print queue operators

Print queue operators are discussed in the Network Printers planning module on page 119.

File server console operators

File server console operators can help manage the file server by using the FCONSOLE utility to perform such tasks as

- Broadcasting messages;
- Purging salvage files;
- Viewing information about the performance of the network and the file server.

You can assign console operators using the "Supervisor Options" menu in the SYSCON utility (refer to the *Reference for ELS NetWare Level II*).



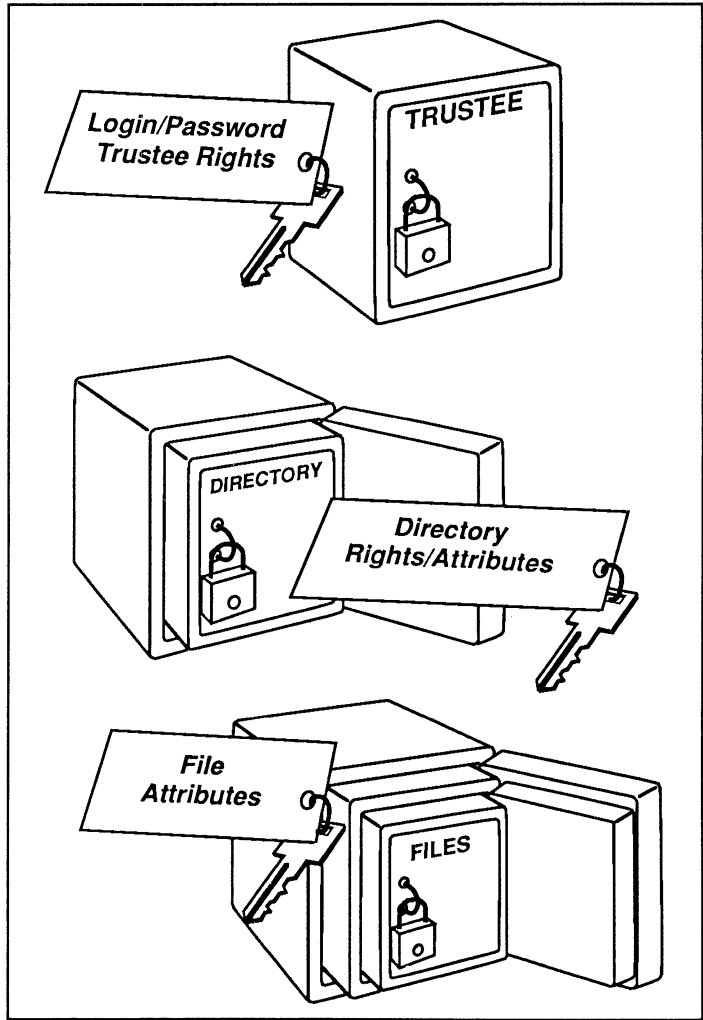
On the Users and Groups Worksheet, record which users or groups you plan to assign as file server console operators.

Notes

Network Security

This module begins with an explanation of the different types of network security. It also contains information to help you make decisions about the following:

Decision	Page
What login security to implement	182
What password security to implement	184
What trustee security to implement	186
What directory security to implement	191
What file and directory attributes security to implement	193



The Four Levels of Network Security

At the user level, access is controlled by login/password security and trustee security. At the directory level, access is controlled through directory rights and attributes. At the file level, access is regulated by file attributes.

The four levels of network security

Because security is often a concern in a multiuser environment, NetWare provides an extensive security system to protect your data. NetWare allows you to control not only who may access particular directories and files but also what tasks users may perform within those directories and files. By setting up effective security, you can prevent users from corrupting data in shared files and prevent unauthorized users from accessing restricted files.

NetWare network security is managed at four levels:

- Login/password security
- Trustee security
- Directory security
- File/directory attributes security

These levels of security are generally used in combination.

What login security to implement

Login security applies to all users. Login security controls access to the network by determining who may log in to the file server.

Username

Persons can log in to the file server only when they know a valid "username" and its corresponding password. A username represents a user identity that the file server recognizes; passwords are optional.

The username for the network supervisor is SUPERVISOR. When you create a user on the file server, you assign the username that person will use for logging in. (You can also create another username for yourself. You should log in as SUPERVISOR only when you have supervisor tasks to perform.)

Login security parameters

As supervisor, you have the option of setting up restrictions for any of the login security parameters explained below. You can set system-wide restrictions that will apply to all users, or you can set different restrictions for each user.

Time restrictions

You can limit the hours or even the days during which a user can log in to the file server.

Station restrictions

You can restrict a user to specific workstation addresses so that the user will be able to log in only from assigned workstations. (You cannot set system-wide station restrictions; they must be set for each user.)

Concurrent connections

You can limit the number of workstations from which a user can be logged in to the file server at the same time.

Intruder detection/lockout

You can help prevent unauthorized users from logging in to the file server by activating the "Intruder Detection/Lockout" option. After an intruder makes several unsuccessful attempts to log in using an incorrect password, the file server will "lock" the intruder out.



On the Users and Groups Worksheet, record login security restrictions you plan to activate system wide. If you want to set different restrictions for each user, record them on a separate sheet of paper for each user.

What password security to implement

Password security is usually used in combination with login security. The two in combination work like this: when a user accesses the LOGIN utility, the user is prompted for a login name. The user must then supply the username he or she has been assigned. (The username may be typed in either upper-case or lower-case letters.)

If the username has a corresponding password, the user is also prompted for the password. Like usernames, passwords may be entered in either upper-case or lower-case letters. Passwords do not appear on the workstation screen as they are entered; this prevents unauthorized users from seeing passwords.

If the file server does not recognize the username or if the password is not entered correctly, access to the file server is denied. The generic "Access to Server Denied" message prevents unauthorized users from knowing whether the username or the password was incorrect.

Password security parameters

Passwords are an optional security feature implemented using the SYSCON utility (refer to the *Reference for ELS NetWare Level II* for more information on SYSCON).

Require passwords

You can decide whether to require users to have passwords. If so, you can require that passwords be a certain length.

Force periodic password changes

If you decide to require passwords, you can require that users change their passwords at regular intervals.

Limit grace logins

If you require users to change their passwords periodically, you can also specify how many times a user can log in after his or her password has expired.

Require unique passwords

You can require users to specify unique passwords (passwords that they have not used before) when they change their passwords.



On the Users and Groups Worksheet, record any password restrictions you plan to assign system wide. If you want to set different restrictions for each user, record them on a separate sheet of paper for each user.

What trustee security to implement

You can set up trustee security to control which directories a user can access and what work the user is allowed to do in the files or subdirectories in those directories. A user who has rights to work in a directory is known as a "trustee."



The user SUPERVISOR has all trustee rights in all directories. These rights cannot be deleted.

What are the trustee rights?

The eight trustee rights and the privileges associated with them are explained below.

Read

Allows a trustee to read (view the contents of) an existing open file.

Write

Allows a trustee to write to (change the contents of) an existing open file.

Open

Allows a trustee to open existing files.

The Open right in combination with Read and Write privileges allows a trustee not only to view but also to change the contents of existing files.

Create

Allows a trustee to create new files and directories. A newly created file is automatically opened when it is created (the Open right is not required in this instance).

Although a trustee with the Create right may create a file, the trustee cannot write to the file without Write privileges. If the trustee does have Write privileges, the trustee may create a file, place data in it, and close it. However, once the new file is closed, the trustee cannot reopen, read, or edit the file without the rights to Open, Read, and Write.

Delete

Allows a trustee to delete files and directories.

Parental

Allows a trustee to assign other trustees rights to the directory and its subdirectories, thus controlling directory and subdirectory access.

Allows a trustee to assign restrictions to the directory and its subdirectories.

The Parental right in combination with the Modify right allows a trustee to rename directories and to alter some of the extended information (such as the creation date and time) of any of the directory's subdirectories.

Search

Allows a trustee to search (list the files in) a directory.

Modify

Allows a trustee to modify the attributes of any file, rename files, and rename directories. However, the name and contents of a file may be changed only if the file is flagged with the Read-Write file attribute. (File attributes are explained more fully under "What file and directory attributes security to implement" on page 193.)

The Modify right in combination with the Parental right allows a trustee to rename directories and alter some of the extended information (such as the creation date and time) of any of the directory's subdirectories.

Conventions used to designate rights

When the letters representing these eight rights appear on your computer screen or in NetWare documentation, they are usually enclosed in brackets, as in the following:

[RWOCPSM]

By convention, if some rights have not been assigned, the absence of each is indicated by a blank space, as in the following:

[R O S]

In the example above, the user can read from open files, open existing files, and search the directory for files. The user cannot write to open files, create new files, delete existing files, exercise any parental rights, or modify file attributes.

How trustee rights are assigned

Users can be assigned any combination of the eight trustee rights.

Users must be granted trustee rights for each directory they need to access. Once a user has been given trustee rights in a directory, those rights extend down through that directory's subdirectories; however, the trustee rights can be redefined at some lower level.

Because trustee rights extend to subdirectories, you must be careful when assigning users the Parental right in a directory. Trustees with the Parental right in a directory can reassign themselves rights in the subdirectories if their rights in those subdirectories have been revoked.

Trustee rights can be granted directly to users or groups. When rights are granted to a group, those rights are automatically granted to each member of the group. Trustee rights can also be granted indirectly through security equivalences.

What is a security equivalence?

In certain instances, you may want to assign a user rights through a security equivalence rather than assigning rights directly to that user. Security equivalence allows a user to exercise rights equivalent to those of another user.

Assigning a security equivalence is useful when you need to give a user temporary access to the same information another user has access to. For example, if user CRAIG has exclusive rights to a spreadsheet application on the network and user JUDITH needs to use the spreadsheet program for a day to complete a special project, you could assign user JUDITH a security equivalence to user CRAIG for the day.

By using a security equivalence, you avoid having to review the whole directory structure and recall which rights need to be assigned in which directories when you want one user to be able to perform the same tasks or access the same information as another.

A user's rights are a combination of those granted directly by a trustee assignment and those granted indirectly by a security equivalence to another user.

For example, although user JUDITH has no rights in a directory as a trustee, she has a security equivalence to user CRAIG, who has been given all rights in that directory. Therefore, user JUDITH has all rights in that directory.

Only the network supervisor can assign security equivalences. In networks containing confidential data that only selected users have access to, you should take care that you do not inadvertently give a user access to restricted information. For example, if you make user CRAIG (a data entry clerk) security equivalent to user RAY in the payroll department, Craig can access any of the payroll directories and files that Ray has access to.

Security equivalences apply only to the trustee rights actually assigned to a user. That is, if user JUDITH is security equivalent to user CRAIG, making user RAY security equivalent to JUDITH does not give Ray the rights of Craig.

You can also assign a user a security equivalence to a group. The result is the same as making the user a member of the group; in fact, a user who has a security equivalence to a group will be listed as a member of the group in SYSCON.

The maximum number of security equivalences you can assign to one user or group is 32.



On the Trustee Security Worksheet, record the trustee rights you want to assign to each user or group.

What directory security to implement

Directory security controls the rights of all trustees, except the supervisor, in a given directory.

Each directory has a "maximum rights mask." When a directory is created, the rights mask includes the same eight rights that apply to trustee security.

- R Read from open files
- W Write to open files
- O Open existing files
- C Create (and simultaneously open) new files and directories
- D Delete existing files and directories
- P Parental (set trustee and directory rights in that directory; set trustee and directory rights in its subdirectories)
- S Search the directory for files
- M Modify file attributes

When the letters representing these eight rights appear on your computer screen or in NetWare documentation, they are usually enclosed in brackets, as in the following:

[RWODPSM]

By convention, if a right has been deleted, its absence is indicated by a blank space, as in the following:

[R O S]

Directory security rights take precedence over individual trustee rights.

How to implement directory security

To implement directory security, you must delete rights from the maximum rights mask of a given directory. This prevents trustees from exercising some (or all) of the trustee rights they have been granted as trustees for that directory. For example, if you create a new directory and delete the Parental right from the maximum rights mask, no users (except SUPERVISOR) can exercise the Parental right in that directory.

Directory security restrictions apply only to the files of one specific directory. They do not extend down through successive subdirectories.

Directory restrictions are usually set first and take precedence over trustee assignments. The rights that take precedence are called effective rights.

Determining a user's effective rights

Effective rights are the rights a user can actually exercise in a given directory. A user's effective rights depend on both the user's trustee rights and the rights allowed in the directory's maximum rights mask.

A user must have the following to have a particular effective right in a directory:

- The right must be assigned to the user, either directly as a trustee right or indirectly with a security equivalence.
- The directory's maximum rights mask must allow that right.

In other words, trustee rights and directory rights intersect to determine effective rights.

For example, if a directory's maximum rights mask includes the Delete right but the user's trustee rights do not, the user will not be allowed to delete a file in that directory.

Similarly, although a user has the Create right as a trustee of a directory, the user will not be allowed to create a file in that directory if the Create right has been deleted (revoked) from the directory's maximum rights mask.

Remember, trustee rights apply down through successive subdirectories until they are redefined at a lower level. However, directory rights must be set in each directory; they are not inherited by successive subdirectories.



Normally, directory rights are restricted only in special situations. Be sure you carefully consider the full effect of restricting directory rights before you change a directory's maximum rights mask.



On the Directories Worksheet, indicate which rights you want to delete from the maximum rights mask of each directory that you want to restrict.

What file and directory attributes security to implement

The following sections describe file and directory attributes security.

File attributes security

You (or users with Parental and Modify rights) can use file attributes security to control whether a specific file can be modified or shared.

File attributes security is mainly used to prevent accidental changes in or deletions of individual files. File attributes security is particularly useful for protecting public information files, which are typically read by many users. It might be impossible to reconstruct such files if they were changed or erased.

File attributes take precedence over a user's effective rights and, therefore, over both trustee assignments and directory security.

For example, if a file has been set to (flagged) Read-Only, a trustee will not be able to write to the file, rename the file, or delete the file, regardless of the trustee's effective rights.

File attributes restrict even SUPERVISOR's access to files. Of course, as network supervisor you can always change file attributes. SUPERVISOR always has all rights in all directories, including the Modify right, which allows you to change file attributes.

You can change file attribute settings using the FLAG command line utility or the FILER menu utility. Both are explained in the *Reference for ELS NetWare Level II*.

Although several file attributes affect network users, only the four listed below apply directly to security. The default file attributes of a newly created file are Non-shareable/Read-Write.

Read-Write

Allows users with appropriate trustee rights to read from, write to, rename, or delete a file.

Read-Only

Allows users to read a file. They cannot write to, rename, or delete the file, regardless of their other rights.

If you intend to flag any files as Read-Only, you should explain file attributes security to users so they will understand why they cannot rename or change such files.

Shareable

Allows a file to be read by more than one user at a time. This attribute is usually used with the Read-Only attribute so that files will not be corrupted.

Non-shareable

Allows only one user at a time to access a file.

Directory attributes security

You can set attributes on directories and subdirectories with the new FLAGDIR command line utility. This feature is especially useful if you are installing NetWare for Macintosh. You must have Modify and Parental rights in the parent directory to set the directory attributes. Directory attributes are explained below.

Normal

Indicates that no attributes have been set. This attribute corresponds to the public folder in the Macintosh environment.

Hidden

Hides the directory so it cannot be seen in a directory listing by any users. This attribute does not prevent a user from accessing that directory.

System

Indicates that the directory is used for the system to function. A directory flagged with this attribute will not appear in a directory search.

Private

Allows users to see the directory listing but not the contents of the directory unless they have Search rights in that directory.

This attribute does not prevent users from accessing the directory or its subdirectories if they know the correct path. The private attribute corresponds to the private (gray) folder in the Macintosh environment.



On the Directories Worksheet, record any file attribute(s) you want to set and the files you want to set them in.

If you want to set directory attributes security, record the attributes you want to assign.

Planning the Network Environment

This module begins with an overview of the different methods you can use to create your network environment. It also contains information to help you make decisions about the following:

Decision	Page
Whether to limit concurrent connections	202
Whether to require passwords	203
Whether to limit disk space	204

Creating a Network Environment

1. USERDEF

**Default
Template**

2. USERDEF

**Custom
Template**

3. SYSCON and FILER

Creating the Network Environment

The network environment can be created three ways: using the default template of USERDEF, using the custom template of USERDEF, or using both SYSCON and FILER.

Whether to use SYSCON and FILER or USERDEF

ELS NetWare Level II enables you to create your network environment using a variety of utilities. This manual explains how to set up your network environment three different ways:

- Using the basic setup procedure of USERDEF
- Using the custom setup procedure of USERDEF
- Using the SYSCON and FILER utilities to create the most customized environment

When to use the basic USERDEF setup

A default template is provided with the USERDEF utility. (A template is a pattern or mold that determines the features of the network environment.) The default template provides most of the features your users will need to begin working on the network.

USERDEF's basic setup allows you to

- Create one DOS directory;
- Store your application program files in SYS:PUBLIC;
- Create all users' home directories in the SYS volume (for example, SYS:MARILYN).
- Assign users only to the system-created group EVERYONE;
- Install no accounting features;
- Include only basic drive mappings in the login script;
- Include only default login and password restrictions. (These will be explained later in this module.)

To use the default template, the following must apply to your network:

- All workstations on your network must be the same type of machine and use the same version of DOS. (Thus you need only one DOS directory on the file server.)

Instructions for creating multiple DOS directories are not included in the basic setup procedure. If you have non-IBM workstations (such as COMPAQ or other IBM compatibles) or if some of your IBM PCs use a different version of DOS than others, you should choose either the custom setup of USERDEF or the SYSCON and FILER combination to create the network environment.

- You must be using printers that are listed in the Network Printers module (see page 131).

A printer definition database is provided with ELS NetWare Level II for these commonly used printers. If your printer is not on this list, you will have to create your own printer definitions using the PRINTDEF utility before you run PRINTCON to set up the printer configurations. Instructions for using PRINTDEF are not included in the basic setup procedure.

When to use the custom USERDEF setup

You can create your own template that allows you to customize your user environment with the USERDEF utility.

The custom setup allows you to

- Create multiple DOS directories;
- Create separate directories for application program files;
- Create home directories in any existing directory (not just in the SYS volume);
- Assign users to groups in addition to the system-created group EVERYONE;
- Install accounting on the file server, and supply an initial account balance for newly created users;

- Include additional drive mappings in the login script;
- Include parameter settings to change the login/password restrictions and account restrictions.

To use custom templates, you must take some additional steps before you run USERDEF. For example,

- If you want the users' home directories created in a directory other than the SYS volume, you must first create that directory using FILER or the DOS MD (Make Directory) command.
- If you want to assign initial account balances or make new users members of groups other than EVERYONE, you must first install accounting or create the other groups using SYSCON.
- You must set up the print configurations for SUPERVISOR in PRINTCON before you run USERDEF.

When to use SYSCON and FILER

You can customize your network environment to the greatest extent by using the SYSCON and FILER utilities. For example, you can specify the initial account balance, create printing configurations using the PRINTDEF and PRINTCON utilities, or specify whether or not you want to use passwords.

Even if you use USERDEF to create your network environment, you can use SYSCON and FILER to modify your original setup.

If you plan to use SYSCON and FILER or the default setup of USERDEF, you have completed this module.

If you plan to use the custom USERDEF setup procedure, continue with the following decision.

Whether to limit concurrent connections

If you want to limit the number of workstations a user can be logged in from, you can change the "Limit Concurrent Connections" parameter. The default setting is no limitations. If you decide to limit concurrent connections, the maximum number is 8.



On the USERDEF Template Worksheet, record whether you want to limit concurrent connections. If you want to limit them, record the number of concurrent connections you want to specify.

Whether to require passwords

You can also specify whether you want to require users to use passwords. The default setting is to require passwords.

If you decide to require passwords, you can also specify the minimum number of characters in the password. The minimum password length is five characters.

You can also specify whether or not you want to force periodic password changes. The default setting requires passwords to be changed at fixed intervals.

If you want users to change their passwords periodically, you can specify the interval. The default setting for the "Days Between Forced Changes" parameter is 90. (Ninety days after the user first logs in with a password, he or she receives a message that the password has expired and that a new password must be entered.)

You can also specify that passwords be unique (one the user has not used before on the file server). The default setting is "Yes."



On the USERDEF Template Worksheet, record whether you want to require passwords.

If you do want to require passwords, record

- The minimum password length you want to specify.
- Whether or not you want to force periodic password changes. If you do, record whether you want to accept or change the default setting for the number of days between settings. If you want to change the setting, record the number of days you want to specify.
- Whether or not you want to require unique passwords.

Whether to limit disk space

You can limit the amount of file server disk space each user can use. The amount of disk space is specified in kilobytes (KB).

The default is not to limit disk space.

To limit the disk space, you must enter the maximum disk space you want to allocate each user. Do not allocate more disk space than is available (the amount available will be shown when you run USERDEF); the total number of users created with the template multiplied by the amount of disk space per user should be less than the total available disk space. The minimum disk space you can specify is 4KB. (Any number of kilobytes you enter will be rounded to the nearest multiple of four.)



On the USERDEF Template Worksheet, record whether you want to limit disk space. If so, record the maximum disk space you want to allocate for each user.

Planning Login Scripts

This module begins with an explanation of login scripts. The module also contains descriptions of commands used in login scripts and provides several examples of login scripts. In addition, this module contains information to help you make decisions about the following:

Decision	Page
Whether to map to the NetWare utilities directory	208
Whether to map to DOS directories	209
Whether to map to application directories	210
Whether to map to home directories	211

Login script overview

You can create login scripts with the SYSCON utility. The SYSCON utility has a self-contained screen editor and a help system that you can use as you create or edit login scripts.

If you plan to create your network environment using USERDEF, USERDEF automatically creates login scripts for each user. These automatically created login scripts allow users to access the NetWare utilities and the DOS and home directories and should be sufficient for your network needs. If so, you don't need to read this module.

What is a login script?

A login script is a set of instructions that directs your computer to perform specific actions when you log in to the network. There are two types of login scripts: the system login script and individual user login scripts.

The system login script instructs all workstations on the network to perform the same actions upon login.

A user's login script executes after the system login script and specifies the user's individual drive mappings. Users can change their own login scripts.

Using a login script, you can also create sign-on messages and modify a user's DOS environment.

You can create different login scripts for each file server on which you have been created as a user; however, the script will be interpreted and executed only for the file server you specify when you log in.

If you do not create a login script for a certain file server, a default script will be executed when you log in.

Drive mappings in login scripts

The first decisions in this module focus on drive mappings and search drive mappings in the login script. Other login script commands are explained under "Login script commands" on page 212.

Make sure you are familiar with the information on drive mappings in the Directory Structure module of this manual and with the MAP command, which is explained on page 241.

The system login script allows you to set drive mappings and search drive mappings for all network users. Any drive mappings in the system login script will be in effect each time the user logs in to the file server.

Mapping drives for groups

If you have organized your users into groups, you can customize login scripts for different groups without having to create a login script for each individual user.

For example, if User1 were a member of the group WRITERS, you could map drives in the system login script to the ARTICLES and CURRENT PROJECTS directories used by the Writing department. When the user logs in, the system checks to see if the user belongs to the group WRITERS. The login script could include commands similar to the following:

```
IF MEMBER OF "WRITERS" THEN BEGIN
MAP *2: =SYS:ARTICLES
MAP *3: =SYS:CURRENT PROJECTS
END
```


Mapping drives for users

You can also include specialized drive mappings in each user's individual login script.

If you want to create a system login script and individual login scripts, make a photocopy of the Login Script Worksheet for each login script you will create.

Whether to map to the NetWare utilities directory

To enable workstations on your network to automatically access any of the NetWare utilities, include a command similar to the following in your system login script:

```
MAP INS Sx: =SYS:PUBLIC
```

This command maps a drive to SYS:PUBLIC, enabling all users to access the NetWare utilities. The "S" stands for search drive; replace the *x* variable with the number of the search drive.



On the Login Script Worksheet, write the commands you want to include in the system login script to enable users to access the NetWare utilities.

Whether to map to DOS directories

You must "tell" the NetWare operating system how to find the correct DOS directory for each workstation type and DOS version. To do this, you must create a search drive in the system login script and use the COMSPEC command to reload the COMMAND.COM file in workstations. (You must be logged in as the SUPERVISOR to create the system login script.) Include commands similar to the following in the system login script:

```
MAP INS Sx: =  
SYS:PUBLIC\%MACHINE\%OS\%OS_VERSION  
COMSPEC=Sx:COMMAND.COM
```

The first command maps a drive to a DOS directory, enabling all users to access the correct DOS directory.

The second command ensures that the COMMAND.COM file will reload properly into each workstation when an application is exited.

In the above examples, "S" stands for search drive; replace the *x* variable with the number of the search drive.



On the Login Script Worksheet, write down the commands you want to include in your login script if you want the system login script to enable users to access DOS.

Whether to map to application directories

Search drive mappings to any application directories must be included in the login script.

For example, to create a search drive mapping to an application directory in SYS:PUBLIC, you would include the following command in the system login script:

```
MAP INS Sx: =SYS:PUBLIC\application directory
```

You should include a command like this for each application you want to map a search drive to. Use a different search drive number (*x*) for each mapping.



Users should not use search drives S1, S2, or S3 in their personal login scripts. Otherwise, the search drive mappings in the system login script will be overwritten. Users should create personal search drive mappings using search drive numbers not used by the system login script (generally S4 or higher).



On the Login Script Worksheet, record the commands you want to use to map drives to application directories.

Whether to map to home directories

You can also map a drive to each user's home directory by including the following in the system login script:

```
IF LOGIN_NAME != "Supervisor" THEN
    MAP*1:=SYS:HOME/%LOGIN_NAME
```

As long as the login name is not SUPERVISOR, this command will map the first network drive to the user's home directory (if the name of the home directory is the same as the user's login name).



On the Login Script Worksheet, record the commands you want to use to map a drive to each user's home directory.

Login script commands

You can use the following login script commands to customize your login script:

ATTACH
BREAK
COMSPEC
DISPLAY AND FDISPLAY
DOS BREAK
DOS SET
DOS VERIFY
DRIVE
EXIT
EXTERNAL PROGRAM EXECUTION (#)
FIRE PHASERS
IF ... THEN
INCLUDE
MACHINE NAME
MAP
PAUSE
PCCOMPATIBLE
REMARK
WRITE

Each login script command is explained in this section. The commands appear in alphabetical order.

Only a few restrictions apply to creating login scripts.

- Command lines cannot exceed 150 characters. To increase readability, however, we recommend that you use only 78 characters per line, which is the width of your screen.
- Only one command can be entered on each line.

Use **ATTACH** to connect to additional network file servers without interrupting the current execution of the login script.

Command format

```
ATTACH [file server[/username[:password]]]
```

How to use ATTACH

Enter this command in your login script. Type

```
ATTACH <Enter>
```

You can also specify a file server, a username, and a password. If you use the **ATTACH** command without supplying these variables, you will be prompted to enter them when you log in. The following prompts appear (one at a time) on your screen:

```
Enter the server name:
```

```
Enter login name for server file server:
```

```
Enter password for server file server:
```

You will be prompted to enter only those variables that you have not included. For example, if you enter **ATTACH** and the name of the file server in your login script, you will be prompted to enter only the login name and password for that file server when you log in.

Example

To attach to file server FS2 as the supervisor (whose password is "Pizza"), you would type the following in the login script:

```
ATTACH FS2/SUPERVISOR;PIZZA <Enter>
```

ATTACH (cont.)

We do not recommend that you attach to file servers from a login script unless the connection is required for supervisory reasons or for regular, frequent sharing of network resources. For occasional network communication, it is better to execute the ATTACH command line utility.

If there are several file servers to which you regularly attach, we recommend that you use the same username and password on each file server (unless you attach as GUEST, since GUEST usually does not require a password). In this case, the command ATTACH FS2 will attach your workstation to FS2 and log you in using the username and password you specified when you logged in to the default file server.

However, even if you use different usernames and passwords for different file servers, you can still place the ATTACH FS2 command in your login script. The login program will prompt you to enter the username and password (if a password is required) for the file server to which you are attaching.

By using the same username and password on several file servers and attaching to them in your login script, you will also gain an additional advantage. If your password expires on any of the servers, the login program will let you enter a new password and synchronize your password on all other file servers for which you have a username and password.

Use **BREAK ON** to stop the execution of your login script during login. If you include the **BREAK OFF** command in your login script, you will not be able to stop the execution of your login script.

Command format

BREAK ON|OFF

How to use BREAK

If you have entered the **BREAK ON** command in your login script, you can press <Ctrl> C or <Ctrl> <Break> at any time you want to abort the normal execution of your login script.

To specify whether the execution of your login script can be stopped, enter the appropriate version of this command in your login script. Type

BREAK ON <Enter>

or

BREAK OFF <Enter>

Entering this command into your login script does not affect the DOS <Ctrl> <Break> check. (The login script DOS **BREAK** command is explained on page 220.)

When the **BREAK** option is "ON," type-ahead keyboard input will not be saved in the buffer. If you find this side effect undesirable, you may want to leave the break option in its default form: **BREAK OFF**.

COMSPEC

Use COMSPEC to specify the directory that DOS uses to reload the command processor.

Command format

To specify that a file, usually COMMAND.COM, be loaded from the directory to which the *n*th network drive maps, enter the command as follows:

COMSPEC = **n*:[/]*filename*

To specify that a file, usually COMMAND.COM, be loaded from a particular *drive* (e.g., A, X), enter the command as follows:

COMSPEC = *drive*:[\]*filename*

To specify that a file, usually COMMAND.COM, be loaded from the directory pointed to by search drive *n*, enter the command as follows:

COMSPEC = *Sn*:[\]*filename*

How to use COMSPEC

If more than one version of DOS is available on your network, a directory will have been created for each DOS version. The COMSPEC command will reload the proper COMMAND.COM (the command interpreter file) for the computer and operating system you are using.

To specify the location (directory or drive) from which the program is to be loaded, enter the appropriate version of the COMSPEC command in your login script. The *filename* will usually be COMMAND.COM. No more than 12 characters can follow the drive specification.

Examples

To load COMMAND.COM from the third network drive, type

```
COMSPEC = *3:COMMAND.COM <Enter>
```

To load COMMAND.COM from drive A, type

```
COMSPEC = A:COMMAND.COM <Enter>
```

To load the command file MYCOMAND.COM ("MYCOMAND.COM" might be a specially debugged or modified version of the standard command processor) from the root directory to which drive C is mapped, type

```
COMSPEC = C:\MYCOMAND.COM <Enter>
```

To load COMMAND.COM from the directory to which search drive 2 is mapped when the script command is interpreted, type

```
COMSPEC = S2:COMMAND.COM <Enter>
```

DISPLAY and FDISPLAY

Use the DISPLAY and FDISPLAY commands to show the contents of a specified text file on your workstation screen during the login.

Command format

```
[F]DISPLAY [directory/]filename
```

How to use DISPLAY and FDISPLAY

To instruct the operating system to display a certain file for you when you log in, enter the following command, replacing the variables (*directory* and *filename*) with the name of the file you want to see when you log in. Type

```
[F]DISPLAY [directory/]filename <Enter>
```

If you enter the DISPLAY command in your login script, the exact characters contained in the file, including "garbage" such as printer and word processing codes, will appear on your workstation screen.

If you enter FDISPLAY, the text in the file will be "filtered" and formatted so that only the text itself will be displayed.

Example

Suppose your supervisor puts messages in a public "bulletin board" file (SYS:PUBLIC/MESSAGES/SYSNEWS.TXT, in our example) and wants you to read this file when you log in. To enable the operating system to display this file automatically, you can type a command similar to the following in your login script:

```
FDISPLAY SYS:PUBLIC/MESSAGES/SYSNEWS.TXT  
<Enter>
```

If the FDISPLAY command is in your login script, any messages the supervisor puts in the file will appear on your screen when you log in. For example, if the supervisor updates the SYSNEWS.TXT file with the message, "Meeting for everyone Tuesday at 2:00," you will receive the message when you log in. (If the given directory does not exist or if the given file is not found, no error message will appear on your screen when you log in.)

DOS BREAK

Use the DOS BREAK command to control whether any programs or DOS commands can be interrupted with <Ctrl> <Break> after you have logged in. (This command does not replace the login script BREAK command.)

Command format

DOS BREAK ON

or

DOS BREAK OFF

How to use DOS BREAK

To specify the command in your login script, type

DOS BREAK ON <Enter>

or

DOS BREAK OFF <Enter>

If you have entered DOS BREAK ON in your login script and you press <Ctrl> <Break>, the program or DOS command will be interrupted only after login has been executed; this helps prevent the unexpected termination of login.

This command's default is DOS BREAK OFF. DOS BREAK OFF disables <Ctrl> <Break> immediately after you enter the LOGIN command. (This command sets or resets the DOS <Ctrl> <Break> check feature using DOS function 33 hex. For more information, see the BREAK command in your DOS manual.)

Use the DOS SET command to set a variable in a DOS environment to the specified value.

Command format

```
[DOS] SET name = "value"
```

How to use DOS SET

The DOS SET login script command is similar to the DOS SET command (used at the command line). However, the DOS SET login script command requires you to enter double quotation marks (" ") around values, while the DOS SET command does not. To give a variable name whatever value you specify, type the following in your login script:

```
DOS SET name = "value" <Enter>
```

Substitute a specific name in place of the variable (*name*), and specify the value(s) by which you want the name to be represented.

The value string can contain identifier variable substitutions. For more information about identifier variables, refer to "Identifier variables" on page 231.

Note: The backslash is used as a special programming character in NetWare commands; it will not be recognized as a normal backslash unless you enter two backslashes.

For information about values you can set, see the SET command in your DOS manual.

DOS SET (cont.)

Example 1

To set your prompt to show your directory path, type

```
SET PROMPT = "$P$G" <Enter>
```

The SET PROMPT command lists your directory path at the DOS prompt rather than just the drive letter. \$P lists the directory; \$G provides an ">" character. See your DOS manual for more information about prompt identifiers.

Example 2

To remove a variable from the DOS environment, leave the command line blank after the equal sign. Type

```
DOS SET name = <Enter>
```

or

```
SET name = <Enter>
```

Note:

Since DOS environments have a fixed maximum size, this command cannot work if your environment is too small. To increase the environment size, type SHELL=COMMAND.COM/E200/P in the CONFIG.SYS file. This command increases the environment size from 127 to 200 bytes (if you are using DOS 3.2 or above). For more information about environment size, see the SHELL command in your DOS manual.

Use the DOS VERIFY command to ensure that data copied to a local drive has been copied correctly.

Command format

```
DOS VERIFY ON
```

or

```
DOS VERIFY OFF
```

How to use DOS VERIFY

The DOS COPY command, unlike the NetWare copy command (NCOPY), does not automatically verify that data has been correctly copied to a local drive. If you want DOS to make the same verification, you must enter the DOS VERIFY ON command in your login script. This command may not work with some software that is copy-protected.

In your login script, type

```
DOS VERIFY ON <Enter>
```

or

```
DOS VERIFY OFF <Enter>
```

If the DOS VERIFY ON command has been entered in the login script, the operating system automatically verifies that data copied to a local drive using the DOS COPY command has been copied correctly. If DOS VERIFY has been set to OFF, no verification takes place.

If you have entered a DOS VERIFY OFF command in your login script but still want a particular copy verified, you must add the /v option to the DOS COPY command, as in the following example:

```
COPY filename to local drive:/v <Enter>
```


DOS VERIFY (cont.)

In other words, if you want to make sure that data copied to a local drive has been copied correctly, you can do any of the following:

- Enter the DOS VERIFY ON command in your login script.
- Use the NCOPY command.
- Add the /v option to the DOS COPY command.

You can use the DRIVE command to specify which drive is your default drive.

Command format

DRIVE *x*: (where *x* = a letter)

or

DRIVE **n*: (where *n* = a number)

How to use DRIVE

Unless you have entered this command in your login script, your default drive is set to the first network drive, which is often assigned to your home directory when you log in.

Enter the DRIVE command in your login script, replacing *x* with the appropriate drive. For example, to specify drive J as your default drive, type

```
DRIVE J: <Enter>
```

The drive you specify must be defined in your login script in a separate MAP command entered on any line above the DRIVE command entry.

Example

Suppose you expect to be working on only one project for several days, and the information for the project is located on drive S. You can use the DRIVE command to set your default drive to S (so you won't have to change the drive specification manually every time you log in). To do this, type

```
DRIVE S: <Enter>
```

EXIT

Use the EXIT command to terminate execution of the LOGIN command line utility.

Command format

EXIT

or

EXIT "*filename*"

How to use EXIT

Type the following in your login script:

```
EXIT <Enter>
```



Any login script command entered on any line below the EXIT statement will be ignored. This command allows you to execute .COM, .EXE, and .BAT files and DOS internal commands, such as DIR.

You can also use the EXIT command to pass a short command line to COMMAND.COM (the command interpreter file for the operating system you are using). The command specified cannot exceed 14 characters. To pass a command to COMMAND.COM, type the following in your login script:

```
EXIT "filename" <Enter>
```



Do not use the EXIT command in your login script to exit to a terminate and stay resident (TSR) program (such as SideKick or any terminal emulator that terminates and stays resident).

The EXIT login script command is available only on IBM-PCs and compatibles, unless you use the PCCOMPATIBLE login script command. For an explanation of PCCOMPATIBLE, see page 248.

Example

If you want to exit the LOGIN utility when you have new mail to read, type the following IF ... THEN statement in your login script:

```
IF NEW_MAIL = "Yes" THEN EXIT "MAIL"
```

(See page 231 for a description of IF ... THEN commands.)

EXTERNAL PROGRAM EXECUTION (#)

Use EXTERNAL PROGRAM EXECUTION (#) to execute a command that is external to the login script.

Command format

#[directory/]filename parameter line

How to use EXTERNAL PROGRAM EXECUTION (#)

If you want the LOGIN utility to execute a command that is external to the login script, enter this command in the script. You can

- Specify a full or relative directory path before the filename;
- Add *parameters* after the filename, just as if the command were being executed manually from the DOS prompt.

The following restrictions apply:

- The command statement must appear on its own line.
- The first character on the script line must be a pound sign (#).
- The *filename* must be the name of the .EXE or .COM program you want to execute (excluding the extension).
- The command should appear after MAP assignments, since the program will execute in the environment of drive mappings, default drives, and search drives set up previously in the login script.

This command function will fail if the given directory is invalid, if proper security rights are lacking, if the execute file cannot be found, or if there is insufficient workstation memory to load the execute file.

EXTERNAL PROGRAM EXECUTION (#) (cont.)

The login script is held in memory when the External Program Execution (#) command is run. The login script is not released from memory until you return to the script and complete it or exit the script.

Example

Suppose user Chris wants to play NSNIPES (a network game) whenever she enters "snipes" as a parameter after her login name. She would enter the following IF...THEN conditional in her login script:

```
IF "%2" = "snipes" THEN BEGIN
#NSNIPES 4
END <Enter>
```

(For an explanation of IF...THEN conditionals and the symbols used in the above example, see page 231.)

When user Chris logs in and includes the SNIPES parameter (LOGIN CHRIS SNIPES), the NSNIPES command will be executed, even though it is external to the login script.

FIRE PHASERS

Use the FIRE PHASERS command to generate a noise that sounds like the phaser guns space heroes fire. It can be used to alert you that certain conditions exist.

Command format

```
FIRE PHASERS n TIMES
```

How to use FIRE PHASERS

To instruct the operating system to fire phasers automatically, type the following in your login script:

```
FIRE PHASERS n TIMES <Enter>
```

(The *n* represents the number of times you want to hear this sound. You can fire phasers up to nine times).

Example 1

Suppose you want to hear the "phaser" sound four times when you log in. In your login script, enter

```
FIRE PHASERS 4 TIMES <Enter>
```

Example 2

This command can be used with the IF ... THEN command. (See page 231 for an explanation of the IF ... THEN command.) You can specify that the sound be generated a different number of times depending on the circumstances of the login. For example, you could instruct the system to fire the phasers three times if you have new mail by entering the following command:

```
IF NEW_MAIL = "Yes" THEN FIRE PHASERS 3 TIMES  
<Enter>
```

Use the IF ... THEN command when you want login to perform commands conditionally, depending on whether specified conditions exist.

Command format

IF *conditional(s)* THEN *command*

How to use IF ... THEN

Use this command to instruct the operating system to execute certain commands for you, if a specified condition(s) exists. For example, if you have the following IF ... THEN command in your login script, your workstation screen will display "AARGH..." when you log in on Mondays.

```
IF DAY_OF_WEEK="Monday" THEN WRITE "AARGH..."
```

The conditional is the statement that follows IF. In the example given above, DAY_OF_WEEK="Monday" is the conditional. Conditionals can be made with identifier variables or command line parameters.

Identifier variables

The conditional can contain identifier variables that represent login information that varies depending on the circumstances, such as the date and time. In the example above, DAY_OF_WEEK is the identifier variable. Identifier variables can be entered in either upper- or lower-case letters.

IF ... THEN (cont.)

Some examples of conditionals made with identifier variables follow. For a complete list of identifier variables, see "WRITE" on page 251.

```
IF DAY_OF_WEEK="Monday"  
(If it is Monday)
```

```
IF GREETING_TIME IS NOT "Evening"  
(If it is not evening)
```

```
IF "%ERROR_LEVEL" IS NOT "0"  
(If an error condition exists)
```

```
IF MEMBER OF "GROUPNAME"  
(If the user is a member of the specified group)
```

%ERROR_LEVEL

You can use the "%ERROR_LEVEL" identifier variable as a conditional to execute a command only if certain conditions are met. "%ERROR_LEVEL" gives you control over error situations. If a command can be successfully executed, the error level will be "0." If a command cannot be executed, the error level will be represented by a value other than "0." You can use an "If "%ERROR_LEVEL"=" "0" conditional to prevent the commands following the "THEN" from being executed if an error occurs.

For example, if you normally need to access files on more than one file server, you could enter the following in your login script:

```
ATTACH file server/username  
IF "%ERROR_LEVEL"="0" THEN MAP K:=file server/  
volume:directory/subdirectory
```

If the specified file server is down at the time you log in, an error level of "1" or some value other than "0" will be returned, and the login program will not map a drive to that server. By using the "%ERROR_LEVEL" identifier variable, you can avoid creating an error or receiving an error message.

"%ERROR LEVEL" will search for the last ATTACH or # (EXTERNAL PROGRAM EXECUTION) that was executed in the login script command. For example, if you attached to two file servers, it will search for the second ATTACH command.

Note: Allow IF commands to "wrap" to the next line if there is not enough room on one line. Also, the "%ERROR LEVEL" identifier can be typed with an underscore (_) or as one word ("%ERRORLEVEL").

[NOT] MEMBER OF "GROUPNAME"

The MEMBER OF "GROUPNAME" identifier variable can be used like any other conditional in an IF statement. The MEMBER OF "GROUPNAME" tests whether the user belongs to a certain group that the supervisor has defined on the file server. For example, you might have the following command in your login script:

```
IF MEMBER OF "SALES" AND
DAY_OF_WEEK = "MONDAY" THEN
WRITE "Sales meeting at 10:00; BE THERE!"
```

If you are a member of the group SALES and it is Monday, you will receive the message "Sales meeting at 10:00; BE THERE!" when you log in.

Note: Literal text (text that does not represent something else or is not just part of the command syntax) must be enclosed in double quotation marks (" "). For example, "Monday" and "Sales meeting at 10:00; BE THERE!" are both literal text—they will be displayed exactly as you type them.

An embedded quotation mark (one that will be present in the screen display) must be preceded by a backslash (\). For example, if you want the screen display to say "Hi!" (not just Hi!), you must enter "Hi!" in the script as

```
\ \
```

IF ... THEN (cont.)

Command line parameters

You can use command line parameters in IF... THEN commands in your login script. Then when you log in, you can specify parameters that the LOGIN command will pass to your login script.

When the login script is interpreted, any percent sign (%) entered in a command and followed by a number from 0 to 19 will be replaced by the corresponding parameter from your LOGIN command line. The file server name will always correspond to %0, and the login username will always correspond to %1. If you type "LOGIN *file server/username*" at the command line, the file server name you typed will correspond to %0 in the login script. The username will correspond to %1.

The next entry in the login command line will correspond to %2 in the login script, the next entry will correspond to %3, and so on. (The parameters %2 to %19 are variable.)

You could enter the following LOGIN command:

```
LOGIN COUNT/RON SALES MARKETING LEGAL
```

The server COUNT will correspond to %0 in the login script, the user RON will correspond to %1, the server SALES to %2, the server MARKETING to %3, and the server LEGAL to %4.

Remember that command line parameters are substituted in the script command. For example, "%0"="COUNT" would become "COUNT"="COUNT" as you log in.

Suppose that you want to log in to server COUNT every day, and you also want to sometimes attach to one or two other file servers on the internet. Type the following commands in your login script:

```
IF "%2" DOES NOT EQUAL "" ATTACH %2  
IF "%3" DOES NOT EQUAL "" ATTACH %3
```

Then, when you log in, specify the additional file servers (if any) to which you want to attach. For example, to log in to server COUNT and attach to servers LEGAL and COMMS, you would type the following LOGIN command:

```
LOGIN COUNT/username LEGAL COMMS
```

To log in to server COUNT and attach only to server LEGAL, you would type

```
LOGIN COUNT/username LEGAL
```

To log in only to server COUNT, you would type

```
LOGIN COUNT/username
```

To attach to different file servers, you would substitute the server names for LEGAL and COMMS.

Relationships in conditionals

There are six possible relationships between the information contained in an IF ... THEN statement: equal to, not equal to, greater than, less than, greater than or equal to, and less than or equal to.

You can represent equal and not equal relationships in the following ways:

Equal	Not Equal
IS	IS NOT
=	!=
==	<> #
EQUALS	DOES NOT EQUAL NOT EQUAL TO

IF ... THEN (cont.)

The other four relationships can be represented as follows:

>	IS GREATER THAN
<	IS LESS THAN
>=	IS GREATER THAN OR EQUAL TO
<=	IS LESS THAN OR EQUAL TO

Conditionals can be joined with commas or the word **AND** to form compound conditionals. A compound conditional is true only if all of its related conditionals are true. The following are compound conditionals:

If GREETING_TIME IS "AFTERNOON" AND DAY IS "01"
(If it is the afternoon of the first day of the month)

If HOUR24="23", MINUTE="59", AND SECOND="59"
(If it is 11:59:59 p.m.)

Entering login script commands after THEN

The command following the THEN can be a single statement or the beginning of a block of commands. The statement or block of commands will be interpreted only if all of the specified conditions are true.

Single statement

The following is an example of a single statement:

```
IF DAY_OF_WEEK="6" THEN  
WRITE "HOORAY! IT'S FRIDAY!"
```

Block of commands

You must start a block of commands by specifying **BEGIN** or **DO** after the **THEN** in the **IF ... THEN** statement. **BEGIN** or **DO** must be entered on the same line as the conditional **IF**. When you have entered all the conditional commands you want, end the block by specifying **END**.

For example, you could type the following **IF ... THEN** statement:

```
IF DAY_OF_WEEK="Tuesday" THEN BEGIN
WRITE "Staff meeting today at 10 a.m."
INCLUDE SYS:PUBLIC/UPDATE
END
```

In this case, on Tuesdays you would receive the message about staff meeting. Your login script would also process any commands or messages contained in the file **SYS:PUBLIC/UPDATE**. (For an explanation of the **WRITE** and **INCLUDE** commands, see pages 251 and 238, respectively.)



You cannot nest **IF** statements; that is, one **IF** statement cannot include another **IF** statement.

INCLUDE

Use **INCLUDE** to create the login script interpreter process "subscripts" that are not contained in the login script being processed. These subscripts are text files that contain valid script commands (any of the commands explained in this section).

Command format

```
INCLUDE [directory\]filename
```

How to use INCLUDE

Type the following in your login script:

```
INCLUDE [directory\]filename <Enter>
```

Replace the variables with the directory path and filename of the subscript you need. Subscripts can be created and edited using any text editor or word processor.

Note: **INCLUDE** nesting can be 10 levels deep. This means that one script file can **INCLUDE** another script file which, in turn, can **INCLUDE** yet another script file, and so on down to 10 levels. You must have at least Open and Read rights in any directory containing a subscript you want to use.

Example 1

Suppose a network supervisor wanted to create a special text file containing system-wide announcements. The supervisor could send the contents of this file to users by entering the command to include the text file in each user's login script.

If the name of the special text file were `SYS:PUBLIC\MESSAGES.INC`, the supervisor could include this file in users' login scripts by entering the following in each user's login script:

```
INCLUDE SYS:PUBLIC\MESSAGES.INC <Enter>
```

Then, if the supervisor wanted to post the message "Don't forget 7:30 a.m. meeting tomorrow," he or she could use the WRITE command to type the message in the SYS:PUBLIC\MESSAGES.INC file. When the users logged in, each user would get the message.

Note: The INCLUDE command does not function in the same way as the DISPLAY or FDISPLAY commands. In order for it to display text as shown in this example, the included file must contain WRITE commands.

Example 2

The INCLUDE command can also be used to shorten users' login scripts. The supervisor may want to create one script file, and then have each user who needs it include the script file in his or her login script with the INCLUDE command, instead of having the user type the extra commands in the script.

MACHINE NAME

Use **MACHINE NAME** to set the machine name of the station to the specified name.

Command format

MACHINE NAME = "*name*"

or

MACHINE = "*name*"

How to use MACHINE NAME

The machine name can contain up to 15 characters. (Longer machine names will be truncated automatically to 15 characters.)

The **MACHINE NAME** command is necessary for some programs written to run under PC DOS. The name can include such identifier variables as %STATION. For more information about identifier variables, see "Identifier variables" on page 231.

Use MAP to map a drive to a directory on the network. Before you can work in a network directory, you must have a drive mapped to that directory.

Command format

MAP [*option*]

Command options

MAP can be used to do a variety of things, depending on the options (variables) you include in the command format. These commands can be entered anywhere in your login script. The command formats, along with the different parameters you can use, are listed below.

MAP

Displays the current drive mappings for all drives on the workstation. Undefined local drives (drives that have not been mapped to a directory) will not be displayed.

MAP *drive:=directory*

Maps the specified drive to the given directory. Directory refers to the directory path, beginning with the volume name.

MAP *drive:=drive:*

Maps the first drive to the same directory that the second drive is mapped to.

MAP *drive:=directory; drive:=directory ...*

Maps multiple drives to multiple directories with one command. This command has the same result as executing the command MAP *drive:=directory* two or more times.

MAP (cont.)

Directory refers to the directory path, beginning with the volume name.

MAP INSERT *search drive:=directory*

Inserts a new search drive using the next available letter in the search drive sequence. Directory refers to the directory path, beginning with the volume name.

MAP DISPLAY ON

Displays your drive mappings when you log in. This is the default setting.

MAP DISPLAY OFF

Your drive mappings will not be displayed when you log in.

MAP ERRORS ON

Displays MAP error messages (messages that report serious errors encountered while mapping drive assignments). This is the default setting.

MAP ERRORS OFF

MAP error messages will not be displayed.

You can use MAP DISPLAY ON and MAP DISPLAY OFF anywhere in your login script; however, you must place MAP ERRORS ON and MAP ERRORS OFF before the drive mappings in your login script.

How to use MAP

When you use the MAP command to save drive mappings in your login script, you don't have to remap drives to directories every time you log in. This command is especially useful if you frequently use a number of directories and don't want to specify drive mappings for them every time you log in.

You can specify drive mappings in your login script by entering the same commands in the login script that you would enter if you were using the regular MAP command at the command line. These mappings will be displayed when you log in, unless you have entered MAP DISPLAY OFF in your login script.

Your workstation has 26 logical drives (assigned letters A through Z) which you can use to map to directories in all areas of the network directory structure. Some of these logical drives will be assigned to local drives when you log in. Up to 16 of the 26 drives can be assigned as search drives.

When specifying drive names such as F or G, you can use an asterisk followed by a number *n* to represent the *n*th network drive. For example, if your workstation has two local drives, A and B, then *1: would map to one of two drives: either the first drive beyond the drive specified by the LASTDRIVE command found in the CONFIG.SYS configuration file (see the DOS manual), or drive F if no LASTDRIVE = command is used. It is generally best to use the relative specification **n*::; this allows you to log in from workstations with different local drive configurations.

Note: IBM PC AT compatibles generally have five local drives by default (depending on the version of DOS you are using). You can override the default by using the LASTDRIVE command in your DOS CONFIG.SYS file.

MAP (cont.)

You can map a local drive to a network directory, but you will not be able to access the local drive until you remove the network drive mapping. The supervisor can initially assign *1: to a user's home directory. Users can redefine *1: if they choose.

You should assign search drives in numerical order, beginning with S1:.

Example 1

If you include the following map command in your login script, drive F will be mapped to the SYS:SALES directory when you log in:

```
MAP F:=SYS:SALES <Enter>
```

Example 2

If you include the following map command, your first network drive will be mapped to the SYS:SALES directory when you log in:

```
MAP *1:=SYS:SALES; Q:=*1:TEST
```

Drive Q will be mapped to the subdirectory TEST relative to SYS:SALES (since you defined *1: to be mapped to the directory SYS:SALES).

Example 3

If you include the following map command, your first search drive will be mapped to the SYS:PUBLIC directory:

```
MAP SEARCH1:=SYS:PUBLIC <Enter>
```

The MAP command and the shell descriptor area

When a workstation loads the NetWare shell, it passes the information in the descriptor area to the file server. Special identifiers are assigned to each descriptor in the shell descriptor area. The shell descriptor identifiers are listed below.

SHELL_TYPE

Assigned to the shell-type descriptor.

OS

Assigned to the DOS-type descriptor.

OS_VERSION

Assigned to the DOS-version descriptor.

MACHINE

Assigned to the long-machine-type descriptor.

SMACHINE

Assigned to the short-machine-type descriptor.

Assigning shell descriptor identifiers

You can use these identifiers within login script commands to modify your operating environment at the time you log in. Using these identifiers within the MAP command allows the file server to map a drive to the directory with the correct version of DOS.

MAP (cont.)

If the MAP command is inserted into the system login script (or into each individual's login script), it should appear as follows:

```
MAP S2: =SYS:PUBLIC\%MACHINE\%OS\%OS_VERSION
```

The mapped drive must be a search drive, so that DOS commands can be accessed from any directory on the network.

The values for the identifiers come from the shell's descriptor area when the shell attaches to the file server during login.

For example, the following search path could be created using the MAP command shown above:

```
S2: =SYS:PUBLIC\COMPAQ\MSDOS\V4.00
```

The directory (indicated by the identifiers in the MAP command) should already exist and the correct DOS version should be loaded in the directory, or login will not be completed successfully.

Use PAUSE to create a pause in the execution of the login script.

Command format

PAUSE

or

WAIT

How to use PAUSE

You can add the PAUSE command to the login script following a message so that you will have time to read the message before it scrolls off the screen. If you include the PAUSE command, the message, "Strike a key when ready...", will appear on the workstation screen. The login program will then wait for a key to be pressed before it executes the rest of the login script.

Enter either of these commands in your login script at any point you want a pause to occur. Type

PAUSE <Enter>

or

WAIT <Enter>

PCCOMPATIBLE

Use **PCCOMPATIBLE** to include a filename with the **EXIT** login script command on all computers that are IBM PC compatible; you can also use it with computers that are not 100-percent IBM PC compatible.

Command format

[PC]COMPATIBLE

How to use PCCOMPATIBLE

If your machine is an IBM PC compatible but you have changed your long machine name in your **SHELL.CFG** file to another name (for example, **COMPAQ**) to access a different version of **DOS**, you must use the **PCCOMPATIBLE** (or **COMPATIBLE**) login script command to inform the login program that your machine is an IBM PC compatible.

Type the following anywhere before **EXIT** in the login script:

```
PCCOMPATIBLE <Enter>
```

For example, if you are working on an IBM PC compatible and you want to exit to **SYSCON** from within your login script, you would put the following commands in your login script:

```
PCCOMPATIBLE <Enter>  
EXIT SYSCON <Enter>
```

Use **REMARK** to insert explanatory text into your login script.

Command format

REM[ARK] [*text*]

or

* [*text*]

or

; [*text*]

How to use **REMARK**

Any text following **REMARK** (or **REM**), an asterisk (*), or a semicolon (;) will be ignored when the **LOGIN** command interprets and executes your login script. The "remark" will not appear on your screen.

Using remarks in your login script can make the script much easier for you to read and understand.

The **REMARK** command and its associated text must be the only entry on a line. Placing remarks on the same line as other script commands will cause errors when your login script is interpreted.

To add explanatory text to your login script, type the following (or one of the other variants of the **REMARK** command) in your login script, entering the text you need in place of the *text* variable.

```
REMARK text <Enter>
```

REMARK (cont.)

Example

The following are examples of explanatory text that you might use with the REMARK command:

* Sample Text

; assign OS-dependent Search mappings

REM Check for new mail.

REMARK Be sure to update the PROJECTS file.

Use WRITE to customize your login messages.

Command format

WRITE [*text string(s)*; ... *identifier(s)*; ...]

How to use WRITE

You can enter a single command or include a list of text strings or identifiers separated by semicolons (;) after any WRITE command. Each message will appear on a new line on your screen, unless you place a semicolon at the end of the WRITE command line. Then multiple WRITE commands will generate a one-line display.

Text strings must be enclosed in double quotation marks (" ") and can include the following super-characters:

- \r for a carriage return
- \n for a new line
- \\" for an embedded quotation mark
- \7 to sound a beep

Identifier variables

The identifiers in the table on the next page represent variable text information. (Enter them exactly as shown.) When the WRITE command is executed, the correct text will be substituted and then displayed on your workstation screen.

Note: Identifier variables can be used with the IF ... THEN command as well as the WRITE command. They can also be used with commands for which you can specify a pathname, such as COMSPEC.

WRITE (cont.)

Identifier Variable	Screen Display
HOUR	Hour of day or night (1 - 12)
HOUR24	Hour (00 - 23)
MINUTE	Minute (00 - 59)
SECOND	Second (00 - 59)
AM_PM	Day or night (am or pm)
MONTH	Month number (01 - 12)
MONTH_NAME	Month name (January, June, etc.)
DAY	Day number (01 - 31)
NDAY_OF_WEEK	Weekday number (1 - 7, Sunday's 1)
YEAR	Year in full format (1988, 1989)
SHORT_YEAR	Year in short form (88, 89, etc.)
DAY_OF_WEEK	Day of week (Monday, Friday, etc.)
LOGIN_NAME	User's unique login name
FULL_NAME	User's full name (from SYSCON files)
STATION	Workstation number
P_STATION	Physical station (12 hex digits)
GREETING_TIME	Morning, afternoon, or evening
SHELL_TYPE	Shell type number (0, 27, 3, etc.)
NEW_MAIL	YES or NO, indicating whether or not new mail has arrived. Your mailbox is checked automatically when you log in, and the correct value ("YES" or "NO" is assigned.
OS	The workstation's operating system

Identifier Variable	Screen Display
OS_VERSION	The version of the workstation's DOS
MACHINE	The machine that the shell was written for, e.g., IBM_PC
SMACHINE	Short machine name, e.g., IBM
ERROR_LEVEL	A value; for example, 0 (no errors) or any number other than 0 (errors)
MEMBER_OF_GROUPNAME	Name of group

You can use **WRITE** command identifiers in other login script commands if the identifiers are preceded by a percent sign.

These "identifier variables," as they are called, will be replaced by their actual values before the script line is interpreted.

Identifier variables can also be placed within literal text strings in a **WRITE** statement; however, the identifier name must be in upper-case letters and preceded by a percent sign.

For example, the following two lines would result in the same output:

```
WRITE "Good "; greeting_time; ", John"
```

```
WRITE "Good %GREETING_TIME, John"
```

WRITE (cont.)

Note: Identifier variables are extremely useful if you intend to use different PC operating systems concurrently on different network stations. Depending upon the operating system type, you can appropriately set search drive mappings and other OS-dependent mappings for the operating system you are using when you log in. Using identifier variables can provide a way to handle the different commands required by different machine types.

For example, if you are using PC-DOS 4.00, you could create a SYS:PUBLIC/IBM_PC/PCDOS/4.00 directory and place a copy of the appropriate COMMAND.COM in that directory. You could then create a similar directory for each different machine and operating system type. If your login script contained the following command, it would access the proper login command no matter which machine you execute LOGIN from:

```
MAP S2: =SYS:PUBLIC\%MACHINE%\%OS%\%OS_VERSION
<Enter>
```

Example

Suppose user Bill's login script contained the following WRITE commands:

```
WRITE "Hello, "; LOGIN_NAME
WRITE "This is station "; STATION
```

The following would be displayed when Bill logged in to station 16:

```
Hello, BILL
This is station 16
```

Sample system login scripts

Following are three sample system login scripts. They may give you some ideas for your own system login script, or you could adapt these to your own situation.

Example 1

```
MAP DISPLAY OFF
MAP S1:=SYS:PUBLIC
MAP S2:=
    SYS:PUBLIC/%MACHINE/%OS/%OS_VERSION
MAP S3:=SYS:PUBLIC/APPLIC/WP
MAP S4:=SYS:PUBLIC/APPLIC/DB
MAP S5:=SYS:ATC/EXE
MAP S6:=SYS:ACS
MAP *1:=SYS:USERS/%LOGIN_NAME
MAP DISPLAY ON
MAP
WRITE
WRITE
WRITE "GOOD %GREETING_TIME, %LOGIN_NAME"
REM IDENTIFIERS PLACED IN QUOTES MUST BE IN
    UPPER CASE
REM WITH THE % PRECEEDING THE IDENTIFIER
WRITE
WRITE
INCLUDE SYS:PUBLIC\SCRIPTS
PAUSE
WRITE
FDISPLAY SYS:SUPERVISOR\MESSAGE
IF NEW_MAIL = "YES" THEN BEGIN
WRITE "YOU HAVE NEW MAIL, %LOGIN_NAME"
FIRE 4
PAUSE EXIT "MAIL"
END
```


Example 2

```
Write "Good %GREETING_TIME, %LOGIN_NAME.
MAP DISPLAY OFF
MAP ERRORS OFF
IF LOGIN_NAME <> "SUPERVISOR" THEN BEGIN
    MAP *1:=DC-2/SYS:HOME
    MAP *2:=DC-2/SYS:TRASH
    MAP *3:=DC-2/SYS:SYSTEM
    MAP *4:=DC-2/SYS:LOGIN
    MAP *5:=DC-2/SYS:PUBLIC
END
MAP S1:=DC-2/SYS:PUBLIC
MAP S2:=DC-2/SYS:PUBLIC
MAP S3:=DC-2/SYS:PUBLIC
MAP S4:=DC-2/SYS:PUBLIC\%OS_VERSION\%MACHINE
MAP S5:=DC-2/SYS:PUBLIC\TCP_OPT
COMSPEC=S4:COMMAND.COM
MAP DISPLAY ON
MAP
DOS SET USER="LOGIN_NAME"
IF NEW_MAIL = "Yes" THEN BEGIN
    WRITE " "
    FIRE PHASERS 2 TIMES
    WRITE "You have mail on server DC-2"
END
write " "
write "Type DSSMENU to enter the Decision Support
    Services Network Menu."
write " "
write "If you wish to use the TCP Gateway, execute"
write "NETBIOS before entering the menu system."
```

Example 3

```
MAP DISPLAY OFF
MAP S1:=SERVER/SYS:PUBLIC;
S2:=S1:%MACHINE/%OS/%OS_VERSION
COMSPEC=S2:COMMAND.COM
MAP G:=SERVER/SYS:COMMON
MAP S4:=SERVER/SYS:APPS/DATABASE
MAP S5:=SERVER/SYS:APPS/SC4
MAP S6:=SERVER/SYS:APPS/WP
MAP S7:=SERVER/SYS:ATC/EXE
#CAPTURE /NB /NFF /TI=30
DOS VERIFY ON
SET PROMPT = "$P$G"
IF "%HOUR24%MINUTE" > "0830" THEN BEGIN
#COMMAND /C ECHO %LOGIN_NAME IN AT
%HOUR:%MINUTE/%MONTH/%DAY/%SHORT_YEAR >>
\COMMON\%DAY%HOUR%MINUTE%SECOND.ADT
END
MAP F:=SERVER/VOL1:USERS/%LOGIN_NAME
#COMMAND /C COPY Z:PUBLIC.MNU F:DAILY.MNU
IF MEMBER OF "GROUPNAME" = "ACCT" THEN BEGIN
MAP INS S3:=SERVER/SYS:ACCTING
END
EXIT "MENU DAILY"
```

Sample user login script

This is a sample of a user login script. It may give you ideas for your own login scripts, or you could adapt this one to your own situation.

Example

```
MAP G:=-SYS:USERS\KAREN\REPORTS
MAP H:=-SYS:USERS\KAREN\LETTERS
#CAPTURE P=1 NB TI=10 NFF
IF DAY_OF_WEEK = "FRIDAY" THEN BEGIN
FIRE 9
WRITE "FRIDAY AGAIN, TIME TO GENERATE THE
REPORTS"
MAP I:=-SYS:APPLIC/DBB/REPGEN
END
SET PROMPT $p$g
EXIT "GOMENU"
REMARK GOMENU.BAT CONTAINS THE COMMAND
'MENU FILENAME'
```

Planning Menus

This module begins with an explanation of the MENU utility. It also contains information to help you make decisions about the following:

Decision	Page
Which programs and applications to include	261
Which main menu options to include	262
Which submenu options to include	263
Which commands and variables to include	264
Where to place menus on the screen	269

MENU utility overview

The NetWare MENU utility allows you to create customized menus to suit your networking needs. You can create your own menus in any text editor that is capable of saving a file in ASCII format; using the text editor, you can specify the commands that call up the applications and programs you want to use and save them as a text file. Later, you can use the MENU utility to run the menu you have created.

Regardless of your level of experience, a menu can be a useful work tool. The NetWare MENU utility makes it possible for you to

- Combine several NetWare utilities into one menu operation, speeding up access to and execution of command sequences that you use often.
- Organize infrequently used DOS and NetWare command line tasks within one menu. Users can access the task from the menu rather than having to remember the command names and formats that would otherwise be typed at the command line. They can also use the menu prompts to issue command parameters (rather than having to remember the possible parameters or having to look them up in the manual).
- Make individual menus that cater to beginning or occasional users who may not be very familiar with DOS or NetWare tasks.
- Make as many menus as there are users, so that every user can use a menu tailored to his or her specific needs.

Before you begin to create a menu, you should be familiar with the format of the NetWare menu utilities and know how to use them.

Creating your own menus is much like writing your own software program. Much of the language and the concepts used are similar to those used in programming or in creating DOS batch files. You can create basic menus without this knowledge, but the use of some features, such as variables, is more difficult to understand. If you want to create complex menus, you should have a knowledge of these concepts.

Which programs and applications to include

Before you plan your menu, you should give some thought as to who will use the menu. If you are creating it for yourself, you should decide what you want to include on it. If you are creating it for another user, consider that user's level of experience. Then decide what options the user will need to simplify the tasks he or she will likely perform. Likewise, if you are creating a menu for a group, consider the needs and experiences of the entire group. This will help you decide which programs, applications, and NetWare commands you want to include on the menu.



Do not load terminate and stay resident (TSR) programs (such as SideKick or terminal emulators that terminate and stay resident) from menus you create. Loading TSR programs from menus may cause problems with your computer's memory allocation and create serious errors.



On the Menu Worksheet, record the programs, applications, and NetWare commands you want to include on your menu.

Which main menu options to include

Next you must identify categories for the programs and applications you have chosen, group them into logical categories, and decide how frequently you use them. These categories will become the options on your main menu. You may branch from these options to submenus that contain further options, or you may simply route your main menu options directly to the applications you want them to bring up.

Some programs and applications will fall naturally into categories. For instance, if you have only a few word processing and database applications, you might simply categorize all of them under "Applications." If your database and word processing applications are more extensive or complicated, however, you might want to separate them into categories, such as "Word Processing" and "Database."



On the Menu Worksheet, record your application categories (main menu options). Also record the title you want to give the main menu.

Which submenu options to include

The next step is to decide whether you will need submenus and what options you want to include if you do. You should group related topics under the categories you identified above.

For example, if one of your categories on the main menu is "Word Processing," the options that will appear on the submenu under that category might be "WordPerfect," "WordStar," and "Microsoft Word."

You can use as many submenus as you need. Often, submenus have their own submenus.



On the Menu Worksheet, record the options you plan to include on your submenus. Also record the title you want to use for each submenu.

Which commands and variables to include

Determine the commands you will need to start each utility and application you plan to use on your menu. (For example, to start the SYSCON utility, you must type "SYSCON.") If you do not know the correct format for each command, see the *Reference for ELS NetWare Level II* or your application's manual.

It's usually helpful to include "Logout" as a menu option. When you are ready to log out, you can choose "Logout" from the main menu, and you will be logged out of MENU and your file server in one step.

Using command characters as literal text

You can use command characters in the text file script. These command characters (such as, @ and %) give the program specific instructions.

However, you may want to use some of these characters as literal text. (Literal text is displayed on the screen but is not used to issue commands from within the MENU program. For instance, the text in the menu or submenu titles and options is literal text.)

To use command characters as literal text, you must also include the \ (backslash) character. The backslash signals to the program that whatever character follows should not be considered an instruction, but rather a normal text character that should be displayed as literal text. For example, if you type \@, the @ symbol will be treated as a literal text character and will appear on your menu; the program will not think of it as a programming command when the backslash accompanies it.

Similarly, entering a double backslash (\\) allows you to use the second backslash as a part of the regular text.

If you want to use several symbols together in literal text, you must use the backslash symbol before each of them.

For example, suppose you want the following line to be displayed on the screen as part of a menu title:

```
42%a\
```

You would have to enter it in the text file script as

```
"42\%\@\\\"
```

Note: Literal text must also be enclosed in quotation marks (see command above). Do not use quotation marks with the DOS ECHO and PAUSE commands unless you want the quotation marks displayed on the screen.

Parameters (such as the *.* wildcard characters) are not recognized as program commands if they are inside quotation marks.

Because quotation marks are a programming symbol, they will not be displayed as literal text unless they are preceded by a backslash (\).

Including variables

You might want to include some commands on your menu that require additional instructions. For example, you might want users to be able to copy files from one destination to another using the menu.

If this is the case, you will need to include the COPY command in your text file. The COPY command might include several parameters that specify the file being copied, the file's source directory, and the file's destination directory.

This particular use of the command forms a "string" that displays the commands one after the other.

Note: Including variables in your menu program is complicated. A knowledge of basic programming concepts is helpful, since you are essentially writing your own menu program.

Each value in a command string that a user must specify (such as a destination drive or a filename) is called a variable. In the following example, the variable @ will become whatever value the user enters for the source drive—for example, A:, B:, or C:.

```
copy @"Enter Source Drive"
```

You can use some variables as "repeaters" by numbering the variables (such as @1, @2, or @3). Once you assign the value of a variable in a particular command string, you do not need to repeat the assignment again. Every time you include that variable in the command string, it will automatically keep the same value.

The following command string illustrates the use of "repeater" variables:

```
COPY
COPY @1"Enter source drive/filename"
      @2"Enter destination"
DIR/W @1
DIR/W @2
PAUSE
```

Using this command string, the program will copy a file from one drive (directory) to another and then display a directory listing for each drive.

This process is explained below.

1. The variable @1 displays the message "Enter source drive/filename" on the screen.
2. The user enters the source drive and filename (for example, C:GEORGE) and presses <Enter>.
3. The variable @2 displays the message "Enter destination" on the screen.

4. The user enters the destination drive (for example, G:) and presses <Enter>. This creates a string for the menu system: COPY C:GEORGE G:.
5. The COPY command then copies the file GEORGE from drive C to drive G.
6. The program then proceeds to the next command in the string, DIR/W, which is the command used to display a directory listing of the source drive.
7. Before it can execute this command, the program needs to know which drive to list. Because the variable @1 is included after the DIR/W command, the program knows that it should use the same value for @1 that was specified earlier for "Enter source drive" (drive C). Therefore, the user does not need to enter a drive letter.
8. The program displays a directory listing of only the file GEORGE on drive C. Because a filename was specified in the @1 variable, only that file will be displayed.
9. The program then displays a directory listing of the destination drive (from the DIR/W command). To complete this command, the program again needs to know which drive to list. Because the variable @2 is included after the second DIR/W command, the program knows that it should use the same value for @2 that was specified earlier for "Enter destination" (drive G). Therefore, the user does not have to enter the drive letter.
10. The program displays a directory listing of drive G.
11. When the user presses any key, the program continues.

Whenever the program encounters a new command in the text file, variables are assigned new values. (Any command that is not indented in the text file script is viewed as a new command, and the program disregards previous variable values.)

For example, the following script specifies different values for the variables in each command.

```
COPY DIR
  copy @1"Enter source drive"*. * @2"Enter destination"
  dir @2
DIR-CHKDSK
  dir @1"Enter drive you want directory of"
  chkdsk @1
PAUSE
```

The first command (COPY DIR) will copy all files from the default directory of the one drive to another drive and then display a directory listing of the destination drive. The command string indicates that variable @1 will take on the value of whatever source drive is entered, and variable @2 will take on the value of whatever destination drive is entered.

The second command (DIR-CHKDSK) will display a directory listing of whatever drive is entered and then check its available disk space (CHKDSK can only be executed on local drives). Since this is a new command, all variables will be assigned new values (different from the variable values in the preceding COPY DIR command). Variable numbering begins again, with a new value for variable @1.



On the Menu Worksheet, record the commands you will need to start the utilities and applications you plan to use on your menu. Include any variables that will be necessary to execute each command.

Where to place menus on the screen

When creating a menu, you can decide where you want each menu to be located on the screen. After you have decided where you want each menu located, you can specify location values.

The default value for menu placement situates all menus at the center of the screen, each subsequent menu overwriting the previous one.

If you do not want to manipulate the location of your menus, use the default values.

By calculating your own values for menu placement, you can choose where your menus will appear on the screen. The menus will probably still overlap, but you can often prevent complete overwriting. This allows you to fully utilize your screen's work space.

Once you determine where you want the menu to be positioned on the screen, you must calculate the vertical and horizontal location values. These values are measured by lines and columns, respectively.

Default settings for menu placement

When creating a menu, you can choose default settings for the location values. This will save you a great deal of time. You can use the default specifications in two ways:

- You can use full default specifications.
- You can combine default specifications with custom-set specifications.

Using full defaults

When default values are used in full, each menu screen will be positioned at the center of the screen, and a standard color scheme will be used for lists and menus.

To use full default settings for both the location and the color palette, you do not need to enter any values. Simply press <Enter> after you enter the menu or submenu title in the text file script. For example, if you are entering the menu title "Accounts" and you wanted to accept the default location settings, you would type

```
%Accounts <Enter>
```

Mixing default and custom settings

You can also choose a default setting for one specification and create a custom setting for another.

You can enter three numeric values on the menu or submenu title line which represent the specifications for vertical and horizontal location, and color. When you integrate default values with custom values, you enter the number of the custom specification in its appropriate place on the title line.

The specification numbers directly follow the menu or submenu title in the text file script, as in this example:

```
%Menu Title,0,0,0
```

To specify a custom value, type the desired numeric value in its correct place on the title line. To use a default value, type either a 0 (zero) or a comma in the value's place.

The examples below show the formats for using custom and default values together. The first example shows the default values for vertical location and color palette (represented by zeros) and the custom value of 20 for horizontal placement. The second example uses the same values, but the default values are represented by commas instead of numerals.

Example 1: %Accounts,0,20,0

Example 2: %Accounts,,20,

In these examples, the custom value in the title line places the menu "Accounts" at the center and to the left of the screen, and sets the palette to the default color scheme.

If you do not plan to change the default settings for locating your menu on the screen, you have finished this module.

If you want to choose the placement for your own menus, in part or in full, continue with the following sections.

Vertical placement

Lines are measured from the top of the screen to the center of the menu. The line value you specify should equal the number of lines you want above the menu plus half the length of the menu.

Thus, you measure vertical placement by deciding

- How many lines down from the top of the screen you want the top of the menu to begin;
- How many lines tall you want the menu to be, divided by 2 (because measurement begins at the center of the menu, which divides the menu in half).

This makes an equation of

$$A + B/2 = C$$

where

- A = number of lines above the menu
- B/2 = half the number of lines in the menu
- C = vertical placement value

For example, if you have a menu that is 8 lines long, and you want it to begin 5 lines down from the top of the screen, you would use this formula:

$$5 + 8/2 = 9$$

The equation determines which line will be at the center of your menu (line 9 in our example). This is the vertical placement value. (If you specify a line that extends beyond the limitations of the screen, the menu will appear as close to the edge of the screen as possible and still leave a one-line margin.)

If you do not know exactly where you want the menu, approximate a position. Sometimes it is easier to choose a location after you see it on the screen. For example, if you create a menu screen and then decide you want to move it 3 lines lower on the screen, you can easily edit the script file to move the menu by increasing the vertical placement value by 3.

Horizontal placement

Columns are measured from the left edge of the screen to the center of the menu. The column value you specify should equal the number of columns to the left of the menu plus half the width of the menu.

Thus, you measure horizontal placement by deciding

- How many columns from the left edge of the screen you want the left edge of the menu to begin;
- How many columns across you want the menu to be (at least the length of the longest menu option), divided by 2 (because measurement begins at the center of the menu, which divides the menu column length in half).

This makes an equation of

$$A + B/2 = C$$

where

A = number of columns to the left of the menu

B/2 = half the column width of the menu

C = horizontal placement value in number of columns

For example, if you have a menu that is 14 columns wide and you want it to begin 5 columns from the left edge of the screen, you would use this formula:

$$5 + 14/2 = 12$$

The equation determines which column will be at the center of your menu (12 in our example). This is the horizontal placement value. (If you specify a column that extends beyond the limitations of the screen, the menu will appear as close to the edge of the screen as possible and still leave one column as a margin.)

If you do not know exactly where you want the menu, approximate a position. Sometimes it is easier to choose a location after you see it on the screen. For example, if you create a menu screen and then decide you want the menu 3 columns to the right, you can easily move the menu by increasing the horizontal placement value by 3 in the script file.

Menu colors

You can use the COLORPAL menu utility to "paint" a color scheme on your menu screen. Each color scheme is called a palette. You can use COLORPAL to change the colors of the palettes that already exist, add new color palettes, or delete color palettes you no longer want.

NetWare's default color palettes are set to blue and white. Although it is possible to change the default color palettes used by the NetWare-supplied menus, we strongly suggest that you do not do so because you cannot change these defaults for one utility only.

COLORPAL contains five defined palettes, numbered 0 through 4. NetWare supplied menus use these palettes for the following:

- Palette 0 for lists, menus, and normal text
- Palette 1 for main headers and the background of the screen
- Palette 2 for help screens
- Palette 3 for error messages
- Palette 4 for exit and alert portals

Since these palettes are already being used by NetWare, you must add a new palette to the defined list to change the color palette on a menu you create. For more information on creating new color palettes, see the *Reference for ELS NetWare Level II*.



On the Menu Worksheet, record the vertical and horizontal placement values for each menu and submenu. Also record the color palette you want to use for each menu.

Sample menus

Example 1

```
%Network Menu,5,20,0
Applications
  %Applications
NetWare Utilities
  %NetWare Utilities
Mail
  mail
Logout
  !logout
%Applications,15,10,0
WordPerfect
  wp
dBASE III
  dbase
%NetWare Utilities,0,50,0
SESSION
  session
FILER
  filer
NCOPY
  ncopy @1"Enter source drive/filename"
  @2"Enter destination"
  dir/w @2
  pause
```

This is a very simple menu script that produces the following main menu:

Network Menu
Applications NetWare Utilities Mail Logout

Example 1 (cont.)

The submenu for "Applications" contains two options:

Applications
WordPerfect dBase III

The submenu for "NetWare Utilities" contains three options:

NetWare Utilities
SESSION FILER NCOPY

When a user selects NCOPY, the user will be prompted to enter the source drive and filename of the file to copy, then the destination drive or directory. After the file is copied, a listing of the destination directory is displayed. The user must press a key to continue after the directory listing.

Example 2

```
%Novell Education Main Menu
Menu Utilities
    %Menu Utilities
Command Line Utilities
    %Command Line Utilities
%Menu Utilities, 1,79
System Configuration
    SYSCON
File Management
    FILER
Print Manager
    PCONSOLE
%Command Line Utilities, 1,79
DOS Copy Files
    Echo Off
    CLS
    Rem @2"Enter the destination"
    Rem @1"Enter the source"
    if not exist @1 go to no file
    Copy @1 @2
    go to done
    :no file
    Echo The file @1 does not exist!
    Pause
    :done
Network Copy Files
    Ncopy @1"Enter the source" @2"Enter the destination"
    Pause
```

Example 3

```
%Network Main Menu
System Configuration
  SYSCON
File Management
  FILER
Session Management
  SESSION
Print Management
  PCONSOLE
Applications
  %Applications Menu
Network Utilities
  %Network Utilities Menu
DOS Command
  @1"Enter DOS Command"
  pause
%Applications Menu, 6,10
WordPerfect
  h:
  wp
Coordinator
  atc
Field Service
  k:
  flex dmenu
Field Service Queue
  l:
  flex plog
Training
  m:
  flex
AscomIV
  ascomiv
%Network Utilities Menu, 20,66
Mail
  mail
Login
  login
Logout
  logout
Capture
  Capture/ti=5
```

Example 3 (cont.)

```
Help
  help
Castoff
  castoff
Caston
  caston
Ckvol
  ckvol @"Enter volume name or <CR> for SYS"
  pause
Map
  map @1"Enter MAP assignment"
Nprint
  nprint @1"Enter PATH/FILENAME [options. . .]"
Salvage
  salvage
Slist
  slist
  pause
Userlist
  userlist
  pause
Who Am I
  whoami/a
  pause
```


Example 4

%Main Menu, 12,40
Network Management
 %Network Menu
Applications Menu
 %Applications Menu
DOS
 command
Logout
 !logout
Printer Control
 %Printer Menu
%Network Menu, 20,15
System Configuration
 SYSCON
File Management
 FILER
Session
 SESSION
%Applications Menu, 5,70
dBASE III
 %dBASE Menu
WordPerfect
 map g: = f:wp
 g:
 wp
 f:
Coordinator
 map g: = f:atc
 g:
 atc
 f:
%Printer Menu, 10,10
See Job Lists
 PCONSOLE
Use Laser Printer
 capture nff nb
Use Dot Matrix Printer
 capture s=chicago2
Use Local Printer
 endcap
Printer Options
 %Printer Options
%DBASE Menu, 18,75

Example 4 (cont.)

Shared Quota Data

map g: = \share\dbase\quota

g:

dbase

f:

Private Data

map g: = f:dbase

g:

dbase

f:

%Printer Options, 22,10

Set Timeout to 10 Seconds

Capture ti=10

Set Timeout to 30 Seconds

Capture ti=30

Set Timeout to 60 Seconds

Capture ti=60

Form Feeds OFF

Capture nff

Form Feed ON

Capture ff

No Banner

capture nb



Accounting Option

This module explains the accounting options available with NetWare and gives instructions for setting up the accounting functions. The accounting feature is not installed automatically. You must activate accounting using the SYSCON utility.

This module also contains information to help you make decisions about the following:

Decision	Page
Whether to authorize additional servers	286
Which services to charge for	287
Which charge rates to set	288
How to assign account balances in SYSCON	290
Which account balance to specify in USERDEF	291
Whether to limit account balances in USERDEF	291

Accounting options overview

ELS NetWare Level II features several accounting options. You can choose those that are suitable for your network environment. These options are

- Tracking when a user logs in and out of the file server. This option is automatically selected if you choose to install accounting on your file server. An entry is placed in the file server's audit file each time a user logs in or out of the server. No charges are made to users by this option.
- Charging each user's account for resources consumed. These charges can be made by the file server or by other types of servers such as print servers, job servers, or gateways. As network supervisor, you can decide which servers have the right to charge users on your file server.
- Tracking and charging users for several different services that the file server provides. As supervisor, you must decide which of the services in your environment you want to charge for. If a particular accounting option is not necessary for your situation, you don't have to install it.
- Charging users for the amount of file server disk space they are using. To use this option, you will need to install accounting on the file server and specify the amount that should be charged for disk storage. You will also have to specify how often and at what times the file server should measure the disk space users are using and charge their accounts.
- Charging users for the amount of time they use the file server, as well as the amount of work they ask the file server to do.

The amount of time and work that a user is consuming is measured by the file server in four ways:

- The amount of time the user is logged in to the file server
- The amount of data (programs and/or information) the user requests the file server to read from its disks
- The amount of data (programs and/or information) the user requests the file server to write to its disks
- The number of requests the user makes of the file server

You can have the file server charge for one, several, or all of these services. If you install accounting and do not choose to charge for any services, the server will still keep track of logins and logouts.

Whether to authorize additional servers

You can authorize servers to charge for the services they provide, or revoke the server's right to charge. The current file server will automatically be authorized to charge for services. Unless you add other servers, such as print servers, no other servers will be authorized to charge for services.

If you add additional servers to your network, you can authorize them to charge for their services.

To include these additional servers in the list of accounting servers, you will need to create an account for the server and then authorize the server to charge. If the type of server is known by the SYSCON utility, you can use SYSCON to make this authorization. If the type of server is not known by SYSCON, you will need to use the software included with the server to authorize it to charge.



On the Accounting Worksheet, record the type and name of the server(s) you want to authorize to charge for their services. Refer to the documentation that came with the server to set up the charge rates.

Which services to charge for

The file server can charge for five types of services.

Blocks read

This option sets up charge rates for the amount of data read from the server. The charge is assigned per block read each 1/2 hour. One block equals 4,096 bytes (4KB).

Blocks written

This option sets up charge rates for the amount of data written to the disk. The charge is assigned per block written each 1/2 hour. One block equals 4,096 bytes (4KB).

Connect time

This option sets up charge rates for the amount of time a user is logged in to a server. You can specify the amount charged for each 1/2-hour increment.

Disk storage

This option sets up charge rates for each block (4,096 bytes or 4KB) that is stored on the disk for one day. You can assign different charge rates for each 1/2-hour increment. The charge is assigned per block-day (the number of blocks stored in a day).

Service requests

This option sets charge rates for requests for service. The charge can be changed at 1/2-hour intervals. The charge is assigned per request received.



On the Accounting Worksheet, record the services you want your file server to charge for.

Which charge rates to set

If you plan to charge users for services provided by the file server, you will need to calculate the amount to charge. The amount you charge will depend on your network environment.

To determine the amount you want to charge, you will need to know the following:

- Your costs and the amount you need to charge over a given period of time to cover these costs.
- The services you will charge for and the amount you expect to make from each service.
- How much each service is being used. This will probably be an estimate and will require you to monitor the file server for a period of time.

How to determine the usage of a service

1. To see what the record total usage is for each service, you must assign a charge rate. We suggest that you assign an initial charge rate of 1/1 for "Disk Storage" and "Connect Time." This rate is for monitoring purposes only and has no bearing on actual charge rates.
2. Monitor your file server for two or three weeks to determine how much each service is being used.
3. At the end of this period, use the ATOTAL utility to view total usage for each service.

How to calculate the charge rates

After you have determined the amount you want to charge for each service and have a fairly good estimate of the how much each service was used, you are ready to calculate the charge rates.

Charge rates are specified as multipliers and divisors. This multiplier/divisor ratio is used to change the amount of service used to a monetary charge. The unit of charge is completely arbitrary, but we suggest that in the United States you begin with one charge unit equalling one cent. You can adjust this ratio later if it doesn't work well for your network environment.

To calculate a charge rate, divide your estimated total usage of a service by the amount you want to charge for that service.

For example, if you wanted to charge \$100 a month for blocks read services and you found that 250,000 blocks were being read each month, then your charge rate would be $\$100/250,000$, or $1/2,500$.

You will need to make the necessary conversion to cents (assuming one charge is equal to one cent) per block. In the example above, \$100 for 250,000 blocks converts to one cent for 25 blocks, or .04 cents per block. So if a user reads 100 blocks, it would cost four cents, or four "charges."



On the Accounting Worksheet, record your calculations to determine the charge rates to set for each service.

If you are setting up accounting using the SYSCON utility, continue with the following decision.

If you are setting up accounting using the custom template of USERDEF, skip to "Which account balance to specify in USERDEF" on page 291.

How to assign account balances in SYSCON

Account balances determine how much of a given service users can use. The default account balance in SYSCON is 0.

You can also assign a credit limit indicating how much credit the user can draw upon. If you want to allow credit, you can give users unlimited credit or a specific amount of credit.



If you assign account balances, you need to carefully monitor them. You should warn users that if they are told to log out because their account balances are too low, they should log out immediately.

If users do not log out, the file server will automatically log them out. Users will lose any data that has not been saved.

If you decide to assign account balances, you have two ways to do it.

- You can assign a system or default account balance.
- You can assign individual account balances for users.

You can also increase a user's account balance. However, the user must log out and then log in again before any account balance changes will be put into effect.



On the Accounting Worksheet, record the system default account balance you want to specify. Also record whether or not you want to allow credit and if so, whether credit will be limited or unlimited.

Which account balance to specify in USERDEF

You can assign users account balances to determine how much of a given service they can use. The balance is lowered each time the user is charged for a service. The default setting for "Account Balance" is 1,000 charges.



On the USERDEF Template Worksheet, record the account balance you want to specify in your custom template.

Whether to limit account balances in USERDEF

The default setting for "Limit Account Balance" is not to set limits. This means that even after the account balance is depleted, users can continue to "charge." In other words, "credit" is unlimited.

You can also limit how far users can overcharge their accounts. If you do, you must specify how low the account balance can go by setting the "Low Limit" parameter. The default setting is 0.

To indicate that the user must always have a balance remaining, you would enter a positive number. For example, 10 would indicate that when the user's account drops to 10, the user would no longer receive services.

To indicate that a user can still receive services after the account balance has been depleted, you would enter a negative number. For example, -20 would indicate that the user can receive services for 20 charges after the user's account balance is down to zero.



On the USERDEF Template Worksheet, record whether you want to limit account balances in your custom template. If you want to limit the balances, record the "Low Limit" parameter you want to specify.

Notes



How to Use the Installation Steps

The Installation Steps section takes you through the installation process step by step. Each major part of installation is a tabbed section containing specific steps to complete that part of the installation.

You should thoroughly plan your network before beginning installation. The Planning Modules are provided to help you plan for the most efficient installation.

If you are an experienced installer and have skipped the Planning Modules, references are provided in the step lists that send you back to the appropriate planning module if you need more information during installation.

The Installation Steps are to be followed consecutively, beginning with the Site and Equipment Preparation section. You may find that some sections are not applicable to your installation. These you should skip over. For example, if you are not installing a remote workstation on your network, you would skip the ARCONFIG section.

A number of worksheets are provided for you at the end of this manual. We recommend that you use these worksheets to plan out your network prior to installation even if you do not use the Planning Modules. These worksheets are designed to make the installation of ELS NetWare Level II easier.

As you follow the installation steps, you will be referred to the appropriate worksheet to find the decision you recorded when you planned your network. These worksheets can also be used as a record of your installation for future reference.



Site and Equipment Preparation

To protect the investment you have made in your file server, workstations, and attached peripherals, your installation site must meet certain physical requirements described in this section.

Locate and use the NetWare Installation Worksheet as you complete these steps.

Before you start

See the module for each piece of hardware.

See the Network Printers module on page 119.

See the UPS module on page 145.

- Make sure your hardware is compatible with ELS NetWare Level II v2.15;
- Decide what kinds of printers you will attach to the file server and determine the serial printer parameters (baud rate, word length, and so on);
- Decide whether or not you will install a UPS (uninterruptible power supply).

If you are upgrading to ELS NetWare Level II v2.15, start with Step 8 on page 301.

If you are performing a new installation, start with Step 1 on the next page.

Steps to prepare site and equipment

1. Check the operating environment and power requirements for your equipment.

In order for your hardware to function safely and properly, you should ensure that each hardware component is placed in a suitable operating environment with an appropriate power source.

Consult the *Guide to Operations* or similarly titled manual provided with your particular computer for the specific requirements in the following areas.

- Temperature/humidity
- Maximum altitude
- Power source
- Frequency
- Power requirements
- Power consumption
- Heat dissipation

2. Make sure you are using dedicated power lines and grounded outlets.

Use dedicated power lines for all hardware components on your ELS NetWare network (file servers, workstations, printers, and so on). Only network components should be connected to these lines.

Electrical outlets should be standard 3-wire (NEMA 5-15R) grounded outlets, with the ground wire connected to an earth ground. (If you connect the ground wire to conduit ground, be sure that the conduit ground is an earth ground.)

3. Install power conditioning equipment.

Because network hardware components are sensitive to power fluctuations, all power lines connected to components should use some kind of power conditioning equipment.

Using uninterruptible power supplies

ELS NetWare file servers should be protected from power fluctuations with a regulating uninterruptible power supply (UPS). In addition to protecting hardware from damage caused by power surges and voltage spikes, a UPS protects data held in RAM during a power failure.

We strongly recommend that you use UPS protection for network workstations and other peripherals. If this is not feasible, you should at least equip them with one of the power conditioning devices described below.

Using other power conditioning devices

Many devices are available to protect equipment from various irregularities, such as electrical noise and voltage spikes. These devices include line-surge suppressors (also called power conditioners and line filters) and ferro-resonant isolation transformers.

All network hardware components should be connected through at least one of these devices to protect them from minor power surges. These devices offer some protection and are inexpensive although they have the following disadvantages.

- They do not protect hardware components from large power surges.
- Data held in RAM is lost if there is a power failure.
- Network maintenance costs are higher with line-surge suppressors and ferro-resonant isolation transformers than with uninterruptible power supplies.

4. Protect network equipment from static electricity.

Make sure the operating environment for all NetWare hardware does not subject equipment to static electricity. We strongly recommend that you take the following protective measures.

- Treat carpets with anti-static chemicals (available in spray form from most computer stores).
- If you wish to use protective covers for carpets, use the anti-static type or use conductive covers connected to earth ground. Do not use plastic or other synthetic carpet protectors near network equipment. Such protectors generate large amounts of static electricity.
- Provide conductive work surfaces that are connected to earth ground.
- Make sure that personnel working on open equipment chassis take precautionary measures, such as wearing grounded wrist straps.

5. Prepare the file server computer.

The next step in preparing for your NetWare installation is to set up the personal computer you will use as the file server and enable it to boot DOS. Do not install your networking hardware (network board, cabling, and so on) now. This initial preparation consists of checking the hardware requirements, checking for adequate memory, and performing the initial computer setup procedures.

5a. Check hardware and memory requirements.

The hardware and memory requirements for file servers are given in the File Server planning module on page 23. Make sure your computer meets these requirements.

If your file server needs more memory, you can install add-on memory boards which can be purchased from your computer dealer. Instructions for inserting add-on boards should be included in the documentation supplied by the computer manufacturer.

5b. Prepare the file server to boot DOS.

Follow the initial equipment setup instructions outlined in the *Guide to Operations* or *Quick Reference* for the computer you are using.

When you set up the file server, complete the SETUP (or equivalent) program shipped with the machine. SETUP is used to set the internal clock and specify memory size, internal disk drive types, and other parameters.

If you are setting up an IBM Personal System/2 Model 30-286, 50, 50Z, 60, 70, or 80 as your file server, observe the following as you run the IBM *REFERENCE* program.

- Do not choose "Set Features." Although this option enables you to set a power-on password and a keyboard password, we recommend that you do not use these passwords. If you do set these passwords and the network experiences a power failure, the file server will not reboot automatically.
- Do not choose "Set network server mode." This mode does not allow keyboard input after DOS executes an AUTOEXEC.BAT file, and as a result, your file server console will not operate properly.
- Do not change the arbitration level of the MFM or ESDI fixed-disk driver from the factory default setting. The ELS NetWare operating system software requires the default setting.

6. Prepare the workstation computers.

The next step in preparing for your NetWare installation is to set up your workstations and to enable them to boot DOS. Do not install your networking hardware (network board, cabling, and so on) now. This initial preparation consists of checking the hardware requirements, checking for adequate memory, and performing the initial computer setup procedures.

- 6a.** Check hardware and memory requirements.

The hardware and memory requirements for workstations are given in the Workstations planning module on page 69. Make sure the computers you use meet these requirements.

If your workstations need more memory, you can install add-on memory boards which can be purchased from your computer dealer. Instructions for installing add-on boards should be included in the documentation supplied by the computer manufacturer.

- 6b.** Prepare the workstations to boot DOS.

Follow the initial setup instructions in the *Guide to Operations* or *Quick Reference* for each computer.

7. Prepare network printers for installation.

- 7a.** Install add-on printer ports if necessary.

Most file servers approved for an ELS NetWare network come with at least one serial and one parallel port built in to the system board. If you plan to attach more printers, you can install printer port add-on boards.

- 7b.** Set the printer hardware communication parameters.

For parallel printers, no hardware communication settings are necessary to communicate with the file server.

For serial printers, the data-transfer protocol is defined by the following parameters:

Baud Rate
Word Length
Stop Bits
Parity
XON/XOFF Protocol



If you completed the Network Printers planning module, you should have recorded the parameters you want to set for your serial printers on the NetWare Installation Worksheet. If you did not use the module and need help determining appropriate settings, refer to "Which serial printer parameters to specify" on page 129.

Setting serial printer communication parameters is specific to the type of printer(s) and printer interface board(s) you are installing. Refer to the instructions supplied by the printer hardware manufacturer and make the actual settings now.

8. Make working copies of the NetWare diskettes.

As you run the installation programs, various files on the diskettes will be created or modified. Before you begin, make working copies of all the ELS NetWare diskettes. Use only the working copies to run the program.

As you copy the original ELS NetWare diskettes, you may notice that certain diskettes initially contain no files. Make working copies of these empty diskettes. As the installation proceeds, files will be created on the empty diskettes. To make working copies of the ELS NetWare diskettes, complete the following steps.

- 8a. Boot a personal computer with DOS.
- 8b. Use the DOS DISKCOPY command to copy each NetWare diskette onto a newly formatted diskette.



Do not use the DOS COPY command to make working copies of your NetWare software.

The DISKCOPY command ensures that the working-copy diskettes are formatted correctly, have the correct volume name, and have all the directories and files of the original NetWare diskettes.

- 8c.** Label each copied diskette with the same name that appears on the original diskette.
- 8d.** After making your working copies, store the original NetWare diskettes in a secure place. (Do not discard the original diskettes; you may need them later.) Throughout the NetWare installation, whenever you are instructed to insert a specific diskette, use the working copy.

9. Back up existing data (upgrade only).

Before you start the upgrade, you must back up (archive) the data on your network hard disks. You must do so for the following reasons:

- If you are replacing any hard disks or hard disk controllers during the upgrade, you will need your backups to restore data after the upgrade is completed (unless you can transfer the data to other hard disks attached to the network).
- If you are upgrading from Advanced NetWare 286 v2.0 or above and your existing hardware is supported by ELS NetWare Level II v2.15, no data should be lost during the transfer. However, you should always back up all data as a precaution.
- If you are upgrading from NetWare 86 or 286 below v2.0, you will need to restore your current data files (non-NetWare files) after you have reformatted your disks. In this case, we recommend that you make two backup copies of your data files.

Non-NetWare files and applications are those that you have copied into SYS volume directories from any source other than the NetWare installation diskettes. The files can include word processing programs and files, spreadsheet programs and files, and so on.



If you are upgrading from NetWare 86 or 286 below v2.0, make a list of all non-NetWare data files and program applications that are in the SYS volume. After the upgrade is finished, you must restore these non-NetWare files and applications to the SYS volume.

Consider all mail files in the SYS:MAIL directory as NetWare files.

If you are upgrading from NetWare v4.61, your existing SYS volume includes the following directories: SYS:SUPER, SYS:LOGIN, SYS:PUBLIC, and SYS:MAIL. The SYS:SUPER directory will be replaced by a SYS:SYSTEM directory on your ELS NetWare v2.15 network.

Instructions for using NetWare archiving utilities can be found in the following manuals:

Utility	NetWare manual
LARCHIVE (for backing up to diskette)	For NetWare v2.1 or above: <i>Command Line Utilities</i> For NetWare v2.0a: <i>Archiving Utilities</i>
Tape backup and restore (for backing up to a tape cartridge)	For NetWare v2.1 or above: <i>Tape Backup and Restore Supplement</i> For NetWare v2.0a: <i>NetWare Server 286 Guide to Operations</i>

Instructions for other archiving utilities can be found in your computer's *Guide to Operations* or in the manual that came with your third-party backup system.

Note:

If you are replacing a non-PS/2 file server with an IBM PS/2 file server (Model 30-286, 50, 50z, 60, 70, or 80), you must take the following precautions as you back up the data on your hard disks.

- If you use a tape backup, make sure your backup hardware and software are compatible with both your old file server and the PS/2 file server.
 - If you use the NetWare LARCHIVE utility, you must restore the data from a workstation on the network. Archive your data to the media the workstation uses (3.5-inch or 5.25-inch diskettes) and restore the data from that workstation to the network after the upgrade. In this case, we recommend making two backup copies of your data files.
 - If neither of the above methods is available to you and your file server is connected to an internetwork, copy your data onto another file server's hard disk(s) and restore the data to your file server after the upgrade. This method does not copy the bindery (users, rights, and so on), so use it only when necessary.
-

Where to go from here

With the initial hardware installation completed and working copies of the NetWare diskettes made, you are ready to run the programs that will generate the workstation shells and the network operating system.

To generate the workstation shells, continue with the SHGEN section.

SHGEN

SHell GENeration Utility

This section explains step by step how to run the SHGEN program to generate a customized workstation shell for each workstation in an ELS NetWare Level II network. (This includes remote workstations and workstations that will use Remote Reset.) It also explains how to copy NetWare shells onto the workstation's boot diskette.

Locate and use the Workstation Configuration Worksheets as you complete the steps.

Before you start

*See Step 8
on page 301.*

- Make working copies of all ELS NetWare Level II diskettes;

*See "Which
SHGEN run
method to use"
on page 76.*

- Decide which method to use to run SHGEN;
 - Standard Floppy Disk
 - Hard Disk
 - Network Drive

*See "Which
SHGEN level to
use" on page 74.*

- Decide which level you will use to run SHGEN.
 - Default
 - Intermediate
 - Custom

If you will be using the Default or Intermediate level, start on page 306.

If you will be using the Custom level, start on page 316.

Steps for the default or intermediate level of SHGEN

- 1. Turn on your computer and boot DOS 3.0 or above.**

- 2. Format a blank diskette to use as the workstation boot diskette.**
 - 2a.** Obtain a new diskette compatible with the workstation on which you are running SHGEN (5.25-inch or 3.5-inch).

 - 2b.** Format the diskette using the DOS FORMAT command with the /S parameter (the /S parameter will make the diskette bootable). Type
FORMAT A: /S <Enter>

 - 2c.** Follow the prompts on the screen to format the blank diskette.

 - 2d.** When the diskette is formatted, remove it from the drive and put it in a safe place. You will need it later.

- 3. Make the necessary preparations for the SHGEN run method you chose.**

Standard Floppy Disk method

Insert the *SHGEN-1* diskette into drive A.

Hard Disk method

If the SHGEN files have already been uploaded to the hard disk, skip to Step 4.

If the files have not been uploaded, create a directory on your hard disk to which SHGEN can upload the files. SHGEN will upload them from your NetWare diskettes to your hard disk the first time you run SHGEN. (If you have previously run SHGEN or ELSGEN and created a work directory, skip to Step 4.)

- 3a. Make sure the hard disk you use is your default drive.
- 3b. Use the DOS MD command to create a directory in which SHGEN can create its NETWARE work directory. The directory can have any name (within DOS parameters) you choose.

For example, if your hard disk were drive C and you wanted to create a directory for SHGEN called GENERATE, type

```
C: <Enter>  
MD GENERATE <Enter>
```

- 3c. Access the directory you created using the DOS CD command.

For example, if you created a directory on drive C called GENERATE, you would access the directory by typing

```
C: <Enter>  
CD GENERATE <Enter>
```

- 3d. Insert the *SHGEN-1* diskette into drive A.

You are ready to enter the SHGEN program. Skip to Step 4.

Network Drive method

If the NetWare files have been uploaded to the network disk you are using, skip to Step 4.

If the NetWare files are not on the network disk you are using, you must create a directory on your hard disk to which SHGEN can upload the files. SHGEN will upload files from your NetWare diskettes to your network drive the first time you run SHGEN from a network drive. (If you have previously run SHGEN or ELSGEN and created a work directory, skip to Step 4.)

- 3a. Log in to the network of the file server you will use to run SHGEN.
- 3b. Create a directory using the DOS MD command. You can name this directory anything you want within the DOS parameters.
- 3c. Map a drive to the directory.
- 3d. Insert the *SHGEN-1* diskette into drive A.

You are now ready to enter the SHGEN program. Continue with Step 4.

4. Type the SHGEN command for the level of SHGEN you chose.



If you completed the planning modules, you should have recorded the SHGEN level you want to use on the Workstation Configuration Worksheet. If you did not use the modules and need help deciding which level to use, refer to "Which SHGEN level to use" on page 76.

Standard Floppy Disk method

Type the following command to run the default level of SHGEN:

```
SHGEN -D <Enter>
```

Type the following command to run the intermediate level of SHGEN:

```
SHGEN -I <Enter>
```

Hard Disk or Network Drive method

Make sure you are in the directory you created for the SHGEN files. Use the following chart to determine how to enter the SHGEN command.

First time running SHGEN?	SHGEN Level you want to run	Type:
Yes	Default	A:SHGEN -D
	Intermediate	A:SHGEN -I
No	Default	SHGEN -D
	Intermediate	SHGEN -I

5. Select the SHGEN run method you chose to use.



If you completed the planning modules, you should have recorded the SHGEN run method you want to use on the Workstation Configuration Worksheet. If you did not use the modules and need help deciding which method to use, refer to "Which SHGEN run method to use" on page 78.

5a. Highlight your choice:

SHGEN Run Options
Standard (floppy disks)
Hard Disk
Network Drive

Then press <Enter>.

5b. If you are using the Standard Floppy Disk or RAM Disk method, skip to Step 8.

If you are using the Hard Disk or Network Drive method, type the letter of the current drive:

Drive:

Then press <Enter>.

6. Insert the NetWare diskettes as prompted to upload the files onto the hard disk or network drive.

If you have already uploaded the diskettes, skip to Step 8.

SHGEN creates a work directory named NETWARE. In the NETWARE work directory, SHGEN creates subdirectories to which it uploads NetWare files. SHGEN also uploads the files from the *SHGEN-1* diskette in drive A.

After the files from the *SHGEN-1* diskette are uploaded, you are prompted to insert other NetWare diskettes. Insert the diskettes as they are requested. Always wait for the prompt to appear on the screen before you remove any diskette. SHGEN automatically uploads all the files it needs from the diskettes to the hard disk or network drive.

7. Upload any additional diskettes.

Check through the NetWare diskettes you received. If you have any diskettes labeled *LAN_DRV_ plus three alphanumeric characters other than ELS*, highlight "Yes" at this prompt. Otherwise, highlight "No" and skip to Step 8.

7a. Highlight your choice:

Upload Additional Diskettes?
Yes
No

Then press <Enter>.

7b. If you answer "Yes," the following appears.

Insert diskette to upload in Drive A <Press ESCAPE to Continue>
--

Insert the diskette and press <Escape>.

7c. Repeat Steps 7a and 7b for each additional diskette you have. When you are finished uploading diskettes, answer "No" to the prompt in Step 7a and continue with Step 8.

8. Select the LAN driver for the workstation.



If you completed the planning modules, you should have recorded the LAN driver you want to use on the Workstation Configuration Worksheet. If you did not use the modules and need help deciding which LAN driver to select, refer to "Which LAN driver to select" on page 82.

8a. Highlight your choice:

Available LAN Drivers	
▲	IBM PCN II & Baseband V1.10 (880526)
	IBM Token Ring V2.40 (880815)
	Micom-Interlan NI5010 V2.30EC (880513)
	NetWare Ethernet NE-1000 V2.30EC (880512)
▼	NetWare RX-Net V1.00 (880520)

Then press <Enter>.

If you are using the Default Level of SHGEN, skip to Step 8c. If you are using the Intermediate Level of SHGEN, continue with Step 8b.

8b. Highlight the configuration option you want:

Available LAN Driver Configurations	
0:	IRQ = 2, I/O Base = 2E0h, RAM Buffer at D000:0
1:	IRQ = 2, I/O Base = 350h, RAM Buffer at C000:0
2:	IRQ = 2, I/O Base = 300h, RAM Buffer at CC00:0
3:	IRQ = 2, I/O Base = 2F0h, RAM Buffer at DC00:0
4:	IRQ = 3, I/O Base = 2E0h, RAM Buffer at D000:0
5:	IRQ = 3, I/O Base = 350h, RAM Buffer at C000:0
6:	IRQ = 3, I/O Base = 300h, RAM Buffer at CC00:0
7:	IRQ = 3, I/O Base = 2F0h, RAM Buffer at DC00:0

Then press <Enter>.

- 8c. On the Workstation Configuration Worksheet, record the selected configuration that appears on the screen. Your screen will be similar to the following:

Selected Configurations
LAN Driver: NetWare RX-Net V1.00 (880520) Option 0: IRQ=2, I/O Base=2E0h, RAM Buffer D000

9. Generate the workstation shell.

- 9a. Highlight:

Continue Shell Generation Using Selected Config...?
No
Yes

Then press <Enter>.

SHGEN will generate the IPX.COM shell file for your selected configuration.

If you are running SHGEN from diskettes, the IPX.COM file will be placed on the *SHGEN-1* diskette (3.5-inch diskettes) or the *SHGEN-2* diskette (5.25-inch diskettes). If you are running SHGEN from a hard disk or a network drive, the file will be placed in the corresponding directory.

- 9b. A prompt similar to the following will appear, indicating where the IPX.COM shell file is located:

A valid shell has been placed on SHGEN-1 <Press ESCAPE to Continue>
--

Press <Escape>.

10. Copy the NetWare shell files to the workstation's boot diskette.

Standard Floppy Disk method

After the IPX.COM file is generated, you will be returned to the DOS prompt.

Use the DOS COPY command to copy the following shell files onto the boot diskette:

IPX.COM
NET4.COM (if the workstation will use DOS 4.x)
NET3.COM (if the workstation will use DOS 3.x)
NET2.COM (if the workstation will use DOS 2.x)
NETBIOS.EXE and INT2F.COM (if the workstation will run applications that require NETBIOS)

Hard Disk or Network Drive method

You must copy the IPX.COM file and the other NetWare shell files to the workstation's boot diskette before you run SHGEN again for another workstation configuration.

- 10a. To download the shell files to diskette, highlight:

Download Shell Files To Floppy Disk?	
	Yes
	No

Then press <Enter>.

- 10b. Insert the boot diskette as prompted. After the shell files are downloaded, you will be returned to the DOS prompt.

11. Copy any additional files to the workstation's boot diskette.

- 11a. Copy or create any additional files that the workstation will need on its boot diskette (SHELL.CFG, CONFIG.SYS, AUTOEXEC.BAT, and so on).



If you completed the planning modules, you should have recorded the additional files you need on the Workstation Configuration Worksheet. If you did not use the modules and need help determining which additional files are needed, refer to "Which files to include on the boot diskette" on page 84.

- 11b. Label the boot diskette so you know what LAN driver was used to generate IPX.COM and which configuration option it was generated for.

For example:

Boot Diskette for Workstation #1
NetWare RX-Net v1.00 (880520)
Option 0 Dos v3.3

Where to go from here

Repeat Steps 1 through 11 for each workstation you will run the default or intermediate level of SHGEN for.

If you have generated a shell for a remote workstation using the "IBM ASYNC (COM1/COM2)" driver, you must run the ARCONFIG utility to configure the shell for the remote connection. Instructions for running ARCONFIG are given in the ARCONFIG section.

After you have made boot diskettes for all of the workstations on your network, skip to the ELSGEN Part 1 section.

Steps for the Custom level of SHGEN

1. Turn on your computer and boot DOS 3.0 or above.

2. Format a blank diskette to use as the workstation boot diskette.
 - 2a. Obtain a new diskette compatible with the workstation for which you are running SHGEN (5.25-inch or 3.5-inch).
 - 2b. Format the diskette using the DOS `FORMAT` command with the `/S` parameter (the `/S` parameter will make the diskette bootable). Type the command as follows:

```
FORMAT A: /S <Enter>
```
 - 2c. Follow the prompts on the screen to format the blank diskette.
 - 2d. When the diskette is formatted, remove it from the drive and put it in a safe place. You will need it later.

3. Make the necessary preparations for the SHGEN run method you chose.

Standard Floppy Disk method

Insert the *SHGEN-1* diskette into drive A.

Hard Disk method

If the files have already been uploaded to the hard disk, skip to Step 4.

If the files have not been uploaded, you must create a directory on your hard disk to which SHGEN can upload the files. SHGEN will upload files from your NetWare diskettes to your hard disk the first time you run SHGEN. (If you have previously run SHGEN or ELSGEN and created a work directory, skip to Step 4.)

- 3a. Make sure the hard disk you use is your default drive.
- 3b. Use the DOS MD command to create a directory in which SHGEN can create its NETWARE work directory. The directory can have any name (within DOS parameters).

For example, if your hard disk were drive C and you wanted to create a directory for SHGEN called GENERATE, you would type the following:

```
C: <Enter>  
MD GENERATE <Enter>
```

- 3c. Access the directory you created using the DOS CD command.

For example, if you created a directory on drive C called GENERATE, you would access the directory by typing

```
CD GENERATE <Enter>
```

- 3d. Insert the *SHGEN-1* diskette into drive A.

You are ready to enter the SHGEN program. Skip to Step 4.

Network Drive method

If the NetWare files have been uploaded to the network disk you are using, skip to Step 4.

If the NetWare files are not on the network disk you are using, you must create a directory on your hard disk to which SHGEN can upload the files. SHGEN will upload files from your NetWare diskettes to your network drive the first time you run SHGEN from a network drive. (If you have previously run SHGEN or ELSGEN and created a work directory, skip to Step 4.)

- 3a. Log in to the network of the file server you will use to run SHGEN.
- 3b. Create a directory using the DOS MD command. You can name this directory anything you want within the DOS parameters.
- 3c. Map a drive to the directory.
- 3d. Insert the *SHGEN-1* diskette into drive A.

You are now ready to enter the SHGEN program. Continue with Step 4.

4. Type the SHGEN command for the custom level of SHGEN.

Standard Floppy Disk method

Type

SHGEN -C <Enter>

Hard Disk or Network Drive method

If this is the first time you have run SHGEN from the hard disk or network drive, type

A:SHGEN -C <Enter>

If you have run SHGEN before from the hard disk or network drive, make sure you are in the directory you created for the SHGEN program files. Then type

SHGEN -C <Enter>

5. Select the SHGEN run method you chose to use.



If you completed the planning modules, you should have recorded the SHGEN run method you want to use on the Workstation Configuration Worksheet. If you did not use the modules and need help deciding which method to use, refer to "Which SHGEN run method to use" on page 78.

5a. Highlight your choice:

SHGEN Run Options
Standard (floppy disks)
Hard Disk
Network Drive

Then press <Enter>.

- 5b.** If you are using the Standard Floppy Disk method, skip to Step 8.

If you are using the Hard Disk or Network Drive method, type the letter of the current drive:

Drive:

Then press <Enter>.

- 6. Insert the NetWare diskettes as prompted to upload the files onto the hard disk or network drive.**

If you have already uploaded the diskettes, skip to Step 8.

SHGEN creates a work directory named NETWARE. In the NETWARE work directory, SHGEN creates subdirectories to which it uploads NetWare files. SHGEN will also upload the files from the *SHGEN-1* diskette in drive A.

After the files from the *SHGEN-1* diskette are uploaded, you are prompted to insert other NetWare diskettes. Insert the diskettes as they are requested. Always wait for the prompt to appear on the screen before you remove any currently inserted diskette. SHGEN automatically uploads all the files it needs from the diskettes to the hard disk or network drive.

- 7. Upload any additional diskettes.**

Check through the NetWare diskettes you received. If you have any diskettes labeled *LAN_DRV_ plus three alphanumeric characters other than ELS*, highlight "Yes" at this prompt. Otherwise, answer "No" and skip to Step 9.

7a. Highlight your choice:

Upload Additional Diskettes?
Yes
No

Then press <Enter>.

7b. If you answer "Yes", the following prompt appears.

Insert diskette to upload in Drive A <Press ESCAPE to Continue>
--

Insert the diskette and press <Escape>.

7c. Repeat Steps 7a and 7b for each additional diskette you have. When you are finished uploading diskettes, answer "No" to the prompt in Step 7a and continue with Step 8.

8. Select resource sets for the workstation hardware.

8a. Highlight:

Available Options
Select Resource Sets (optional)
Select LAN Driver
Edit Resource List
Edit Resource Sets
Save Selections and Continue

Then press <Enter>.

8b. Highlight:

Resource Set Options
Select Available Item
Load and Select Item

Then press <Enter>.

Note: The "Load and Select Item" option is used only to update the resource set definitions. Refer to the instructions that came with the updated diskette if you need to use this option.



If you completed the planning modules, you should have recorded the resource sets you want to use on the Workstation Configuration Worksheet. If you did not use the modules and need help deciding what to select, refer to "Which resource sets to select" on page 37.

8c. Highlight your choice:

Available Resource Sets	
	COM1
	COM1 (No Interrupts)
	COM2
	COM2 (No Interrupts)
	▼ COM3 (Micro Channel Only)

Then press <Enter>.

8d. Review the resource sets you have selected. The list will appear similar to the following:

Selected Resource Sets	
	LPT1

- To select another resource set, repeat Steps 8b and 8c.
- To delete a selected resource set, choose "Deselect an Item" in the "Resource Set Options" menu and highlight the resource set you want to delete. Then press <Enter>.
- When you are ready to continue, press <Escape> twice.

9. Select the LAN driver for the workstation.

9a. Highlight:

Available Options
Select Resource Sets (optional)
Select LAN Driver
Edit Resource List
Edit Resource Sets
Save Selections and Continue

Then press <Enter>.

9b. If the LAN driver you want to select is already loaded into memory, highlight:

LAN Driver Options
Select Available Item
Load and Select Item

Then press <Enter>. Skip to Step 9f.

If the LAN driver you want to select came on a separate diskette, highlight:

LAN Driver Options
Select Available Item
Load and Select Item

Then press <Enter>. Continue with Step 9c.

9c. If you are using the Hard Disk or Network Drive method, skip to Step 9d.

If you are using the Standard Floppy Disk method, insert the diskette containing the LAN driver you want to load.

Insert disk matching LAN_DRV_??? in any drive. <Press ESCAPE to continue> <Press CANCEL (F7) to abort>
--

Press <Escape>.

9d. Wait for a prompt similar to the following:

```
The LAN Driver name file was read successfully.
Press ESCAPE to continue.
```

Then press <Escape>.

9e. If you are using the Standard Floppy Disk method, reinsert the *SHGEN-1* diskette into drive A.

```
Insert disk SHGEN-1 in any drive.
<Press ESCAPE to continue>
```

Then press <Escape>.

9f. Select the LAN driver you want.



If you completed the planning modules, you should have recorded the LAN driver you want to use on the Workstation Configuration Worksheet. If you did not use the modules and need help deciding which LAN driver to select, refer to "Which LAN driver to select" on page 82.

Highlight your choice:

```
Available LAN Drivers
^| IBM Token Ring V2.40 (880815)
  | Micom-Interlan NI5010 V2.30EC (880513)
  | NetWare Ethernet NE-1000 V2.30EC (880512)
  | NetWare RX-Net V1.00 (880520)
v| Proteon ProNET-10 p1300/p1800 Ver 2.23 w/cksm
```

Then press <Enter>.

9g. Your selection will be displayed in a window similar to the following.

```
Selected LAN Driver
|NetWare RX-Net V1.00 (880520)
```

Press <Escape>.

10. Configure the resource sets.

10a. Highlight:

Available Options
Select Resource Sets (optional)
Select LAN Driver
Configure Driver / Resources
Edit Resource List
Edit Resource Sets
Save Selections and Continue

Then press <Enter>.

10b. Highlight:

Configure Driver / Resources
Choose LAN Configuration
Choose Resource Configuration

Then press <Enter>.

10c. Highlight a list entry:

Resource Sets With Unconfigured Resources
0: LPT1

Then press <Enter>.

10d. Highlight a listed entry:

Unconfigured Resources
0: LPT1

Then press <Enter>.

10e. Highlight your choice:

Available Resource Configurations	
0:	IRQ=7, I/O Base=378h
1:	IRQ=7, I/O Base=3BCh

Then press <Enter>.

11. Configure the LAN driver.

11a. Highlight:

Configure Driver / Resources	
Choose LAN Configuration	
Release Resource Configuration	

Then press <Enter>.

11b. The unconfigured driver will appear in a screen similar to the following:

Unconfigured Driver	
NetWare RX-Net	V1.00 (880520)

Press <Enter>.

11c. Highlight your choice:

Available LAN Driver Configurations	
0:	IRQ = 2, I/O Base = 2E0h, RAM Buffer at D000:0
1:	IRQ = 2, I/O Base = 350h, RAM Buffer at C000:0
2:	IRQ = 2, I/O Base = 300h, RAM Buffer at CC00:0
3:	IRQ = 2, I/O Base = 2F0h, RAM Buffer at DC00:0
4:	IRQ = 3, I/O Base = 2E0h, RAM Buffer at D000:0
5:	IRQ = 3, I/O Base = 350h, RAM Buffer at C000:0
6:	IRQ = 3, I/O Base = 300h, RAM Buffer at CC00:0
7:	IRQ = 3, I/O Base = 2F0h, RAM Buffer at DC00:0

Then press <Enter>.

11d. A screen similar to the following will appear:

Configure Driver / Resources
Review Selected Configurations Release LAN Driver Configuration

- To release and reconfigure the LAN Driver, highlight "Release LAN Driver Configuration" and repeat Steps 11c and 11d.
- To review the selected configurations, highlight "Review Selected Configurations." Record the selected configurations so you will have a record of them. Then press <Escape> twice to continue.

12. Generate the workstation shell.

12a. Highlight:

Available Options
Select Resource Sets (optional) Select LAN Driver Configure Driver / Resources Edit Resource List Edit Resource Sets Save Selections and Continue

Then press <Enter>.

12b. Highlight:

Continue Shell Generation Using Selected Config...?
No Yes

Then press <Enter>.

12c. Highlight:

```
Shell Generation Options
|
| Select Shell Configuration
| Link NetWare Shell
| Exit SHGEN
```

Then press <Enter>.

SHGEN will link the IPX.COM shell file.

12d. After the shell has been linked, highlight:

```
Shell Generation Options
|
| Select Shell Configuration
| Configure NetWare Shell
| Exit SHGEN
```

Then press <Enter>.

SHGEN will configure the NetWare shell file.

If you are running SHGEN from diskettes, the IPX.COM file will be placed on the *SHGEN-1* diskette (3.5-inch diskettes) or *SHGEN-2* diskette (5.25-inch diskettes). If you are running SHGEN from a hard disk or network drive, the file will be placed in the corresponding directory.

12e. A prompt similar to the following appears, indicating where the IPX.COM shell file is located:

```
A valid shell has been placed on SHGEN-1
  <Press ESCAPE to Continue>
```

Press <Escape>.

13. Exit SHGEN.

13a. Highlight:

Shell Generation Options
Select Shell Configuration
Exit SHGEN

Then press <Enter>.

13b. Highlight:

Exit SHGEN
Yes
No

Then press <Enter>.

14. Copy the NetWare shell files to the workstation's boot diskette.

Standard Floppy Disk method

After the IPX.COM file is generated, you will be returned to the DOS prompt.

Use the DOS COPY command to copy the following shell files onto the boot diskette:

IPX.COM

NET4.COM (if the workstation will use DOS 4.x)

NET3.COM (if the workstation will use DOS 3.x)

NET2.COM (if the workstation will use DOS 2.x)

NETBIOS.EXE and INT2F.COM (if the workstation will run applications that require NETBIOS)

Hard Disk or Network Drive method

You must copy the IPX.COM file and the other NetWare shell files to diskette before you run SHGEN again for another workstation configuration.

- 14a.** To automatically download the shell files to diskette, highlight:

Download Shell Files To Floppy Disk?	
Yes	<input checked="" type="checkbox"/>
No	<input type="checkbox"/>

Then press <Enter>.

- 14b.** Insert the boot diskette as prompted. After the shell files are downloaded, you will be returned to the DOS prompt.

15. Copy any additional files to the workstations boot diskettes.

- 15a.** Copy or create any additional files that the workstation will need on its boot diskette (SHELL.CFG, CONFIG.SYS, AUTOEXEC.BAT, and so on).



If you completed the planning modules, you should have recorded the additional files you need on the Workstation Configuration Worksheet. If you did not use the modules and need help determining which additional files are needed, refer to "Which files to include on the boot diskette" on page 84.

- 15b.** Label the boot diskette so you know what LAN driver was used to generate IPX.COM and which configuration option it was generated for.

For example:

Boot Diskette for Workstation #1
NetWare RX-Net v1.00 (880520)
Option 0 DOS v3.3

Where to go from here

You must use SHGEN to generate a shell for each workstation you will use on your network. Repeat Steps 1 through 15 for each workstation you will run the custom level of SHGEN for.

If you have generated a shell for a remote workstation using the "IBM ASYNC (COM1/COM2)" driver, you must run the ARCONFIG utility to configure the shell for the remote connection. Instructions for running ARCONFIG are given in the ARCONFIG section.

After you have made boot diskettes for all of the workstations on your network, continue with ELSGEN Part 1.

Notes

ELSGEN Part 1

ELS NetWare GENeration Utility

This section explains step by step how to start the ELSGEN program and use the Network Configuration utility to configure and generate the operating system.

Locate and use your File Server Configuration Worksheet as you complete these steps.

Before you start

See "Which ELSGEN run method to use" on page 29.

- Decide which ELSGEN run method to use.
 - Standard Floppy Disk
 - RAM Disk
 - Hard Disk
 - Network Drive

Steps for generating the operating system

1. Turn on your computer and boot DOS 3.0 or above.
2. Make the necessary preparations for the method you chose.

Standard Floppy Disk method

No preparations are necessary; skip to Step 3.

RAM Disk method

Be sure your computer is set up to boot with the RAM disk installed. Instructions for creating a RAM disk are in your DOS manual under "DEVICE Command." After the RAM disk is installed, reboot the computer and skip to Step 3.

Hard Disk method

If the ELSGEN files have already been uploaded to the hard disk, skip to Step 3.

If the files have not been uploaded, you must create a directory on your hard disk to which ELSGEN can upload the files. ELSGEN will upload files from your NetWare diskettes to your hard disk the first time you run ELSGEN. (If you ran SHGEN from the hard disk before running ELSGEN, you may want to use the NETWARE directory, which already exists. If you created this directory when running SHGEN, skip to Step 3.)

- 2a. Use the DOS MD command to create a directory into which ELSGEN can upload the NetWare files it needs. The directory can have any name (within DOS parameters) you choose.

For example, if your hard disk were drive C and you wanted to create a directory for ELSGEN called NETWARE, you would type the following:

```
C: <Enter>  
MD NETWARE <Enter>
```

- 2b. Access the directory you created (or that was created for you) using the DOS CD command.

For example, if you created a directory on drive C called NETWARE, you would access the directory by typing the following:

```
C: <Enter>  
CD NETWARE <Enter>
```

- 2c. Insert the *ELSGEN* diskette into drive A.

You are ready to enter the ELSGEN program. Skip to Step 3.

Network Drive method

If the NetWare files have already been uploaded to the network hard disk, skip to Step 3.

If the NetWare files are not on the network disk you will be using, you must create a directory to which ELSGEN can upload the files. ELSGEN will upload files from your NetWare diskettes to your network drive the first time you run ELSGEN from a network drive. (If you ran SHGEN from the hard disk before running ELSGEN, you can use the NETWARE directory, which already exists. If you created this directory when running SHGEN, skip to Step 3.)

- 2a. Log in to the network of the file server you will use to run ELSGEN.
- 2b. Create a directory using the DOS MD command. You can name this directory anything you want within the DOS parameters.
- 2c. Map a drive to the directory.
- 2d. Insert the *ELSGEN* diskette into drive A.

You are ready to enter the ELSGEN program. Proceed to Step 3.

3. Follow the instructions below that apply to your ELSGEN run method.

Standard Floppy or RAM Disk method

Insert the *ELSGEN* diskette into drive A.

If you have a drive B:



Insert the *SUPPORT* diskette into drive B.



Insert the *AUXGEN* diskette into drive B.

Make sure drive A is your default drive.

Hard Disk method

Make sure you are in the directory you created for the ELSGEN program files.

Network Drive method

Make sure you have logged in to the network and are in the directory you created for the ELSGEN program files.

4. Type the ELSGEN command.

Use the following charts to determine the command that is appropriate to your situation.

Note: If you have run ELSGEN before, you must decide whether you want to save the file server configuration data you previously entered or start over with a new configuration.

Standard Floppy or RAM Disk method

First time running ELSGEN?	Save previously entered data?	Type:
N/A	No	ELSGEN -N
	Yes	ELSGEN

Hard Disk or Network Drive method

First time running ELSGEN?	Save previously entered data?	Type:
Yes	N/A	A:ELSGEN
No	No	ELSGEN -N
	Yes	ELSGEN

5. Select the ELSGEN run method you chose to use.

5a. Highlight your choice:

ELSGEN Run Options
Standard (floppy disks)
RAM Disk
Hard Disk
Network Drive

Then press <Enter>.

- 5b.** If you are using the Standard Floppy Disk or RAM Disk method, skip to Step 8.

If you are using the Hard Disk or Network Drive method, type the letter of the current drive:

Drive:

Then press <Enter>.

- 6. Insert the NetWare diskettes as prompted to upload the files onto the hard disk or network drive.**

If you have already uploaded the diskettes, skip to Step 8.

ELSGEN will create subdirectories on the hard disk or network drive to which it will upload the NetWare files it needs. ELSGEN will also upload the files from the *ELSGEN* diskette in drive A.

After the files from the ELSGEN diskette are uploaded, you will be prompted to insert other NetWare diskettes. Insert the diskettes as they are requested. Always wait for the prompt to appear on the screen before you remove any diskettes. ELSGEN automatically uploads all the files it needs from the diskettes to the hard disk or network drive.



If you will be using the Hard disk or Network drive method to install multiple file servers (if you are a Novell Authorized Reseller, for example), you must exit ELSGEN at this point and delete the *GENDATA* subdirectory and the files it contains from the directory you created in Step 2. Elsgen requires a separate *GENDATA* diskette for each file server.

After you have deleted the *GENDATA* directory, re-enter ELSGEN and continue from this point.

7. Upload any additional diskettes.

Check through the NetWare diskettes you received. If you have any diskettes labeled *LAN_DRV_ plus three alphanumeric characters other than ELS*, answer "Yes" to this prompt. Otherwise, answer "No" and skip to Step 8.

7a. Highlight your choice:

Upload Additional Diskettes?
Yes
No

Then press <Enter>.

7b. If you answer "Yes", the following prompt will appear.

Insert diskette to upload in Drive A <Press ESCAPE to Continue>
--

Insert the diskette and press <Escape>.

7c. Repeat Steps 7a and 7b for each additional diskette you have. When you are finished, answer "No" to the prompt in Step 7a and continue with Step 8.

8. Select the type of operating system you want to generate.

8a. Highlight:

Network Generation Options
Operating System Generation
Exit ELSGEN

Then press <Enter>.

8b. If you see this prompt:

Insert disk GENDATA in any drive. <Press ESCAPE to Continue>

Insert the *GENDATA* diskette into drive A and press <Escape>.



Be sure to insert your working copy of the *GENDATA* diskette (the *GENDATA* diskette that was shipped with the ELS Level II operating system you are installing). Do not substitute any other *GENDATA* diskette.

8c. Highlight:

Available Options
Select Operating System
Select Resource Set Options
Select LAN Drivers
Return To Main Menu

Then press <Enter>.



If you completed the planning modules, you should have recorded the type of operating system you want on the File Server Configuration Worksheet. If you did not use the modules and need help with this setting, refer to "Which operating system type to use" on page 33.

8d. Highlight your choice:

Set Operating System Type
ELS NetWare 286 Level II / Dedicated
ELS NetWare 286 Level II / Nondedicated

Then press <Enter>.

9. Select resource sets for your file server hardware.

9a. Highlight:

Available Options
Select Operating System Select Resource Set Options Select LAN Drivers Return To Main Menu

Then press <Enter>.

9b. Highlight:

Resource Set Options
Select Resource Sets Edit Resource List Edit Resource Sets

Then press <Enter>.

9c. Highlight:

Available Options
Select Loaded Item Load and Select Item

Then press <Enter>.

Note: The "Load and Select Item" option is used only to update the resource set definitions. Refer to the instructions that came with the updated diskette to use this option.



If you completed the planning modules, you should have recorded the resource sets you want to include on the File Server Configuration Worksheet. If you did not use the modules and need help deciding what resource sets to include, refer to "Which resource sets to select" on page 35.

9d. Highlight your choice:

Available Resource Sets
AST Clock-Calendar Card
AT Compatible File Server
Color Graphics Adapter
COM1
▼ COM1 (No Interrupts)

Then press <Enter>.

9e. Review the resource sets you have. A list will appear similar to the following:

Selected Resource Sets
IBM PS/2 Model 50 File Server

- To select another resource set, repeat Steps 9c and 9d.
- To delete a selected resource set, choose "Deselect an Item" in the "Available Options" submenu and highlight the resource set you want to delete. Then press <Enter>.
- When you are ready to continue, press <Escape> twice.

10. Select LAN drivers for your network boards.

10a. Highlight:

Available Options
Select Operating System
Select Resource Set Options
Select LAN Drivers
Return To Main Menu

Then press <Enter>.

- 10b.** If the LAN driver you want to select is already loaded into memory, highlight:

LAN Driver Options
Select Loaded Item Load and Select Item

Then press <Enter>. Skip to Step 10f.

If the LAN driver you want to select is on a separate diskette, highlight:

LAN Driver Options
Select Loaded Item Load and Select Item

Then press <Enter>. Continue with Step 10c.

- 10c.** If you are using the Hard Disk or Network Drive method, skip to Step 10d.

If you are using the Standard Floppy Disk or RAM Disk method, insert the diskette containing the LAN driver you want to load.

Insert disk matching LAN_DRV_??? in any drive. <Press ESCAPE to continue> <Press CANCEL (F7) to abort>
--

Then press <Escape>.

- 10d.** Wait for a prompt similar to the following:

The LAN Driver name file was read successfully. Press ESCAPE to continue.
--

Then press <Escape>.

- 10e. If you are using the Standard Floppy Disk or RAM Disk method, reinsert the *ELSGEN* diskette into drive A.

Insert disk ELSGEN in any drive.
<Press ESCAPE to continue>

Then press <Escape>.



If you completed the planning modules, you should have recorded the LAN drivers you want to include on the File Server Configuration Worksheet. If you did not use the modules and need help deciding which LAN drivers to select, refer to "Which LAN drivers to select" on page 39.



Select LAN A first, LAN B second, and LAN C (if necessary) third. If you are using a remote workstation, the Asynchronous Remote driver must be your last LAN (either B or C depending on whether or not you use LAN B as an Apple Macintosh LAN).

- 10f. Choose one of the LAN drivers you want to include.

Available LAN Drivers	
	3Com 3C505 EtherLink Plus (Assy 1194 only) V2.30EC
	3Com 3C505 EtherLink Plus (Assy 2012 only) V2.30EC
	3Com 3C523 EtherLink/MC V2.30EC (880526)
	Gateway Communications Inc. G/NET V1.00 (880513)

Then press <Enter>.

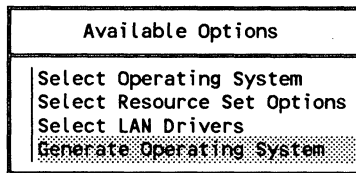
- 10g. Review the LAN drivers you have selected. The list will appear similar to the following:

Selected LAN Drivers	
	A: LAN Driver name

- To select another LAN driver, repeat Steps 10b through 10f.
- To deselect a LAN driver, choose "Deselect an Item" from the "LAN Driver Options" menu and highlight the LAN driver you want to deselect. Then press <Enter>.
- When you are ready to continue, press <Escape>.

11. Assign network addresses.

11a. Highlight:

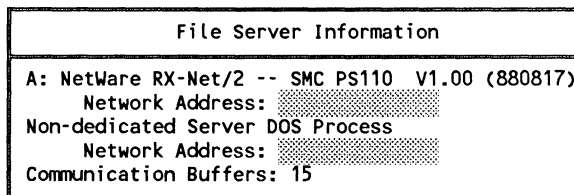


Then press <Enter>.



If you completed the planning modules, you should have recorded the network addresses you want to use on the File Server Configuration Worksheet. If you did not use the modules and need help, refer to "Which network addresses to set" on page 40.

11b. At each network address prompt, type the address you have selected and press <Enter>.



12. Specify the number of communication buffers.



If you completed the planning modules, you should have recorded the number of communication buffers you want to use for your file server on the File Server Configuration Worksheet. If you need help, see "How many communication buffers to assign" on page 41.

File Server Information
A: NetWare RX-Net/2 -- SMC PS110 V1.00 (880817) Network Address: 00000001 Non-dedicated Server DOS Process Network Address: 00000002 Communication Buffers: 15

- To accept the default number, press <Escape>.
- To change the number, type the number of communication buffers you want and press <Enter>. Then press <Escape>.

13. Decide whether to accept the configuration settings chosen automatically.

Review the automatically chosen configuration settings displayed on the screen. If you need help deciding whether to accept this configuration, refer to "Whether to use the automatic configuration" on page 42.

Selected Configurations
LAN A: NetWare RX-Net/2 -- SMC PS110 V1.00 (880817) Option 0: IRQ = 2, I/O Base = 2E0h, RAM Buffer at D000:0 Network Address: 00000001 Non-dedicated Server DOS Process Network Address: 00000002
OS Type: ELS NetWare 286 Level II / Nondedicated Communication Buffers: 15
Resource Set 1: IBM PS/2 Model 50 File Server Resource 1: Model 50 Hard Drive

- To accept this configuration, record the configuration settings on the File Server Configuration Worksheet. Then press <Escape> and skip to Step 18 on page 352.
- To change a setting, press <Escape> and continue with the next step.

14. Reject the automatic configuration settings.

14a. Highlight:

Continue Network Generation Using Selected Config....?	
No	
Yes	

Then press <Enter>.

14b. Highlight:

ABANDON NETWORK GENERATION and Exit!	
No	
Yes	

Then press <Enter>.

14c. Highlight:

Available Options	
Select Operating System	
Select Resource Set Options	
Select LAN Drivers	
Configure Operating System	
Generate Operating System	

Then press <Enter>.

15. Choose a LAN driver configuration.

If you need a different LAN configuration from the one chosen automatically by ELSGEN, do the following.

15a. Highlight:

Configure Drivers / Resources
Review Selected Configurations
Enter Server Information
Release LAN Configuration
Release Resource Set Configuration

Then press <Enter>.

15b. Highlight the LAN driver you want to reconfigure:

Configured LAN Drivers
A: NetWare RX-Net V1.00 (880520)

Then press <Enter>.

15c. Highlight:

Configure Drivers / Resources
Choose LAN Configuration
Enter Server Information
Release Resource Set Configuration

Then press <Enter>.

15d. Highlight the LAN driver you want to configure:

Unconfigured LAN Drivers
A: NetWare RX-Net V1.00 (880520)

Then press <Enter>.

- 15e. Highlight the LAN configuration you want to use:

Available LAN Configurations	
0:	IRQ = 2, I/O Base = 2E0h, RAM Buffer at D000:0
1:	IRQ = 2, I/O Base = 350h, RAM Buffer at C000:0
2:	IRQ = 2, I/O Base = 300h, RAM Buffer at CC00:0
3:	IRQ = 2, I/O Base = 2F0h, RAM Buffer at DC00:0
4:	IRQ = 3, I/O Base = 2E0h, RAM Buffer at D000:0
5:	IRQ = 3, I/O Base = 350h, RAM Buffer at C000:0
6:	IRQ = 3, I/O Base = 300h, RAM Buffer at CC00:0
7:	IRQ = 3, I/O Base = 2F0h, RAM Buffer at DC00:0

Then press <Enter>.

16. Choose a resource set configuration.

If you need a different resource set configuration from the one chosen automatically, do the following.

- 16a. Highlight:

Configure Drivers / Resources
Review Selected Configurations
Enter Server Information
Release LAN Configuration
Release Resource Set Configuration

Then press <Enter>.

- 16b. Highlight the resource set you want to reconfigure:

Configured Resource Sets
0: Novell 386A File Server

Then press <Enter>.

- 16c. Highlight the resource you want to reconfigure:

Configured Resources
2: COM1 (No Interrupts)

Then press <Enter>.

- 16d. Highlight:

Configure Drivers / Resources
Choose Resource Set Configuration
Enter Server Information
Release LAN Configuration

Then press <Enter>.

- 16e. Highlight the resource set you want to configure:

Unconfigured Resource Sets
0: Novell 386A File Server

Then press <Enter>.

- 16f. Highlight the resource you want to configure:

Unconfigured Resources
2: COM1 (No Interrupts)

Then press <Enter>.

- 16g. Highlight the configuration you want:

Available Resource Configurations
0: I/O Base=3F8h
1: Used exclusively by "IBM ASYNC" LAN to LAN Driver

Then press <Enter>.

17. Review the selected configurations again.

17a. Highlight:

Configure Drivers / Resources
Review Selected Configurations
Enter Server Information
Release LAN Configuration
Release Resource Set Configuration

Then press <Enter>.

17b. The "Selected Configurations" window will appear:

Selected Configurations
LAN A: NetWare RX-Net V1.00 (880520) Option 0: IRQ = 2, I/O Base = 2E0h, RAM Buffer at D000:0
Network Address: 00000001
Non-dedicated Server DOS Proces Network Address: 00000002
OS Type: ELS NetWare 286 Level II / Nondedicated
Communication Buffers: 15
Resource Set 1: Novell 386A File Server Resource 1: AT Auxiliary ROM

Press <Escape> to leave this window and continue.

17c. Press <Escape> again to save the configuration selections and continue.

17d. Highlight:

Available Options
Select Operating System
Select Resource Set Options
Select LAN Drivers
Configure Operating System
Generate Operating System

Then press <Enter>.

- 17e. The "File Server Information" window will appear. Press <Escape>.
- 17f. The "Selected Configurations" window will appear. Press <Escape> to continue.

18. Generate the NetWare operating system.

- 18a. Highlight:

Continue Network Generation Using Selected Config.....?
No
Yes

Then press <Enter>.

- 18b. The program will cycle through the various steps in the generation process automatically. If you are using the Standard Floppy Disk or RAM Disk method, insert the appropriate installation diskettes as they are requested by the prompts.

19. Exit ELSGEN.

- 19a. Highlight:

Network Generation Options
Operating System Generation
Utility Programs
NetWare Installation
Exit ELSGEN

Then press <Enter>.

19b. Highlight:

Exit ELSGEN
<input checked="" type="radio"/> Yes
<input type="radio"/> No

Then press <Enter>.

19c. If you are running the Hard Disk or Network Drive method, highlight.

Download Needed Files To Floppy Disk?
<input checked="" type="radio"/> Yes
<input type="radio"/> No

Then press <Enter>.

19d. Insert the diskettes as requested by the prompts.

Where to go from here

You must now install your network hardware and peripherals. Continue with the next section, Installing Hardware.



Installing Hardware

After you have completed the initial hardware setup and you have run SHGEN and the ELSGEN Network Configuration utility for your workstations and file server, you are ready to install the networking hardware and any peripherals that will be attached to the file server.

This section explains how to do the following:

- Install networking hardware to connect the file server and workstations together.
- Attach network printers to the file server.
- Attach an uninterruptible power supply (UPS).

Refer to the appropriate installation supplement(s) for instructions on installing specific networking hardware. This includes setting and installing network boards in the file server and in each workstation and cabling the file server and workstations together.

Use your File Server Configuration Worksheet, NetWare Installation Worksheet, Workstation Configuration Worksheets, and Network Boards Worksheet as you complete these steps.

Set and install network boards

Each workstation on an ELS NetWare network must contain one network board. These network boards, which are connected to each other with cables, allow the workstations and file server to communicate.

A file server in an ELS NetWare network can operate with many different brands of networking hardware. In the SHGEN and ELSGEN Part 1 sections of this manual you ran programs to generate the NetWare shells and operating system for the types of networking hardware you plan to install. You should have determined valid settings for each piece of hardware you will install; these settings should be recorded on the appropriate worksheets. The settings you selected are also recorded in CONFIG.DAT files on diskettes or in subdirectories.

Each type of network board requires different types of cable, connectors, and other devices. The method of physically setting the hardware configuration (interrupt line, DMA line, I/O address, and so on) also varies for each board type. For this reason we have provided installation instructions for each type of board in separate installation supplements, which are included with your NetWare manual set.

Complete the hardware installation using the appropriate installation supplement for your networking hardware. The configuration settings (interrupt line, DMA, and so on) on each network board must match the settings you selected in SHGEN and ELSGEN.

As you connect workstations to the file server, record the necessary information about each workstation on a copy of the Network Boards Worksheet. You can also record information about the types of cables and other connecting hardware on this worksheet.

When you have finished installing your networking hardware, return to this section and continue with the instructions on the next page.

Set and install UPS monitoring hardware

A Novell-approved uninterruptible power supply (UPS) should be attached to each file server to provide backup power if the commercial power fails. A UPS can also be attached to workstations on the network without installing any kind of UPS monitoring hardware.

If you are not installing a UPS on your network, skip to "Install other circuit boards in the file server" on page 360.

You can use either of the following as the UPS monitor board:

- SS keycard with UPS monitoring
- Standalone UPS monitor board

1. Make the appropriate settings on the UPS board.

You must set all UPS-related jumpers on the hardware you will be using for UPS monitoring. Instructions for setting these jumpers are given in the supplements listed below.

For the SS keycard: *NetWare Installation Supplement for Novell Keycards*

For a Standalone UPS monitor board: *NetWare Installation Supplement for Novell Disk Coprocessor Boards*

2. Insert the board in the computer.

Refer to the appropriate supplement or the *Guide to Operations* for your computer for instructions on inserting the UPS board in the computer.

Install other circuit boards in the file server

If you need to install additional hardware (such as memory add-on boards and asynchronous communications adapters) that is not related to the network, install it now. Refer to the documentation that came with the hardware for instructions.

As you install circuit boards, set the hardware to the configuration settings you selected in *ELSGEN*. These settings should be recorded on the File Server Configuration Worksheet. These settings are also recorded in a file labeled *CONFIG.DAT* on the *SUPPORT* (5.25-inch format) or *ELSGEN* (3.5-inch format) diskette for the file server.

When you have installed all of the internal file server hardware, replace the file server cover.

If you are installing a UPS, continue with the next section. If you are not installing a UPS, skip to "Attach network printers" on page 360.

Attach a UPS to the file server

Before you attach the UPS power unit to the file server, you should have installed the UPS monitoring hardware as explained in "Set and install UPS monitoring hardware" on page 359.

Once you have installed the UPS monitoring hardware in the file server, connect the UPS to the file server with the UPS monitor cable supplied by your UPS manufacturer.

One end of the monitor cable should have either a stereo phone plug (for plugging into the standalone UPS monitor board or the SS keycard in a non-PS/2 file server) or a 4-pin "mouse" plug (for plugging into the mouse port of an IBM PS/2 file server). The other end of the monitor cable should have the type of connector required by your particular UPS. (If you use UPS monitoring with a nondedicated IBM PS/2 file server, you cannot use a mouse, since the UPS monitor cable is connected to the mouse port.)

The procedure for connecting the UPS monitor cable to the file server varies according to the type of file server you have. In general, you must connect one end of the cable to the UPS monitoring hardware in the file server and the other end of the cable to the UPS power unit. Then you must properly connect the UPS and file server power cables.

After you connect the UPS monitor cable to the file server, refer to your UPS documentation for instructions on how to connect the UPS monitor cable to the UPS power unit.

Your UPS may allow you to supply power to another unit (or units) in addition to the file server. Plug the power cord of each unit into the appropriate socket of the UPS according to the UPS documentation.

See your UPS documentation to complete any other steps that apply to your UPS.

Attach network printers

The instructions in this section explain how to attach network printers to the file server. If you are not attaching any printers to the file server at this time, skip to the COMCHECK section.

Once the printers have been prepared for installation, follow the instructions under the appropriate subheading below for attaching serial printers or parallel printers. Refer to the information you recorded in the "Network Printers" section of the NetWare Installation Worksheet to make sure you attach the correct printer to the correct printer port on the file server.

Attach serial printers

To attach serial printers to the file server, complete the following steps.

- 1.** Make sure each serial printer is set to use the communication parameters (baud rate, word length, and so on) that you have recorded for it on the NetWare Installation Worksheet
- 2.** Connect each serial printer to the file server with the necessary hardware. Follow the instructions supplied by the manufacturers of the printer hardware and the computer you are installing as a file server.
- 3.** Connect each printer power cord to an appropriate AC power source.

Attach parallel printers

To attach parallel printers to the file server, complete the steps below. No hardware or software communication parameters must be specified for parallel printers.

- 1.** Connect each parallel printer to the file server with the necessary hardware. Follow the instructions supplied by the manufacturers of the printer hardware and the personal computer you are installing as a file server.
- 2.** Connect each printer power cord to an appropriate AC power source.

Where to go from here

You are now finished installing your hardware. Continue with the next section, COMCHECK.

Notes

COMCHECK

COMmunication CHECK

The NetWare COMCHECK utility performs a diagnostic test to determine whether a network's stations are communicating properly across the cabling system. (The COMCHECK utility cannot be run for Remote Reset stations that have no local floppy disk drives.)

You should use the COMCHECK utility in the following two situations.

- As soon as you have completed the hardware installation, use COMCHECK to test for proper connections and functioning of the network boards and cabling. COMCHECK does not require the network to be up and running.
- After the network has been completely installed and is up and running, you can use COMCHECK to isolate faulty cable segments or network boards.

What you need to run COMCHECK

You will need the following items to run the COMCHECK test.

- The working copy of the ELS NetWare *DIAGNOSTICS* diskette.
- The IPX.COM file(s) on the boot diskette(s) you created with SHGEN in the SHGEN section.
- The special files indicated in the network board supplement which must be on your boot diskette to load IPX. This applies only to certain network boards such as the IBM Token-Ring boards.

Note: The IPX.COM file is located on the workstation boot diskette(s) that you created in the SHGEN section. The boot diskette also contains the generic shell files you copied from the appropriate diskette or downloaded from the hard disk or network drive. If you want to include the file server in the COMCHECK test, run SHGEN to generate a version of IPX.COM for the file server's network board that is connected to the network bus you are testing. (Refer to the SHGEN section for instructions on how to run SHGEN.)

Use the version of the IPX.COM file configured for each station's network board and its configuration option setting. For example, workstations with NetWare Ethernet boards set at option 0 must use an IPX.COM file that was generated in SHGEN specifically for NetWare Ethernet option 0.

Changing the COMCHECK time parameters

Two time parameters can be modified in COMCHECK.

To change either of these time values for a particular station, complete the following steps after you have started COMCHECK.

1. Press <Escape> while the COMCHECK screen is shown.
2. Highlight your choice:

Select Option
Broadcast Delay Period
Dead Timeout Period
Exit ComCheck

Then press <Enter>.

Broadcast Delay Period

This is the number of seconds between updates (broadcasts) from a particular station. (The default is 15 seconds.)

A broadcast delay period of less than 15 seconds can drastically slow down the file server response time to workstation requests in a functioning network.

Dead Timeout Period

This is the number of seconds after which the station will be considered "dead" if it does not broadcast an update transmission. The default is 60 seconds. The information for any station considered dead is shown in bold on the screens of all other workstations running COMCHECK.

The dead timeout period must be at least 10 seconds greater than the broadcast delay period.

Steps for running COMCHECK

1. Load IPX in each network station.

- 1a. Turn on a network workstation and boot it with DOS.
- 1b. Remove the DOS diskette from drive A and insert the diskette containing the IPX.COM file that corresponds to the station's network board and configuration option setting.
- 1c. Type

IPX <Enter>

When IPX is successfully loaded, the screen will display the correct LAN option and hardware configuration for the station.

If IPX does not load properly in a station, check for the following.

- **Mismatched Settings.** The hardware settings in the IPX.COM file must match the switch or jumper settings actually made on the station's network board in order for IPX to load properly. If necessary, run SHGEN to regenerate the IPX.COM file for the correct board configuration (see SHGEN section).
 - **Defective Board.** If the network board is defective, IPX will not load properly. Run the diagnostics program (if any) provided with the network board to ensure that the board is good. If the board passes the diagnostics test, contact your Novell authorized reseller for more help in finding the problem.
 - **Special Boot Diskette Files Missing.** Some network boards require special files on the boot diskette to enable the computer to load IPX. These files are explained in the supplement for the network board you are installing.
- 1d. Repeat Steps 1a through 1c for each station on the network being tested.

2. Start COMCHECK in each network station.

- 2a.** Insert the *DIAGNOSTICS* diskette into drive A of one of the stations and type

COMCHECK <Enter>

Within a few seconds, the "NetWare Communication Check" header and a "Unique User Information" entry box will appear on the screen.

- 2b.** Type a name or a phrase that will identify the station you are using and distinguish it from all other stations.

Unique User Information

Then press <Enter>.

For example, you might enter information such as

STATION #1

or

ALANA'S WORKSTATION

Make sure that, as the prompt indicates, each station's identifying information is unique.

After you have entered the user information at the first workstation, a display similar to the following will appear:

Network Node	Unique User Information	Yr	Mo	Dy	Hr	Mn	Sc	*
0000000	00036 Alana			89/12/21	15:04:45			*

The columns on the screen contain the following information.

Network

Network refers to the network address of the cabling system being tested. If you are testing a new installation, no network address has been specified yet, so the screen should display all zeroes as shown.

Node

Node refers to the physical address of the station, expressed in hexadecimal notation. The station address is selected in one of three ways: It is assigned via switch settings on the network board (according to the instructions in the appropriate installation supplement), it is read from the board's firmware and assigned automatically, or it is set on the *REFERENCE* diskette (for IBM PS/2 computers).

Unique User Information

Unique user information refers to the identifying text specified for the station in Step 2b.

Date and Time

Date and time refers to the current date and time according to the station's clock. This is the date and time specified or accepted by default when booting the station with DOS.

Asterisk (*)

The asterisk indicates the station you are currently viewing.

- 2c. While the first station displays the user information, repeat Steps 2a and 2b to start COMCHECK in a second station.

If the stations are cabled properly, the second station's screen will show the user information for both stations (within 15 seconds), in a format similar to the following.

Network Node	Unique User	Information	Yr	Mo	Dy	Hr	Mn	Sc	*
0000000	00036	Alana	89/09/23	15:04:45					
0000000	0004E	Saascha	89/09/23	15:06:00					*

The screen of the first station should also list both stations as shown, except that the asterisk will appear on the line for the first workstation.

The data on the screens is updated every 15 seconds for stations that are still running COMCHECK and operating properly.

Accessing the COMCHECK help screen

A help screen, which provides information about the COMCHECK utility similar to the information in Step 2c, is available at any station that is running COMCHECK.

To access the help screen, make sure the *DIAGNOSTICS* diskette is in drive A. Then press the F1 (Help) key. When you are finished with the help screen, press <Escape> to return to the COMCHECK diagnostics screen.

- 2d. Continue loading COMCHECK into additional stations. As you do so, the screens will continue to be updated (at 15-second intervals) with data identifying the respective stations. When you have repeated the process for all stations on the cabling system, the user information for all properly connected stations should be listed on each of the station screens.

3. Correct problems indicated by COMCHECK.

If stations that should appear on the COMCHECK screen do not appear, complete the following tests.

- Check the screen of each station to make sure that it is still running COMCHECK (the screen is being updated periodically).
- Check all physical connections between the workstations and the file server. Make sure the network boards are cabled and seated properly in the workstation and file server expansion ports.
- Make sure that there are no duplicate or invalid station address settings on the various network boards. (See the appropriate installation supplement for information about station addresses.)

4. Exit COMCHECK.

Complete the following steps at each station currently running the test.

- 4a. Make sure the working copy of the *DIAGNOSTICS* diskette is in drive A of the station.
- 4b. Press <Escape>.
- 4c. Highlight:

Select Option
Broadcast Delay Period
Dead Timeout Period
Exit ComCheck

Then press <Enter>.

- 4d.** An exit confirmation prompt will appear on the screen.

Exit ComCheck
No Yes

- To continue the COMCHECK test without exiting, highlight "No." Then press <Enter>.
- To terminate the COMCHECK test, highlight "Yes." Then press <Enter>.

Repeat Steps 4a through 4d for each network station that is running the COMCHECK diagnostics test.

Where to go from here

If you are using a remote workstation on your network, continue with the ARCONFIG section.

If you are not using a remote workstation on your network, skip to the COMPSURF section.

Notes



ARCONFIG

Asynchronous Remote CONFIGuration

This section explains how to use the ARCONFIG utility to configure the software which will be running in your remote workstation and file server.

Note: These instructions apply only if your file server includes a LAN B or LAN C connection to a remote workstation. If you are using the remote connection to communicate with another file server or a remote bridge, refer to the *NetWare External Bridges Supplement* to set up the remote connection.

Locate and use the Remote Workstation Worksheet as you complete the steps in this section. You will also need the instructions for your modem.

Before you start

See the SHGEN section on page 323.

Make sure that you have generated the workstation shell for the remote workstation and that you selected the "IBM ASYNC (COM1/COM2)" driver in SHGEN.

See the ELSGEN Part 1 section on page 351.

Make sure that you have generated the file server operating system and that you selected the "IBM ASYNC (COM1/COM2)" driver as the LAN B or LAN C driver in ELSGEN.

To configure the remote workstation shell, start on page 374.

To configure the file server operating system, start on page 381.

Steps for configuring the remote workstation shell

You can configure the remote workstation shell as soon as you have prepared a boot diskette (explained in the SHGEN section). Or, you can follow these same steps to reconfigure the remote workstation shell at any time after the initial network installation.

1. Prepare to run ARCONFIG.

- 1a.** Locate the NetWare ARCONFIG utility.

ARCONFIG is found on the NetWare diskette labeled *UTIL-1*. If you have uploaded the NetWare diskettes onto a network drive or hard disk, ARCONFIG is found in the *UTIL-1* subdirectory.

- 1b.** Locate the files to be configured.

The remote workstation shell file (*IPX.COM*) is found on the boot diskette you created for the remote workstation with SHGEN.

- 1c.** Assign a volume label to the boot diskette using the DOS LABEL command.

Use any label you like up to 11 characters in length. You may want to use a label that identifies the location of the remote workstation, such as "SINGAPORE." NetWare utilities check the volume label to ensure that the correct diskette has been inserted. (For more assistance in using the DOS LABEL command, see the *DOS Reference* or similarly titled manual that came with your computer's disk operating system.)

2. Start ARCONFIG.

- 2a. If you are running ARCONFIG from a network drive or a hard disk, map a search drive to the UTIL-1 directory or include the UTIL-1 directory in the DOS PATH command.

For example, if the UTIL-1 directory was in the NETWARE directory on your C disk, you would type

```
PATH=C:\NETWARE\UTIL-1 <Enter>
```

If you are running ARCONFIG from diskettes, insert the *UTIL-1* diskette into drive A. Make sure you are using drive A by typing

```
A: <Enter>
```

If the computer on which you are running ARCONFIG has two floppy disk drives, insert the boot diskette into drive B. If your computer has only one drive, ARCONFIG will prompt you for the appropriate diskette.

- 2b. Type the ARCONFIG command as follows.

```
ARCONFIG volume_label:IPX.COM <Enter>
```

Replace *volume_label* with the label you gave the boot diskette in Step 1c.

A "please wait" message will appear on the screen for a few seconds; then, a form similar to the following will appear:

Edit Shell	
ID String	
Workstation ID	
COM Port	COM1:
Baud Rate	
Modem Type	
Modem String	

3. Specify the ID string for the remote workstation shell.

- 3a. Highlight the "ID String" field.



If you completed the planning modules, you should have recorded the ID string you want on the Remote Workstation Worksheet. If you did not use the modules and need help with this setting, refer to "Whether to specify an ID string" on page 108.

- 3b. Type the ID string you decided on and press <Enter>.



You must use the same combination of upper- and lower-case characters for both the remote workstation and the file server ID strings, or the remote workstation will not be able to connect to the file server. For example, "ABC" and "abc" are not recognized as the same string.

- 3c. If you have not already done so, record the ID string you specify on the worksheet so that you can specify the same ID string for the file server software.

4. Specify the workstation ID.

- 4a. Highlight the "Workstation ID" field.



If you completed the planning modules, you should have recorded the workstation ID you want on the Remote Workstation Worksheet. If you did not use the modules and need help with this setting, refer to "Which workstation ID to specify" on page 109.

- 4b. Type the workstation ID you have selected and press <Enter>.

5. Specify which COM port the remote shell is configured to use.



If you completed the planning modules, you should have recorded the COM port you want on the Remote Workstation Worksheet. If you did not use the modules and need help with this setting, refer to "Which COM port to use" on page 107.

When you first run ARCONFIG, the default COM port is COM1. If you do not need to change the COM port setting, skip to Step 6.

To change the COM port number, complete the following steps.

5a. Highlight the "COM Port" field and press <Enter>.

5b. Highlight your choice:

COM Port
COM1:
COM2:

Then press <Enter>.

Your selection will appear in the "Edit Shell" window.

6. Specify the baud rate for the remote connection.

6a. Highlight the "Baud Rate" field and press <Enter>.



If you completed the planning modules, you should have recorded the baud rate you want on the Remote Workstation Worksheet. If you did not use the modules and need help with this setting, refer to "Which Baud rate to specify" on page 113.

6b. Highlight your choice:

Baud Rate
300
600
1200
1800
2400
3600
4800
7200
9600
19200

Then press <Enter>.

Your selection will appear in the "Edit Shell" window.

7. Specify the modem type.

7a. Highlight the "Modem Type" field and press <Enter>.



If you completed the planning modules, you should have recorded the modem type you want on the Remote Workstation Worksheet. If you did not use the modules and need help with this setting, refer to "Which modem type to specify" on page 112.

7b. Highlight your choice:

Modem Type
Hayes Compatible
Special Configuration

Then press <Enter>.

Your selection will appear in the "Edit Shell" window.

- If you selected the "Special Configuration" option, you are now ready to exit ARCONFIG. Skip to Step 9.
- If you selected the "Hayes Compatible" option, continue with Step 8.

8. Specify the modem string.

If you selected the "Hayes Compatible" modem type, you must now specify the phone number of the remote location the modem will be calling.

- 8a.** Highlight "Modem String" in the "Edit Line" window and press <Enter>.

Several characters will appear in the "Modem String" field. The exact characters that appear depend on the baud rate you selected in Step 6. These characters make up the first part of your modem command string and cannot be edited.



If you completed the planning modules, you should have recorded the modem string you want on the Remote Workstation Worksheet. If you did not use the modules and need help with this setting, refer to "Which Hayes modem parameters to specify" on page 114.

- 8b.** Type the remainder of the modem command string and press <Enter>.

The command string will now be displayed in the "Edit Line" window.

9. Save the configuration settings and exit ARCONFIG.

- 9a.** Press <Escape>.

- 9b.** Highlight:

Save Changes
No
Yes

Then press <Enter>.

You will be returned to the DOS prompt.

Where to go from here

You are finished configuring the remote workstation shell. Continue with the instructions on the next page to configure the file server operating system.

Steps for configuring the file server operating system

You can run ARCONFIG in one of two ways:

- By selecting it as a menu option within the ELSGEN program
- By running it outside of ELSGEN from diskettes, a hard disk, or a network drive

It is easier to run ARCONFIG from within ELSGEN for an initial installation. Normally you would run it from outside ELSGEN only if you need to reconfigure the remote connection after it is installed.

- To run ARCONFIG from within the ELSGEN program, you must re-enter ELSGEN by completing Steps 1 through 6 starting on page 383.
- To run ARCONFIG as a separate utility without getting back into the ELSGEN program, complete the preliminary steps outlined below.

Starting ARCONFIG outside of ELSGEN

1. Prepare to run ARCONFIG.

- 1a. Locate the NetWare ARCONFIG utility.

ARCONFIG is found on the NetWare diskette labeled *UTIL-1*. If you have uploaded the NetWare diskettes onto a network drive or hard disk, ARCONFIG is found in the *UTIL-1* subdirectory.

- 1b. Locate the files to be configured.

The file server operating system is found on the NetWare diskettes as follows:

Format	Filename	Diskette Name
3.5-inch	NET\$OS.EX1	<i>OSEXE-1</i>
5.25-inch	NET\$OS.EX1 NET\$OS.EX2	<i>OSEXE-1</i> <i>OSEXE-2</i>

2. Start ARCONFIG.

- 2a. If you are running ARCONFIG from a network drive or hard disk, map a search drive to the UTIL-1 directory or include the UTIL-1 directory in the DOS PATH command.

For example, if the UTIL-1 directory was in the NETWARE directory on your C disk, you would type

```
PATH=C:\NETWARE\UTIL-1 <Enter>
```

If you are running ARCONFIG from diskettes, insert the *UTIL-1* diskette into drive A. Make sure you are using drive A by typing

```
A: <Enter>
```

If the computer on which you are running ARCONFIG has two floppy disk drives, insert the *OSEXE-1* diskette into drive B. If your computer has only one drive, ARCONFIG will prompt you for the appropriate diskettes.

- 2b. Type the ARCONFIG command corresponding to the format of your diskettes.

5.25-inch format

Type

```
ARCONFIG OSEXE-1:NET$OS.EX1 UTIL-1 S <Enter>
```

Be sure to include the "S" parameter; this tells ARCONFIG that the operating system file is split between two diskettes.

3.5-inch format

Type

```
ARCONFIG OSEXE-1:NET$OS.EX1 <Enter>
```

- 2c. Skip to Step 6 on page 386 and follow the steps to run the ARCONFIG program.

Starting ARCONFIG from within ELSGEN

Complete the steps below to re-enter ELSGEN and start the ARCONFIG utility.

1. **Determine the method you will use to run the installation portion of ELSGEN.**

From this point on, you must run the ELSGEN program on the file server. You can run ELSGEN using one of the following methods. (You cannot use the Hard Disk method to run this portion of ELSGEN.)

Standard Floppy Disk method

You can use this method if you used it to generate the operating system in ELSGEN Part 1 or if your Novell Authorized Reseller generated the operating system for you and has downloaded the necessary files to your diskettes.

RAM Disk method

You can use this method if you created a RAM disk (also called a "virtual disk") in your computer by following the directions in your DOS manual. ELSGEN will operate the same with the RAM Disk method as with the Standard Floppy Disk method for this portion of the program.

Network Drive method

You can continue to use this method if you used it to generate the operating system in ELSGEN Part 1. The file server must still be attached to the network it was attached to when you generated the operating system.



You cannot use the Hard Disk method to run this portion of ELSGEN. If you used this method to generate the operating system in ELSGEN Part 1, you must use the Standard Floppy Disk or RAM Disk method to run this portion of ELSGEN. If you were to select the Hard Disk method, the "Network Generation Options" menu would appear without the options necessary to continue with the installation.

If you ran the ELSGEN Network Configuration utility using the Hard Disk or Network Drive method, the files generated thus far with ELSGEN should have been downloaded from the appropriate subdirectories onto the corresponding NetWare installation diskettes.

2. Follow the instructions below that apply to your ELSGEN run method.

Standard Floppy or RAM Disk method

Insert the *ELSGEN* diskette into drive A.

If you have a drive B:



Insert the *SUPPORT* diskette into drive B.



Insert the *AUXGEN* diskette into drive B.

Make sure drive A is your default drive.

Network Drive method

Make sure you have logged in to the network and are in the directory you created for the ELSGEN program files.

3. Type the ELSGEN command.

At the DOS prompt, type

ELSGEN <Enter>



Do not use the "N" option at this time! The "N" option causes the program to start over, ignoring the network configuration you have already specified in ELSGEN Part 1. You are now re-entering ELSGEN in the middle of the program.

4. Select the ELSGEN run method you have chosen to use.

- 4a.** Highlight your choice. (Do not select the Hard Disk method at this time.)

ELSGEN Run Options
Standard (floppy disks)
RAM Disk
Hard Disk
Network Drive

Then press <Enter>.

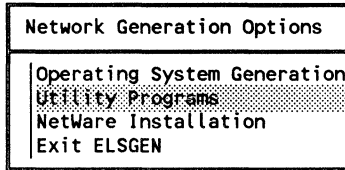
- 4b.** If you are using the Network Drive method, type the letter of the network drive:

Drive:

Then press <Enter>.

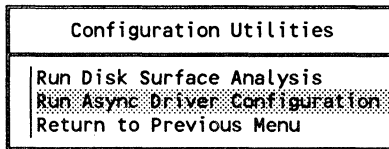
5. Access the ARCONFIG utility.

5a. Highlight:



Then press <Enter>.

5b. Highlight:



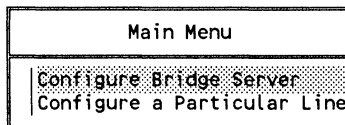
Then press <Enter>.

6. Specify the file server ("bridge") configuration.

After you have entered the ARCONFIG utility, a "Please Wait" message will appear on the screen while the NET\$OS file is being loaded. After a few seconds, the ARCONFIG "Main Menu" screen will appear.

You must configure the file server (referred to in the menu as the "Bridge Server") and the line for the IBM ASYNC (COM1/COM2) LAN driver that you selected during the ELSGEN program.

6a. Highlight:



Then press <Enter>.

A screen similar to the following will appear.

Edit Bridge	
Number of lines	1
LAN Driver	LAN B
Name Of Bridge Server	
ID String	
Control Password	

Only the last three items in this window can be edited. Each is explained in the following steps.

7. Specify the "bridge server" name.

7a. Highlight "Name Of Bridge Server."



If you completed the planning modules, you should have recorded the bridge server name you want on the Remote Workstation Worksheet. If you did not use the modules and need help with this setting, refer to "What to name the bridge server" on page 110.

7b. Type the name you have selected for your bridge server and press <Enter>.

8. Specify the ID string.

If you specified an ID string for your remote workstation shell (see Step 3 on page 376), you must specify an identical ID string for the file server; otherwise, the remote location will not be able to establish a connection with the server.



If you did not specify an ID string in the remote workstation shell, you must not specify an ID string for the file server software. If you did not specify an ID string for the remote workstation shell, skip to Step 9.

- 8a. Highlight "ID String" in the "Edit Bridge" window.



You must use the same combination of upper- and lower-case characters for both the remote workstation and file server ID strings, or the remote workstation will not be able to connect to the file server. For example, "ABC" and "abc" are not recognized as the same string.

- 8b. Type the ID string you specified for the remote workstation shell and press <Enter>.

9. Specify the control password.

- 9a. Highlight "Control Password" in the "Edit Bridge" window.



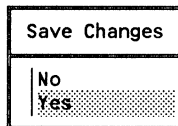
If you completed the planning modules, you should have recorded the control password you want on the Remote Workstation Worksheet. If you did not use the modules and need help with this setting, refer to "Whether to specify a control password" on page 111.

- 9b. Type the control password you chose and press <Enter>.

10. Exit the "Edit Bridge" window.

- 10a. To save the file server ("bridge") configuration and exit the "Edit Bridge" window, press <Escape>.

- 10b. Highlight:



Then press <Enter>.

The "Main Menu" window will reappear.

11. Configure the line.

11a. Highlight:

Main Menu
Configure Bridge Server Configure a Particular Line

Then press <Enter>.

The "Edit Line" screen will appear, containing information similar to the following.

Edit Line	
Line Number	Line 1 of 1 Lines
Baud Rate	300
Modem Type	Special Configuration
Dial Mode	
Auto Connect	No
Phone Number	
Auto ID String	
Life Class	
Idle Time-Out	

If you have run ARCONFIG before, the configuration settings you selected will be listed on the screen. Otherwise, most of the options will be blank, as shown above.

12. Specify the baud rate.

If you do not want to change the baud rate shown in the "Edit Line" window, skip to Step 13.

To edit the baud rate for the modem at the remote workstation, complete the following steps.

12a. Highlight the "Baud Rate" field and press <Enter>.



If you completed the planning modules, you should have recorded the baud rate you want on the Remote Workstation Worksheet. If you did not use the modules and need help with this setting, refer to "Which baud rate to specify" on page 113.

12b. Highlight the appropriate baud rate:

Baud Rate
300
600
1200
1800
2000
2400
3600
4800
7200
9600
19200

Then press <Enter>.

The "Edit Line" window will reappear, displaying the baud rate you have selected.

13. Specify the modem type.

13a. Highlight the "Modem Type" field in the "Edit Line" window.



If you completed the planning modules, you should have recorded the modem type you want on the Remote Workstation Worksheet. If you did not use the modules and need help with this setting, refer to "Which modem type to specify" on page 112.

- 13b.** Highlight your choice:

Modem Type
Hayes Compatible Special Configuration

Then press <Enter>.

The "Edit Line" window will reappear, displaying the modem type you have selected.

If you have chosen the "Special Configuration" option, skip to Step 15. Otherwise, complete Step 14.

14. Select the dial mode.

To select the dial mode (phone type) for the Hayes or Hayes compatible modem, complete the following steps.

- 14a.** Highlight the "Dial Mode" field in the "Edit Line" window and press <Enter>.
- 14b.** Highlight the appropriate phone type:

Dial Mode
Pulse Touch Tone

Then press <Enter>.

Your selection will be added to the "Edit Line" window.

15. Specify whether or not you want to use the "Auto Connect" option.

The "Auto Connect" option determines whether the file server automatically establishes a connection with a remote station when it is booted.

- If you select "Yes," the file server will immediately establish a connection with a remote station when the file server is booted.
- If you select "No," you will have to manually instruct the file server to establish a connection to a remote station.

15a. Highlight the "Auto Connect" field in the "Edit Line" window. If you need help deciding whether to enable the "Auto Connect" feature, refer to "Whether to enable auto connect" on page 116.

To select "No," type N and press <Enter>. You are now finished with the line configuration process. Skip to Step 20 on page 394.

To select "Yes," type Y and press <Enter>.

If you are using the "Special Configuration" option, skip to Step 17.

16. Specify the phone number.

To specify the phone number of the remote location the modem will be calling, complete the following.

16a. Highlight "Phone Number" in the "Edit Line" window.



If you completed the planning modules, you should have recorded the phone number you want on the Remote Workstation Worksheet. If you did not use the modules and need help with this setting, refer to "Which Hayes modem parameters to specify" on page 114.

Several characters already appear on the "Phone Number" line. The exact characters that appear depend on the baud rate you selected in Step 14. These characters make up the first part of your phone number command string and cannot be edited.

16b. Enter the remainder of the phone number command string and, press <Enter>. The command string will appear in the "Edit Line" window.

17. Specify the auto ID string.

If you specified an ID string for the file server, you can include this ID string as an automatic feature of the auto connect function. (If you did not specify an ID string, skip to Step 18.)

- 17a. Highlight the "Auto ID String" line in the "Edit Line" window.
- 17b. Type the ID string and press <Enter>.

Remember, the auto ID string must match the ID string specified for the file server and for the workstation shell specified earlier (including the use of upper- and lower-case characters).

18. Specify the life class.

The "Life Class" option allows you to specify whether the line connection will be continuous or timed.

- 18a. Highlight "Life Class" in the "Edit Line" window and press <Enter>.
- 18b. Highlight your choice:

Life Class
Continuous
Timed

Then press <Enter>.

If you selected "Continuous," you are now finished with the "Edit Line" form. Skip to Step 20.

If you selected "Timed," continue with Step 19.

19. Specify the idle time-out.

If your remote connection is timed (as specified in Step 18), you must specify the time-out period after which an idle connection will be automatically terminated.

- 19a. Highlight the "Idle Time-out" line in the "Edit Line" window.
- 19b. Type the number of minutes you choose (from 1 through 59) and press <Enter>.

20. Save the configuration settings.

To save your configuration settings for the line, press <Escape>. You will see the following prompt.

Save Changes
No
Yes

- If you do not want to save the changes, highlight "No" and press <Enter>.
- To save the changes, highlight "Yes" and press <Enter>.

You will be returned to the "Main Menu."

21. Exit ARCONFIG.

To exit ARCONFIG press <Escape>.

If you saved the changes, the following will appear on your screen.

Generating file checksum ... Please wait.

If you ran ARCONFIG during initial installation as part of ELSGEN, you will be returned to the "Configuration Utilities" menu.

If you ran ARCONFIG after initial installation, you will be returned to the DOS prompt.

Make sure the reconfigured NET\$OS file is on the proper diskette or in the proper directory for rebooting the file server.

- If you have an ELS NetWare 286 nondedicated operating system, copy the reconfigured NET\$OS.EX1 to the OSEXE-1 diskette you use to boot the file server. (You must also copy the NET\$OS.EX2 to the OSEXE-2 diskette for 5.25-inch format. This diskette is also used to boot the file server.)
- If you have an ELS 286 dedicated operating system, copy the reconfigured NET\$OS.EX1 (and NET\$OS.EX2 for 5.25-inch format) file into the SYS:SYSTEM directory.

Where to go from here

If you need to run the COMPSURF utility on any network hard disks, continue with the next section, COMPSURF.

If you do not need to run the COMPSURF utility, skip to ELSGEN Part 2.

Notes



COMPSURF

COMPrehensive SURFace Analysis

This section explains step by step how to run the "NetWare Disk Surface Analysis" (COMPSURF) utility to prepare your hard disks for initial installation of ELS NetWare Level II.

Note: Hard disk drives that you purchased from Novell, including hard disks in all NetWare file servers, have been formatted and tested extensively prior to shipment. Therefore, you do not need to use COMPSURF during initial installation to format and test these disks.

Locate and use the NetWare Installation Worksheet as you complete the steps in this section.

Before you start

See "What you need to run COMPSURF" on page 59.

- Locate the disk manufacturer's test printout;
- Attach a parallel printer to the file server;
- Make sure you have run the SETUP (or similar) utility supplied by the computer manufacturer to identify your internal disk drives.

Steps for running COMPSURF

Before you run COMPSURF, you must specify the COMPSURF operation parameters that determine how the program will run (whether you want COMPSURF to format the disk, read the Bad Block table from the disk, or record the bad blocks as you enter them from the keyboard, and so on.)

The COMPSURF utility then performs a series of formatting and testing operations which are summarized below:

- **Formatting the disk.** COMPSURF will format (or reformat) the hard disk drive.
- **Testing track zero.** Track zero must be reliable on any hard disk used with NetWare. COMPSURF runs a thorough check of that track.
- **Running the Sequential Test.** The Sequential Test writes various data patterns sequentially to the disk to identify bad blocks. Any bad blocks found during the Sequential Test are added to the disk's Bad Block table.
- **Running the Random Test.** The Random Test writes various data patterns to random locations on the disk to test the ability of the read-write heads to synchronize with and seek data on the disk. Any bad blocks discovered during this test are also added to the disk's Bad Block table.

The COMPSURF utility may take several hours to test each hard disk. Allow sufficient time for this testing.

1. Re-enter ELSGEN (if necessary).

You must run ELSGEN on the file server to which the hard disk that needs testing is attached.

If you are already running the ELSGEN program, make sure you are in the "Network Generation Options" menu; then, skip to Step 2.

If you exited ELSGEN to add or remove internal file server hardware, you must re-enter ELSGEN at this time. The basic steps involved are summarized below.

Complete the appropriate step below according to the method you are using to run ELSGEN. (You cannot run COMPSURF from a local hard disk drive; therefore, do not select the Hard Disk method when you re-enter ELSGEN.)

Standard Floppy Disk or RAM Disk method

- 1a. Insert the *ELSGEN* diskette into drive A.
- 1b. If your file server has two floppy disk drives, insert the *SUPPORT* diskette (5.25-inch diskette) or the *AUXGEN* diskette (3.5-inch diskette) into drive B. Skip to Step 1c.

Network Drive method

- 1a. Boot your file server as a workstation with DOS and log in to the secondary file server.
- 1b. Access the work directory containing the NetWare files on the appropriate network drive.

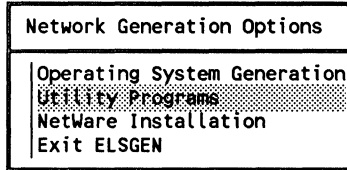
All methods

- 1c. At the DOS prompt, type
ELSGEN <Enter>
- 1d. Specify the method you want to use in the "ELSGEN Run Options" menu that appears on the screen.
- 1e. If you are using the Network Drive method, type the letter of the network drive and press <Enter>.

2. Access the COMPSURF utility.

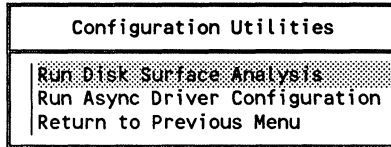
Complete the steps contained in the rest of this section to run COMPSURF on each disk to be formatted and tested. (You can format and test only one hard disk at a time.)

2a. Highlight:



Then press <Enter>.

2b. Highlight:



Then press <Enter>.

2c. If you are running ELSGEN from diskettes, you will be prompted to insert the *UTIL-1* diskette. Be sure you insert your working copy of this diskette. Then press <Escape> to continue.

2d. You will receive an error report, warning you that COMPSURF destroys all existing data on a hard disk. If you need to exit COMPSURF, follow the instructions in the report.

Press <Escape> to continue with COMPSURF.

2e. If you have not attached a parallel printer to the file server, you will receive a message stating that the printer could not be initialized. COMPSURF may hang if you try to print the test results without a parallel printer attached.

Press <Escape> to continue.

3. Select the hard disk drive to be tested.

The "Comprehensive Surface Analysis" header will appear, as well as a screen listing the hard disk drives attached to the file server.

Highlight the disk you want to test:

Select the drive to be tested
1) Chan.0 Cont.0 Drive 0 IBM AT Hard Disk "C" type 018

Then press <Enter>.

The second line of the "Comprehensive Surface Analysis" header will display the name of the disk you selected, along with the number of heads, cylinders, and sectors per track.

Note: Do not be concerned if the head, cylinder, and sectors per track values displayed in the header do not reflect the actual values for the disk. Certain types of disk drives do not supply this information; COMPSURF uses a set of default values for any such disks.

The following screen will appear:

Program Operation Parameters

You must specify the appropriate COMPSURF operation parameters for the hard disk you have selected. All of the possible parameters are listed below; however, you will only be prompted for the necessary parameters, depending on the type of disk you are testing.

You can specify the following COMPSURF operation parameters.

- Whether or not to format the disk
- The interleave factor (if applicable)
- Whether to read the Bad Block table (media defect list) from the disk or to record the bad blocks as you enter them from the keyboard
- The number of passes for the Sequential Test
- The number of I/Os for the Random Test

The following steps explain the screen prompts for each of these options. Skip any parameters that do not appear as you are running COMPSURF.

4. Specify that you want to format the disk.

A prompt similar to the following will appear to the right of the "Program Operation Parameters" window.

Highlight:

Format the disk?	
	No
	Yes

Then press <Enter>.

The following message will appear in the "Program Operation Parameters" window:

The disk WILL be formatted.

5. Select the interleave value for the disk.



If you completed the planning modules, you should have recorded the interleave value for your hard disk on the NetWare Installation Worksheet. If you did not complete the modules and need help with this setting, refer to "Which interleave value to select" on page 60.

If the hard disk you have selected requires an interleave value, a prompt similar to the following will appear.

Highlight your choice:

Select the interleave	
1	- one
2	- two
3	- three
4	- four
5	- five
6	- six
7	- seven
8	- eight

Then press <Enter>.

The interleave value you select will be indicated in the "Program Operation Parameters" window in a format similar to the following:

The interleave is 2

6. Specify not to maintain the current Bad Block list.

Each hard disk drive maintains a list of disk areas that are unable to hold data reliably. This list is referred to as the "media defect list," or "Bad Block table."

When you perform an initial installation of an IBM PS/2 or PC AT-type file server, you should not keep this Bad Block list. Disks in these file servers do not initially contain NetWare-compatible Bad Block tables, and you must not attempt to read an incompatible Bad Block table from a disk during COMPSURF.

Highlight:

Maintain the current media defect list?
No
Yes

Then press <Enter>.

Your choice will be indicated in the "Program Operation Parameters" window in a format similar to the following.

The media defect list is cleared.

7. Specify whether you want to enter the existing Bad Block table.

If the disk was shipped with a manufacturer's media defect list, you can enter the manufacturer's Bad Block list from the file server keyboard. (You should have located the disk drive's Bad Block list before starting COMPSURF.) The bad blocks you enter, plus any additional bad blocks found by COMPSURF, will be written to the disk's new Bad Block table.

We recommend that you enter the manufacturer's Bad Block list whenever possible to ensure that these blocks are included in the NetWare-compatible Bad Block table on the disk.

If the disk you are testing was not shipped with a manufacturer's media defect list, you cannot enter the known bad blocks before the COMPSURF testing begins.

Highlight your choice:

Enter media defects?
No
Yes

Then press <Enter>.

If you answered "Yes" to the prompt, a message similar to the following will appear in the "Program Operation Parameters" window.

Media defects will be hand entered.

You will be prompted to enter the manufacturer's bad block list after you have finished specifying the remaining program operation parameters.

8. Specify the number of passes for the Sequential Test.

The Sequential Test writes data patterns to the disk sequentially to analyze the disk's surface. Any bad blocks that are found will be added to the disk's Bad Block table so that the file server will not attempt to store data on them.

Each pass of the Sequential Test takes approximately 30 to 45 minutes for a 20MB hard disk. The test will take longer for hard disks with larger storage capacity.

You can specify that the Sequential Test be performed from zero to five times. However, to ensure the integrity of COMPSURF, we recommend that this test be performed at least three times.

Highlight your choice:

Number of Sequential Passes	
1	- one
2	- two
3	- three
4	- four
5	- five

Then press <Enter>.

A message reflecting your choice will appear in the "Program Operation Parameters" window in a format similar to the following.

3 passes of Sequential Test

9. Specify the number of reads and writes (I/O's) in the Random Test.

The Random Test writes data patterns to random locations on the disk to locate bad blocks. Any bad blocks that are found will be included in the disk's Bad Block table so that the file server will not attempt to store data on these blocks.

The default number of writes (I/Os) shown in the prompt is the recommended minimum number of random I/Os to ensure an adequate test of the disk's head-positioning mechanism. The Random Test takes approximately three minutes to do 1,000 I/Os. For example, a Random Test on a 20MB hard disk requiring 16,000 random I/Os would take 45 to 50 minutes.

We recommend that you accept the default number of I/Os for the Random Test. However, you can specify a different number of I/Os at the prompt.

The prompt for the Random Test parameter will appear in a format similar to the following:

number of I/O's in Random Test
80000

- To accept the default number of I/Os, press <Enter>.
- To specify a different number of I/Os, use the Backspace key to delete the default number shown. Then type in the number you want and press <Enter>.

If you specify fewer than the minimum recommended number of I/Os, you will receive a warning message. This message is to remind you that the Random Test may not be as effective as it would be with the default number of I/Os; press <Escape> to continue.

Your choice will be reflected in the "Program Operation Parameters" window, in a format similar to the following:

80000 I/O's in Random Test

10. Confirm the operation parameters you have selected.

After you have specified all of the program operation parameters, a confirmation prompt will appear at the bottom of the screen in a format similar to the following.

Are these parameters correct?
No Yes

- If any of the parameters shown are incorrect, answer "No" to the prompt and press <Enter>. Then return to Step 3 on page 401 and reselect the hard disk and the COMPSURF operation parameters.
- If all the parameters shown are correct, answer "Yes" and press <Enter>. Continue with the next step.

11. Enter the Bad Block list (if necessary).

If the "Program Operation Parameters" window indicates that "Media defects will be hand entered," you must now type in the manufacturer's Bad Block list. (If you specified not to enter the manufacturer's Bad Block list, skip to Step 13 on page 409.)

An empty Bad Block list will appear on the screen.

Head	Cylinder

<Ins> to insert to delete

Bad blocks are identified by head and cylinder number. Each hard disk has a certain number of read-write heads and a specific number of cylinders.

- 11a. Press <Insert> to add a block to the list.
- 11b. Type the head number of one of the bad blocks.

Enter head number (zero relative)

Then press <Enter>.

Note: Heads and cylinders are usually numbered starting with zero, or "zero relative"; in other words, if your disk has seven heads, they are numbered from zero to six.

- 11c. Type the cylinder number of the bad block.

Enter cylinder (zero relative)

Then press <Enter>.

The head and cylinder numbers you typed will be displayed in the list on the screen.

Deleting bad blocks from the list

If you make a mistake and type an incorrect head or cylinder number, you can delete the incorrect bad block entry by highlighting the bad block and pressing <Delete>. Answer "Yes" to the confirmation prompt.

If you must delete more than one bad block at a time, press the Mark key (<F5> on most machines) to "mark" the blocks you want to delete. (A marked item will be bolded on the screen, or, if the item is highlighted, the item name will blink.) You can use the Cancel key (<F7> on most machines) to unmark them.

- 11d. Repeat Steps 11a through 11c until you have entered all of the bad blocks on the manufacturer's Bad Block list. Then continue with the next step.

12. Confirm the Bad Block list.

12a. When you have entered all of the bad blocks from the manufacturer's Bad Block list, press <Escape>.

12b. Highlight:

Are these entries correct?	
No	
Yes	

Then press <Enter>.

13. Format and test the disk.

COMPSURF formatting and testing begins now.

Although you do not need to make any more keyboard entries until COMPSURF is completed, you should monitor the progress of the test as outlined under the following heading.

The documentation of screen messages displayed for each test assumes that you selected the recommended COMPSURF operation parameters (such as formatting the disk and repeating the surface analysis three times). If you have selected different parameters, you may see different messages than those documented here.

Formatting the disk

While the disk is being formatted, a message similar to the following will appear on the screen.

The Drive is Being Formatted
Please Wait

The formatting process will take a few minutes, depending on the type and size (storage capacity) of the disk.

The Track Zero Test

After the disk has been formatted, the Track Zero Test will begin immediately. This test ensures that track zero on the disk is free from defects. During this test, the screen will display information in a format similar to the following.

Track Zero Test			
Block #	Pattern	Pass	BadBlocks
0	a5a5	1/20	0

As the Track Zero Test progresses, the numbers displayed in each column will change continuously.

The Sequential Test

When the Track Zero Test is completed, the Sequential Test will begin. This test searches for bad blocks and records them in the Bad Block table. Any bad blocks found by the Sequential Test will be added to those you entered manually from the manufacturer's Bad Block list.

The Sequential Test will run until the specified number of passes have been made. Each pass of the Sequential Test takes approximately 30-45 minutes for a 20MB hard disk. The test will take longer for hard disks with larger storage capacity.

While the Sequential Test is running, information in a format similar to the following will be constantly updated on the screen.

Sequential Test			
Block #	Pattern	Pass	BadBlocks
14517	db6d	1/3	14

The columns in the screen are explained on the next page.

Block #

The block number is the block being tested. This number counts down to zero for each of five data patterns.

Pattern

This column indicates the data pattern currently being written to the blocks on the disk.

Pass

This column indicates how many passes of the Sequential Test have been completed out of the total number of passes specified in the "Program Operation Parameters" window.

Bad Blocks

This column shows how many bad blocks have been located in the Sequential Test.

COMPSURF test options

As indicated by the options in the submenu on the screen, you can interrupt COMPSURF at any time to view or to print a list of the bad blocks that have been found. You can also turn off the screen update to speed up the program. These options are explained under the following headings.

Display the Bad Block table

To display the bad blocks found by the Sequential Test, highlight "Display Bad Block Table" in the submenu. Then press <Enter>.

The current list of bad blocks will be displayed on the screen. (Do not be concerned if there are duplicate entries in the list.)

To exit the list of bad blocks, press <Escape>.

Print the Bad Block table

If you have attached a parallel printer to the file server, you can print a list of the bad blocks found so far. Printing a partial list of bad blocks is optional. After the testing is complete, you can print the complete Bad Block list.



Do not select the "Print Bad Block Table" option if you have not attached a parallel printer to the file server. Without a printer, COMPSURF may hang when you ask it to print out the test results.

To print a list of the bad blocks found so far, highlight "Print Bad Block Table" in the submenu. Then press <Enter>.

Turn off the screen update

To reduce the time required to complete the Sequential Test or the Random Test, you can turn off the screen update. This allows the tests to run without constant screen updates. You can select this option at any time.

To turn off the screen update, highlight "Turn OFF Screen Update" in the submenu. Then press <Enter>.

The information in the various columns on the screen will not be updated until you turn on the screen update.

Turn on the screen update

To turn on the screen update after it has been turned off, highlight "Turn ON Screen Update" in the submenu. Then press <Enter>.

The information in the various columns on the screen will be updated continuously as the program progresses.

The Random Test

The Random Test automatically begins when the Sequential Test is finished.

Note: If you specified zero passes of the Sequential Test, a Random Test Initialization procedure will run before the actual Random Test begins. This procedure initializes the disk's data storage area in preparation for running the Random Test.

While the Random Test is running, the screen will display information in a format similar to the following.

Random Test			
Block #	Pattern	I/O's	BadBlocks
3017	0000	79966	3

The columns in the screen are explained below.

Block

The number in this column is the random block that is being tested.

Pattern

This column displays the data pattern being written to the random blocks on the disk.

I/Os

The number of I/O (input/output) operations you specified in the "Program Operation Parameters" window is counted down in this column.

Bad Blocks

This column shows how many bad blocks have been located thus far in the COMPSURF testing, including any new ones found in the Random Test.

The options in the "Random Test" submenu are similar to the options for the Sequential Test. You can interrupt the Random Test at any time to view or to print a list of the bad blocks that have been found. You can also turn off the screen update to speed up the operation of the program. These options are explained under "COMPSURF test options" on page 411.

The Random Test will run until the specified number of I/O operations have been performed.

14. Record the final Bad Block table.

When all of the COMPSURF formatting and testing operations have been successfully completed, a message similar to the following will appear on the screen:

Surface Testing Finished - disk passed
Display Bad Block Table Print Bad Block Table

Note: If the disk did not successfully pass the COMPSURF testing, the failure will be indicated on the screen. You must replace such a hard disk; it is unsuitable for use with ELS NetWare Level II.

You should make a record of the final Bad Block table (the list of bad blocks you entered from the manufacturer's Bad Block list plus those found during COMPSURF testing). You can either display the table on the screen and record the bad blocks by hand, or if you have a parallel printer attached to the file server, you can print a hard copy of the final Bad Block table.

Select the appropriate choice from the menu to obtain a permanent record of the disk's Bad Block table.



You should always record the COMPSURF test results. If you do not, you will have no way to replace the Bad Block table if it should ever be accidentally deleted. With a current record or printout, you can re-enter the complete Bad Block table manually, if necessary.

15. Exit COMPSURF.

- 15a. After you have recorded or printed the complete list of bad blocks, press <Escape>.
- 15b. Press <Escape> again.
- 15c. Highlight:

Exit CompSurf
No
Yes

Then press <Enter>.

You will be returned to the "Configuration Utilities" menu.

- 15d. If you need to run COMPSURF for another disk drive, return to Step 2b on page 400.

If you are finished running COMPSURF for all applicable disk drives, press <Escape>, or highlight "Return to Previous Menu" and press <Enter>. You will be returned to the "Network Generation Options" menu of ELSGEN.

Where to go from here

When you have finished running the COMPSURF utility for all applicable disk drives, continue with ELSGEN Part 2.

Notes

ELSGEN Part 2

ELS NetWare GENeration Utility

This section explains step by step how to run the NetWare Installation part of ELSGEN.

Locate and use the NetWare Installation Worksheet as you complete these steps.

Before you start

See the COMPSURF section on page 397.

Format and test the file server hard disks with COMPSURF;

See "Whether to use default or custom installation options on page 47.

Decide whether you will install NetWare using the default or custom installation options.

If you are already in the "Network Generation Options" menu of ELSGEN, skip to Step 6 on page 421.

To re-enter the ELSGEN program, begin with the instructions on the next page.

Steps to re-enter ELSGEN

From this point on, you must run the ELSGEN program on the computer you are using as the file server. You can run ELSGEN using the Standard Floppy Disk method, the RAM Disk method, or the Network Drive method.



You cannot use the Hard Disk method to run this portion of ELSGEN. If you ran this method to generate the operating system in ELSGEN Part 1, you must use the Standard Floppy Disk or RAM Disk method to run the ELSGEN NetWare Installation utility. If you were to select the Hard Disk method, the "Network Generation Options" menu would appear without the options necessary to continue with the installation.

If you ran the ELSGEN Network Configuration utility using the Hard Disk or Network Drive method, the files generated thus far with ELSGEN should have been downloaded from the appropriate subdirectories onto the corresponding NetWare installation diskettes.

You should also have the installation worksheets containing all the pertinent information you have been instructed to record on them up to this point and any printouts of the file server configurations taken from the CONFIG.DAT file.

1. Turn on the file server computer and boot with DOS 3.0 or above.

Make sure your boot diskette has the CONFIG.SYS file with "FILES = 10."

2. Determine the method you will use to run the installation portion of ELSGEN.

Standard Floppy Disk method

You can use this method if you used it to generate the operating system in ELSGEN Part 1 or if your Novell Authorized Reseller generated the operating system for you and has downloaded the necessary files to your diskettes.

RAM Disk method

You can use this method if you created a RAM disk (also called a "virtual disk") in your computer by following the directions in your DOS manual. ELSGEN will operate the same with the RAM Disk method as with the Standard Floppy Disk method for this portion of the program.

Network Drive method

You can continue to use this method if you used it to generate the operating system in ELSGEN Part 1. The computer you plan to use as the file server must still be attached to the network it was attached to when you generated the operating system.

3. Follow the instructions below that apply to your ELSGEN run method.

Standard Floppy or RAM Disk method

Insert the *ELSGEN* diskette into drive A.

If you have a drive B:



Insert the *SUPPORT* diskette into drive B.



Insert the *AUXGEN* diskette into drive B.

Make sure drive A is your default drive.

Network Drive method

Make sure you have logged in to the network and are in the directory you created for the ELSGEN program files.

4. Type the ELSGEN command.

At the DOS prompt, type

ELSGEN <Enter>



Do not use the "N" option at this time. The "N" option causes the program to start over, ignoring the network configuration you have already specified in ELSGEN Part 1. You are now re-entering ELSGEN in the middle of the program.

5. Select the ELSGEN run method you have chosen to use.

- 5a. Highlight your choice. (Do not select the Hard Disk method at this time.)

ELSGEN Run Options
Standard (floppy disks)
RAM Disk
Hard Disk
Network Drive

Then press <Enter>.

- 5b. If you are using the Network Drive method, type the letter of the network drive:

Drive:

Then press <Enter>.

6. Access the NetWare Installation utility.

6a. Highlight:

Network Generation Options
Operating System Generation
Utility Programs
NetWare Installation
Exit ELSGEN

Then press <Enter>.

You will see a message indicating that the program is analyzing the system to determine the number and types of disk drives that are connected. This analysis should only take a matter of seconds.

7. Verify the hard disk configuration.

A screen similar to the following will appear:

Drive Name	Channel	Controller	Drive Status
IBM AT Hard Disk "C">	0	0	0
IBM AT Hard Disk "C">	0	0	1

Note: This information must be correct and all network hard disks must appear in this list. Incorrect information about the disks can prevent the proper installation of NetWare on the file server and could damage a disk drive.

7a. If you installed two hard disks, make sure they both appear on the list. Then press <Escape>.

- 7b.** A confirmation menu similar to the following will appear:

Confirm Attached Drives
Drive List is Correct Re-examine Drive List Drive List Is Not Correct

- If the list of hard disk drives shown on the screen is correct, highlight "Drive List is Correct." Then press <Enter> and continue with Step 7c.
- If the list of hard disk drives shown on the screen is not correct, highlight "Drive List Is Not Correct" and press <Enter>. You will be returned to the "Network Generation Options" menu. You must exit ELSGEN and rerun the computer's SETUP or similar program that specifies your internal hard disk configuration.
- If you want to look at the list of disk drives again, highlight "Re-examine Drive List" and press <Enter>. After you have looked at the list, return to Step 7b.

- 7c.** After you have verified that the drive list is correct, one of the following will appear on the screen.

- A message similar to the following:

The drives listed above have not been tested by the surface analysis program COMPSURF. You must run this program for these drives before ELSGEN will be able to continue. Press ESCAPE to continue.

If this message appears, you must run the COMPSURF utility at this point. Press <Escape> and return to the COMPSURF section.

- The "Installation Options" menu. If this menu appears, continue with Step 8.

8. Select your installation options.



If you completed the planning modules, you should have recorded the installation options you want to use on the NetWare Installation Worksheet. If you need help, see "Whether to use default or custom installation options" on page 47.

8a. Highlight your choice:

Installation Options
Select Default Installation Options
Select Custom Installation Options
Continue Installation

Then press <Enter>.

If you chose "Select Default Installation Options" continue with "Steps for default installation options" on the next page.

If you chose "Select Custom Installation Options," skip to "Steps for custom installation options" on page 428.

Steps for default installation options

1. Record the volume names on the NetWare Installation Worksheet.

The default volumes created by ELSGEN will be displayed in a window similar to the following:

Drives/Volumes	Volume	Chnl	Ctrlr	Drv	Status
IBM AT Hard Disk "C" P SYS		0	0	0	

Record the default volume names on the NetWare Installation Worksheet. Then press <Escape>.

2. Name the file server.

Type the name of your file server in the highlighted box.

File Server Name: <input type="text"/>
--

Then press <Escape>.

3. Record the System Configuration parameters.

The default system configuration parameters will be displayed.

System Configuration	
File Server Name:	PD-TWINKIE
Number of Open Files:	60
Number of Indexed Files:	0
Limit Disk Space:	No
Number of Bindery Objects:	

Record the parameters on the NetWare Installation Worksheet. Then press <Escape>.

4. Specify which of the file server's printer ports has a printer attached to it.

- 4a.** For each printer port (COM1, COM2, LPT1, and so on) available on the file server, a prompt similar to the following will appear:

Use COM1 for a Network Printer?	
No	
Yes	



If you used the planning modules, you should have recorded the printers you are going to use on the NetWare Installation Worksheet. If you need help, refer to "Which types of printers to use" on page 129.

Answer "Yes" or "No" to each of the printer prompts, according to whether you have attached a printer to that particular port.

- 4b.** When you have answered all the printer prompts, the current printer configuration for the file server will be displayed on the screen in a format similar to the following:

Device	Spooled	Printer #	Baud	Size	Stop	Parity	Xon/Xoff
COM1		Not Spooled					
COM2		Not Spooled					
LPT1		0					

Record the printer numbers on the NetWare Installation Worksheet. Then press <Escape>.

You will be returned to the "Installation Options" menu.

5. Install the NetWare files on your file server.

5a. Highlight:

Installation Options
Select Default Installation Options
Select Custom Installation Options
Continue Installation

Then press <Enter>.

5b. Highlight:

Install Networking Software on File Server?
No
Yes

Then press <Enter>.

A prompt similar to the following will appear.

Performing the Installation operations that have been selected. This could take several minutes, depending on the number of drives and the number of operations required.

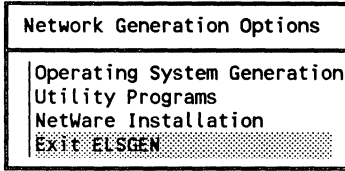
Please Be Patient!

After this prompt, several more prompts will appear. Each time a prompt appears, follow the instructions as requested.

When all files have been successfully loaded on to the file server, you will be returned to the "Network Generation Options" menu.

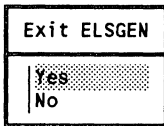
6. Exit ELSGEN.

6a. Highlight:



Then press <Enter>.

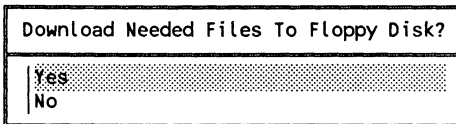
6b. Highlight:



Then press <Enter>.

6c. If you are running the Network Drive method, download the needed files to diskette.

Highlight:



Then press <Enter>.

6d. Insert the various diskettes as ELSGEN prompts you for them. ELSGEN will automatically download all the necessary files.

Where to go from here

You are now finished with ELSGEN Part 2. Continue with the Booting the File Server section.

Steps for custom installation options

When you are installing NetWare with custom options, the ELSGEN program automatically makes as many decisions as possible for you. However, you must still specify a few things for which no automatic settings are possible. You can change the automatic settings, if you want, to customize the file server for your particular network.

As you go through the various steps that follow, record all parameters (including the automatically set ones) on the appropriate worksheets. Skip any steps explaining options that do not appear in the "Custom Installation" menu.

Fixing the Master System Drive table

The Master System Drive table stores information about network hard disk drives as each disk is initialized for NetWare. On occasion, when hard disks are added to or removed from the system, the Master System Drive table becomes invalid and needs to be updated with current disk drive information.

If, at any time during the custom NetWare installation, the "Fix the Master System Table" option appears in the "Custom Installation" menu, you must fix the table before you go any further in the program.

To fix the Master System Drive table, highlight "Fix System Drive Table" and press <Enter>. A prompt similar to the following will appear on the screen.

Fix the Master System Table?
No
Yes

Highlight "Yes" and press <Enter>. Then resume your custom NetWare installation from the point at which the "Fix the Master System Table" option appeared.

1. Install Hot Fix on the network hard disks.



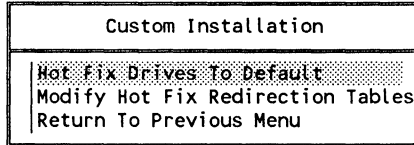
If you completed the planning modules, you should have recorded whether you want to use the default or custom Hot Fix size. If you chose the custom size, you should have also recorded the physical and logical disk size on the NetWare Installation Worksheet. If you need help, refer to "How much area to reserve for Hot Fix" on page 63.

To set all the network hard disks to the default Hot Fix logical disk size (approximately 98% of the physical disk size), complete Steps 1a-1c.

To set the Hot Fix logical disk size of each network hard disk individually, skip to Step 1a under "Setting disks to custom Hot Fix size" below.

Setting disks to the default Hot Fix size

1a. Highlight:

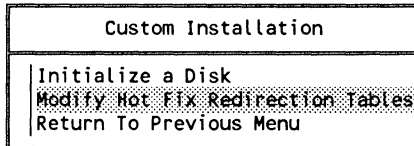


Then press <Enter>.

When Hot Fix has been installed on all of the disks, the option will disappear from the menu.

1b. Examine the Hot Fix logical disk sizes.

Highlight:



Then press <Enter>.

A list of the network hard disks will appear on the screen in a format similar to the following.

Hot Fix	Drives	Channel	Controller	Drive	Logical	Hot	Fixed
	IBM AT Hard Disk	"C>	0	0	0	14518	

- 1c. If you have not already done so, record the logical disk size for each disk on the NetWare Installation Worksheet. Then press <Escape>. Skip to Step 2.

Setting disks to custom Hot Fix size

- 1a. Highlight:

Custom Installation
Hot Fix Drives To Default
Modify Hot Fix Redirection Tables
Return To Previous Menu

Then press <Enter>.

A list of the network hard disks will appear on the screen, in a format similar to the following.

Hot Fix	Drives	Channel	Controller	Drive	Logical	Hot	Fixed
	IBM AT Hard Disk	"C>	0	0	0	14518	

Initially, the numbers displayed in the "Logical" column will be physical disk size.

- 1b. Highlight the disk you want to set up for Hot Fix.

Hot Fix	Drives	Channel	Controller	Drive	Logical	Hot	Fixed
	IBM AT Hard Disk	"C"	0	0	0	14518	

Then press <Enter>.

- 1c. A screen similar to the following will appear:

Redirection Information	
Physical Disk Size:	14518
Logical Disk Size:	14065

The default logical disk size (approximately 98% of the physical disk size) will be shown in the "Logical Disk Size" field.

- To accept the default logical disk size shown, press <Escape>.
- To enter a different logical disk size, type the new size in the field. Then press <Escape>.

The logical disk size will now appear in the "Logical" column for the disk, and the "Hot Fixed" column will contain an asterisk (*) indicating that the disk is now set up for Hot Fix.

Note: The logical disk size is specified in "blocks" instead of bytes. A block is 4KB (kilobytes), or 4,096 bytes, of data. For example, if a disk shows a physical size of 10,000 blocks, its total storage is about 40MB (40,000KB).

- 1d. Repeat Steps 1b and 1c for any remaining disk drives in the list that have not been set up for Hot Fix.
- 1e. When all of the network drives have been set up for Hot Fix, record the logical disk size for each disk as shown on the NetWare Installation Worksheet. Then press <Escape> and continue with Step 2.

2. Initialize the hard disk(s).

As you initialize the hard disk(s), ELSGEN will set as many defaults as possible for you. In most cases, the defaults are satisfactory, but you can change them.

2a. Highlight:

Custom Installation
Initialize a Disk
Modify Hot Fix Redirection Tables
Return To Previous Menu

Then press <Enter>.

2b. Highlight the disk you want to initialize.

Initialization	Channel Controller	Drive	Status
IBM AT Hard Disk 'C>	0	0	0

Then press <Enter>.

- The first disk you select (usually the first internal hard disk) will become the "system" hard disk. You must specify the system configuration parameters for the system disk before you define the volume(s) on the disk. To do this, continue with Step 3.
- For the second hard disk you select, skip to Step 4 on page 435.

3. Set the system configuration parameters.

A screen similar to the following will appear:

System Configuration	
File Server Name:	
Number of Open Files:	60
Number of Indexed Files:	0
Limit Disk Space:	No
Number of Bindery Objects:	

You can choose either to accept the default parameters as shown or to change them to better suit your particular network. These parameters are explained in the following steps.

If you have not already done so, record the settings you make on the NetWare Installation Worksheet (even if you accept the default settings).

3a. Specify the file server name.



If you completed the planning modules, you should have recorded the name you chose for the file server on the NetWare Installation Worksheet. If you need help, see "What to name the file server" on page 46.

Type the name of the file server in the "File Server Name" field. Then press <Enter>.

3b. Specify the number of open files.



If you completed the planning modules, you should have recorded the number of open files you want to specify for your file server on the NetWare Installation Worksheet. If you need help, refer to "How many open files to specify" on page 51.

To change the default number of open files, highlight the "Number of Open Files" field and press <Enter>. Use the Backspace key to erase the number shown. Then type the maximum number of open files you want and press <Enter>.

3c. Specify the number of indexed files.



If you completed the planning modules, you should have recorded the number of indexed files you want to specify for your file server on the NetWare Installation Worksheet. If you need help, refer to "How many indexed files to specify" on page 52.

To change the default number of indexed files, highlight the "Number of Indexed Files" field and press <Enter>. Use the Backspace key to erase the number shown. Then type the number of indexed files you want and press <Enter>.

3d. Specify whether to limit disk space.



If you completed the planning modules, you should have recorded whether or not you want to limit the disk space on the NetWare Installation Worksheet. If you need help, refer to "Whether to limit disk space" on page 61.

To change the setting so that disk space can be limited for each user, press the "Y" key to change the field to "Yes." Then press <Enter>.

3e. Specify the number of bindery objects.



If you completed the planning modules, you should have recorded the number of bindery objects you want to specify for your file server on the NetWare Installation Worksheet. If you need help, refer to "How many bindery objects to specify" on page 62.

You can specify the maximum number of bindery objects only if the "Limit Disk Space" field is set to "Yes" (as explained above). If the field is not set to "Yes," skip to Step 3f.

The default number shown should suffice for ELS NetWare Level II networks. If, however, you want to change the number of bindery objects, press <Enter>. Use the Backspace key to erase the number shown. Type the number of bindery objects you want and press <Enter>.

- 3f. Make sure you have recorded all of the system configuration parameters on the NetWare Installation Worksheet. Then press <Escape> to exit the "System Configuration" form and continue.

4. Define volumes on the selected hard disk.

A screen similar to the following will appear.

Volume	Megs	Directory Size	Cached

Upon initial installation, the window will be empty, as shown above.

To define one or more NetWare volumes on the hard disk you are initializing, complete the following steps.

- 4a. Press <Insert> to define a new volume (or highlight any volume in the list and press <Enter> to edit the existing volume information).

A screen similar to the following will appear.

Volume Definition			
Volume Name:	SYS		
Volume Size in Megs:	55		
Number of Directory Entries:	3968		
Cache the Directory:	Yes		

You must specify the four parameters for each volume you are defining.

4b. Specify the volume name.

If you are defining the first volume on the system hard disk, the field will contain the automatically assigned name SYS for that volume. The name SYS cannot be changed nor used for any other volume. Skip to Step 4c.



If you completed the planning modules, you should have recorded the volume names you want to specify for your file server on the NetWare Installation Worksheet. If you need help, refer to "What to name the volumes" on page 65.

To enter the volume name, highlight the "Volume Name" field and type an appropriate name. Then press <Enter>.

4c. Specify the volume size.



If you completed the planning modules, you should have recorded the size of the volumes you want to specify for your file server on the NetWare Installation Worksheet. If you need help, refer to "What size volumes to define" on page 64.

If you are defining only one volume on the hard disk, leave the default volume size as it is and press the Down-arrow key.

To enter the volume size, highlight the "Volume Size in Megs" field. Type the number of megabytes you want the particular volume to contain. Then press <Enter>.

4d. Specify the maximum number of directory entries.



If you completed the planning modules, you should have recorded the maximum number of directory entries you want to specify for your file server on the NetWare Installation Worksheet. If you need help, refer to "How many directory entries to specify" on page 66.

The "Number of Directory Entries" field will initially contain a default number of directory entries based on the size of the volume. In most cases, this default number will suffice.

If you want to specify more or fewer directory entries, highlight the "Number of Directory Entries" field. Type the number of directory entries for the volume. Then press <Enter>.

- 4e.** Specify whether to cache the volume directory.



If you completed the planning modules, you should have recorded whether or not you want to cache the volume directories on the NetWare Installation Worksheet. If you need help, refer to "Whether to cache volumes directories" on page 67.

The directory of volume SYS should always be cached.

To change the "Cache the Directory" field to "No," highlight the field and type N. Then press <Enter>.

- 4f.** Press <Escape> to exit the "Volume Definition" form. The volume information you specified should appear in the "Volume" window on the screen.

Record the information in the "Volume Definition" form on the NetWare Installation Worksheet.

- 4g.** If you have not yet defined volumes for all the available space on the disk, return to Step 4c and continue defining additional volumes until the disk space is completely used up.

When all the available space on the disk has been allocated to NetWare, press <Escape>.

- 4h.** Create the defined volumes on the hard disk.

A screen similar to the following will appear.

Create Volume?	
	No
	Yes



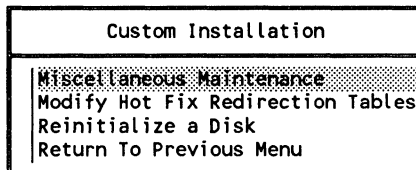
Once created on a disk, volumes cannot be changed without reinitializing the disk, which causes all data on the disk to be lost. Make sure the volumes are defined the way you want them before you respond to the prompt.

- If the volume definitions are satisfactory, highlight "Yes" and press <Enter> to exit the "Volumes" window and create the volumes on the disk being initialized.
 - If you want to change the volume definitions, press <Escape> and return to Step 4.
 - If you want to abandon the volume definitions without creating the volumes on the disk, highlight "No" and press <Enter>. Return to Step 2 to start the disk initialization process over again.
- 4i. If you have a second hard disk to initialize for NetWare, it will be listed in the "Initialization" window on the screen. Return to Step 2 and initialize the remaining hard disk.

When you have initialized all of the network hard disks attached to the file server, continue with Step 5.

5. Enter the "Miscellaneous Maintenance" menu.

Highlight:



Then press <Enter>.

A screen similar to the following will appear.

Miscellaneous Maintenance
Load Operating System
Load System & Public Files
System Configuration
Volume Information
Printer Maintenance
Return To Previous Menu

This menu contains the options used to perform the remainder of the initial NetWare installation, as well as other options that can be used later to maintain the network.

The options you must choose to complete the initial installation are described in the following steps.

6. Set the "Load Operating System" flag.

Since you are performing a new NetWare installation, the NetWare operating system file (NET\$OS.EXE) does not yet exist on the file server's system hard disk. This file must be copied from the *OSEXE-1* diskette or subdirectory (and the *OSEXE-2* diskette or subdirectory if you are using 5.25-inch format diskettes) into the SYS:SYSTEM directory after NetWare installation is complete. The file will be copied only if the operating system load flag is set as indicated on the next page.

Use this option to avoid reloading the operating system when you run ELSGEN to maintain the network in the future.

- 6a. Highlight "Load Operating System" in the "Miscellaneous Maintenance" menu and press <Enter>. A prompt similar to the following will appear on the screen.

Set Flag for Operating System Load?
No
Yes

Always answer "Yes" to this prompt when you are performing the initial NetWare installation. (If "No" is selected, any previous "Yes" will be ignored, and the operating system load flag will not be set.)

- 6b. To set the operating system load flag, highlight "Yes" and press <Enter>.

7. Set the "Load System and Public Files" flag.

Since you are performing a new NetWare installation, the NetWare System, Login, and Public files needed to operate the network do not yet exist on the file server's system hard disk. These files must be copied from the various *SYSTEM* and *PUBLIC* diskettes into the appropriate directory in volume SYS after the NetWare installation is complete. The files will be copied as long as the System and Public files load flag is set as indicated below.

Use this option to avoid reloading the System, Login, and Public files when you run ELSGEN to maintain the network.

- 7a. Highlight "Load System & Public Files" in the "Miscellaneous Maintenance" menu and press <Enter>. A prompt similar to the following will appear on the screen.

Set Flag for System & Public Files Load?
No
Yes

Always answer "Yes" to this prompt when you are performing the initial NetWare installation. (Answering "No" will clear any previously set "Yes," and the system and public files load flag will not be set.)

- 7b. To set the System and Public files load flag, highlight "Yes" and press <Enter>.

8. Define network printers.

- 8a. Highlight "Printer Maintenance" in the "Miscellaneous Maintenance" menu and press <Enter>.

Device	Spooled	Printer#	Baud	Size	Stop	Parity	Xon/Xoff
COM1	Not	Spooled					
LPT1	Not	Spooled					
LPT4	Not	Spooled					

You must specify which of the file server's printer ports you have attached a printer to. For each serial printer you have attached, you must also enter the printer hardware communication settings you made on the printer itself. Refer to the NetWare Installation Worksheet for the necessary information.

- 8b. Highlight the entry in the "Device" column that corresponds to one of the ports to which you have attached a printer. Then press <Enter>.
- If the port is a serial printer port (COM1, COM2, and so on), follow the instructions under "Define a serial printer."
 - If the port is a parallel printer port (LPT1, LPT2, and so on), follow the instructions under "Define a parallel printer" on page 445.

Define a serial printer

When you highlight a serial printer port (COM1 or COM2), a printer definition form similar to the following will appear on the screen.

Spooled Serial Printer	
Device:	COM1
Spooled Printer #:	0
Baud Rate:	9600
Word Length:	8 bits
Stop Bits:	1 bit
Parity:	None
Xon/Xoff Protocol:	No

The "Spooled Printer #" field will contain a default printer number from 0 to 4. The spooled printer number is used to identify the print devices to which the file server can send files to be printed.

- If your serial printer is set to the default settings and you want to use the default spooled printer number shown, press <Escape>. The default serial printer information will be displayed in the "Printer Definition" window. Skip to Step 9 on page 446.
- If your serial printer is not set to the default settings shown, you must change the hardware settings to match those of the printer's. Record the settings you make on the NetWare Installation Worksheet. Complete the instructions that follow to change the appropriate parameters.

Spooled Printer



If you completed the planning modules, you should have recorded whether or not to use the default printer numbers on the NetWare Installation Worksheet. If you need help, refer to "Whether to use the default printer numbers" on page 128.

To change the spooled printer number, highlight the "Spooled Printer #" field. Type the printer number you want and press <Enter>.

Baud Rate

To specify the printer's baud rate, complete the following steps.

1. Highlight the "Baud Rate" field and press <Enter>.
2. Highlight your printer's baud rate

Baud Rates
110
150
300
600
1200
2400
4800
9600

Then press <Enter>.

Word Length

To specify the word length your serial printer is set to use, complete the following steps.

1. Highlight the "Word Length" field and press <Enter>.
2. Highlight the printer's word length.

Word Length
7 bits
8 bits

Then press <Enter>.

Stop Bits

To specify the number of stop bits for your serial printer, complete the following steps.

1. Highlight the "Stop Bits" field and press <Enter>.
2. Highlight the number of stop bits your printer is set to use.

Stop Bits
1 bit
2 bits

Then press <Enter>.

Parity

To specify the parity checking method for your serial printer, complete the following steps.

1. Highlight the "Parity" field and press <Enter>.
2. Highlight the parity checking method for your printer.

Parity
Even
None
Odd

Then press <Enter>.

XON/XOFF Protocol

If your printer is not set to use the XON/XOFF protocol, leave the field as it is and press the Down-arrow key.

If your printer is set to use the XON/XOFF protocol, type Y in the "Xon/Xoff Protocol" field and press <Enter>.

Exit the "Spooled Serial Printer" form

To exit the "Spooled Serial Printer" form, press <Escape>. You will be returned to the "Printer Definitions" window.

- If you have other printers to define, return to Step 8b on page 441.
- If you are finished defining all of the network printers, skip to Step 9 on page 446.

Define a parallel printer

If the port you have selected is a parallel printer port (LPT1, LPT2, or LPT3), you will see a printer definition form similar to the following.

Spooled Parallel Printer
Device: LPT1
Spooled Printer #: 1

The only parameter you need to specify for an attached parallel printer is an appropriate spooled printer number. A default printer number from 0 to 4 will be shown in the field.

The spooled printer number is used to identify the print devices to which the file server can send files to be printed.



If you completed the planning modules, you should have recorded the printer numbers you want on the NetWare Installation Worksheet. If you need help, refer to "Whether to use default printer numbers" on page 128.

- If you want to accept the default printer number shown, press <Escape>. The default parallel printer information will be displayed in the "Printer Definition" window.
- To change the spooled printer number, type the new printer number you want in the "Spooled Printer #" field and press <Enter>. To exit the "Spooled Parallel Printer" form, press <Escape>. You will be returned to the "Printer Definitions" window.
- If you have other printers to define, return to Step 8b on page 441.
- If you have finished defining all of the network printers, continue with the next step.

9. Save the printer definitions

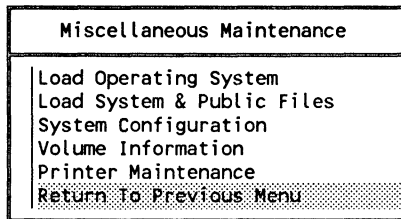
- 9a. When you have defined all the printers that are attached to the file server, review the printer configuration on the screen. If the configuration is correct, record the printer numbers you have assigned on the NetWare Installation Worksheet. (The rest of the settings should match those already recorded on this worksheet.)
- 9b. Press <Escape> when you have recorded the printer information. A prompt similar to the following will be displayed on the screen.

Use New Printer Definitions?
No
Yes

- To save the current printer definitions, answer "Yes" to the prompt. You will be returned to the "Miscellaneous Maintenance" menu. Continue with Step 10.
- To return to the "Printer Definition" window and make changes to the listed printer definitions, press <Escape>. Return to "Define a serial printer" on page 441 or to "Define a parallel printer" on page 445, whichever is appropriate.
- To discard the current printer definitions altogether, highlight "No" and press <Enter>. Return to Step 8 on page 441 to start the printer definition process over again.

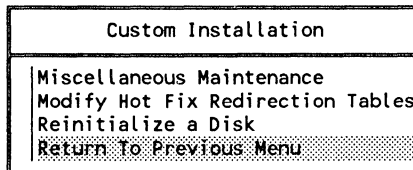
10. Return to the "Installation Options" menu.

10a. Highlight:



Then press <Enter>.

10b. Highlight:



Then press <Enter>.

You will be returned to the "Installation Options" menu.

11. Complete the NetWare installation.

11a. Highlight:

Installation Options	
	Select Default Installation Options
	Select Custom Installation Options
	Continue Installation

Then press <Enter>.

11b. Highlight:

Install Networking Software on File Server?	
	No
	Yes

Then press <Enter>.

If you chose "Yes," continue with Step 12.

If you do not want to install NetWare on the file server at this time, highlight "No" and press <Enter>. A prompt similar to the following will appear:

Exit Installation and ABANDON Changes?	
	No
	Yes

- To return to the "Installation Options" menu without abandoning the current installation options, highlight "No" and press <Enter>. Return to "Steps for custom installation options" on page 428 to respecify the installation options.
- To exit the ELSGEN NetWare Installation utility and abandon the current installation options, highlight "Yes" and press <Enter>. All of the options you specified will be abandoned, and you will be returned to the "Network Generation Options" menu.

To exit ELSGEN, highlight "Exit ELSGEN" and press <Enter>. Then highlight "Yes" in the confirmation prompt and press <Enter>.

12. Load the NetWare files onto the system hard disk.

When you have instructed ELSGEN to install NetWare on the file server, a message similar to the following will appear.

Performing the Installation operations that have been selected. This could take several minutes, depending on the number of drives and the number of operations required.

Please Be Patient!

After the initial installation of NetWare on the file server's hard disks has been completed, the following files and programs must be copied onto the system hard disk (the first internal hard disk in the file server).

- The NetWare "cold boot loader" program, which is used to boot the file server from hard disk. This program must be loaded on track 0 of the system disk. (Only ELS NetWare 286 dedicated file servers can boot from the system hard disk; ELS NetWare 286 nondedicated file servers must boot from diskette.)
- The NetWare operating system file (NET\$OS.EXE), which will be copied into the SYS:SYSTEM directory.

- All of the NetWare System, Login, and Public files, which will be copied from the installation diskettes into the SYS:SYSTEM, SYS:LOGIN, and SYS:PUBLIC directories on the system hard disk.

If you are running ELSGEN using the Standard Floppy Disk or RAM Disk method, you must insert the diskettes containing these files into any disk drive when ELSGEN prompts you to do so. ELSGEN will then copy the necessary files to the system hard disk. Gather your working copies of the following NetWare installation diskettes.

5.25-Inch Format

OSEXE-1 PUBLIC-4
OSEXE-2 PUBLIC-5
SYSTEM PUBLIC-6
PUBLIC-1 PUBLIC-7
PUBLIC-2 PUBLIC-8
PUBLIC-3 PUBLIC-9

3.5-Inch Format

OSEXE-1
SYSTEM
PUBLIC-1
PUBLIC-2
PUBLIC-3
PUBLIC-4

12a. Install the cold boot loader.

The file server "cold boot loader" is installed on track 0 of the system hard disk, as indicated by the following message on the screen.

Installing the cold boot loader on track 0 of
hard disk 0.

When this process is finished, the screen will display a message similar to the following.

The Cold Boot Loader has been successfully installed.
Strike a key when ready . . .

Press any key to continue the NetWare installation.

Note: ELSGEN will install the cold boot loader for both ELS NetWare 286 dedicated and nondedicated. However, only ELS NetWare 286 dedicated file servers can actually use the cold boot loader to boot from the system disk.

12b. Load the operating system file

A message similar to the following will appear, indicating that the operating system is being loaded.

Copying NET\$OS.EXE to SYS:SYSTEM.

When this process is finished, the screen will display a message similar to the following.

NET\$OS.EXE successfully installed.
Strike a key when ready . . .

Press any key to continue the NetWare installation.

12c. Load the LOGIN, PUBLIC, and SYSTEM files.

If you are running ELSGEN using either the Standard Floppy Disk or RAM Disk method, follow the screen prompts to insert the appropriate diskettes as they are needed by the ELSGEN program.

If you are running ELSGEN from a network drive, ELSGEN will copy these files automatically from the network drive to the system hard disk.

ELSGEN will first copy the NetWare SYSTEM files into SYS:SYSTEM on the system hard disk. Then it will copy the NetWare LOGIN files into SYS:LOGIN. Finally, ELSGEN will copy the NetWare PUBLIC files into the SYS:PUBLIC directory on the system hard disk.

When this process is completed, the screen will display a message similar to the following.

System files successfully installed.
Strike a key when ready . . .

Press any key. You will be returned to the "Network Generation Options" menu.

13. Exit ELSGEN.

13a. Highlight:

Network Generation Options
Operating System Generation
Utility Programs
NetWare Installation
Exit ELSGEN

Then press <Enter>.

13b. Highlight:

Exit ELSGEN
Yes
No

Then press <Enter>.

13c. Highlight:

Download Needed Files To Floppy Disk?
Yes
No

Then press <Enter>.

You should always download the files to diskette. Insert the various diskettes as ELSGEN prompts you for them.

Where to go from here

You are now finished with ELSGEN Part 2. Continue with the next section, Booting the File Server.

Booting the File Server

After you have initialized the network hard disks and loaded the necessary ELS NetWare system files onto the system hard disk, the file server is ready to be booted. Once the file server is booted, you can log in to it from any attached workstation.

This section explains

- How to boot both a dedicated and nondedicated file server to run the ELS NetWare Level II operating system;
- How to log in as the user SUPERVISOR.

If you are booting a nondedicated file server, skip to "Booting a nondedicated file server" on page 457.

If you are booting a dedicated file server, continue with the steps in the following section.

Steps for booting a dedicated file server

A dedicated file server may be booted either from diskettes or from the system hard disk.

You can boot from the system hard disk on any of the following types of file servers that have bootable system hard disks.

- IBM PC AT or compatible file servers
- IBM Personal System/2 Models 30(286), 50, 50Z, 60, 70, and 80 file servers

If your file server can be booted from a hard disk, follow the steps under "Booting the file server from the system hard disk" on the next page.

If your file server does not have a bootable system hard disk, you must boot from diskettes as explained below.

Booting the file server from diskettes

1. Turn on the file server and boot it with DOS 3.0 or above.
2. Insert your working copy of the *OSEXE-1* diskette into drive A.
3. At the DOS prompt, type
`NET$OS <Enter>`
4. If you are booting from 5.25-inch diskettes, insert the *OSEXE-2* diskette into drive A when you are prompted to do so.

The file server will boot. To interpret the boot screen display, read the information under "Interpreting the file server boot screen display" on the next page.

Booting the file server from the system hard disk

1. Make sure there is no diskette in drive A of the file server.
2. Turn on the file server and any attached peripherals (including printers).
3. Press <Control>, <Alt>, and <Delete> simultaneously.

The file server will clear any data in memory and boot. To interpret the boot screen display, read the information in the next section.

Interpreting the file server boot screen display

If you followed the proper boot procedure, the file server screen will display information similar to that described below. (The information may not appear for several seconds.)

If you are booting the file server from the system hard disk, you will see a "File Server Cold Boot Loader" heading similar to the following.

```
Novell SFT NetWare File Server Cold Boot Loader
(C) Copyright 1984, 1987 Novell, Inc. All Rights
Reserved.
```

As each hard disk volume is activated, or "mounted," a message similar to the following will be displayed on the screen.

```
Mounting Volume SYS
```

If any problems are encountered as the volumes are being mounted, an error message will also be displayed (for example, "Not enough memory to cache volume xxx").

The file server next checks the bindery and queues. A message similar to the following is displayed.

```
Checking Bindery
Checking Queues
```

Any problems detected in either of these areas will be indicated on the screen.

The networks that you have attached to the network boards in the file server are then initialized, as indicated by a message similar to the following.

```
Initializing LAN A
```

If your file server contains an asynchronous communications adapter (IBM ASYNC COM1/COM2), you will also see the following message.

```
Initializing LAN x
```

This can be either LAN B or LAN C depending on your network configuration.

The file server screen then displays the version of NetWare that has been installed on the server, and the related copyright information, in a format similar to the following.

```
Novell ELS NetWare 286 Level II V2.15
(C) Copyright 1983, 1987 Novell Inc.
All Rights Reserved.
```

The file server date and time are shown, based on the internal clock that was programmed with the SETUP (or similarly titled) utility for your file server hardware.

```
AUGUST 31, 1989      3:58:23 pm
```

Any changes to the date or time must be made by either running SETUP again or using the NetWare SET TIME console command (as described in the *Reference for ELS NetWare Level II* manual).

Since you are booting a dedicated file server, a colon (:) will be displayed on the screen below the date and time. This colon is the network prompt. You will enter network console commands at this prompt.

Your file server is now booted and ready for network use. Skip to "Logging in as SUPERVISOR" on page 460.

Booting a nondedicated file server

To boot a nondedicated file server so that it can also be run as a workstation, you must boot the server with DOS, load the ELS NetWare nondedicated operating system, and load a Netware workstation shell.

You must boot the nondedicated file server from diskette. Booting is easier if you create a boot diskette for a nondedicated file server as explained below.

- 1. Create a boot diskette for a nondedicated file server.**
 - 1a.** Format a new diskette using the DOS FORMAT command with the /S parameter. This will become the file server boot diskette.
 - 1b.** Copy the NET\$OS.EXE file from the *OSEXE-1* diskette onto the newly formatted file server boot diskette. (If you ran ELSGEN from a hard disk or network drive, the NET\$OS.EXE file is in the OSEXE-1 directory.)
 - 1c.** Copy the NetWare shell files (IPX.COM and NET2.COM, NET3.COM, or NET4.COM) onto the file server boot diskette.

If you used 5.25-inch diskettes, the NetWare shell files are on the *SHGEN-2* diskette (or in the *SHGEN-2* directory if you used the Hard Disk or Network Drive method). If you used 3.5-inch diskettes, the NetWare shell files are on the *SHGEN-1* diskette (or in the *SHGEN-1* directory if you used the Hard Disk or Network Drive method).

- 1d. Copy the **CONSOLE** utility (**CONSOLE.COM**) from the NetWare *GENDATA* diskette to the file server boot diskette.

The **CONSOLE** utility allows you to switch from DOS mode to the file server mode without logging in to the file server.

- 1e. Create an **AUTOEXEC.BAT** file containing the following command to load the ELS NetWare operating system.

NET\$OS

You can create an **AUTOEXEC.BAT** file by using a DOS text editor or by using the DOS **COPY CON** command.

To create the **AUTOEXEC.BAT** file using the DOS **COPY CON** command, make sure the file server boot diskette is in the file server's default drive (usually drive A). Then type

```
COPY CON AUTOEXEC.BAT <Enter>  
NET$OS <Enter>  
^Z <Enter>
```

To type **^Z**, press the Control and Z keys simultaneously or press **<F6>**.

2. Reboot the computer.

- 2a. Make sure the file server boot diskette you created in Step 1 is in drive A. Then press the <Ctrl>, <Alt>, and <Delete> keys simultaneously.
- 2b. After the computer checks its internal memory, insert the *OSEXE-1* and *OSEXE-2* diskettes (for 5.25-inch diskettes) or the *OSEXE-1* diskette (for 3.5-inch diskettes) as prompted.

A display similar to the following will appear on the screen.

```
Mounting Volume SYS

Checking Bindery
Checking Queues

Initializing LAN A

Novell ELS NetWare v2.15 1/30/89
(C) Copyright 1983, 1987 Novell Inc.
All Rights Reserved.

AUGUST 31, 1989      3:58:23 pm
```

The last prompt to appear on the screen is the following.

```
Insert disk with batch file
and press any key when ready
```

- 2c. The batch file is the one that you created on the file server boot diskette in Step 1.

When this prompt appears, insert the file server boot diskette into drive A and press <Enter>.

The DOS prompt (A>) will now appear. The file server is now up and operating in DOS mode. You can log in to the nondedicated file server by following the instructions in the next section.

Logging in as SUPERVISOR

These steps explain how to log in to a file server from any workstation, including the nondedicated file server's DOS process (workstation mode). You may want to log in from each workstation to make sure each is functioning properly on the network.

1. Boot the file server.

If you haven't already done so, boot the file server as explained earlier in this section.

If you are logging in from the DOS process (workstation mode) on a nondedicated file server, skip to Step 4 on the next page. The IPX program is automatically loaded when you boot the nondedicated file server.

2. Boot a workstation with DOS.

Turn on one of the network workstations and boot it with its version of DOS.

3. Load the IPX program in the workstation.

- 3a.** Remove the DOS boot diskette from drive A and insert the boot diskette for the workstation.

Make sure the boot diskette contains the IPX.COM file generated for the workstation, the NET2.COM, NET3.COM, or NET4.COM file (depending on the DOS version), and any other files required to boot the workstation. (If necessary, refer to the SHGEN section of this manual.)

- 3b.** At the DOS prompt, type

IPX <Enter>

Once IPX is loaded, the workstation screen will display information similar to that shown below. Information specific to your workstation will appear on the screen in place of the x's.

```
Novell IPX/SPX V2.15  
(C)Copyright Novell Inc. 1985, 1987
```

```
LAN Option: xxxx  
Hardware Configuration: xxxx
```

Note: If you receive an error message when entering the IPX command or if the workstation "hangs" (stops functioning) after the command has been entered, make sure the IPX.COM file is configured correctly for the workstation's network board.

4. Load the NetWare shell.

At the DOS prompt, type

```
NET2 <Enter> (for DOS 2.x)
```

or

```
NET3 <Enter> (for DOS 3.x)
```

or

```
NET4 <Enter> (for DOS 4.x)
```

Once the shell is loaded, the workstation screen will display shell information similar to that shown below. Information specific to your server will appear on the screen in place of the x's.

```
NetWare V2.15 Workstation Shell for PCDOS V3.X  
(C) Copyright 1983, 1987 Novell, Inc. All Rights  
Reserved.
```

```
Attached to Server xxxx  
Wednesday, August 31, 1988 4:01:19 pm
```

If you receive an error message or if the computer hangs after you enter either the IPX or the NET3 command, check the following possibilities (in the order listed):

- If you are logging in from a computer other than the one that is also functioning as the file server, make sure the IPX.COM file is configured correctly for the computer's network interface board.
- Make sure your nondedicated file server is one of those listed under "Which type of computer to use as a file server" on page 27. If it is a Novell 286A or 286A(T) file server, it must be one that was purchased after August 1, 1987.
- Make sure your nondedicated file server has at least 1.5MB of memory (total of base and extended memory). It should have 2.5MB of memory if you are running the NetWare for Macintosh VAPs in the file server.
- Make sure that your computer, its BIOS chip, and its keyboard are compatible with the ELS NetWare Level II nondedicated operating system.

5. Change to the first network drive.

The first network drive will vary, depending on the version of DOS you are using, the type of workstation you are using, the hardware configuration of your workstation, and whether or not you have a DOS CONFIG.SYS file.

On any IBM PC, PC AT, or PS/2 running DOS 3.x, the first network drive will be F (unless you have specified a different drive with the LASTDRIVE parameter in a DOS CONFIG.SYS file).

For example, if you are logging in from an IBM PC AT workstation running DOS 3.x (with no CONFIG.SYS file), you would change to the first network drive by typing

F: <Enter>

6. Type the LOGIN command.

At the DOS prompt, type

```
LOGIN SUPERVISOR <Enter>
```

The screen will display the default login script for the user SUPERVISOR in a format similar to the following.

```
Good afternoon, SUPERVISOR.

Drive A  maps to a local disk.
Drive B  maps to a local disk.
Drive C  maps to a local disk.
Drive D  maps to a local disk.
Drive E  maps to a local disk.
Drive F := FILESERVER/SYS:SYSTEM
Drive G := FILESERVER/SYS:LOGIN
Drive Y := FILESERVER/SYS:PUBLIC
-----
SEARCH1 := Z:. [FILESERVER/SYS:PUBLIC]
```

You are logged in to the file server as the user SUPERVISOR.

Switching modes on a nondedicated file server

This section explains how to switch between the console (file server) mode and the DOS process (workstation) mode in a nondedicated file server. Before you proceed, you must have already booted the ELS NetWare nondedicated operating system on the file server.

If you are not logged in to the file server, you must also have a copy of the NetWare CONSOLE utility on the boot disk. The CONSOLE utility file, CONSOLE.COM, can be copied to the diskette from the SYS:PUBLIC directory.

Switch to the console mode

To switch to the console mode so that you can enter file server console commands, complete the following steps.

1. Make sure that you are logged in to the file server as a user or that a diskette containing the NetWare CONSOLE utility file is in the file server's default drive.
2. Type the following command at the DOS prompt.

```
CONSOLE <Enter>
```

The network prompt, a colon (:), will appear on the screen. You can now enter NetWare console commands (such as MONITOR or QUEUE).

Switch to the DOS process mode

To switch back to the DOS process (workstation) mode so that you can use the file server as a workstation, type the following command at the network prompt:

```
DOS <Enter>
```

The DOS prompt will appear on the screen. You can now enter the workstation commands (such as USERLIST or DIR) and run application programs.

Where to go from here

Before the new file server and its workstations can be used effectively, you (or someone who knows how the network will be used and who the users will be) must complete the following tasks.

- Create the necessary DOS directories on the file server.
- Create the rest of the file server's directory structure.
- Create the users and groups that will use the file server.
- Establish network security for both users and directories.
- Prepare login scripts.
- Load application and data files into the appropriate directories on the file server.

Instructions for completing the above tasks are found in the **USERDEF** and **SYSCON/FILER** sections of this manual.

If someone else (presumably the network supervisor) will be completing these tasks, that person will need the following items:

- The completed NetWare installation worksheets (so the supervisor will have access to the information and know what parameters were selected during installation)
- The workstation boot diskettes created in the **SHGEN** section

USERDEF

USER DEFINITION Utility

This section explains step by step how to create users using USERDEF.

The USERDEF utility can be used to create multiple users, to provide simple login scripts, and to set up home directories, minimal login/password security, account restrictions, and print job configurations.

If you want to set up your network environment with SYSCON and FILER (see "Whether to use SYSCON and FILER or USERDEF" on page 199), skip to the SYSCON/FILER section.

Locate and use the Users and Groups Worksheet and the USERDEF Worksheet as you complete these steps.

Before you start

See "Whether to use PRINTDEF" on page 131.

See "When to use the basic USERDEF setup" on page 199.

- Determine whether the print definitions for your printers are included with ELS NetWare Level II;
- Decide whether you will create your users with the basic setup (use the default template) or the custom setup (make your own template).

Steps to complete before running USERDEF

Before you run USERDEF, you must log in as SUPERVISOR and complete a few preliminary steps.

- Install the accounting option in SYSCON (if you will use the accounting feature).
- Create additional user groups in SYSCON (if you need groups other than EVERYONE).
- Create application directories (if you are not putting program files in SYS:PUBLIC).
- Create a parent directory for users' home directories (if you don't want them directly in the SYS volume).
- Copy print device definitions for your printer(s) with PRINTDEF.
- Create the print job configurations for user SUPERVISOR so that the configurations can be copied for new users. This is done using the PRINTCON utility.

Some of these steps are not necessary if you use the default setup. If you are using the default setup of USERDEF, log in as SUPERVISOR (Step 1 below) and install accounting (if applicable—Step 2 below). Then skip to Step 6 on page 474.

1. From a network workstation, log in to the file server as SUPERVISOR.

See "Logging in as SUPERVISOR" on page 460 if you are not sure how to log in.

2. Install the accounting option in SYSCON.

If you want to install the accounting feature, you must do so using SYSCON before you run USERDEF.

If you do not want to install this option, skip to Step 3.

To install this option, complete the following steps.

- 2a. Access the SYSCON utility by typing

SYSCON <Enter>

- 2b. Highlight:

Available Topics
Accounting
Change Current Server
File Server Information
Group Information
Supervisor Options
User Information

Then press <Enter>.

- 2c. Highlight:

Install Accounting
No
Yes

Then press <Enter>.

- 2d. Press <Escape> until you return to the following screen.

Available Topics
Accounting
Change Current Server
File Server Information
Group Information
Supervisor Options
User Information

If you plan to set up charge rates for the various services, you will need to do this later by following the steps outlined in the SYSCON/FILER section.

If you will be using the default setup of USERDEF, exit SYSCON by pressing <Alt> and <F10> simultaneously; then press <Enter>. Skip to Step 6 on page 474.

If you will be using the custom setup, continue with Step 3.

3. Create the user groups in SYSCON.

If you want to create user groups in addition to the default group EVERYONE, you must create them using the SYSCON utility before you run USERDEF.



If you completed the planning modules, you should have decided what groups you need to create on the Users and Groups Worksheet. If you need help, refer to "Which users and groups to create" on page 176.

If you don't want to create user groups, skip to Step 4.

3a. Highlight:

Available Topics
Accounting
Change Current Server
File Server Information
Group Information
Supervisor Options
User Information

Then press <Enter>.

3b. A screen similar to the following will appear.

Group Names
EVERYONE

Press <Insert>.

3c. Type the name of your group.

New Group Name:

Then press <Enter>.

The name of the group you have just created will appear in the "Group Names" list.

- 3d. Repeat Steps 3b and 3c to create any additional groups.
- 3e. To exit SYSCON, press <Alt> and <F10> simultaneously; then press <Enter>.

4. Create application subdirectories.

You have two options for creating applications subdirectories. You can

- Create application subdirectories in SYS:PUBLIC;
- Create a separate directory in the SYS volume as a parent directory for the application subdirectories and then create the application subdirectories.

If you use the second option, you will create the parent directory first. In either case, you will create a subdirectory for each application you plan to use on your network using either the FILER utility or the DOS CD (Change Directory) and MD (Make Directory) commands. The step by step instructions that follow allow for both options.



If you completed the planning modules, you should have decided what application directories you need to create on the Directories Worksheet. If you need help, refer to "Where to create application directories" on page 165.

4a. Create a parent directory for the application subdirectories.

If you have chosen to create your application directories in SYS:PUBLIC, skip to Step 4b.

If you have chosen to create a separate directory (called SYS:APPS or whatever name you prefer), place it in the SYS volume.

FILER utility

Access FILER and create the directory using the "Subdirectory Information" option.

DOS commands

Create the directory with the MD command.

- 4b. Change to the directory in which you will create the application subdirectories (SYS:PUBLIC or SYS:APPS).

FILER utility

Select the appropriate directory using the "Select Current Directory" option.

DOS commands

Use the CD command and its variations to move to the appropriate directory.

- 4c. Create a subdirectory for each application you plan to use on your network.

FILER utility

Create the subdirectories using the "Subdirectory Information" option.

DOS commands

Create the subdirectories with the MD command.

For example, if you plan to install a word processing program, a database program, and an accounting program, you might name your subdirectories as follows.

SYS:PUBLIC/WP	SYS:APPS/WP
SYS:PUBLIC/DB	SYS:APPS/DB
SYS:PUBLIC/ACCTG	SYS:APPS/ACCTG

- 4d.** If you are using **FILER**, the new subdirectories will be listed in the "Subdirectories" list as they are created.

If you are using **DOS** commands and you want to confirm that you have created the application subdirectories, type

```
NDIR * DIR ONLY <Enter>
```

A list of the new subdirectories will appear on the screen.

5. Create a parent directory for users' home directories.

Create the parent directory for the users' home directories using either the **FILER** utility or the **DOS CD** and **MD** commands.



If you completed the planning modules, you should have decided what parent directories you need to create on the **Directories Worksheet**. If you need help, refer to "Where to create home directories" on page 168.

- 5a.** Change to the directory one level above the directory you plan to create.

For example, if you want **USERDEF** to create home directories in a directory named **SYS:HOME**, you must change directories to the **SYS** volume level in the directory structure.

FILER utility

Access **FILER** (if you have not already done so) and then select the appropriate directory as your current directory using the "Select Current Directory" option.

DOS commands

Use the **CD** command to move around in the directory structure until you are in the appropriate directory.

- 5b.** Create the parent directory in which you want USERDEF to create the home directories. (The USERDEF template parameters refer to this parent directory as the "default directory.")

For example, if you want the parent (or default) directory to be SYS:HOME, create a directory named HOME in the SYS volume.

FILER utility

Create the directory using the "Subdirectory Information" option.

DOS commands

Create the directory with the MD command.

- 5c.** If you are using FILER, the new directories will be listed in the "Subdirectories" list as they are created. To exit FILER, press <Alt> and <F10> simultaneously; then press <Enter>.

If you are using DOS commands and you want to confirm that you have created the parent or default directory, type

```
NDIR * DIR ONLY <Enter>
```

A list of the new directories will appear on the screen.

6. Copy print device definitions for your printer(s).

To copy any of the print device definitions that are included with ELS NetWare Level II, you must log in as SUPERVISOR and complete the following steps.



If you completed the planning modules, you should have decided what printer definitions you need to use on the Printer Worksheet. If you need help, refer to "Whether to use PRINTDEF" on page 131.

If you have a printer that is not included with ELS NetWare, you must either import the definitions from another file server or create them in PRINTDEF. (See "Define print devices" on page 550.)

- 6a.** At the DOS prompt, type

```
PRINTDEF <Enter>
```

The "PRINTDEF Options" menu appears.

- 6b.** Highlight "Print Devices" and press <Enter>. The "Print Device Options" menu will appear.

- 6c.** Highlight "Import Print Device" and press <Enter>.

The "Source Directory" entry box displays your current directory.

- 6d.** If you are not in the SYS:PUBLIC directory, use the Backspace key to erase the current directory name. Then type the new directory name, SYS:PUBLIC, and press <Enter>.

- 6e.** In the "Available .PDFs" list, highlight the .PDF file you want to add to your database and press <Enter>.

If you try to copy a file that has the same name as an existing print device definition, the "New Device Name" entry box will appear, prompting you to rename the new print device definition. Enter the new name and press <Enter>. The new print device definition will be added to the print definition database. You will be returned to the "Print Device Options" menu.

- 6f.** To save the database with the new print device definition, press <Escape> twice.

- 6g.** In the "Exit PrintDef" confirmation box, highlight "Yes" and press <Enter>. Then highlight "Save Data Base, then EXIT" and press <Enter>.

7. Access the PRINTCON utility.

Before running USERDEF, you must create three basic print job configurations for user SUPERVISOR so that the configurations can be copied for new users. This is done using the PRINTCON utility. The three configurations are Reset, Condensed, and Letter Quality.

- 7a.** The PRINTCON utility is in the SYS:PUBLIC directory. You should already have a search drive mapped to SYS:PUBLIC.

If you have a search drive mapped to SYS:PUBLIC, skip to Step 7b.

If you do not, type

```
CD SYS:PUBLIC <Enter>
```

- 7b.** Type

```
PRINTCON <Enter>
```

- 7c.** Highlight:

Available Options
Edit Print Job Configurations
Select Default Print Job Configuration
Supervisor - Copy Print Job Configurations

Then press <Enter>.

8. Create a new print job configuration.

- 8a.** A list of print job configurations will appear.

Print Job Configurations

Press <Insert>.

- 8b.** Type the name of the print job configuration you are creating.

For the "Reset" configuration, type "Reset" in the box.

For the "Condensed" configuration, type "Condensed" in the box.

For the "Letter Quality" configuration, type "Letter" in the box.

Print Job Configurations	
Enter new name :	

Then press <Enter>.

A print job configuration window similar to the following will appear with the configuration's name in the title. For now you will set only the file server, print queue, device (printer), and mode fields.

Edit Print Job Configuration "reset"	
Number of copies: 1	Form name: (None defined)
Suppress form feed: No	Print banner: Yes
File contents: Text	Banner name: SUPERVISOR
Tab size: 8	Banner file:
Local printer: 1	Enable timeout: No
Auto endcap: Yes	Timeout count:
File server: PDTWINKIE	
Print queue: PRINTQ_0	
Device: (None)	
Mode: (None)	

9. Specify the file server that print jobs will be sent to.

- 9a.** If the name of your file server appears in the "File server" field, skip to Step 10.

If your file server name does not appear in the field, highlight:

Edit Print Job Configuration "reset"	
File server:	
Print queue:	PRINTQ_0
Device:	(None)
Mode:	(None)

Then press <Enter>.

- 9b.** Highlight your file server in the list.

Servers
OS
PATAGONIA
PDLC
PDQBACH
PDTWINKIE

Then press <Enter>.

10. Specify the print queue you want the print jobs sent to.

PRINTQ_0 corresponds to the first printer (printer 0), PRINTQ_1 corresponds to printer 1, PRINTQ_2 to printer 2, and so on.

10a. Highlight:

Edit Print Job Configuration "reset"	
File server:	PD_TWINKIE
Print queue:	PRINTQ_0
Device:	(None)
Mode:	(None)

- If the appropriate print queue name appears in the field, skip to Step 11.
- If you need to specify another print queue, press <Enter> and complete Step 10b.

10b. Highlight the queue that corresponds to the appropriate printer.

Queues
PRINTQ_0
PRINTQ_1
PRINTQ-2

Then press <Enter>.

11. Select the type of printer you have from the list of devices.

11a. Highlight:

Edit Print Job Configuration "reset"	
File server:	PDTWINKIE
Print queue:	PRINTQ_0
Device:	(None)
Mode:	(None)

Then press <Enter>.

- 11b. Select the printer assigned to the print queue in the "Print queue" field.

Devices	
	(None)
	Apple Imagewriter II
	Apple Laserwriter I/Plus
	Citizen 120-D
▼	Hewlett Packard Laser Jet I/II

Then press <Enter>.

12. Select the mode that corresponds to the configuration you are creating.

The "Mode" field will automatically be changed to "Re-initialize" when you select the printer.

- 12a. Check to see what other modes are defined for the specified printer.

Highlight:

Edit Print Job Configuration "reset"	
Device:	hplaser
Mode:	(Re-initialize)

Then press <Enter>.

If no modes other than "Re-initialize" appear in the list of modes, your printer will not support other print job configurations.

If your printer does not support any other print job configurations, press <Escape> and skip to Step 13.

If your printer does support other print job configurations ("Condensed" and "Letter Quality"), continue with Step 12b.

- 12b. Follow the instructions for the configuration you are creating.

"Condensed" configuration

Highlight:

Modes
(Re-initialize)
Condensed
Letter Quality

Then press <Enter>.

"Letter Quality" configuration

Highlight:

Modes
(Re-initialize)
Condensed
Letter Quality

Then press <Enter>.

13. Save the new print job configuration.

- 13a. Check the settings you have made (those shown are only examples).

Edit Print Job Configuration "reset"	
File server:	PDTWINKIE
Print queue:	PRINTQ_0
Device:	(hplaser)
Mode:	(Re-initialize)

Then press <Escape>.

13b. Highlight:

Save Changes
No
Yes

Then press <Enter>.

14. Create other print job configurations.

If your printer supports other modes ("Condensed" and "Letter Quality"), repeat Steps 8 through 13 to create configurations for these modes.

15. Set up configurations for additional printers.

If you have more than one printer on your network, repeat Steps 8 through 14 for each additional printer.

Note: Print job configuration names must be unique, which means each name can be used only once. Therefore, as you specify print job configurations for additional printers on your network, make sure each print configuration name is different.

For example, when you specify a condensed mode for a second printer, you could type something like "Condensed 1." Or, if you wanted to incorporate the name of the printer in the mode name, you could type "Condensed HP" for a Hewlett-Packard printer, "Condensed IBM" for an IBM printer, and so on.

16. Exit PRINTCON.

- 16a.** When you are finished creating print job configurations for each printer, press <Alt> <F10>.
- 16b.** Highlight:

Exit Printcon	
No	
Yes	

Then press <Enter>.

- 16c.** Highlight:

Save Print Job Configurations	
No	
Yes	

Then press <Enter>.

You will be returned to the DOS prompt.

If you will run USERDEF using a custom template, skip to "Steps for custom setup using USERDEF" on page 488.

If you will run USERDEF using the default template, continue with the steps on the next page.

Steps for the default setup using USERDEF

1. Access the USERDEF utility.

Type

USERDEF <Enter>

2. Load DOS onto the file server.

You must complete this step the first time you run USERDEF from a workstation using DOS. If you have already run USERDEF and uploaded DOS, skip to Step 3.

2a. Highlight:

```
Load MSDOS V3.30 for IBM_PC on server PDQBACH
|
| No
| Yes
```

Then press <Enter>.

2b. When you see this prompt, insert the indicated diskette into drive A.

```
Load MSDOS V3.30 STARTUP floppy disk for IBM_PC in
floppy drive A: <Press ESCAPE to continue>
```

Then press <Escape>.

Note: If you are uploading DOS v3.30 from 3.5-inch diskettes, the STARTUP and OPERATING files are combined on a single diskette. In this case, just press <Escape> when you are prompted to insert the OPERATING diskette. You do not need to remove the diskette and re-insert it.

- 2c. When you see this prompt, insert the indicated diskette into drive A.

```
Load MSDOS V3.30 OPERATING floppy disk for IBM_PC in
floppy drive A:  <Press ESCAPE to continue>
```

Then press <Escape>.

3. Create users with the default template.

- 3a. Highlight:

Available Options
Add Users
Edit Template

Then press <Enter>.

- 3b. Highlight:

Templates
DEFAULT

Then press <Enter>.

- 3c. A list of users will appear.

Users	
GUEST	
SUPERVISOR	

Press <Insert>.

- 3d. Type in the full name of the user.

Full Name :

Then press <Enter>.

3e. Accept or edit the user's login name.

Login Name : Billy

- To accept the login name, press <Enter>.
- To edit the login name, you can use the following keys:
 - ← or → Move cursor.
 - Backspace Delete character to left of cursor.
 - Delete Delete character to right of cursor.

Then type the new login name and press <Enter>.

3f. Repeat Steps 3c through 3e for each user.

Note: If you make a mistake and need to delete one or more of the usernames you have added to the list, you can delete them as long as they are designated as "(new)" in the right column. Mark the ones you want to delete with the Mark key (<F5> on most keyboards) and then press <Delete>. You cannot delete usernames that have already been created on the file server (usernames not designated as "(new)" in the right column). Existing users can be deleted only with the SYSCON utility.

3g. Review your current list of users.

Users	
BILLY	(new)
GUEST	
SUPERVISOR	

Then press <Escape>.

3h. Highlight:

Create New Users Using Template DEFAULT	
No	
Yes	

Then press <Enter>.

3i. Accept the suggested password for each username less than five characters long.

Suggested 5 character password for user RAY:RAYRAY
--

Press <Enter>.

Note: For all usernames five characters or more in length, the initial password will be the username. Accepting the suggested password for usernames less than five characters long makes it easier to tell your users what their initial password is. This initial password will be used only the first time users log in. At that time, they will set their own passwords.

After the suggested password has been specified for each new user, USERDEF will create the new users. USERDEF formulates a .USR file that can be processed by the MAKEUSER utility. You will be asked to wait while the file is scanned and processed. Any errors encountered during the processing will be indicated on the screen.

When this processing is complete, the "MakeUser Results" screen will appear containing information similar to the following.

3j. Review the screen.

MakeUser Results for Template DEFAULT
User BILLY created
User RAY created
User JUDITH created

Then press <Escape>.

4. Exit USERDEF.

4a. Press <Alt> and <F10> simultaneously.

4b. Highlight:

Exit UserDef	
No	
Yes	

Then press <Enter>.

Steps for the custom setup using USERDEF

1. Access the USERDEF utility.

Type

USERDEF <Enter>

2. Load DOS onto the file server.

This step occurs only the first time you run USERDEF from a workstation using DOS. If you have already run USERDEF and uploaded DOS, skip to Step 3.

2a. Highlight:

Load MSDOS V3.30 for IBM_PC on server PDQBACH	
No	
Yes	

Then press <Enter>.

- 2b. When you see this prompt, insert the indicated diskette into drive A.

```
Load MSDOS V3.30 STARTUP floppy disk for IBM_PC in
floppy drive A: <Press ESCAPE to continue>
```

Then press <Escape>.

Note: If you are uploading DOS v3.30 from 3.5-inch diskettes, the STARTUP and OPERATING files are combined on a single diskette. In this case, just press <Escape> when you are prompted to insert the OPERATING diskette. You do not need to remove the diskette and re-insert it.

- 2c. When you see this prompt, insert the indicated diskette into drive A.

```
Load MSDOS V3.30 OPERATING floppy disk for IBM_PC in
floppy drive A: <Press ESCAPE to continue>
```

Then press <Escape>.

3. Create a custom template.

To create a custom template for creating users, you must edit the templates account parameters, add to the basic login script, or both.



If you completed the planning modules, you should have decided what parameters you need to use on the USERDEF Worksheet. If you need help, refer to the Planning the Network Environment planning module on page 197.

- 3a. Highlight:

```
Available Options
|
| Add Users
| Edit Template
```

Then press <Enter>.

- 3b. A screen similar to the following will appear:

Templates
DEFAULT

Press <Insert>.

- 3c. The following box will appear. Type the name of the template you want to create in the box. The name of the template should indicate the type of users it is intended for. If you were creating a template specifically for clerks, for example, you could name the template "CLERK."

Template :

Then press <Enter>.

4. Edit the parameters for the new template.

- 4a. Highlight:

Template CLERK
Edit Login Script Edit Parameters

Then press <Enter>.

A parameters window for the new template will appear. The listed parameters initially display the same settings as the DEFAULT template.

Parameters for Template CLERK	
Default Directory:	SYS:
Copy PrintCon From:	(see list)
Groups Belonged To:	(see list)
Account Balance:	1000
Limit Account Balance:	No
Low Limit:	
Limit Concurrent Connections:	No
Maximum Connections:	
Require Password:	Yes
Minimum Password Length:	5
Force Periodic Password Changes:	Yes
Days Between Forced Changes:	90
Require Unique Passwords:	Yes
Limit Disk Space:	No
Maximum Disk Space (in KB):	

- 4b. To change the default settings, follow the steps for each option you want to change.

If you do not want to change the default setting for an item in the window, use the Down-arrow key to move to the next item.

Default Directory

The "Default Directory" is the parent directory of the users' home directories. The default setting is the SYS volume. Unless you change the default directory parameter, users' home directories will be created as directories in SYS (SYS:LARRY, SYS:DEANN, and so on).

If you want to create the users' home directories as subdirectories of another directory (such as SYS:HOME), you must have created the parent directory and you must change the default directory parameter. (USERDEF will create home directories only as subdirectories of an existing directory.)

To change the "Default Directory," complete the following steps.

1. Highlight the "Default Directory" field.
2. Type the name of the parent directory in the space following SYS in the highlighted box. Then press <Enter>. Users' home directories will now be created as subdirectories of the new default directory.

Copy PrintCon From

This field allows you to specify where you want to copy the print job configurations from. To copy print job configurations from SUPERVISOR, complete the following steps.

1. Highlight the "Copy PrintCon From" field and press <Enter>. The "PrintCon Users" list will appear.

If you completed Steps 6 through 16 in "Steps to complete before running USERDEF," SUPERVISOR will appear on the list of currently existing PRINTCON users.

2. Highlight "SUPERVISOR" and press <Enter>. PRINTCON users will appear in the list and SUPERVISOR will be highlighted as the user from whom PRINTCON was copied.

Groups Belonged To

This field allows you to specify the groups you want to assign your users to.

1. Highlight the "Groups Belonged To" field and press <Enter>. The "Groups Belonged To" list will appear, containing the system-created group EVERYONE.
2. To view a list of other groups, press <Insert>. The "Groups Not Belonged To" list will appear, displaying the names of the groups.

3. Highlight the group you want to assign new users to and press <Enter>. The group name will now appear in the "Groups Belonged To" list. Press <Escape>.

Repeat Steps 1 through 3 above for every group you want to add users to.

Account Balance

This option appears only if you have installed the "Accounting" option in SYSCON.

As network supervisor, you can assign users account balances to regulate how much of a given service they can use. The balance is lowered each time the user is charged for a service. The default setting for "Account Balance" is 1,000 charges.

1. Highlight the "Account Balance" field.
2. To increase or decrease the amount of the balance, type in the new amount. Then press <Enter>.

Limit Account Balance

The default setting for "Limit Account Balance" is "No" (no limits). Even after the account balance is depleted, users can operate their accounts on unlimited "credit."

1. To limit users' credit, change the setting to "Yes" by typing Y and pressing <Enter>.
2. You must specify how low the account balance can go by setting the "Low Limit" parameter. The default setting is 0. If you want to change the setting, type in a new amount and press <Enter>.

Type a positive number to indicate that the user must always have a balance remaining. For example, 10 indicates that when the user's account drops to 10, the user no longer receives services.

Type a negative number to indicate that a user can still receive services after the account balance has been depleted. For example, -20 indicates that the user can receive services for 20 charges after the user's account balance reaches to zero.

Limit Concurrent Connections

The default setting of the "Limit Concurrent Connections" parameter is no limitations.

1. Highlight the "Limit Concurrent Connections" field.
2. To limit the number of concurrent connections a user can have, type Y for "Yes" and press <Enter>.
3. The maximum number of concurrent connections is 8. If you want to allow fewer connections, type a new number and press <Enter>.

Require Password

The default setting for "Require Password" is "Yes."

If you do not want to require a password, type N for "No" and press <Enter>. Skip to "Limit Disk Space" on the next page.

1. To require passwords to be a certain length, highlight the "Minimum Password Length" field. The default setting requires a password of at least 5 characters.
2. To change the minimum number of characters, type the new minimum number in the field and press <Enter>.

Force Periodic Password Changes

The default setting requires passwords to be changed at fixed intervals.

You can change the setting to "No" by typing N and pressing <Enter>.

If you want users to change their passwords periodically, you can specify the interval. The default setting for the "Days Between Forced Changes" parameter is 90. (When users log in after 90 days, they receive a message that their passwords have expired and that they must enter new passwords.)

1. Highlight the "Days Between Forced Changes" field.
2. To increase or decrease the number of days, type the new number in the response field and press <Enter>.

Require Unique Password

A unique password is one the user has not used before on the file server.

The default setting is "Yes."

If you do not want to require unique passwords, highlight the "Require Unique Passwords" field and type N for "No." Then press <Enter>.

Limit Disk Space

The default setting for the "Limit Disk Space" parameter is "No" (no limits).

1. To limit the amount of file server disk space for each user highlight the "Limit Disk Space" field, type Y for "Yes," and press <Enter>.
2. The "Maximum Disk Space" field will be highlighted. The amount shown initially is the total disk space given in kilobytes (KB).

To limit the amount of disk space users can use, type the maximum disk space you want for each user. Do not allocate more disk space than is available; the total number of users created with the template multiplied by the amount of disk space per user should be less than the total available disk space. The minimum disk space you can specify is 4KB. Any number of kilobytes you enter will be rounded to the nearest multiple of four.

Exit the parameters window

When you have finished specifying all the parameters of your custom template, press <Escape>. The "Save Changes" confirmation box will appear. Press <Enter> to confirm your custom settings. You will be returned to the options menu for the new template.

5. Edit the basic login script.

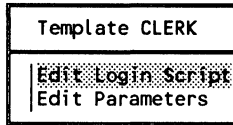
The basic login script in the DEFAULT template is intended as a starting point. Do not change the drive mappings and comspec command contained in the basic login script. They are needed to give users access to their home directories, the DOS directories, and the commands and utilities in SYS:PUBLIC.

You can, however, add additional mappings. In particular, you should add a search drive mapping to each application subdirectory you created in Step 4 on page 471.

For a list of other login script commands and explanations of what they do and how to use them, see "Login script commands" on page 212.

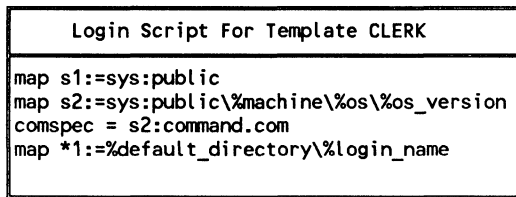
To edit the basic login script, complete the following steps.

5a. Highlight:



Then press <Enter>.

A window will appear displaying the login script that will be assigned to all users created with the DEFAULT template.



5b. Add a search drive mapping to each application subdirectory you created.

For example, if you created SYS:PUBLIC/WP for a word processing application, type (on the line following the last search drive mapping)

```
MAP INS S3: =SYS:PUBLIC/WP
```

Remember, do not use the same search drive number for more than one subdirectory.

5c. Select and enter any additional commands appropriate to your situation. Then press <Escape>.

5d. The "Save Changes" confirmation box will appear. Press <Enter> to confirm the additions you have made to the login script. You will be returned to the options menu for the new template.

- 5e. When you have completed your custom template, press <Escape>. The "Save Changes to Template" confirmation box will appear. Press <Enter> to confirm your custom parameter settings and any login script additions.
- 5f. Press <Escape> until you return to the "Available Options" menu.

6. Create users with the custom template.

- 6a. Highlight:

Available Options	
Add Users	
Edit Template	

Then press <Enter>.

- 6b. Highlight the custom template you created.

Templates	
CLERK	
DEFAULT	

Then press <Enter>.

- 6c. A list of users will appear.

Users	
GUEST	
SUPERVISOR	

Press <Insert>.

- 6d. Type in the full name of the user.

Full Name :	
-------------	--

Then press <Enter>.

6e. Accept or edit the user's login name.

Login Name : Billy

- To accept the login name, press <Enter>.
- To edit the login name, use the following keys.

←	or	→	Move cursor.
Backspace			Delete character to left of cursor.
Delete			Delete character to right of cursor.

Then type the new login name and press <Enter>.

6f. Repeat Steps 6c through 6e for each user.

Note: If you make a mistake and need to delete one or more of the usernames you have added to the list, you can delete them as long as they are designated as "(new)" in the right column. Mark the ones you want to delete with the Mark key (<F5> on most keyboards). Then press <Delete>. You cannot delete usernames that have already been created on the file server (usernames not designated as "(new)" in the right column). Existing users can be deleted only with the SYSCON utility.

6g. Review your current list of users.

Users	
BILLY	(new)
GUEST	
SUPERVISOR	

Then press <Escape>.

6h. Highlight:

Create New Users Using Template CLERK
No
Yes

Then press <Enter>.

- 6i. Accept the suggested password for each username less than five characters long.

Suggested 5 character password for user RAY:RAYRAY
--

Press <Enter>.

Note: For all usernames five characters or more in length, the initial password will be the username. Accepting the suggested password for usernames less than five characters long makes it easier to tell your users what their initial password is. This initial password will be used only the first time users log in. At that time, they will set their own passwords.

After the suggested password has been specified for each new user, USERDEF will create the new users. USERDEF creates a .USR file that can be processed by the MAKEUSER utility. You will be asked to wait while the file is scanned and processed. Any errors encountered during the processing will be indicated on the screen.

When this processing is complete, the "MakeUser Results" screen will appear, containing information similar to the following.

- 6j. Review the screen.

MakeUser Results for Template DEFAULT
User BILLY created User RAY created User JUDITH created

Then press <Escape>.

7. Exit USERDEF.

7a. Press <Alt> <F10>.

7b. Highlight:

Exit UserDef	
	No
	Yes

Then press <Enter>.

Where to go from here

USERDEF has provided your new users with a simple login script and set them up with a home directory, minimal login/password security, account restrictions, and print job configurations.

You must now create the rest of your directory structure, assign directory and trustee rights, and load your application files onto the network. These tasks are explained in the next section.

Notes

SYSCON/FILER

SYSCON and FILER method of setting up the network

This section provides instructions for setting up your network using the SYSCON and FILER utilities.

If you choose to set up your network with USERDEF, you can make many refinements to your system using the information in this section.

You will use many of the worksheets you prepared during your planning and installation.

We suggest you set up your network environment in the following order, using the SYSCON and FILER utilities.

- Create your network directory structure and assign directory rights (see page 504).
- Load application and data files into the appropriate directories (see page 509).
- Create your DOS directories and load the appropriate DOS files into them (see page 511).
- Create groups and assign group trustee rights (see page 514).
- Install the accounting option and set up charge rates (see page 519).
- Create users and assign trustee rights, account restrictions, and login/password restrictions (see page 524).
- Create system and individual login scripts (see page 532).

Create your directory structure

Step by step instructions for creating a directory and modifying its maximum rights mask using FILER follow. (For more information on using the FILER menu utility, see the *Reference for ELS NetWare Level II.*)



If you completed the planning modules, you should have recorded the directories you need to create on the Directories Worksheet. If you did not use the modules and you need help determining what directories you need, refer to the Directory Structure planning module on page 155:

1. Log in to the file server as SUPERVISOR.

If you have not already done so, log in to the file server as SUPERVISOR. (See "Logging in as SUPERVISOR" on page 460 if you are not sure how to log in.)

2. Access the FILER utility.

To access the FILER utility from the DOS prompt, type

```
FILER <Enter>
```

The "Available Topics" menu will appear. The current directory path will be indicated at the top of the screen.

3. Change to the directory in which you want to create the new subdirectory.

When you create a subdirectory, the current directory path displayed at the top of the screen should include the volume or directory in which you want to create a subdirectory.

- 3a.** To change your current directory, highlight:

Available Topics
Current Directory Information
File Information
Select Current Directory
Set Filer Options
Subdirectory Information
Volume Information

Then press <Enter>.

- 3b.** A "Current Directory Path" entry box similar to the following will appear.

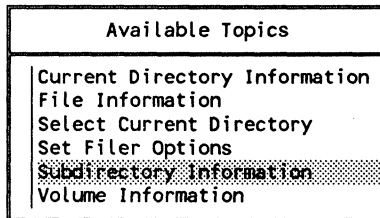
Current Directory Path
PDLC/SYS:PUBLIC

- If you know the complete path of the directory you want to create subdirectories in, use the Backspace key to delete as much of the displayed path as you need to. Then type in the path you want and skip to Step 3f.
 - If you do not know the complete path or if you are unsure of the conventions for specifying a directory path, you can specify the directory path one level at a time by completing Steps 3c through 3e.
- 3c.** Press <Insert>. A list of the volumes or directories will appear under the appropriate heading. If no names appear on the list, no directories have been created at that level.
- 3d.** Move up or down in the directory structure to get to the directory you want.
- To move up a level in the directory structure, highlight the two periods and press <Enter>.
 - To move down a level in the directory structure, highlight the appropriate item from the list and press <Enter>.
- The current directory path displayed at the top of the screen will reflect your selections.

- 3e. When the appropriate directory path appears in the box, press <Escape> to return to the "Current Directory Path" box.
- 3f. Press <Enter> to return to the "Available Topics" menu.

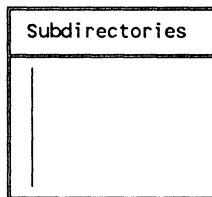
4. Create the new subdirectory.

- 4a. Highlight:



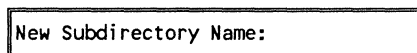
Then press <Enter>.

- 4b. A list of the subdirectories in the current directory will appear in a format similar to the following. (If no names appear in the list, no directories have been created at that level.)



Press <Insert>.

- 4c. Type the name of the new subdirectory.



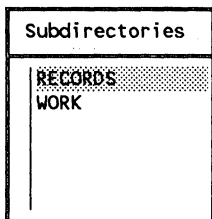
Then press <Enter>.

The name of the new subdirectory will now appear in the list of subdirectories.

5. Assign directory security for the new subdirectory.

To restrict the rights of all users in the subdirectory you just created, you must revoke one or more of the rights in the maximum rights mask for that subdirectory.

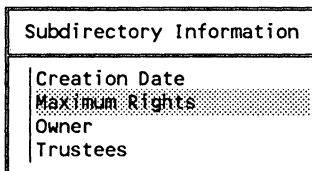
- 5a.** Highlight the name of the subdirectory you want to restrict rights in.



Then press <Enter>.

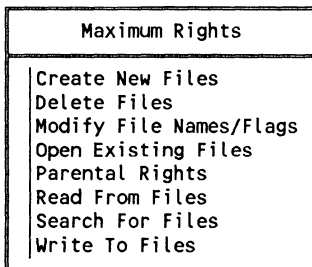
The "Subdirectory Information" menu will appear.

- 5b.** Highlight:



Then press <Enter>.

- 5c.** A list of the eight rights will appear in a format similar to the following.



- If you want to revoke only one right, highlight that right and press <Delete>. The name of the right will appear in boldface, and a "Revoke Right" confirmation box will appear.
 - If you want to revoke several rights at once, mark them with the Mark key (<F5> on most machines) and press <Delete>. (To find the Mark key for your keyboard, press <F1> or <Help> twice.) The names of all marked rights will be bolded, and a "Revoke Right" confirmation box will appear.
- 5d.** Highlight "Yes" in the "Revoke Right" confirmation box and press <Enter>.
- 5e.** Press <Escape> until you return to the "Available Topics" menu.

Repeat Steps 3 through 5 until you have created your directory structure and directory security.

6. Exit the FILER utility.

To exit FILER, press <Alt> and <F10> simultaneously; then press <Enter>.

Load application and data files onto the network

Now that you have created your directory structure, you must load the application and data files you plan to use (such as word processing programs, spreadsheet programs, project files, and databases) into the appropriate directories. You may also want to set up file attributes security in some or all of the application directories.

1. Load your application program files.

Load all third-party applications (such as word processing, spreadsheet, and database) into the directories you created for them.

- 1a. First, refer to the documentation for each application.
 - If the third-party documentation includes instructions for loading the application on a network, follow those instructions. Then skip to Step 2.
 - If the documentation does not contain instructions for loading the application on a network, you can try the instructions for loading the application on a local hard disk. (Some hard disk load commands don't work on network drives. If this is the case, consult the dealer who sold you the application.)
- 1b. To use the local hard disk instructions, you must first map the drive letter that normally corresponds to a local hard disk (C in most cases) to the directory you have created for the application.

For example, suppose you created a directory for an application in SYS:PUBLIC. If the third-party documentation instructs you to copy the files to C, you would first type the following command at the DOS prompt:

```
MAP C: = SYS:PUBLIC\directory <Enter>
```

- 1c.** The following message will appear:

```
Drive C: currently maps to a local disk.  
Do you want to assign it as a network drive? (Y/N) Y
```

Press <Enter> to confirm.

- 1d.** To load the application files, either follow the instructions for installing files on a hard disk, or insert each third-party diskette into drive A and type

```
COPY A:*.* C: <Enter>
```

Remove the diskette containing the application files and insert the next diskette. Then type the above COPY command again. Repeat this step until all third-party application files have been loaded.

2. Flag the application program files Read-Only.

Use the NetWare FLAG command or the FILER menu utility to change the file attributes of application files to Read-Only. (The default file attribute is Nonshareable/Read-Write.) This will prevent users from corrupting the program files (.EXE or .COM files).

For example, to flag the program files with the FLAG command, you would type

```
FLAG *.* RO <Enter>
```

3. Copy any necessary files onto the workstation boot diskettes.

Check the third-party documentation to see if the application modifies or creates a CONFIG.SYS or AUTOEXEC.BAT file. If this is the case, be sure you put those files on each user's boot diskette.

4. Copy data files into the directories you created for them.

Do not place data files in the SYS:PUBLIC directory—only application files.

Data files that only one user needs access to should be kept in that user's home directory.

Data files that several users need access to should be placed in a separate shared directory. All users or groups that work with these data files should be assigned appropriate trustee rights in the shared directory.

Create DOS directories

Most IBM PC-type workstations on your network run DOS. As users work on the network, they will probably use both DOS commands and the NetWare utilities.

If you create network DOS directories and load the DOS files onto the file server, users can access the DOS commands from the network (in much the same way as they access the NetWare utilities) without having to insert a DOS diskette into their workstation.

Note: As you create DOS directories and copy the DOS files onto the network, make sure you comply with all copyright laws. Each workstation must boot with its own licensed copy of DOS.

We recommend you use only one version of DOS. That way you will need only one DOS directory on the file server.



If you completed the planning modules, you should have recorded the DOS directories you will need on the Directories Worksheet. If you did not use the modules and need help determining how many DOS directories to create, refer to "Where to create DOS directories" on page 163.

1. Create the DOS directories.

- 1a.** If you haven't already done so, log in to the file server as SUPERVISOR. (Refer to "Logging in as SUPERVISOR" on page 460 if you are not sure how to log in.)

You can create all the DOS directories and load all the DOS files from one workstation.

- 1b.** Change the current directory to SYS:PUBLIC.
- 1c.** Create one of the DOS directories you will need, using the DOS MD and CD commands. Be sure to name the directory according to the following convention.

SYS:PUBLIC/*machine*/MSDOS/*version*

Replace *machine* with the six-letter long machine name of the workstation (such as IBM_PC or COMPAQ) and *version* with the DOS version number (such as V3.30 or V2.10).

For example, to create the DOS directory for an IBM PC workstation running DOS v3.20, you would begin by typing

```
MD IBM_PC <Enter>
```

Move to the new directory by typing

```
CD IBM_PC <Enter>
```

To create the subdirectory MSDOS in the IBM_PC directory, you would type

```
MD MS_DOS <Enter>
```

To move to the new MS_DOS subdirectory, type

```
CD MS_DOS <Enter>
```

To create the last subdirectory, type

```
MD V3.20 <Enter>
```

2. Load the appropriate DOS files into the new DOS directory

Copy the files from the DOS diskettes, using the NCOPY command.

For example, to load the DOS files for the DOS directory SYS:PUBLIC/IBM_PC/MSDOS/V3.20, insert your original copy of the DOS v3.20 diskette into drive A and type

```
NCOPY A:*.* SYS:PUBLIC\IBM_PC\MSDOS\V3.20 <Enter>
```

The names of the DOS files will appear on the screen as they are copied.

If there is a second DOS 3.20 diskette, insert it into drive A and retype the above command.

3. Flag all the DOS files in the new directory Shareable/Read-Only.

You must flag all of the DOS files Shareable/Read-Only (SRO) to prevent users from corrupting the command files.

3a. Make sure the new DOS directory is your current directory. (If you flag your DOS files immediately after loading them, the DOS directory will be your current directory.)

3b. Use the FLAG command to flag the files Shareable/Read-Only (SRO).

For example, to flag the DOS files for the DOS directory SYS:PUBLIC/IBM_PC/MS_DOS/V3.20 after loading them, you would type

```
FLAG *.* SRO <Enter>
```

3c. Move to the SYS:PUBLIC level by typing

```
CD.... <Enter>
```

3d. Repeat Steps 1 through 3 for each DOS directory you need to create on the file server, each time substituting the appropriate long machine name and DOS version.

Create groups

Step by step instructions for creating a group and assigning group trustee rights using SYSCON follow. (For more information on using the SYSCON menu utility, see the *Reference for ELS NetWare Level II.*)

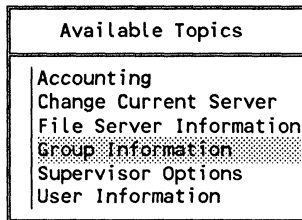


If you completed the planning modules, you should have recorded the groups you need to create on the Users and Groups Worksheet. If you did not use the modules and need help determining what groups you need, refer to "Which users and groups to create" on page 176.

Users can be added to the group after the group is created.

1. Create a group in SYSCON.

- 1a. If you have not already done so, log in to the file server as SUPERVISOR.
- 1b. Access the SYSCON utility by typing
SYSCON <Enter>
- 1c. Highlight:



Then press <Enter>.

- 1d. A list of existing groups will appear.

Group Names
EVERYONE

Press <Insert>.

- 1e. Type the name of the group.

New Group Name:

Then press <Enter>.

2. Assign a full name to the group.

You can assign a full name that will help you identify the group more precisely. If you do not want to identify the group with a full name, skip to Step 3.

- 2a. Highlight the group you just created.

Group Names
CLERKS
EDITORS
EVERYONE
NEW
RICHES
SOOPS
TESTERS
WRITERS

Then press <Enter>.

2b. Highlight:

Group Information
Full Name
Member List
Other Information
Trustee Assignments

Then press <Enter>.

2c. Type the full name of the group.

Full Name:

Then press <Enter>.

You will be returned to the "Group Information" menu.

3. Assign trustee rights to the new group.



If you completed the planning modules, you should have recorded the trustee rights you need to assign to groups on the Trustee Security Worksheet. If you did not use the modules and you need help determining what trustee rights to assign, refer to "What trustee security to implement" on page 186.

3a. To assign the group trustee rights to a particular directory, highlight:

Group Information
Full Name
Member List
Other Information
Trustee Assignments

Then press <Enter>.

3b. The "Trustee Assignments" window will appear. Press <Insert>.

3c. The following entry box will appear.

Directory In Which Trustee Should Be Added

- If you know the complete directory path, type the name of the directory in which you want the group to have trustee rights. (You must type the complete directory path.) Then press <Enter>.
- If you are not sure of the directory path, press <Insert> and follow the prompts as you select volume, directory, and subdirectory. When the desired directory path appears in the box, press <Escape> and then <Enter>.

3d. Only Read, Open, and Search rights in the directory are granted to the group initially.

- If these rights are satisfactory, skip to Step 3h.
- If you want to add additional rights, press <Enter> and continue with Step 3e.

3e. The trustee rights currently assigned in the directory are displayed.

Trustee Rights Granted
Open Existing Files Read From Files Search For Files

Press <Insert>.

- 3f.** The list of trustee rights not granted will appear.

Trustee Rights Not Granted
Create New Files Delete Files Modify File Names/Flags Parental Rights Write To Files

- To add a trustee right, highlight the trustee right and press <Enter>.
 - To add more than one trustee right at once, mark the rights you want to add using the Mark key (<F5> on most machines). Then press <Enter>.
- 3g.** You will be returned to the "Trustee Rights Granted" window. Press <Escape>.
- 3h.** Repeat Steps 3a through 3g for each directory in which you want to assign trustee rights. Then press <Escape> until you return to the "Group Names" menu.
- 3i.** Repeat Step 3 for each group you need to create. (Users can be added to your groups later.) Then press <Escape> to return to the "Available Topics" menu.

Install the accounting option

Accounting is optional. If you install accounting, you can choose which accounting functions are suitable for your network environment. If you do not choose to charge for any services, the file server will still make a record of logins and logouts.



If you completed the planning modules, you should have recorded the accounting options you need to set up on the Accounting Worksheet. If you did not use the modules and need help determining how to set up accounting, refer to the Accounting Option planning module on page 283.

1. Install the accounting option in SYSCON.

1a. Highlight:

Available Topics
Accounting
Change Current Server
File Server Information
Group Information
Supervisor Options
User Information

Then press <Enter>.

The first time you select "Accounting," the "Install Accounting" confirmation box will appear.

1b. Highlight:

Install Accounting
No
Yes

Then press <Enter>.

2. Establish charge rates for the services you want the file server to charge for.

2a. Highlight the option you want to set charge rates for.

Accounting
Accounting Servers
Blocks Read Charge Rates
Blocks Written Charge Rates
Connect Time Charge Rates
Disk Storage Charge Rates
Service Requests Charge Rates

Then press <Enter>.

2b. A charge rates screen will appear. You must highlight the block of time you want to set the charge rates for. (The default setting is no charge for any time period. The number 1 indicates no charge rate.)

Note: Disk storage charge rates are assigned differently from other charge rates. You must specify when you want the system to charge for the disk space being used (for example, at 2:00 a.m. each day).

Use the arrow keys to move the cursor to the beginning of the block of time you want to assign a particular charge rate to. Then press the Mark key (<F5> on most machines).

2c. Move the cursor to the end of the block of time and press <Enter>.

If you are setting disk storage charge rates, skip to Step 2e.

2d. Highlight:

Select Charge Rate
1 No Charge
Other Charge Rate

Then press <Enter>.

- 2e. Enter the multiplier and divisor you want for this charge rate.

New Charge Rate	
Multiplier	1
Divisor	1

Then press <Escape> three times.

- 2f. Repeat Step 2 for each service you want to establish charge rates for. Then press <Escape> until you return to the "Available Topics" menu.

3. Set up default account balances and restrictions.

Follow these instructions to set up a default account balance which will automatically be assigned to each new user created after the parameters are set.

If you want to assign different account balances and restrictions to each individual user, skip to "Create users" on page 524.

- 3a. Highlight:

Available Topics
Accounting
Change Current Server
File Server Information
Group Information
Supervisor Options
User Information

Then press <Enter>.

3b. Highlight:

Supervisor Options
Default Account Balance/Restrictions
Default Time Restrictions
Edit System AUTOEXEC File
File Server Console Operators
Intruder Detection/Lockout
System Login Script
View File Server Error Log

Then press <Enter>.

3c. The default account balance and restrictions for SYSCON will appear.

Default Account Balance/Restrictions	
Account Has Expiration Date:	Yes
Date Account Expires:	May 1, 1989
Limit Concurrent Connections:	No
Maximum Connections:	
Require Password:	No
Minimum Password Length:	
Force Periodic Password Changes:	
Days Between Forced Changes:	
Limit Grace Logins:	
Grace Logins Allowed:	
Require Unique Passwords:	
Account Balance:	0
Allow Unlimited Credit:	No
Low Balance Limit:	

The fields that deal with the accounting option are explained below.



If you completed the planning modules, you should have recorded the system default account balance settings you want on the Accounting Worksheet. If you did not use the modules and need help determining how to set the account balance, refer to "How to assign account balances in SYSCON" on page 290.

Account Balance

The account balance is assigned in charges, and the default setting is 0 (zero). This balance is lowered each time the user is charged for a service.

To set the account balance, highlight the "Account Balance" field. Type in the account balance you want users to have when their accounts are created and press <Enter>.

Allow Unlimited Credit

You have the option of allowing credit. If you do not want to allow credit, leave the default response at "No" and the default response to the "Low Balance Limit" at 0. Then skip to Step 3d.

If you want to allow unlimited credit, highlight the "Allow Unlimited Credit" field. Change the response to "Yes" by typing Y and pressing <Enter>. Then skip to Step 3d.

If you want to allow limited credit, leave the "Allow Unlimited Credit" response at "No" and set the "Low Balance Limit" as explained below.

Low Balance Limit

To set a low balance limit for limited credit, highlight the "Low Balance Limit" field. The default setting is 0, which means that when a user's account balance reaches 0, the user will no longer receive services.

If you want to change the setting, type in the low balance limit you want and press <Enter>.

- A positive number indicates that the user must always have a balance remaining. For example, 10 indicates that when the user's account drops to 10, the user will no longer receive services.
- A negative number indicates that a user can still receive services after the account balance has been depleted. For example, -20 indicates that the user can receive services for 20 charges after the user's account balance has reached zero.

3d. Press <Escape> twice to return to the "Available Topics" menu.

Create users

You can use the SYSCON utility to create the users and assign them individual account restrictions, login/password security, and trustee rights. (Trustee rights can also be assigned at the command line with the GRANT command.)

If you used USERDEF to create your users, you can use SYSCON to modify the user accounts you set up and to delete existing users.

Account restrictions, station restrictions, and time restrictions are optional. You can restrict users by changing the system default restrictions (account and time restrictions only) or by assigning restrictions to individual users as you create them.



If you completed the planning modules, you should have recorded the users you want to create and the system login and password restrictions you want on the Users and Groups Worksheet. If you did not use the modules and need help with these restrictions, see the Network Security planning module on page 179.

1. Set up the system default restrictions.

The system default restrictions are assigned to all users as they are created. But the default restrictions are set up initially so that no password or time restrictions apply. Unless you change the default restrictions, users will have no password or time restrictions. You cannot set up default station restrictions. These must be established on an individual basis.

Use the "Supervisor Options" in SYSCON to change the default restrictions. Changes to the system defaults will affect only user accounts that are created after the changes are made. Changes will not affect any existing user accounts.

- If you have installed the accounting feature, you should have already set the default account balance as explained in Step 2.
- The concurrent connection limit, the disk space limit, and the password restrictions are set by choosing "Default Account Balance/Restrictions" in the "Supervisor Options" menu.
- Time restrictions are set by choosing "Default Time Restrictions" in the "Supervisor Options" menu.
- The intruder detection feature is set by choosing "Intruder Detection/Lockout" in the "Supervisor Options" menu.

For exact instructions on setting these restrictions, refer to SYSCON in the *Reference for ELS NetWare Level II*.

2. Create users with SYSCON.

- 2a. If you are not already in the SYSCON utility, type
SYSCON <Enter>
- 2b. Highlight:

Available Topics
Accounting
Change Current Server
File Server Information
Group Information
Supervisor Options
User Information

Then press <Enter>.

- 2c. A "User Names" list similar to the following will appear.

User Names
AUBREY
CRAIG
GAMAL
GUEST
HAWKSLEY
JAN
JANENE
JUDY
KEN
LARRY

Press <Insert>.

- 2d. Type the user name (generally the first name of the new user).

User Name:

Then press <Enter>.

The new user name will appear in the "User Name" window.

- 2e. Repeat Steps 2c and 2d for each additional user you need to create.

3. Assign login/password, station, and time restrictions to each user.

If you set system default restrictions in Step 2, you need to set only the other options and restrictions for which no system default applies.

- 3a. Highlight the new user name in the "User Names" list. Then press <Enter>.

A "User Information" menu will appear.

User Information
Account Balance
Account Restrictions
Change Password
Full Name
Groups Belonged To
Intruder Lockout Status
Login Script
Other Information
Security Equivalences
Station Restrictions
Time Restrictions
Trustee Assignments

- 3b. The options in the "User Information" menu are explained briefly on the following pages. Highlight each appropriate option and type in the correct information as necessary. Refer to your worksheets to make the settings you planned.

If you changed the system default account and time restrictions or if you installed the accounting option and assigned a default account balance, you do not need to respecify the restrictions for each individual user.

Account Balance

Assign the user an account balance to determine the amount of network services and resources the user is allowed to use. (This option appears only if accounting is installed.)

Account Restrictions

Assign password and login restrictions for each user (optional).

Change Password

Assign the user an initial password or change the currently assigned password (if any).

Full Name

Record the user's full name.

Groups Belonged To

Assign the user to appropriate groups. (Check your Users and Groups Worksheet.)

Intruder Lockout Status

This option is not used when you first create a user. You can use it later to view a record of any unauthorized attempts to log in using this user account. (This record appears only if Intruder Detection and Lockout is activated.) No input is necessary.

Login Script

Create a login script for the user, or copy an existing user's login script to the user you are creating. (Instructions for creating individual user login scripts are under "Create system and individual login scripts" on page 532.)

Other Information

This option is not used when you first create a user. You can use it later to view the user's date and time of last login, disk space in use, user ID number, and whether the user has been designated as a console operator. No input is necessary.

Security Equivalences

Assign the user any appropriate security equivalences.
(Check your Trustee Security Worksheet.)

Station Restrictions

Specify the workstations a user can log in from (optional). You will need to know the network and node addresses of each workstation. A list of these addresses can be found on the Network Boards Worksheet or by typing "USERLIST/A" at the DOS prompt. (USERLIST will list only the connections of those workstations that are logged in to the network.)

Time Restrictions

Limit the times during which a user can log in (optional). Exact instructions for restricting login times are in the *Reference for ELS NetWare Level II*.

Trustee Assignments

Assign a user as a trustee of the appropriate directories. Check your Trustee Security Worksheet to see which directories each user needs rights to.

Note: You can assign the same account restrictions, station restrictions, and time restrictions to several users at once with SYSCON. Highlight "User Information" in the "Available Topics" menu and press <Enter>. The "User Names" list will appear. Use the Mark key (<F5> on most machines) to mark the names of the users you want to assign the same restrictions to. Then press <Enter>. Highlight the restrictions you want to assign in the "Set User Information" menu that appears.

- 3c.** When you are finished specifying the user information, press <Escape> to return to the "User Names" list.

4. Create a user's home directory.

Follow these instructions to create a home directory for each user and assign all trustee rights in that directory, if you haven't already done so.

- 4a. Highlight the user in the "User Names" list and press <Enter>.
- 4b. Highlight:

User Information
Account Balance
Account Restrictions
Change Password
Full Name
Groups Belonged To
Intruder Lockout Status
Login Script
Other Information
Security Equivalences
Station Restrictions
Time Restrictions
Trustee Assignments

Then press <Enter>.

- 4c. The "Trustee Assignments" window will appear. Press <Insert>.
- 4d. Type the complete path name of the home directory.

Directory In Which Trustee Should Be Added

Then press <Enter>.

For example, if you wanted to create the user's home directory in SYS:HOME, you would type

SYS:HOME/*username* <Enter>

- 4e. Highlight:

Verify Creation Of New Directory	
No	
Yes	

Then press <Enter>.

- 4f. Only Read, Open, and Search rights in the directory are granted initially. To add additional rights, highlight the new directory and press <Enter>.
- 4g. The trustee rights currently assigned in the directory are displayed.

Trustee Rights Granted
Open Existing Files Read From Files Search For Files

Press <Insert>.

- 4h. Mark all of the remaining rights using the Mark key (<F5> on most machines).

Trustee Rights Not Granted
Create New Files Delete Files Modify File Names/Flags Parental Rights Write To Files

Then press <Enter>.

- 4i. You will be returned to the "Trustee Rights Granted" window. Press <Escape> three times.
- 4j. If you have more home directories to create, repeat Steps 4a through 4i for each user.

If you are finished creating home directories for all your users, press <Escape> until you see the "Available Topics" menu. Then continue with "Create system and individual login scripts."

Create system and individual login scripts

A login script is a set of instructions that directs your computer to perform specific actions when you log in to the network. As network supervisor, you can create a system-wide login script that instructs all workstations to perform the same actions when users log in.

An individual user's login script executes after the system login script and specifies the user's individual drive mappings. You can create a basic login script for each user. Users can change their own login scripts later, if necessary.



If you completed the planning modules, you should have recorded the commands you want in your login scripts on the Login Script Worksheet. If you did not use the modules and need help determining what to put in your login scripts, refer to the Planning Login Scripts planning module on page 205.

1. Create the system login script.

The system login script allows you to set network drive mappings and search drive mappings for all network users.

The drive mappings in the system login script should give network users access to files in these directories.

- The SYS:PUBLIC directory
- The appropriate DOS directory
- Any application directories
- Their home directory

1a. Access the SYSCON utility by typing

SYSCON <Enter>

1b. Highlight:

Available Topics
Accounting
Change Current Server
File Server Information
Group Information
Supervisor Options
User Information

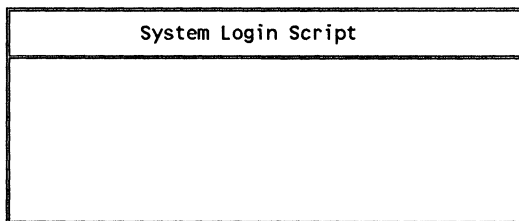
Then press <Enter>.

1c. Highlight:

Supervisor Options
Default Account Balance/Restrictions
Default Time Restrictions
Edit System AUTOEXEC File
File Server Console Operators
Intruder Detection/Lockout
System Login Script
View File Server Error Log

Then press <Enter>.

- 1d.** An empty "System Login Script" window will appear.



In this window, you will type the login script commands you want to include in your system login script.

- 1e.** Type the NetWare utilities mapping and the DOS directory mapping.

For example, you would type

```
MAP INS S1: =SYS:PUBLIC
MAP INS S2: =
        SYS:PUBLIC/%MACHINE/%OS/%OS_VERSION
COMSPEC =S2:COMMAND.COM
```

The first command enables all users to access the NetWare utilities in SYS:PUBLIC.

The second command enables all users to access the DOS files in the appropriate DOS directory.

The third command ensures that the COMMAND.COM file will reload properly into each workstation when users exit an application.

- 1f.** If all users will be using the same applications, you can include search drive mappings to the application directories in the system login script.

For example, if you created a directory SYS:PUBLIC/WP for your word processing application, you can set up a search drive mapping to that directory by typing

```
MAP INS S3: =SYS:PUBLIC/WP <Enter>
```

Note: Users can create personal search drive mappings using search drives not used by the system login script.

If users include the search drive numbers mapped in the system login script (S1, S2, S3, and so on) in their personal login scripts, the search drive mappings in the system login script will be overwritten.

- 1g.** You can also map a drive to each user's home directory in the system login script.

For example, if your home directories are in SYS:HOME and the home directory name is the same as the username, you would type

```
IF LOGIN_NAME != "Supervisor" THEN
  MAP*1:=SYS:HOME/%LOGIN_
```

This command will map the first network drive to each user's home directory.

- 1h.** Another useful command for the system login script is

```
IF MEMBER OF "groupname" THEN
```

With this command, you can set up mappings based on the groups you have created. The drive mapping you put after this command will apply only to users who are members of the specified group.

For example, if you created a group named WRITERS, you could map drives in the system login script to the directories containing articles and current projects used by the members of the group WRITERS.

The system login script could include commands similar to the following (the drive mapping commands are enclosed by the BEGIN and END login script commands).

```
IF MEMBER OF "WRITERS" THEN BEGIN
  MAP *2:=SYS:ARTICLES
  MAP *3:=SYS:PROJECTS
END
```


If you have planned your groups efficiently, commands such as these allow you to customize login scripts for different groups without having to create a login script for each user.

- 1i. Type any other commands that would be useful in the system login script.

For example, the following command sets the DOS prompt to display the current drive letter and directory path so users can see where they are in the directory structure.

```
SET PROMPT = "$P$G"
```

For more information about login script commands, see the Planning Login Scripts planning module on page 205.

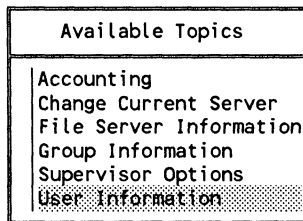
- 1j. When you finish entering the commands into the system login script, press <Escape> and then <Enter>.
- 1k. Press <Escape> again to return to the SYSCON "Available Topics" menu.

You are now ready to create individual users' login scripts to include any drive mappings not provided by the system login script.

2. Create individual users' login scripts.

Follow these instructions to create individual users' login scripts. Refer to your Login Script Worksheet for the commands you plan to put in each login script.

- 2a. Highlight:



Then press <Enter>.

- 2b.** The "User Names" list will appear. To access an individual login script, highlight the username and press <Enter>.
- 2c.** Highlight:

User Information
Account Balance
Account Restrictions
Change Password
Full Name
Groups Belonged To
Intruder Lockout Status
Login Script
Other Information
Security Equivalences
Station Restrictions
Time Restrictions
Trustee Assignments

Then press <Enter>.

- 2d.** If a login script has not been created for the user, the "Login Script Does Not Exist" box will appear.

To simplify creating individual login scripts, you can copy a login script from one user to another and then modify it as necessary. If you want to copy a login script from another user, skip to Step 4 on page 539 under "Copy an existing login script."

If you do not want to copy a login script from another user, press <Enter>.

- 2e.** Enter any drive mappings and other login script commands you want for the user (in addition to those provided in the system login script).
- 2f.** When you have finished entering the commands, press <Escape> and then <Enter>. Press <Escape> again to return to the "User Names" list.
- 2g.** Repeat Steps 2b through 2f to create a login script for each user. To exit SYSCON, press <Alt> and <F10> simultaneously; then press <Enter>.

Copy login scripts from one user to another

You can copy one user's login script to another user in either of two ways. The first way allows you to copy an existing login script to a user who does not have one. The second way allows you to copy selected portions of a login script to a user who already has a login script.

Copy an existing login script

Follow these instructions to copy an existing login script to a user who does not have one.

1. Highlight "User Information" in the SYSCON "Available Topics" menu and press <Enter>. The "User Names" list will appear.
2. Highlight the user you want to create a login script for and press <Enter>. The "User Information" menu will appear.
3. Highlight "Login Script" and press <Enter>. Until a login script has been created for the user, a "Login Script Does Not Exist" entry box will appear.
4. To copy a login script from another user, use the <Backspace> key to delete the current username. Then type in the name of the user whose login script you want to copy and press <Enter>. The "Login Script" box will appear on the screen.
5. Make any modifications to the login script by adding, deleting, or editing existing lines as necessary.
6. Press <Escape> and then <Enter> to save the user's login script. Press <Escape> to return to the "User Names" list.

Copy portions of a login script

Follow these instructions to copy selected portions of a login script to a user who already has a login script.

1. In the "User Names" list, highlight the name of the user whose login script you want to copy and press <Enter>. The "User Information" menu will appear.
2. Highlight "Login Script" and press <Enter>. The "Login Script" box will appear.
3. Highlight the portion of the login script you want to copy by using the Mark key (<F5> on most machines) and the arrow keys.

To place the marked portion of the login script into a temporary buffer in memory, press <Delete> and then <Insert>. (The marked portion of the login script will disappear temporarily from the screen.)

4. To exit the source user's login script, press <Escape> and then <Enter>. Press <Escape> again to return to the "User Names" list.
5. Highlight the name of the user whose login script you are adding to and press <Enter>. The "User Information" menu will appear.
6. Highlight "Login Script" and press <Enter>. A "Login Script" box for that user will appear.

If the "Login Script Does Not Exist" entry box appears, press <Enter>.

7. Move to the point in the login script where you want to insert the copied information and press <Insert>.

The copied information will appear in the login script.

8. To save the new login script, press <Escape> and then <Enter>.
9. To exit SYSCON, press <Alt> and <F10> simultaneously; then press <Enter>.

Notes

DOSGEN

DOS Remote Image File **GEN**eration

This section explains step by step how to use the DOSGEN utility to create boot files for Remote Reset workstations.

Remote Reset allows workstations to boot from a file on the file server's hard disk rather than from a boot diskette in a local drive.

Locate and use the Network Boards Worksheet as you complete the steps in this section.

Before you start

See "What to name the remote boot files" on page 98.

- Determine how many remote reset boot image files you need to create and what to name them.

If you need to create only one remote boot image file, follow the instructions under "Steps to create the default remote boot image file" on the next page.

If you need to create more than one remote boot image file, skip to "Steps to create multiple remote boot image files" on page 543.

Steps to create the default remote boot image file

To create the default remote boot image file (NET\$DOS.SYS) in SYS:LOGIN, complete the following steps.

1. Boot a workstation and log in as SUPERVISOR.

As you create a remote boot image file, you will copy the files from the boot diskette to SYS:LOGIN. You do not need to boot the workstation with the boot diskette you are copying.

2. Prepare to run DOSGEN.

- 2a. At your workstation, insert the boot diskette of the workstation type for which you are creating a remote boot image file into drive A.
- 2b. Map drive F to SYS:SYSTEM and drive G to SYS:LOGIN by typing

```
MAP F: =SYS:SYSTEM <Enter>
MAP G: =SYS:LOGIN <Enter>
```
- 2c. Change to the SYS:LOGIN directory by typing

```
G: <Enter>
```

3. Run DOSGEN.

- 3a. At the DOS prompt, type

```
F:DOSGEN <Enter>
```

The F: tells the file server to find the DOSGEN file in SYS:SYSTEM. DOSGEN will create a boot image file called NET\$DOS.SYS (containing the same files as the boot diskette in drive A) and copy the boot image file into the SYS:LOGIN directory.

- 3b. Flag the NET\$DOS.SYS boot image file Shareable/Read-Write (SRW) by typing

```
FLAG NET$DOS.SYS SRW <Enter>
```

When the remote reset workstation is turned on, it will look for the NET\$DOS.SYS file in the SYS:LOGIN directory for the files it needs to boot.

Steps to create multiple remote boot image files

Just as you needed different boot diskettes for each machine type and DOS version, you must create different Remote Reset boot image files for each workstation machine type and DOS version.

Because the commands in the Remote Reset boot image files tell the file server to load the appropriate files for each workstation, you must also specify which files the workstation needs.

To create multiple Remote Reset boot image files in SYS:LOGIN, complete the following steps.

1. Boot a workstation and log in as SUPERVISOR.

As you create a remote boot image file, you will copy the files from the boot diskette to SYS:LOGIN. You do not need to boot the workstation with the boot diskette you are copying.

2. Prepare to run DOSGEN.

- 2a. At your workstation, insert the appropriate boot diskette into drive A.

For example, since Workstation #3 requires a unique boot image file, insert the Workstation #3 boot diskette into drive A.

- 2b. Map drive F to SYS:SYSTEM and drive G to SYS:LOGIN by typing

```
MAP F: =SYS:SYSTEM <Enter>
MAP G: =SYS:LOGIN <Enter>
```

- 2c. Change to the SYS:LOGIN directory by typing
G: <Enter>

3. Run DOSGEN to create the first remote boot image file.

If most of your workstations can use the same files to boot, we recommend that you let DOSGEN create the default boot image file named NET\$DOS.SYS. Then, for each workstation that requires a different set of boot image files, create a customized boot image file with a unique filename. The new filename must have the .SYS extension.



If you completed the planning modules, you should have recorded the remote image boot files names you need on the Network Boards Worksheet. If you did not use the modules and need help determining filenames, refer to "What to name the remote boot files" on page 98.

- 3a.** To create the default boot image file (NET\$DOS.SYS), type the following command.

```
F:DOSGEN <Enter>
```

- 3b.** Flag the boot image file Shareable/Read-Write (SRW) by typing

```
FLAG NET$DOS.SYS SRW <Enter>
```

4. Run DOSGEN to create additional remote boot image files.



As you create multiple boot image files, rename each file as you create it. If you do not, the new boot image file will overwrite the previous one.

- 4a.** To create a customized boot image file, type the following command (replacing *newname* with the filename you chose).

```
F:DOSGEN A: newname.SYS <Enter>
```

(Leave a space between A: and the name of the file.)

F: tells the file server to find the DOSGEN file in SYS:SYSTEM. A: indicates the location of the boot diskette files that will be copied to the boot image file. DOSGEN will create the new boot image file in the SYS:LOGIN directory.

- 4b.** Flag the boot image file Shareable/Read-Write (SRW) by typing

```
FLAG newname.SYS SRW <Enter>
```

Repeat Steps 4a and 4b for each workstation or each group of workstations requiring unique files.

- 4c.** If you have not already done so, record which workstations need to access which remote boot image files. You will need this information to create the BOOTCONF.SYS file.

For example, your list might look like this:

NET\$DOS.SYS=Workstations #1, #2, and #6
WKST3.SYS=Workstation #3
RX-NET.SYS=Workstations #4 and #5

5. Create the BOOTCONF.SYS file.

When you create multiple remote boot image files, you also need a BOOTCONF.SYS file in the SYS:LOGIN directory. The BOOTCONF.SYS file contains a list of

- All customized Remote Reset boot image files (not including the default NET\$DOS.SYS file)
- The network address and node address of each workstation that must access the customized boot image files

To create a BOOTCONF.SYS file in the SYS.LOGIN directory, complete the following steps.

- 5a. Locate the network addresses and node addresses on the Network Boards Worksheet.
- 5b. Use a text editor or the DOS COPY CON command to create the BOOTCONF.SYS file. The file should be created in the SYS:LOGIN directory.
- 5c. Type a line for each customized boot image file you created, using the following entry format.

0x network address, node address = filename

For example, if you created a customized remote boot image file named WKST3.SYS for workstation #3 and the network address for workstation #3 is 1 and the node address is 10005a003b77, your BOOTCONF.SYS file would contain the following entry.

0x1,10005a003b77=WKST3.SYS

Remember, the BOOTCONF.SYS file must contain an entry for each customized boot image file you created.

For example, if you created a remote boot image file for workstation #3 and workstation #2, your BOOTCONF.SYS file would contain entries similar to the following:

```
0x1,10005a003b77=WKST3.SYS  
0x1,22222=WKST2.SYS
```

You are now finished creating boot files for your Remote Reset workstations.



Customizing Network Printing

This chapter explains how to use the PRINTDEF, PRINTCON, and PCONSOLE utilities to customize your network printing.

Follow the steps in this section only if you do not want to use the default printing setup.

Locate and use the Printer Worksheet and the Print Job Configuration Worksheet as you complete these steps.

Before you start

See "Whether to use PRINTDEF" on page 131.

- Determine whether the print definitions for your printers are included with ELS NetWare Level II;
- Determine whether the print definitions you need already exist on another file server.

Define print devices

By defining network print devices in PRINTDEF, you create a database that other printing utilities (such as PRINTCON, NPRINT, and CAPTURE) can use. You can define print devices three different ways.

- You can copy the 30 print device definitions provided with NetWare. Refer to the next section, "Use print device definitions provided with NetWare."
- You can set up a print device definition that is not included with those provided with NetWare. Refer to "Set up additional print device definitions" on page 552.
- If you have access to print device definitions set up on another file server, you can copy them to your file server. Refer to "Copy print device definitions from one file server to another" on page 557.

Use print device definitions provided with NetWare

For your convenience, NetWare provides 30 print device definitions. If you want to use the NetWare definitions, you need to copy them to the PRINTDEF database for your server. Instructions for doing this are on the next page under "Copy print device definitions from the SYS:PUBLIC directory."

The print device definitions are files that have a .PDF extension. For example, the definition file for the Hewlett-Packard LaserJet printer would be HPLASER.PDF.

The printers for which print device definition files are included are listed under "Whether to use PRINTDEF" on page 131.

Copy print device definitions from the SYS:PUBLIC directory

To copy any of the 30 print device definitions, you must be logged in as SUPERVISOR and complete the following steps.

1. At the DOS prompt, type
PRINTDEF <Enter>

The "PRINTDEF Options" menu will appear.

2. Highlight "Print Devices" and press <Enter>. The "Print Device Options" menu will appear.
3. Highlight "Import Print Device" and press <Enter>.

The "Source Directory" entry box will display your current directory.

4. If you are not in the SYS:PUBLIC directory, use the Backspace key to erase the current directory name. Then type the new directory name, SYS:PUBLIC, and press <Enter>.
5. In the "Available .PDFs" list, highlight the .PDF file you want to add to your database and press <Enter>.

If you try to copy a file that has the same name as an existing print device definition, the "New Device Name" entry box will appear, prompting you to rename the new print device definition. Enter the revised name and press <Enter>.

The new print device definition will be added to the print definition database. You will be returned to the "Print Device Options" menu.

6. To save the database with the new print device definition, press <Escape> twice.

In the "Exit PrintDef" confirmation box, highlight "Yes" and press <Enter>. Then highlight "Save Data Base, then EXIT" and press <Enter>.

If you do not need to set up additional print device definitions, skip to "Define the forms your printer will use" on page 563.

Set up additional print device definitions

If you need to set up additional print device definitions (besides those provided with NetWare), complete the following steps.

- **Define print device functions.** A print function is a printer command that gives instructions to the printer. These functions are sometimes referred to as escape sequences. You will use these functions to create print device modes. You can find instructions for defining print device functions in the next section.
- **Define print device modes.** A print mode is a sequence of functions that defines how you want a job printed. You will use these modes when you specify how to print jobs in the PRINTCON utility. See "Define print device modes" on page 555.

You must define functions and modes for each print device you will be using. Repeat the steps in the following sections, "Define print device functions" and "Define print device modes," for each print device you will be using.

Define print device functions

To define a printer's functions, enter escape sequences or printer commands into the PRINTDEF database. These functions give the printer directions on how to print. To define a printer's functions, complete the following steps.

1. At the DOS prompt, type

```
PRINTDEF <Enter>
```

The "PRINTDEF Options" menu will be displayed.

2. Highlight "Print Devices" and press <Enter>. The "Print Device Options" menu will be displayed.

3. Highlight "Edit Print Devices" and press <Enter>. The "Defined Print Devices" list will be displayed.
4. Press <Insert>. This will allow you to add a new print device.
5. In the "New Device Name" entry box, type the name of the print device and press <Enter>. The name should be recognizable to users (for example, a brand name such as LaserJet or IBM ProPrinter) and cannot be more than 32 characters in length.

The name of the print device you just typed will be highlighted.

6. Press <Enter>. The "Edit Device Options" menu will be displayed.
7. Highlight "Device Functions" and press <Enter>. The "Device Functions" list will be displayed. (The name of your print device will replace *device*.)

Now you must enter the escape sequences or printer commands for the specified printer as explained in the next section. Usually the printer documentation will have a chapter or section explaining printer commands. Consult that documentation.



If you completed the planning modules, you should have recorded the device functions you need on the Printer Worksheet. If you did not use the modules and need help, refer to "What print device functions to define" on page 133.

To enter a device function, complete the following steps.

1. Press <Insert>. This will allow you to add a new print device.
2. In the "Function Definition Form" entry box, enter a name to identify the printer command and press <Enter>.

For example, if you were defining the HP LaserJet and you wanted to include the print function for resetting the printer, you would type

Reset <Enter>

The "Escape Sequence" option will be highlighted.

3. Enter the actual escape sequence supplied by the device documentation and press <Enter>.

For example, to enter the HP LaserJet print function for reset, you would type

<ESC>e <Enter>

When you enter the escape sequences, you must type each character including the angle brackets < >.

4. Press <Escape> and then <Enter> to save and insert the new escape sequence into the Functions list.



When you are entering the print functions, you must include the reset escape sequence.

5. Repeat Steps 1 through 4 for each function or escape sequence you want to enter.
6. To edit any of the device functions, highlight the function you want to change and press <Enter>. Use the Backspace key to erase the current information and type in the new name or escape sequence. Press <Escape> and then <Enter> to save the modified function.
7. After you have entered all the device functions, press <Escape> to return to the "Edit Device Options" menu.

Define print device modes

Once you have defined the functions for a print device, you can combine them into modes. A mode is a sequence of print functions that tells the printer how to print a particular job.

For example, you can create a "Final Printout" mode for the HP LaserJet that would include the functions for 10 cpi, bold printing, and letter quality printing.



If you completed the planning modules, you should have recorded the modes you need on the Printer Worksheet. If you did not use the modules and need help, refer to "What modes to create" on page 134.

Define the modes by completing the following steps.

1. In the "Edit Device Options" menu, highlight "Device Modes" and press <Enter>.

The "(Re-initialize)" mode will appear in the "*Your Printer Modes*" entry box. (*Your Printer* will be replaced with the name of the printer you have selected.)

2. To set up the re-initialize mode, press <Enter>. The "(Re-initialize) Functions" list will be displayed.
3. Press <Insert> to see a list of all defined functions for one print device. Most print devices have a single escape sequence for reset. Highlight the function or the escape sequence for resetting the printer and press <Enter>.

For example, to define the re-initialize mode for the HP LaserJet, you would highlight the following escape sequence and then press <Enter>.

Reset <ESC>e

If your printer does not have a single reset function, enter all your printer's "Cancel" functions into the re-initialize mode. Mark multiple functions by highlighting each and pressing the Mark key (<F5> on most machines).

Define other modes for the printer

After you have entered the re-initialize mode functions, you can create additional modes depending on your printing needs. To create additional print device modes, complete the following steps.

1. In the "*Your Printer Modes*" list (*Your Printer* will be replaced by whatever printer you are defining—for example, "HP LaserJet Modes"), press <Insert>.
2. In the "New Mode Name" entry box, type the name of the mode you want to create (for example, "Final Printout") and press <Enter>.

The "*New Mode Name Functions*" list will be displayed. (*New Mode Name* will be replaced by the name of the mode you are defining—for example, "Final Printout Mode").

3. Enter the functions for that particular mode.

The order of the functions in the list may be important to the printer. Normally, any function you add will be placed at the end of the list.

However, you can insert a new function anywhere in the "*New Mode Name Functions*" list by highlighting the function preceding the line where you want the new function added. Then press the Mark key (<F5> on most machines). You can now insert new functions by completing Steps 4 and 5.

4. Press <Insert> to see the list of all defined functions for that print device.

5. Use the Mark key (<F5> on most machines) to highlight the functions you want to include in the new mode. Then press <Enter>.

The functions you choose will appear in the "New Mode Name Functions" list.

For example, if you were creating a Final Printout mode for the HP LaserJet and wanted to include 10 cpi, bold printing, and letter quality printing, you would highlight and mark each of these options and then press <Enter>.

When you have completed entering options in the new mode, press <Escape> to return to the "Modes" list.

6. To delete a function from the "Modes" list, highlight that function and press <Delete>.
7. Repeat Steps 1 through 5 for each mode or combination of functions you want to create.

When you are finished entering modes for one print device, press <Escape> to return to the "Defined Print Devices" list.

8. To exit the PRINTDEF utility, press <Escape> until you come to the "Available Topics" menu. Highlight "Exit Options" and press <Enter>. Then highlight "Save Data Base, then EXIT" and press <Enter>.

Copy print device definitions from one file server to another

Sometimes you may want to use another file server's printer. If this printer is not defined as a print device on your file server, you cannot take advantage of the enhanced printing capabilities of PRINTDEF. Rather than re-entering all the functions and redefining the modes, you can copy the print device definitions from the printer's file server to your file server.

You must have supervisor privileges on both file servers to copy print device definitions from one to another. If you do not, the supervisor of the other server will need to help you.

Print device definitions are stored in the file server's NET\$PRN.DAT file. To copy a print device definition from one server to another, you must copy the print device's definition from one server's NET\$PRN.DAT file to the other server's NET\$PRN.DAT file. You can copy only one device definition at a time.

To do so, you must first export (copy) the print device definition from the original server's NET\$PRN.DAT file into a .PDF (Print Definition) file. You can then import (add) the .PDF file into the second server's NET\$PRN.DAT file.

Export print device definitions

To export (copy) a device definition into a .PDF (Print Definition) file, complete the following steps.

1. At the DOS prompt, type

```
PRINTDEF <Enter>
```

The "PRINTDEF Options" menu will be displayed.
2. Highlight "Print Devices" and press <Enter>. The "Print Device Options" menu will be displayed.
3. Highlight "Export Print Device" and press <Enter>. The "Defined Print Devices" list will be displayed.
4. Highlight the device definition you want to copy to another file server and press <Enter>. Your current directory will be listed in the "Destination Directory" entry box.
5. You can export a file to your current directory, to another directory on the current file server, or to a directory on another file server. Follow the steps for the method you want.

Export to current directory

- 5a. If you want to export the file to your current directory, press <Enter>. Skip to Step 6.

Export to another directory on the current file server

- 5a. If you want to export the file to another directory on the file server, use the Backspace key to erase the current directory.
- 5b. Press <Insert> to see a list of the volumes on the current file server.
- 5c. Highlight the volume you want and press <Enter>.
- 5d. Repeat these steps for selecting the appropriate directory and subdirectory. When you have selected the complete directory path, press <Escape> and then <Enter>.

The supervisor of the file server containing the print device definition can export the file to any directory in which he or she has Write and Create rights. We suggest putting the file in the SYS:PUBLIC directory of the current file server.

If the file is placed in the SYS:PUBLIC directory, the supervisor of another file server can log in as GUEST and still have sufficient rights to import the file. Skip to Step 6.

Export to a directory on another file server

If you want to export the file to another file server, you must have Write and Create rights on the other file server, or you will be unable to copy the file.

- 5a. Use the Backspace key to erase the complete directory path.
- 5b. Press <Insert> twice to see a list of attached file servers.

- 5c. Highlight the file server you want to export the file to and press <Enter>.
- 5d. If you are not already attached to the destination file server, a box will appear asking for your login name and password. Type your username and press <Enter>. Then type your password and press <Enter>.
- 5e. A box will appear listing the volumes of the destination file server. Highlight the one you want and press <Enter>.
- 5f. Repeat these steps to select the appropriate directory and subdirectory. When you have selected the complete directory path, press <Escape> and then <Enter>.
6. In the "Export File Name" entry box, type the name you want to give the file. The name can be up to eight characters long and cannot include an extension. You will probably want to use the name of the print device so the file is easily recognizable (for example, HP_LASER). Then press <Enter>.

The file will be created with a .PDF extension and placed in the specified directory. Press <Escape> to return to the "Print Device Options" menu.

Import print device definitions

To import (add) a print device definition into the desired file server's NET\$PRN.DAT file, you must import the .PDF (Print Definition) file you just created to the NET\$PRN.DAT file.

1. At the DOS prompt, type
PRINTDEF <Enter>

The "PRINTDEF Options" menu will be displayed.

2. Highlight "Print Devices" and press <Enter>. The "Print Device Options" menu will be displayed.

3. Highlight "Import Print Device" and press <Enter>.

The "Source Directory" entry box will display your current directory.

The "Source Directory" should specify the location of the .PDF file you want to import. The .PDF file must be exported to this directory before you can copy it. If you did not export the file, you will have to ask the supervisor of the source file server which directory the file was copied to.

If the file has been placed in the SYS:PUBLIC directory, user GUEST should have Read, Open, and Search rights in that directory unless these rights were specifically removed by the supervisor. These rights are sufficient to import the .PDF file.

4. Depending on where the .PDF file is located, complete one of the following steps.

If the .PDF file is in your current directory

- 4a. Press <Enter>. Skip to Step 5.

If the .PDF file is in another directory

- 4a. Use the Backspace key to erase the current directory and then press <Insert>.

In the list of available directories, highlight the name of the directory you want to copy the .PDF (Print Definition) file from and press <Enter>. Skip to Step 5.

If the .PDF file is located on another file server

- 4a. If the .PDF file is located on a file server you are not currently attached to, press <Insert> twice. In the "Other File Servers" list, highlight the server you want to attach to and press <Enter>. A box will appear asking for your login name and password. Enter your login name and password.

If the .PDF file is located on another file server you are already attached to, use the Backspace key to erase the complete directory path. Then press <Insert> for a list of attached file servers. Highlight the file server you want to import the file from and press <Enter>.

- 4b. A box will appear listing the volumes of the source file server. Highlight the one you want and press <Enter>.
- 4c. In the list of available directories, highlight the appropriate directory and press <Enter>.
- 4d. When you have selected the complete directory path, press <Escape> and then <Enter>.
5. In the "Available .PDFs" list, highlight the .PDF file you want to import to your database and press <Enter>. If the supervisor of another file server exported the file, you must get the file's name from that supervisor.

If you try to import a file which has the same name as an existing print device definition, the "New Device Name" entry box will appear asking you to rename the new print device definition. Enter the revised name and press <Enter>.

The new print device definition will be added to the print definition database. You will be returned to "Print Device Options."

6. To save the database with the new print device definition, press <Escape> twice.

In the "Exit PrintDef" confirmation box, highlight "Yes" and press <Enter>.

Highlight "Save Data Base, then EXIT" and press <Enter>.

Define the forms your printer will use

Print forms are the type of paper you will print on. You can specify what form you want to print on when you set up print job configurations. For example, you might want some jobs to be printed on letter size sheets of paper and others on green bar continuous feed paper.

The file server recognizes forms by name and number. When you send a print request that requires a specific form, the file server will not print the job until that form is mounted in the printer.



If you completed the planning modules, you should have recorded the forms you need on the Printer Worksheet. If you did not use the modules and need help, refer to "Whether to create forms" on page 135.

To define print forms, complete the following steps.

1. To access the PRINTDEF utility, type

PRINTDEF <Enter>

The "PRINTDEF Options" menu will be displayed.

2. Highlight "Forms" and press <Enter>.
3. Press <Insert>.
4. In the "Forms Definition Form" entry box, type the name of the new form you want to define and press <Enter>. The first character of the form name must be alphabetic, and the form name cannot exceed 12 characters. Use an underscore () instead of a space between words in a form name. Examples of form names include White_8x11, Continuous, Checks, Green_Bar.
- 4a. Type the number you want to assign to the form and press <Enter>. You will probably want to assign the most commonly used form as form 0, since 0 is the default form. Form numbers must fall between 0 and 255.

- 4b. Type the length of the form in lines per page and press <Enter>. The number must fall between 1 and 255. For example, if your printer is set at six lines per inch, a sheet that measures 8-1/2 by 11 inches would be 66 lines long.
- 4c. Type the width of the form in characters per line and press <Enter>. The number must fall between 1 and 999. For example, if your printer is set at 10 characters per inch, a sheet that measures 8-1/2 by 11 inches would have 85 characters per line.
5. To save changes, press <Escape>. Then answer "Yes" to the "Save Changes" confirmation box by pressing <Enter>. The new form will be listed in the "Forms" list.
6. Repeat Steps 2 through 5 for each form you want to define.
7. If you need to edit a form, highlight that form in the "Forms" list and press the Modify key. (<F3> is the Modify key on most keyboards. Press <F1> or the Help key twice to verify this for your keyboard.) Follow Steps 2 through 5 to make any necessary changes.
8. To delete a form from the "Forms" list, highlight that form and press <Delete>. Press <Enter> to confirm your decision to delete the form.
9. To exit the PRINTDEF utility after you have finished defining forms, press <Escape> twice and then <Enter> to access the "Exit Options" menu. Highlight "Save Data Base, then EXIT" and press <Enter>.

Create print job configurations

You can set up a print job configuration by specifying certain parameters. The first print job configuration you create will become your default. As soon as you define other configurations, you can select which will be your default.



If you completed the planning modules, you should have recorded the print job configurations you need on the Print Job Configuration Worksheet. If you did not use the modules and need help, refer to "Whether to set up print job configurations" on page 139.

To set up a print job configuration, complete the following steps.

1. At the DOS prompt, type

```
PRINTCON <Enter>
```

The "Available Options" menu will be displayed.

2. Highlight "Edit Print Job Configurations" and press <Enter>.
3. Press <Insert>.
4. Type the name of the print job configuration you want to add in the "Enter New Name" entry box. Then press <Enter>. For example, you might want to set up a print job configuration to print a monthly report that requires special formatting. You could name the print job configuration MONTH.

The "Edit Print Job Configuration" form will be displayed in a format similar to the following.

Edit Print Job Configuration "Gam's_format"		
Number of copies:	1	Form name: CONTINUOUS
Suppress form feed:	No	Print banner: Yes
File contents:	Text	Banner name: SUPERVISOR
Tab size:	8	Banner file:
Local printer:	1	Enable timeout: No
Auto endcap:	Yes	Timeout count:
File server:	PDLC	
Print queue:	PRINTQ_0	
Device:	HP LASERJET	
Mode:	(Re-initialize)	

To make changes in the job configuration, highlight the item you want to modify and press <Enter>. Then make the appropriate change by typing in a new value or by choosing an item from the menu provided. Press <Enter> to save the change.

5. Once you have set up your print job configuration, press <Escape>.
6. Highlight "Yes" and press <Enter> to save the changes.

Select the default print job configuration

The default print job configuration you choose will become the default for files you print with PCONSOLE. It will also determine the default settings for files you print with the printing command line utilities NPRINT and CAPTURE/ENDCAP. If you print a file with either of the printing command line utilities and you do not specify any flags, the file will be printed according to your default print job configuration in PRINTCON. However, any flags you enter at the command line will override the defaults.

To specify a default setting, complete the following steps.

1. At the DOS prompt, type

```
PRINTCON <Enter>
```

The "Available Options" menu will be displayed.

2. Highlight "Select Default Print Job Configuration" and press <Enter>. The "Select Default Print Job Configuration" list will appear.
3. Highlight the Print Job Configuration you want as the default and press <Enter>. The word "(default)" will appear in the right column of the "Edit Print Job Configurations" list, indicating your new default Print Job Configuration.

Copy print job configurations

Each user has a unique print job configuration file that will store any print job configurations created by or for that user. This file, PRINTCON.DAT, is stored in the user's mail directory.

As supervisor, you can copy print job configurations from one user to another. You cannot copy a single job configuration at a time. You must copy the whole file, including all job configurations. When you copy one user's print job configuration file to another user, the copied file overwrites the target user's existing file. Since users can create their own print job configurations, you will want to check with users before copying a PRINTCON.DAT file over their existing files.

To copy a print job configuration, complete the following steps.

1. At the DOS prompt, type

```
PRINTCON <Enter>
```

The "Available Options" menu will be displayed.

2. Highlight "Supervisor--Copy Print Job Configurations" and press <Enter>.
3. In the "Source User" entry box, type the name of the user whose job configuration file you want to copy and press <Enter>.
4. In the "Target User" entry box, type the name of the user whose print job configuration file you want to replace and press <Enter>. The file will be copied.
5. Press <Escape> to exit the PRINTCON utility. The second user can now use all of the first user's job configurations.

Create print queues

When the file server first comes up, the system automatically creates one print queue for each printer attached to the file server. However, a printer can service more than one queue. If you want a printer to service more than one queue, you must create additional queues.

If you create new print queues, you must also create corresponding spoolers. The system does not automatically create spoolers for new print queues.

For example, you may want to create a queue that will be serviced at a high priority and limit the users who can place jobs in the queue. Or you may want to have one queue for each work group or department using a file server.



If you completed the planning modules, you should have recorded the print queues you need on the Printer Worksheet. If you did not use the modules and need help, refer to "Whether to create additional print queues" on page 136.

To create a print queue, complete the following steps.

1. At the DOS prompt, type

```
PCONSOLE <Enter>
```

The "Available Options" menu will be displayed.

2. Highlight "Print Queue Information" and press <Enter>. The system-created print queues will be listed in the "Print Queues" list.
3. To create a new queue, press <Insert>. The "New Print Queue Name" entry box will be displayed.
4. Type the name of the new queue and press <Enter>. The new queue will be listed in the "Print Queues" list.
5. In order for the new queue to be functional, you must attach the queue to a printer and assign a spooler to the queue. You cannot do this in PCONSOLE. You can do this at the file server console or with the AUTOEXEC.SYS file. Use the console commands

```
P[RINTER] nn ADD queue name  
S[POOL] nn [TO] queue name
```

For example, if you created a queue named NEWQUEUE and wanted to attach it to PRINTER 0 (printer numbers are assigned during installation) and assign SPOOLER 0 to it, you would type

```
P 0 ADD NEWQUEUE <Enter>  
S 0 TO NEWQUEUE <Enter>
```

After you have attached a queue to a printer, you can see the mapping by choosing "Currently Attached Servers" in the "Print Queue Information" menu and pressing <Enter>. If no server appears in the "Current Attached Servers" box, the queue has not been properly mapped to the printer.

Mappings you enter at the console will not be saved when you bring down the file server. To save the mappings permanently, you must create an AUTOEXEC.SYS file as explained on the next page.

Create an AUTOEXEC.SYS file

To create an AUTOEXEC.SYS file, complete the following steps.

1. At the DOS prompt, type

```
SYSCON <Enter>
```

The "Available Topics" menu will be displayed.

2. Highlight "Supervisor Options" and press <Enter>. The "Supervisor Options" menu will be displayed.
3. Highlight "Edit System AUTOEXEC File" and press <Enter>. The "System AUTOEXEC File" entry box will be displayed.
4. Type a list of the printer and spooler mappings you want to be executed each time the file server comes up using the following formats.

```
P[RINTER] nn ADD [QUEUE] name  
S[POOL] nn [TO] [QUEUE] name
```

For example, to add print queue LASER to printer 0 and print queue LASER2 to printer 1, you would use the following commands.

```
P 0 ADD LASER  
P 1 ADD LASER2
```

To assign spooler 0 to the LASER print queue and spooler 1 to the LASER2 print queue, you would use the following commands.

```
S 0 LASER  
S 1 LASER2
```

5. List any additional console commands you want to be executed each time the file server comes up.

6. Press <Escape> and then <Enter> to save the changes.

You can modify the AUTOEXEC.SYS file by completing these same steps. Use the Backspace key to delete previous mappings and then type in the new mappings.

Rename print queues

You may want to rename the system-created print queues to more easily recognizable names. For example, you could have print queue names such as LASERJET and LINEPRINTER or STUDENTS and ADMINISTRATION.

If you rename a queue, you must map the newly named queue to a printer and create a corresponding spooler with the appropriate console commands or modify the name of the print queue in any mappings you have saved in the AUTOEXEC.SYS file.

To rename a print queue, complete the following steps.

1. At the DOS prompt, type

```
PCONSOLE <Enter>
```

The "Available Options" menu will be displayed.

2. Highlight "Print Queue Information" and press <Enter>. The "Print Queues" list will be displayed.
3. In the "Print Queues" list, highlight the queue whose name you want to change and press the Modify key. (Press <F1> or the Help key twice to identify which key on your keyboard is the Modify key.)
4. In the "Rename Print Queue To" entry box, use the Backspace key to delete the old name. Type the new name of the queue and press <Enter>.

Assign queue users

When you create a queue using PCONSOLE, you must also specify which users can place print jobs in the queue by assigning queue users. The group EVERYONE is automatically assigned as a queue user.



If you completed the planning modules, you should have recorded the queue users on the Printer Worksheet. If you did not use the modules and need help, refer to "Whether to assign new queue users" on page 137.

To assign queue users, complete the following steps.

1. At the DOS prompt, type

```
PCONSOLE <Enter>
```

The "Available Options" menu will be displayed.
2. Highlight "Print Queue Information" and press <Enter>. The "Print Queues" list will be displayed.
3. Highlight the queue you want to assign queue users to and press <Enter>. The "Print Queue Information" menu will be displayed.
4. Highlight "Queue Users" and press <Enter>. The "Queue Users" list will be displayed.
5. Press <Insert> to access a list of users and groups.
6. Highlight the users or groups you want to assign as queue users. You can assign multiple users or groups as queue users by highlighting each and then pressing the Mark key. (<F5> is the Mark key on most machines. Press <F1> or the Help key, twice to verify this for your machine.) Then press <Enter>.
7. Press <Escape> to return to the "Print Queue Information" menu.

The users you selected will now be queue users.

Assign queue operators

When you create a queue using PCONSOLE, you must also specify which users can control the queue by assigning queue operators. The user SUPERVISOR is automatically assigned as a queue operator.



If you completed the planning modules, you should have recorded the queue operators you need on the Printer Worksheet. If you did not use the modules and need help, refer to "Whether to assign queue operators" on page 137.

To assign queue operators, complete the following steps.

1. At the DOS prompt, type

```
PCONSOLE <Enter>
```

The "Available Options" menu will be displayed.

2. Highlight "Print Queue Information" and press <Enter>. The "Print Queues" list will be displayed.
3. Highlight the queue you want to assign queue operators to and press <Enter>. The "Print Queue Information" menu will be displayed.
4. Highlight "Queue Operators" and press <Enter>. The list of "Queue Operators" will be displayed.
5. Press <Insert>. The "Queue Operator" list will be displayed.
6. Highlight the users or groups you want to designate as queue operators. You can assign multiple users or groups as queue operators by using the Mark key (<F5> on most machines). Then press <Enter>.
7. Press <Escape> to return to the "Print Queue Information" menu. The users you selected will be assigned as queue operators.
8. To exit PCONSOLE, press <Alt> and <F10> simultaneously; then press <Enter>.



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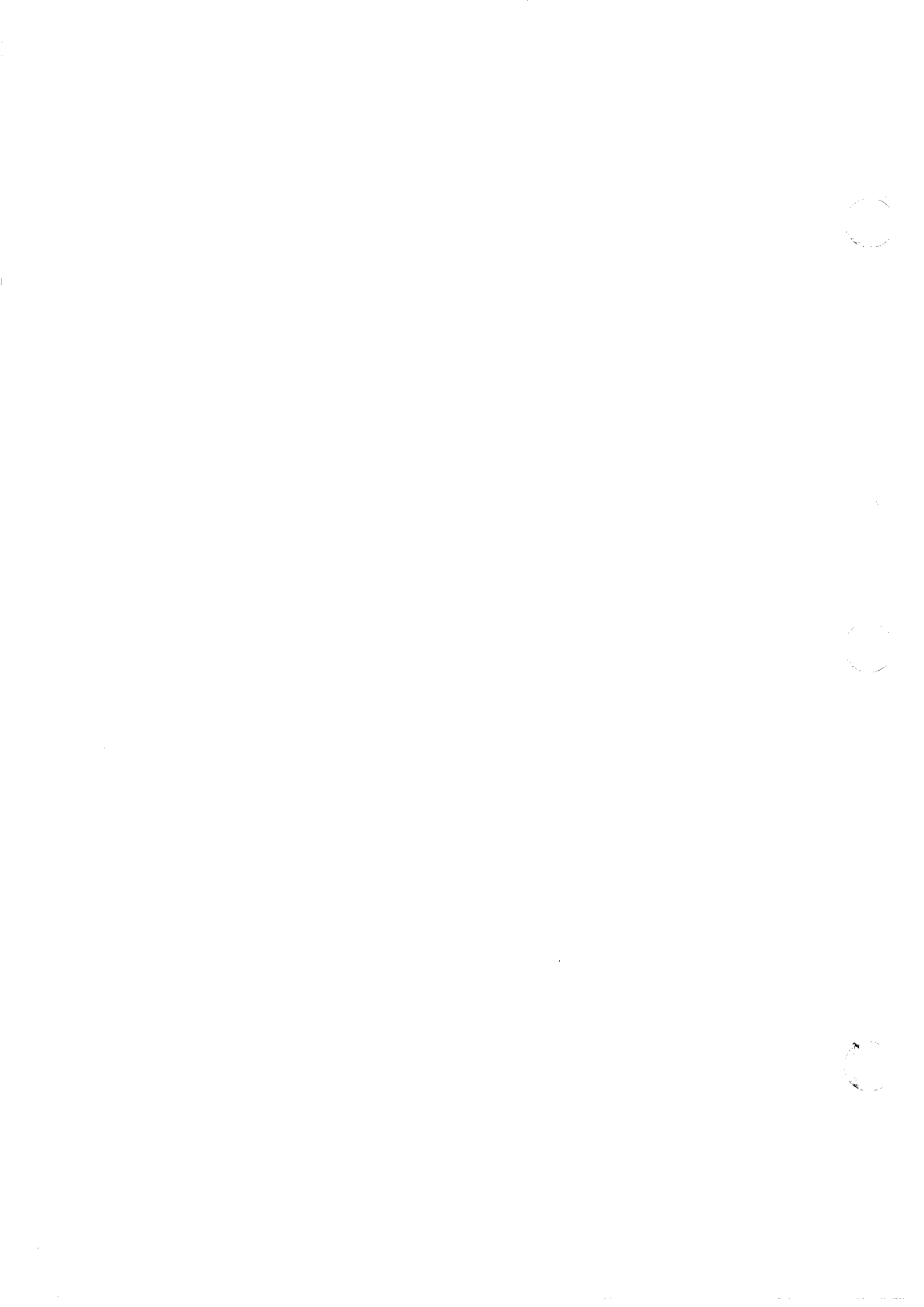
W

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User Comments

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City: _____ State: _____ Zip: _____

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Comments or suggestions

File Server Configuration Worksheet

File Server Name				Installed by			
Type of Computer							
Floppy Drive A		<input type="checkbox"/> 5.25 Inch <input type="checkbox"/> Double-sided (360KB) <input type="checkbox"/> High-capacity (1.2MB)			<input type="checkbox"/> 3.5 Inch <input type="checkbox"/> 720KB <input type="checkbox"/> 1.44MB		
Floppy Drive B		<input type="checkbox"/> 5.25 Inch <input type="checkbox"/> Double-sided (360KB) <input type="checkbox"/> High-capacity (1.2MB)			<input type="checkbox"/> 3.5 Inch <input type="checkbox"/> 720KB <input type="checkbox"/> 1.44MB		
ELSGEN Run Method <input type="checkbox"/> Standard Floppy Disk <input type="checkbox"/> RAM Disk <input type="checkbox"/> Hard Disk <input type="checkbox"/> Network Drive							
Operating System Type <input type="checkbox"/> Dedicated (default) <input type="checkbox"/> Nondedicated							
Memory		Base		Extended		Total	
RESOURCE SETS							
Res Set	Name	Option No.	Int. Line (IRQ)	I/O Base Address	DMA Line	RAM/ROM Addresses	Notes
LAN DRIVERS							
LAN	Name	Option No.	Int. Line (IRQ)	I/O Base Address	DMA Line	RAM/ROM Addresses	NETWORK ADDRESSES
A							
B							
C							
Communication Buffers <input type="checkbox"/> 15 (default) <input type="checkbox"/> (custom)							
Automatic Configuration <input type="checkbox"/> Accept <input type="checkbox"/> Reject							

Workstation Configuration Worksheet

Connected to File Server				Installed by			
Type of Workstation							
Floppy Drive A		<input type="checkbox"/> 5.25 inch <input type="checkbox"/> Double-sided (360KB) <input type="checkbox"/> High-capacity (1.2MB)			<input type="checkbox"/> 3.5 inch <input type="checkbox"/> 720KB <input type="checkbox"/> 1.44MB		
Floppy Drive B		<input type="checkbox"/> 5.25 inch <input type="checkbox"/> Double-sided (360KB) <input type="checkbox"/> High-capacity (1.2MB)			<input type="checkbox"/> 3.5 inch <input type="checkbox"/> 720KB <input type="checkbox"/> 1.44MB		
Memory		Base		Extended		Total	
SHGEN Level <input type="checkbox"/> Default <input type="checkbox"/> Intermediate <input type="checkbox"/> Custom							
SHGEN Run Method <input type="checkbox"/> Standard Floppy Disk <input type="checkbox"/> Hard Disk <input type="checkbox"/> Network Drive							
RESOURCE SETS							
Res Set	Name	Option No.	Int. Line (IRQ)	I/O Base Address	DMA Line	RAM/ROM Addresses	Notes
LAN DRIVER							
LAN A							
BOOT INFORMATION							
Boot Method <input type="checkbox"/> Boot from floppy disk				<input type="checkbox"/> Boot by Remote Reset			
Files needed to boot workstation:				Remote Reset Checklist			
<input type="checkbox"/> DOS System Files DOS Version:				<input type="checkbox"/> Network board set to configuration Option 1			
<input type="checkbox"/> IPX.COM				<input type="checkbox"/> Remote Reset PROM(s) installed on a board			
<input type="checkbox"/> NET4.COM or <input type="checkbox"/> NET3.COM or <input type="checkbox"/> NET2.COM				<input type="checkbox"/> Remote Reset enabled on board			
<input type="checkbox"/> NETBIOS.EXE and INT2F.COM				Network Address			
<input type="checkbox"/> Others				Station (node) Address		Hex	
<input type="checkbox"/> SHELL.CFG Options						Decimal	
				Remote Boot File Name			
				<input type="checkbox"/> NET\$DOS.SYS (default)			
				<input type="checkbox"/> Other:			

Network Boards Worksheet

File Server Name		Installed by			
File Server Boards					
LAN	Type of Network Board	Network Address		Station (Node) Address	
				Decimal	Hexidecimal
A					
B					
Workstations Connected to LAN A					
Type of Workstation	DOS Version	Type of Network Board	Station (Node) Address		Remote Boot File Name (Remote Reset Only)
			Decimal	Hexidecimal	
Workstations Connected to LAN B					
Type of Macintosh Workstation	Type of Network Board	Station (Node) Address			
		Decimal	Hexidecimal		
Networking Hardware					
Type of Hardware Used	Description			Vendor	
Main network cable					
Drop cables (if applicable)					
Other types of cable					
Connectors					
Other hardware					

Remote Workstation Worksheet

WORKSTATION							
Type of computer							
Memory	Base		Extended			Total	
Remote Workstation Shell (generate with SHGEN)							
Resource Sets	Option No.	Int. Line (IRQ)	I/O Base Address	DMA Line	RAM/ROM Addresses	Notes	
LAN Driver <i>IBM ASYNC (COM1/COM2)</i>							
Asynchronous Remote Configuration (configure with ARCONFIG)							
* Security ID String:							
Workstation ID:							
COM Port: <input type="checkbox"/> COM1 <input type="checkbox"/> COM2							
Baud rate:							
Modem Type: <input type="checkbox"/> Hayes or compatible <input type="checkbox"/> Special Configuration							
Modem Dial String (only for Hayes or Compatible):							
FILE SERVER							
IBM ASYNC (COM1/COM2) driver configured in ELSGEN as: <input type="checkbox"/> LAN B <input type="checkbox"/> LAN C							
COM Port: <input type="checkbox"/> COM1 <input type="checkbox"/> COM2 <input type="checkbox"/> Built-in port <input type="checkbox"/> IBM ASYNC board installed							
"Bridge" Configuration (configure with ARCONFIG)							
Identifying Name:							
* Security ID String:							
Control Password (for LCONSOLE):							
Line Configuration (configure with ARCONFIG)							
Baud rate:							
Modem Type: <input type="checkbox"/> Hayes or compatible <input type="checkbox"/> Special Configuration							
Auto Connect: <input type="checkbox"/> No <input type="checkbox"/> Yes							
(If yes) * Security ID String:							
Life Class: <input type="checkbox"/> Continuous <input type="checkbox"/> Timed (If timed) Idle Timeout:							
(If Hayes or compatible) Dial Mode: <input type="checkbox"/> Touch Tone <input type="checkbox"/> Pulse							
Phone number:							
* These ID strings must be identical, including case ("ABC" is not the same as "abc").							

Print Job Configuration Worksheet

Print Job Configurations (PRINTCON)	
Name:	<input type="checkbox"/> Default
Number of Copies:	Form Name:
Suppress Form Feed: <input type="checkbox"/> Yes <input type="checkbox"/> No	Print Banner: <input type="checkbox"/> Yes <input type="checkbox"/> No
File Contents: <input type="checkbox"/> Text <input type="checkbox"/> Byte Stream	Banner Name:
Tab Size: <input type="checkbox"/> 8 (default) <input type="checkbox"/>	Banner File:
Local Printer:	Enable Timeout: <input type="checkbox"/> Yes <input type="checkbox"/> No
Auto Endcap: <input type="checkbox"/> Yes <input type="checkbox"/> No	Timeout Count:
File Server:	Device:
Print Queue:	Mode:
Name:	<input type="checkbox"/> Default
Number of Copies:	Form Name:
Suppress Form Feed: <input type="checkbox"/> Yes <input type="checkbox"/> No	Print Banner: <input type="checkbox"/> Yes <input type="checkbox"/> No
File Contents: <input type="checkbox"/> Text <input type="checkbox"/> Byte Stream	Banner Name:
Tab Size: <input type="checkbox"/> 8 (default) <input type="checkbox"/>	Banner File:
Local Printer:	Enable Timeout: <input type="checkbox"/> Yes <input type="checkbox"/> No
Auto Endcap: <input type="checkbox"/> Yes <input type="checkbox"/> No	Timeout Count:
File Server:	Device:
Print Queue:	Mode:
Name:	<input type="checkbox"/> Default
Number of Copies:	Form Name:
Suppress Form Feed: <input type="checkbox"/> Yes <input type="checkbox"/> No	Print Banner: <input type="checkbox"/> Yes <input type="checkbox"/> No
File Contents: <input type="checkbox"/> Text <input type="checkbox"/> Byte Stream	Banner Name:
Tab Size: <input type="checkbox"/> 8 (default) <input type="checkbox"/>	Banner File:
Local Printer:	Enable Timeout: <input type="checkbox"/> Yes <input type="checkbox"/> No
Auto Endcap: <input type="checkbox"/> Yes <input type="checkbox"/> No	Timeout Count:
File Server:	Device:
Print Queue:	Mode:
Name:	<input type="checkbox"/> Default
Number of Copies:	Form Name:
Suppress Form Feed: <input type="checkbox"/> Yes <input type="checkbox"/> No	Print Banner: <input type="checkbox"/> Yes <input type="checkbox"/> No
File Contents: <input type="checkbox"/> Text <input type="checkbox"/> Byte Stream	Banner Name:
Tab Size: <input type="checkbox"/> 8 (default) <input type="checkbox"/>	Banner File:
Local Printer:	Enable Timeout: <input type="checkbox"/> Yes <input type="checkbox"/> No
Auto Endcap: <input type="checkbox"/> Yes <input type="checkbox"/> No	Timeout Count:
File Server:	Device:
Print Queue:	Mode:

Directories Worksheet

Directory Structure					Files and File Attributes	Maximum Rights Mask (applies only to directory in which assigned)	Directory Attribute (Normal, Hidden, System, or Private)
Volume:	Directory	/Subdirectory	/Subdirectory	/Subdirectory			
SYS	LOGIN				Login files (copied in at installation)	[R W O C D P S M]	Normal
	MAIL	Subdirectory for each user created automatically			Mail files (copied in at installation)	[R W O C D P S M]	Normal
	SYSTEM				System files (copied in at installation)	[R W O C D P S M]	Normal
	PUBLIC				Public files (copied in at installation)	[R W O C D P S M]	Normal
		Machine Name	DOS Directory OS MS DOS	DOS Version	Copy files from DOS diskettes	[R W O C D P S M]	
						[R W O C D P S M]	
						[R W O C D P S M]	
						[R W O C D P S M]	
						[R W O C D P S M]	
						[R W O C D P S M]	
						[R W O C D P S M]	
						[R W O C D P S M]	
						[R W O C D P S M]	
						[R W O C D P S M]	
						[R W O C D P S M]	
						[R W O C D P S M]	
						[R W O C D P S M]	
						[R W O C D P S M]	
						[R W O C D P S M]	
						[R W O C D P S M]	

Users and Groups Worksheet

Users and Groups

User	Username	Applications Needs Access To	Directories Needs Access to	Group(s) to Belong to

File Server Console Operators

Users	Groups

System Login Restrictions (apply to all users)

Time Restrictions	SUN	MON	TUES	WED	THU	FRI	SAT
Hours to allow login:							
Limit Concurrent Connections:	<input type="checkbox"/> Yes <input type="checkbox"/> No		(If Yes) Maximum Connections:				
Intruder Detection/Lockout	<input type="checkbox"/> Yes <input type="checkbox"/> No						
Intruder Detection Threshold	Number of Incorrect Login Attempts:						
	Bad Login Count Retention Time		Days:	Hours:	Mins:		
Lock Account After Detection	<input type="checkbox"/> Yes <input type="checkbox"/> No		(If Yes) How long		Days:	Hours:	Mins:

System Password Restrictions (apply to all users)

Require Passwords:	<input type="checkbox"/> Yes <input type="checkbox"/> No		(If Yes) Minimum Password Length:				
Force Periodic Password Changes:	<input type="checkbox"/> Yes <input type="checkbox"/> No		(If Yes) Days Between Forced Changes:				
Limit Grace Logins:	<input type="checkbox"/> Yes <input type="checkbox"/> No		(If Yes) Grace Logins Allowed:				
Require Unique Passwords:	<input type="checkbox"/> Yes <input type="checkbox"/> No						

USERDEF Template Worksheet

Username: <i>first name</i>		
Initial Password: <i>first name</i>		
Template Name:		
Parameters	<input type="checkbox"/> Default Template Settings	<input type="checkbox"/> Custom Template Settings
Default Directory (where home directories are created)	SYS:	
Copy Print Job Configurations from	SUPERVISOR	SUPERVISOR
Groups Belonged to	EVERYONE	
Account Balance	1000	
Limit Account Balance	No	
Low Limit		
Limit Concurrent Connections	No	
Maximum Connections		
Require Password	Yes	
Minimum Password Length	5 characters	
Force Periodic Password Changes	Yes	
Days Between Forced Changes	90	
Require Unique Passwords	Yes	
Limit Disk Space	No	
Maximum Disk Space (In KB)		
Login Script		
Search drive for NetWare Utilities Search drive for DOS directory COMSPEC to COMMAND.COM file Network drive to home directory	<pre>map s1:=sys:public map s2:=sys:public\%machine%\OS\%OS_version COMSPEC=s2:command.com map *1:=%default_directory%\%login_name</pre>	
Other commands (custom template)		

Login Script Worksheet

Type of Login Script: System Individual User Username:

NetWare utilities mapping: *MAP INS S1:=SYS:PUBLIC*

DOS directory mapping:

COMSPEC command:

Application directory mappings:

Home directory mapping:

Data directory mappings:

Other commands:

Menu Worksheet

Menu script file name: .MNU			
Applications, Programs, and Commands to Include			
MAIN MENU			
Title:	Horizontal Position:	Vertical Position:	Color Palette:
Options:	Commands/variables OR % submenu label:		
SUBMENU			
Title:	Horizontal Position:	Vertical Position:	Color Palette:
Options:	Commands/variables OR % submenu label:		
SUBMENU			
Title:	Horizontal Position:	Vertical Position:	Color Palette:
Options:	Commands/variables OR % submenu label:		

Accounting Worksheet

System Default Account Balance in SYSCON	
Account Balance (in charges)	
Allow Credit <input type="checkbox"/> Yes <input type="checkbox"/> No	
(If Yes) Unlimited Credit <input type="checkbox"/> Yes <input type="checkbox"/> No (If No) Credit Limit:	
Accounting Servers	
<input type="checkbox"/> File Server	
<input type="checkbox"/> Other Type of Server (refer to the documentation that came with the server)	
Charge for:	Charge Rate:
<input type="checkbox"/> Blocks Read A. Total amount you want to charge for blocks read per _____ B. Estimated total blocks read per _____	$\frac{A}{B} = \frac{\text{Multiplier}}{\text{Divisor}} = \underline{\hspace{2cm}}$
<input type="checkbox"/> Blocks Written A. Total amount you want to charge for block written per _____ B. Estimated total blocks written per _____	$\frac{A}{B} = \frac{\text{Multiplier}}{\text{Divisor}} = \underline{\hspace{2cm}}$
<input type="checkbox"/> Connect Time A. Total amount you want to change for connect time per _____ B. Estimated total connect time per _____	$\frac{A}{B} = \frac{\text{Multiplier}}{\text{Divisor}} = \underline{\hspace{2cm}}$
<input type="checkbox"/> Disk Storage A. Total amount you want to charge for disk storage B. Estimated total disk storage (in block-days)	$\frac{A}{B} = \frac{\text{Multiplier}}{\text{Divisor}} = \underline{\hspace{2cm}}$
<input type="checkbox"/> Service Requests A. Total amount you want to charge for service requests per _____ B. Estimated total service requests per _____	$\frac{A}{B} = \frac{\text{Multiplier}}{\text{Divisor}} = \underline{\hspace{2cm}}$

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