™

System Owner Handbook

N O V E L L®

UnixWare®

2

E N T E R P R I S E C O M P U T I N G P R O D U C T S

disclaimer

Novell, Inc. makes no representations or warranties with respect to the contents or of this manual, and specifically disclaims any express or implied warranties of merchantability or fitness for any particular purpose. Further, Novell, Inc. reserves right to revise this publication and to make changes to its content, at any time, with obligation to notify any person or entity of such revisions or changes.

Further, Novell, Inc. makes no representations or warranties with respect to any UnixWare software, and specifically disclaims any express or implied warranties o merchantability or fitness for any particular purpose. Further, Novell, Inc. reserves right to make changes to any and all parts of UnixWare software, at any time, with any obligation to notify any person or entity of such changes.

trademarks

Novell, NetWare, the N-Design, and UnixWare are registered trademarks of Novel Inc.

NetWare Logotype is a trademark of Novell, Inc.

A complete list of trademarks and their respective owners appears in the "Trademark section.

T*able of Contents*

3   Configuring Your User Environment

4 Setting Up and Configuring Printers

5 Installing and Sharing Applications

11 Setting Up and Configuring NetWare Connectivity

12   Monitoring and Tuning Your System

13   Recovering Your System

14   Setting Up DOS and MS Windows for Merge

A   Troubleshooting

B   Setting Up the Document Browser

Glossary

Trademarks

Index

About This Handbook

This *System Owner Handbook* explains how to set up and configure the UnixWare® operating system on your UnixWare Personal Edition™ or UnixWare Application Server™. It describes what the UnixWare operating system is, how to use the tools provided with UnixWare, how to customize your UnixWare system, how to perform administrative work, and how to access Novell® NetWare® from a UnixWare system, among other topics.

In this handbook, you will learn how to set up, configure, and administer UnixWare. Where applicable, descriptions of graphical setup tools are enhanced with descriptions of command-line utilities available with UnixWare.

Note ▼ Before you begin to read this handbook, UnixWare should be installed on your computer. Follow the procedures described in the *Installation Handbook*.

The *System Owner Handbook* explains how to set up UnixWare from the UnixWare Desktop first and then may include additional tasks you can perform at the command line to customize your system further.

Use this handbook along with the *Desktop User Handbook*. The *Desktop User Handbook* will teach you basic desktop operations; consequently, this handbook assumes you are familiar with many of the basics about the desktop that are described in the *Desktop User Handbook*.

After your system is set up and configured, you can then go to the *Desktop User Handbook* and learn how to use UnixWare.

UnixWare User Documentation and Online Help

Information on installing, setting up, configuring, and using UnixWare is available to you in the following forms:

◆ **Paper versions of user documentation**. Paper copies of the *Installation Handbook*, *Desktop User Handbook*, and *System Owner Handbook* are packaged with your Personal Edition or Application Server edition of UnixWare.

◆ **Online help**. Online help provides information you can readily access electronically through the online Help facility on your UnixWare system. Most screens on the UnixWare Desktop contain a Help button you can click on to access the Help facility. For information, refer to the chapter "Using Online Help and Documentation" in the *Desktop User Handbook*.

◆ **DynaText® online documentation browser**. You can read UnixWare documents with the *Dyna*Text browser. After you install the online document browser, you can open and read books, jump immediately to cross-references (within the book or in other books), or leave bookmarks and notes (annotations) in books.

To install the document browser, refer to the *Installation Handbook*. The appendix "Setting Up the Document Browser"in this handbook describes how to set up the *Dyna*Text document browser. The chapter "Using Online Help and Documentation" in the *Desktop User Handbook* describes how to use it. Information about document browser features and use is also available by clicking on Help in the menu bar of the online document browser.

◆ **Traditional Manual Pages**. The command-line man command provides UnixWare manual pages (complete and concise summaries of the UnixWare command-line utilities, files, and devices). This option is designed for users who do not access the graphical desktop (for example, a user who logs in from a remote character-based terminal). Desktop users can use the document browser to read the UnixWare manual pages.

UnixWare Documentation Roadmap

The following roadmap illustrates hardcopy and online documents for the Personal Edition (PE), Application Server (AS), and Software Development Kit (SDK).

Release Notes
Installation Handbook
System Owner Handbook
Desktop User Handbook

Online Help available

To classic "man" pages, if installed

Proceed if *Dyna*Text is installed or
you are using File Sharing or Remote Apps
to access the *Dyna*Text browser.

Entering *Dyna*Text
online documents
for PE, AS, & SDK

To SDK documents
and other add-ons

To AS documents

PE Use & Administration
Desktop User Handbook
System Owner Handbook
NLM Installation & Administration
Terminal Emulators for
  DOS/MS Windows
Terminal Emulator Scripts
  for MS Windows

PE Reference Manuals
Command Reference
System Files & Devices Reference

Entering SDK documents
(includes PE and AS documents)

Entering AS documents
(includes PE documents)

AS Use & Admin
System Administration
Network Administration
Supplement

SDK Overview (Hardcopy only)
Basic SDK Set (5 documents)
Network Development Set (3 documents)
Windowing Development (4 documents)
C++ Development Set (3 documents)
IHV Kit Set (4 documents)
SDK Reference Set (7 documents)

To print documents
from *Dyna*Text or
order hard copies

To print documents
from *Dyna*Text or
order hard copies

To print documents
from *Dyna*Text or
order hard copies

Documentation Assumptions

This handbook makes the following assumptions about your UnixWare system

◆ Your UnixWare system is installed.

◆ You have your set of UnixWare documentation available for reference.

◆ You plan to do most of your work at the desktop, but you may have to use the command line periodically to edit configuration files or perform some administrative work.

◆ You are aware that many of the tasks in this handbook require some knowledge of the NetWare or UNIX® System V™ operating systems.

◆ You are using a mouse with UnixWare (see the *Desktop User Handbook* for information on mouse functions). If you are using only the keyboard, refer to the *Desktop User Handbook* for information on using the keyboard rather than the mouse.

◆ Key combinations use the following format in text and in user input:

<Alt>+<F4>

In this example, you press the <Alt> and the <F4> keys simultaneously and then release them. If a third key is required, press the first two keys simultaneously and then press the third key.

1 *An Introduction to UnixWare*

This chapter introduces you to the following components of the UnixWare system and includes information on

◆ The user interfaces: the desktop graphical user interface and the shell command line interface

◆ The operating system: the kernel, the file system, and devices

Overview

As an owner of a UnixWare system, you have power in your hands that was once only available to UNIX system administrators. You can configure connections to networks, add hardware, set up user accounts, and tune the performance of your system.

All the power of traditional UNIX systems is now in UnixWare. In addition, many of the procedures for setting up and connecting to remote systems are simplified by the desktop graphical user interface. You can do most tasks on the desktop by manipulating windows and icons.

You also have access to standard UNIX system utilities and configuration files for more complex or specialized tasks. You access these features by typing commands from a command-line interpreter called a shell.

This handbook focuses primarily on the graphical configuration utilities contained in the Admin Tools folder. The Admin Tools folder is where most of the system setup features are contained. Because more advanced features may require you to use commands, command-line basics are also described here and in the chapter "UnixWare Command-Line Tools" in this handbook.

After you install UnixWare, however, a "Welcome" screen appears on your system. If you need to understand where to begin when you are ready to set up UnixWare and what particular components are essential to get UnixWare running, you have the option at that time to set up several basic components

such as mail and TCP/IP. See the *Installation Handbook* or online help which list the various components you must set up first if you are using UnixWare for the first time.

Though most internals of the UnixWare operating system are hidden by the desktop, there are parts of the operating system you will encounter as you configure your system. Those parts of the UnixWare operating system you need to know about are also described in this chapter.

Desktop vs. Command-Line Interfaces

The desktop graphical user interface and the shell command line interface are the two ways of working with the UnixWare system. For the beginning UnixWare user, we suggest you use the desktop. It is more intuitive and does more error checking.

If you know the basics of the UNIX operating system and the command line or you are fully knowledgeable about the UNIX operating system, you can either use the desktop or the command line to do your work.

The following sections describe how the desktop and command line interfaces differ, how the desktop is used to configure your system (focusing on the Admin Tools folder), and how to access the command line from a Terminal window.

Differences Between the Desktop and the Command Line

The desktop interface relies primarily on the mouse in combination with the screen and keyboard. The shell, however, expects you to type commands to work with the system. The following examples demonstrate how the two interfaces can be used to accomplish the same task.

Moving Around the File System. The following example describes how to move around the file system from the desktop and the shell:

♦ From a desktop folder you can move around the file system by double-clicking on folder icons or by selecting items from the *Go To* menu. Also, files deleted from the desktop can be retrieved from the Wastebasket. See the *Desktop User Handbook* for information on using files and folders.

◆ From the command line you can type **cd** to change directories. Files deleted from the command line cannot be retrieved. See the chapter "UnixWare Command-Line Tools" in this handbook for information on using the command line.

Viewing File Attributes. Each item in the file system has attributes associated with it. These attributes include who can access the item, who owns it, the date it was created, its size, and whether it can be read, changed, or executed (see the chapter "UnixWare Command-Line Tools" in this handbook for information on file access). For example:

◆ From a desktop folder you can click on *Edit* then *Properties* after selecting an icon to view its properties.

◆ From the command line you can type **ls -l** to view file properties.

See the chapter "UnixWare Command-Line Tools" on page 13 in this handbook for more information on the file system.

Overview of the Desktop

By operating the mouse and keyboard together, you can work with the windows, icons, and menus that come with the UnixWare Desktop. The first UnixWare screen will look similar to this:

Figure 1-1
UnixWare Desktop
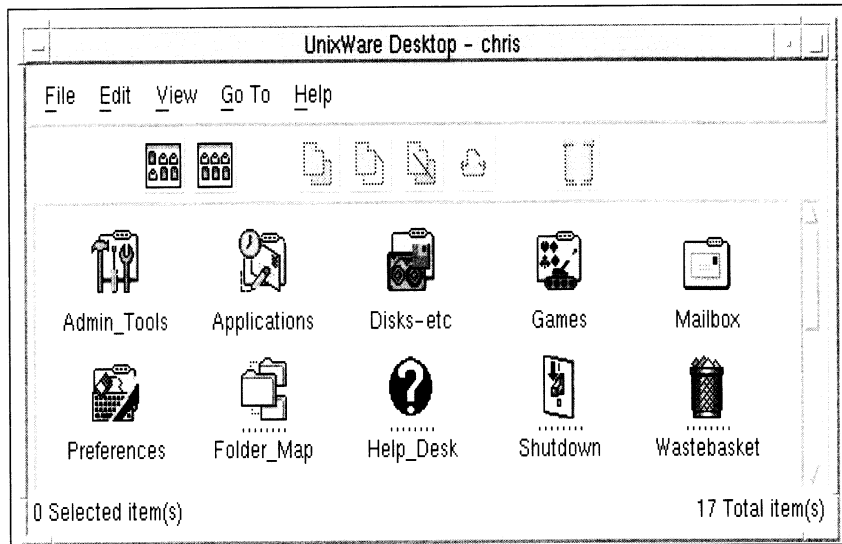
Think of the "UnixWare Desktop" window as your *home* folder. Within it are other folders containing major desktop tools, including the following:

Note ▼ These tools may vary depending on what packages you chose to install.

Admin Tools. Contains tools for administering and configuring your UnixWare system, such as Backup and Restore, Display Setup, Mail Setup, Printer Setup, and so on.

Applications. Contains graphical applications and accessories, such as Mail and Text Editor.

Disks-etc. Provides icons to access floppy disks, tapes, and other devices.

Games. Contains graphical games, such as Puzzle and Tetris.

Mailbox. Contains mail messages you have saved.

Preferences. Contains utilities for changing the look and feel of the desktop, such as colors, startup items, and background designs.

NetWare. Displays the NetWare servers on your network to which you can connect.

Folder Map. Displays a graphical view of the file system, including all of your folders.

Help Desk. Accesses online help facilities.

Shutdown. Shuts down the system.

Wastebasket. Contains files that you discarded. You can retrieve these files later if needed (for up to seven days, by default).

See the *Desktop User Handbook* to learn how to use the previous tools.

Using Admin Tools

Most of the tools you need to configure your system are contained in the Admin Tools folder on the desktop. Using different Admin Tools icons, you can connect to networks, install hardware, and add applications and users. The next figure shows the contents of the Admin Tools folder.

Admin Tools

Folder: /home/chris/Admin_Tools

File   Edit   View   Go To   Help

Networking   App_Installer   App_Sharing   Backup-Restore   Display_Setup

GetInetBrowser   Hardware_Setup   Icon_Setup   MHS_Setup   Mail_Setup

Printer_Setup   System_Monitor   System_Status   System_Tuner   Task_Scheduler

User_Setup

1 Selected item(s)   16 Total item(s)
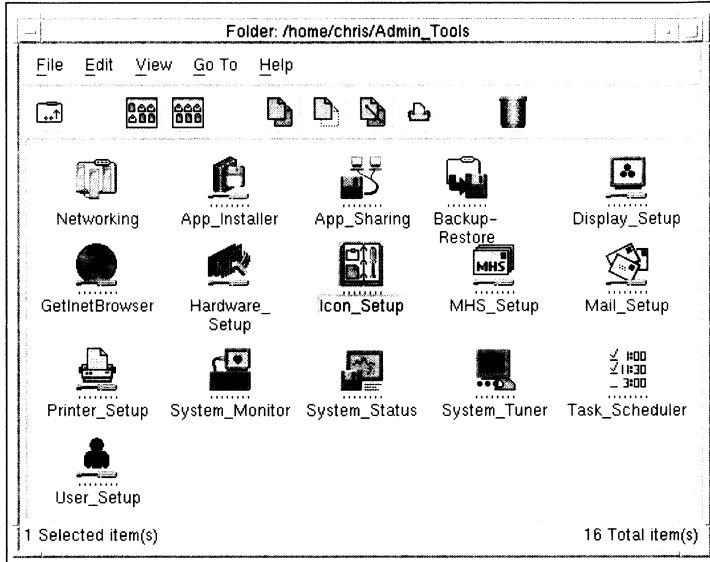
Note ▼ Depending on how your system is installed, not all of these items may appear on the desktop.

Networking Folder. Contains the following utilities for networking:

Dialup Setup. Used for configuring serial communications. You can configure devices for modem and direct connections, add names of systems you can contact, create icons in folders for easy communications with devices and remote systems, and view and modify dialup settings.

File Sharing. Allows you to configure file sharing through Network File System (NFS) for local files and folders to connect to remote files and folders. Once File Sharing is configured, you can work with remote files and folders as though they were on your local system.

NetWare Setup. Allows you to configure NetWare-related services on your system. You can change Local Area Network (LAN) board assignments, set LAN parameters, and choose to advertise NetWare services from UnixWare.

NetWare Access. Once set up, this allows you to manage access to NetWare servers. You can log in to and out of servers, change passwords on a server, save a list of servers, and view a list of users and volumes on servers.

Internet Setup. Allows you to configure your system for TCP/IP networking. The features include Network Information Service (NIS) server access, Domain Name Service (DNS) access, and routing configuration (setting netmask and broadcast address). Once Internet Setup is configured, you can use file transfer, remote login, and other TCP/IP services.

App Installer. Allows you to install applications and UnixWare system software from CD-ROM, floppy disk, cartridge tape, the network, or the file system. It also displays what applications are already installed.

App Sharing. Allows you to share applications with other UnixWare systems. Other systems can use the Remote Applications icon in the Applications folder to view and run the applications you share.

Backup-Restore. Allows you to make a backup copy (onto a floppy diskette or cartridge tape) of data on your hard disk and allows you to restore previously saved backups of your data from tape, floppy disk, or other media.

Display Setup. Allows you to change attributes associated with your video display. These attributes include the video board you are using (based on the manufacturer and video chips used), the memory available on the board, the screen resolution, the type of monitor used, the size of the monitor, and the number of colors available on the board (typically 16 or 256). This tool also has a feature for testing selected video settings.

Get Inet Browser. Allows you to install an Internet Browser. The Internet Browser is a graphical interface for navigating through the Internet.

Extra Admin. Starts the character-based Operations, Administration, and Maintenance (OA&M) utility for system administration.

Hardware Setup. Allows you to add hardware drivers and configure them into your system. You can assign interrupts and addresses for specific boards as well as view information about your current hardware configuration.

Icon Setup. Allows you to create icon classes for files and applications. Icon classes define how the icon appears on the desktop and the resulting action when you use it.

Install Server. Allows you to set up your system as a server for network installation of UnixWare. Other UnixWare systems can install individual applications or the entire UnixWare system from an Install Server system.

MHS Setup. Allows you to configure the UnixWare side of a gateway between Message Handling Service™ (MHS™) and UnixWare mail. Once configured, MHS Setup allows you to send and receive messages from an MHS mail system.

Mail Setup. Allows you to manage electronic mail between your UnixWare system and other UNIX systems. Using this feature, you can also define how mail messages are routed.

Printer Setup. Allows you to configure your printers. You can configure local printers (serial and parallel), access to remote UNIX system printers, and access to remote NetWare printers for use with your system. You can also allow users on remote systems to access your printers.

Processor Setup. Allows you to manage processors in a multi-processor system. You can place a processor online, take a processor offline, and view its properties.

System Monitor. Allows you to monitor system activities, such as hard disk I/O and memory usage. You can change how often the system is checked and the precision with which activities are monitored. The results are displayed graphically.

System Status. Allows you to check system characteristics including the system name, hard disk space consumed, and the types of media devices (tape and floppy disk) connected to the system. You can also change the system time with this utility.

System Tuner. Allows you to tune the UnixWare kernel to improve performance. Specifically, the System Tuner icon allows you to change tunable parameters that impact how resources (such as memory and processing power) are allocated on your system.

Task Scheduler. Allows you to schedule programs to run later. You can configure tasks to run once at a specific time and date or to run on a specific day of the week at a specific time.

User Setup. Allows you to manage user accounts on your system. You can add and delete users or groups. For all users, you can specify permissions to system resources, if they are a desktop user, and the locale in which the user will be working.

This handbook describes how to use most of the features listed previously. See the *Desktop User Handbook* or the *Installation Handbook* for more information.

User Types

Because UNIX systems were usually run on large, multiuser computers, the concept of different user types arose. UnixWare adds the concept of a system owner user type to the standard UNIX user types. The following paragraphs describe the difference between user types.

- ◆ **System owner**. A system owner can run any of the utilities in the "Admin Tools" window to configure UnixWare. Other users can only view Admin Tools information from the desktop unless the owner grants them additional permission.

- ◆ **Root user**. This user has complete control over the UnixWare operating system. The system owner is allowed to perform desktop administrative tasks, but the root user is allowed to perform other command-line tasks such as editing a system configuration file.

- ◆ **Regular user**. This user can perform tasks that the system owner allows and can use the desktop to work in files and use applications.

- ◆ **Reserved user**. Typically, no users log in to reserved accounts. These accounts are used by programs, such as mail, to access system resources.

See the chapter "UnixWare Command-Line Tools" in this handbook for more information on the UnixWare operating system, the file system, and the shell.

Overview of the Command Line

While many system operations can be performed from the desktop, some operations must be executed using the UNIX System shell command-line interpreter. Experienced users may prefer to use the command-line interface because of the powerful utilities it has for programming high-level operations.

If you are a non-desktop user (see "Using User Setup" in the chapter "Configuring Your User Environment" of this handbook for more information), you are automatically presented with a UnixWare shell command prompt after a message appears indicating that you are not a desktop user when you log in (and the desktop does not appear on your screen), as shown in the following example:

$

If you are a desktop user, you can open a "Terminal" (or xterm) window (located in Applications) to start a shell session, as shown in the following example:

Figure 1-3
Terminal Window
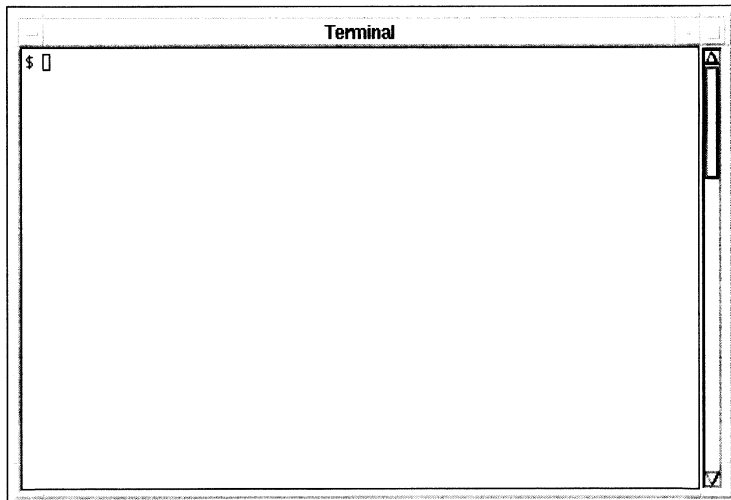
Once you open a "Terminal" window, you can type any command the same as you would in any standard shell session.

To use a "Terminal" (or xterm) window to do administration and configuration tasks, you must usually obtain root permissions. Do this by typing **su -root** from the "Terminal" window, then type the root password when prompted. (You were asked to type a root password when you installed UnixWare and this is the same password you use.) At that point, you can edit any files on the system or run any administrative commands.

Important Only work as root when you absolutely need to perform root tasks; this reduces the chance of accidentally damaging the system. For example, files deleted from the command line cannot be retrieved from the Wastebasket.

Various features of the UnixWare shell are described later in this handbook. There are also several UnixWare system books available in bookstores, such as the comprehensive *Novell's Guide to UnixWare*, from Novell Press/Sybex.

Overview of the UnixWare Operating System

As the owner or administrator of your UnixWare system, you should, at the minimum, become familiar with the different aspects of your operating system even if you only use the desktop. An in-depth knowledge of UNIX system internals is not necessary, but it is important to understand those parts of the system with which you may need to come in contact.

The following sections discuss the underlying operating system. If you have an Application Server, see the online browser for more information on the UnixWare operating system.

Devices

Devices provide access to the hardware connected to your system. Devices are represented in UnixWare as files in the file system. Some of these files represent pseudo devices (items that resemble hardware to your system but are actually software devices). For example, every time you open a "Terminal" window, the system opens another pseudo device as if you were working from another separate physical terminal.

Devices are contained in the */dev* directory (or its subdirectories). Permissions for ownership of, reading from, and writing to devices are the same as they are for any other file in the system. If you cannot read a floppy disk or communicate on a COM port, it may be that the permissions are turned off and you cannot read media or communicate to a port. See the chapter "Setting Up and

Configuring NetWare Connectivity" for information on file and directory permissions.

As a UnixWare system owner, you may need to know the device names of certain hardware items to be able to configure them into your system. For example, here are a few device names you may find useful:

/dev/tty00	COM1 Port
/dev/tty01	COM2 Port
/dev/rdsk/f0	Floppy Drive A
/dev/rdsk/f1	Floppy Drive B
/dev/rmt/c0s0	Cartridge Tape Drive
/dev/cdrom1	CD-ROM

There are usually several device names that access a particular hardware device. These names describe where on the medium the devices begin reading or whether or not the device supports hardware flow control, for example. See the following manual pages in the *System Files and Devices Reference* for more information: **asyc**(7) for COM ports and other serial devices or **fd**(7) for floppy disk devices.

The Kernel

The kernel is the heart of UnixWare. When you install the UnixWare system and configure the devices connected to it, the system builds a bootable UnixWare kernel in the */unix* file. Because every hardware and software configuration is slightly different, every kernel is different.

The configured kernel recognizes the hardware connected to your system, how memory is allocated for different system resources, and what limits are placed on the system (such as how many processes can run simultaneously or the maximum size a file can be on the system).

Most UnixWare system owners can ignore the kernel quite happily. However, there are tools for configuring and tuning your kernel which you might want to use either from the desktop or at the command line.

For example, adding software and hardware to your system sometimes requires that you rebuild your UnixWare kernel. Though this works automatically when you reboot your system, some system owners prefer to rebuild the kernel manually because they can display error messages for further analysis. (See the chapter "Setting Up and Configuring Hardware" in this handbook for information on how to rebuild your kernel.)
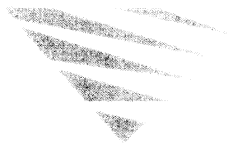
2 *UnixWare Command-Line Tools*

This chapter introduces you to various command-line tools you may need as you work in UnixWare and also includes information on

◆ How the file system works and how to use files and directories at the command line

◆ How to start up and use a UnixWare shell

◆ How to use some basic UnixWare commands

◆ How to check if you have enough disk space

◆ How to use an editor either from the UnixWare Desktop or from the command line

Overview of the UnixWare File System

A file system is comprised of files. Some of these files contain data (regular files) while others serve as containers for organizing data (directories or folders). There are also special files, such as devices (providing access to hardware), links (providing multiple ways of accessing a particular file), and FIFOs (providing a way to pipe information between applications), that serve special purposes. These components provide a way to organize, retrieve, and manage information electronically.

The set of files and directories on your system is organized into a tree structure. The *root* (/) directory is the top directory of the tree. By moving down the branches extending from root, you can reach other major system directories. Within these directories are subdirectories and then files.

Note ▼ Do not confuse the root directory with a root user. See the chapter "An Introduction to UnixWare" earlier in this handbook for information on root users.

Each directory in the tree is represented as a folder on the desktop. On the desktop, you can double-click on a folder to move down the directory tree. From the command line, you can use the **cd** command to move around the file system.

As a user of a system, you can create as many directories (or folders) as desired for organizing your applications and data files. UnixWare, however, has many standard directories for storing files. For example, home directories are typically stored in the */home* directory under the user's name (for example, */home/chris*). The */bin* and */usr/sbin* directories contain UnixWare user utilities, while */etc* and */sbin* contain administration utilities.

The directories at the highest level of the tree are */usr, /bin, /home*, and so on. These directories are mostly used by the system owner or other users. Other directories, such as */etc, /var, /sbin*, and so on, are mostly used by system administrators. If you have an Application Server, see the *System Administration* guide for information on these directories.

Pathnames

Every file and directory in the UnixWare system is identified by a unique pathname. The pathname displays the location of the file or directory, and also provides directions for reaching the file. There are two types of pathnames: full and relative.

Absolute Pathnames

An absolute pathname (also known as a full pathname) starts at the *root* directory and leads you down through the directory tree. For example, a file in Chris's *home* directory would be */home/chris/file*. You can use an absolute pathname to reach any file or directory in the UnixWare system in which you are working. For example, if you type

```
cp /home/chris/stars /home/docs/stars
```

you are copying a file (stars), using the absolute pathname, from one directory (*/home/chris/stars*) to another (*/home/docs/stars*).

Checking Your Position in the File System Tree

When you log in to UnixWare and the UnixWare shell, you are placed in your *home* directory. If you change to other directories and lose your place, type

pwd in a "Terminal" window. This will show the full pathname of your current working directory.

For example, the file *stars* is in the directory *chris* and user Chris wants to view the absolute path. If Chris types

```
pwd
```

the system displays the current absolute pathname:

```
/home/chris/stars
```

Relative Pathnames at the Command Line

A relative pathname starts in your current working directory in a "Terminal" window and leads you up or down through the directory tree. You can type two periods (..) to refer to the directory above the current directory (also known as the parent directory).

For example, if you type

```
cd ..
```

you can move to the directory above the current directory. In the previous example, this would move you from the directory */home/Chris/stars* to */home/Chris*.

If you are logged in as root, you can also type **cd** to reach the *root* directory (/).

Overview of NetWare Rights and UnixWare Permissions

UnixWare stores files with permission assignments that define who owns the file, which group is assigned to the file, and what read, write, and execute permissions are assigned to the file. NetWare has a completely different set of permissions associated with files it uses on a NetWare server. To use NetWare resources from UnixWare, UnixWare maps the access control permissions into UnixWare permissions on a UnixWare system.

For example, if you open a file on the NetWare side and you are set up in NetWare mode, you may find different file attributes and accessibility than if you opened the file in UnixWare using UNIX mode. See the chapter "Setting Up and Configuring NetWare Connectivity" later in this handbook for information on the modes you can use.

As a UnixWare owner, you can use all of the standard UNIX methods for changing permissions (**chmod**, **chown**, **chgrp** commands, as described in the chapter "Setting Up and Configuring NetWare Connectivity") on NetWare files accessed through UnixWare. Because the two systems' file attributes do not correspond exactly, changing permissions on NetWare resources through UnixWare can sometimes have unexpected results. For a description of NetWare permissions as they relate to UnixWare, see the chapter "Setting Up and Configuring NetWare Connectivity" later in this handbook.

The UnixWare Shell

The primary function of the shell is to act as a command interpreter between you and your UnixWare system. Special shell functions and characters give you flexibility in managing your shell environment, handling input and output, and referring to files.

Every time you log in to the UnixWare shell, or when you double-click on the Terminal icon and open a "Terminal" window, you start communicating with the shell. When you use the shell, you are using the command line to perform tasks.

Note When naming files and directories, avoid using the following characters because they have special meaning to the shell:

? @ # $ ^ & * ( ) ' [ ] \ | ; ´ ˝ < > null space

Starting Up a UnixWare Shell

Instead of launching the desktop when you log in to UnixWare, you can start up with the standard UNIX shell prompt. This is similar to starting your system from a DOS prompt.

Entering the Shell at Login Time

If you prefer to work with UnixWare exclusively from the command line (or if you are working from a remote terminal or dumb terminal that does not support a graphical interface), you can start up UnixWare with a command line prompt instead of the graphical interface.

By default, each user is a desktop (graphical) user and has the graphical interface start automatically upon login. To change this behavior, open the Desktop icon in the Preferences folder and set Start Desktop at Login to **No**.

The next time the user logs in, the login session will start with a command-line prompt.

If you want to start the desktop later, you can always do so by typing **desktop** at the shell prompt.

Entering the Shell from the UnixWare Desktop

To open a shell session while you are using the desktop, double-click on the Terminal icon in the Applications folder. You can have several "Terminal" windows open during a single desktop session.

Exiting the UnixWare Shell

If you are in a "Terminal" window on the desktop, you can exit the shell by typing **exit**. To exit the shell from a non-desktop session, you can also type **exit** to close the session and log off of the system.

If you are running remote applications (such as rlogin), when you exit the windows on your local system, your local windows will close but your remote windows will remain open until you log out of the remote system.

Using the UnixWare Shell

Most of your tasks may be performed in the desktop, but some may require use of the command line. Throughout this handbook, there are various references to the shell variables, shell commands, and so on.

Shell Types

A default shell is assigned to each user account. This default shell is what you work from if you are a non-Desktop user. The default shell for each user is defined in the "User Setup" window and stored in the */etc/passwd* file. If you are not sure what your current shell is, type **ps** from the command-line prompt. The name of the current shell will appear as one of the running processes.

The most popular shells are listed in the following:

◆ **Bourne Shell**. This is *sh* (*/usr/bin/sh*), which was one of the first shells to be developed. This is the most common shell and is assigned to new users by default when you open up a "Terminal" window. Type **sh** to get the Bourne shell.

◆ **Korn Shell**. This is *ksh* (*/usr/bin/ksh*), which is a standard UNIX System V shell. The Korn shell is a superset of Bourne shell features and is assigned by default from User Setup. This is the shell that comes up when you log in from the command line.

◆ **C Shell**. This is *csh* (*/usr/bin/csh*), which is more commonly used in Berkeley UNIX systems.

◆ **Windowing Korn Shell**. This is *wksh* (*/usr/bin/wksh*), which is a common version of the Korn Shell. The wksh has additional features that allow you to create graphical applications using shell commands. For example, an administrator could create, through shell scripts, a graphical interface to customize and perform an administrative task, such as changing shell types.

Using Shell Special Characters

Some characters have special meanings when using the shell as shown next:

Table 2-1
Shell Special Characters

Character	Function
>>	This appends the output of a command to the end of a file; for example, **ls** *file1* **>>** *file2*.
&	This runs commands in the background so you can perform other tasks; for example, **cc** *filename* **&** means to print this file in the background so you can perform another task.
;	This separates multiple commands on one typed line; for example, **lp** *filename***; ls** *file1* > *file2*. These commands are executed one at a time from left to right.
>	This redirects the output of a command into a file and replaces its contents; for example, **ls** *file1* > *file2*.
<	This redirects the input for a command to come from a file; for example, **mailx** *user1* < *file1* mails the contents of *file1* to the user named *user1*.
$	This is used to preface shell variables; for example, *$HOME* is interpreted as the user's *home* directory.
|	This is the pipe symbol which directs the output from one command to the next command; for example, **ls** | **pg** (list files and print to the screen one page at a time).

The following metacharacters can also be used in the shell and can save you keystrokes:

* ? [ ]	The asterisk, question mark, or brackets allow you to specify filenames by matching patterns. For example, if you type **ls ?[abc]*** you are asking the shell to list all the files that begin with any character (?) then list the letters a, b, or c second letter ([abc]), followed by any number of characters (*).

Listing Files in a Directory

To view the contents of a given directory, type

ls *dirname*

For example, to list all of the files in a directory that contain the first three characters *chr*, type

ls chr*

The asterisk (*) matches any character(s) or no characters. (In other words, it would list any filename that included the characters *chr.*)

Copying Files

To copy a file from one directory to another directory, type

cp *current_pathname new_pathname*

For example, if you want to copy the file *horns* from the */usr/bin/antelope* directory to the */home/chris/antelope* directory, type

cp /usr/bin/antelope/horns /home/chris/antelope

Your copied file should now appear in the */home/chris/antelope* directory.

Moving Files

To move (rather than copy) a file from one location to another, type

mv *current_pathname new_pathname*

For example, if you want to move the file starship to the */home/docs/stars* directory, type

mv /home/chris/stars/starship /home/docs/stars

If */home/chris/stars* was your current directory, you could type

mv starship /home/docs/stars

Linking Files

To link files together, type

ln *current_pathname new_pathname*

For example, you could link these two directories together by typing

ln /home/chris/starship /home/docs/starship

This links the file */home/chris/starship* to a new file that is called */home/docs/starship*. Instead of creating a copy of the file, you have two points of access to the same file. Therefore, if you change one file, the other file is changed as well.

To perform a link as shown previously (known as a hard link), both files must reside in the same file system. If they do not, you may use **ln** with the **-s** option to create a symbolic link. (Type **/etc/dfspace** to see a list of the file systems.)

With a soft link, if you remove the original file, the link you created will point to an empty file. With a hard link, the file still exists until all hard links are deleted.

Deleting Files

To remove a file in a directory, change to that directory and type

rm *filename*

this deletes the file you specify if you have the correct permissions.

Warning ▼ Once you delete a file using the command line, it cannot be recovered. If you delete a file using the desktop, however, you may be able to recover your file. See the *Desktop User Handbook* for more information on the Wastebasket.

Compressing Files

File compression usually saves 30 to 50 percent of file space which allows you more space on your media. This can also be used to send lengthy mail messages.

Note ▼ The **compress** program adds a *.Z* extension to the filename to indicate it is compressed. Make sure all compressed files are uncompressed when you want to use them.

To compress a file, type

compress *filename*

To uncompress a file, type

uncompress -v *filename*

Note ▼ The **compress** program creates a file that is in binary format. Before you mail the file, you must convert it to an ASCII format using the **uuencode** command after the file is compressed. The recipient should be instructed to use the **uudecode** command, then the **uncompress** command before using the file.

For more information on **compress**, **uncompress**, **uuencode**, or **uudecode**, see the *Command Reference*.

Backing Up Files

There are three ways to back up files and directories:

1. You can use the "Backup-Restore" window in the desktop (see the *Desktop User Handbook*).

2. If you prefer to back up and restore your files using the command line, you can use the **cpio** or **tar** commands or the **backup** and **restore** commands. See the *Command Reference* for more information. If you have an Application Server, see "Backup and Restore Services" in the *System Administration* guide.

   When copying files from your media, the two most common commands to use are the **cpio** and **tar** commands. These commands use different formats; if you try one command and it does not work, try the other command.

3. You can also back up UnixWare files and directories from the NetWare server using the Storage Management Service Target Service Agent (SMS TSA™). See the *NLM Installation and Administration* guide for more information.

Copying Files from Your Media to Your Hard Drive

Note Before you copy files from cartridge tape, floppy diskette, or CD-ROM, ensure that your media is inserted in the drive and that it is formatted as either **cpio** or **tar**.

If you have an Application Server, see the *System Administration* guide for a complete list of the device names used in this section. Also, see the *Command Reference* for more information on the **cpio**(1) and **tar**(1) commands and options.

Copying Files from Diskette

The **cpio** command (copy input/output) allows you to copy files from one location to another.
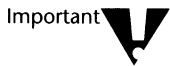
Important If absolute pathnames are recorded on the diskette, files are recovered to the designated paths, regardless of the directory you are in.

To copy all of the files from the first diskette drive onto your hard drive, for example, change to the directory (type **cd**) in which the files are to be copied:

Procedure

1. **Double-click on Applications in the UnixWare Desktop.**

2. **Double-click on Terminal in the Applications folder.**

   A "Terminal" window appears.

3. **Type *su* to become root.**

4. **Type**

   ```
   cpio -ivmd < /dev/rdsk/f0
   ```

   where **-i** is input mode, **-v** places the output in verbose mode and causes a list of file systems to be printed, **-m** means to maintain previous file modification time, and **-d** means create directories where needed.

Copying Files from Cartridge Tape

The **cpio** or **tar** commands (tape archive) allow you to copy files from one location to another. Though **cpio** is a more flexible tool, **tar** is available on all UNIX systems.

To copy all of the files from your cartridge tape, for example, do the following:
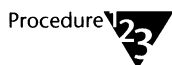
1. **Double-click on Applications in the UnixWare Desktop.**

2. **Double-click on Terminal in the Applications folder.**

   A "Terminal" window appears.

3. **Type *su* to become root.**

   You only need to be root if you are copying files to restricted directories. This is usually true if you are installing an application with **tar**.

4. **To copy all the files from cartridge tape onto your hard drive, change to the directory (type cd) in which the files are to be copied.**

   If absolute pathnames are recorded on the tape, files are recovered to the designated paths, regardless of the directory you are in.

5. **Type one of the following commands for cpio-formatted media. For example, type**

   ```
   cpio -it < /dev/rmt/ctape1
   ```

   to view the contents of the tape, or type

   ```
   cpio -ivmud < /dev/rmt/ctape1
   ```

   to copy files from the tape to your hard disk.

   Type one of these commands for **tar**-formatted media. For example, type

   ```
   tar tfi /dev/rmt/ctape1
   ```

   to view the contents of the tape, or type

   ```
   tar xvf /dev/rmt/ctape1
   ```

   to copy files from tape to your hard disk.

Copying Files from CD-ROM

The UnixWare Desktop provides an easy way to copy files from your CD-ROM to your hard disk. (See the *Desktop User Handbook* for more information.)

To copy your files from a CD-ROM device (you must also mount the media using the command line), do the following:

1. **Double-click on Applications in the UnixWare Desktop.**

2. **Double-click on Terminal in the Applications folder.**

   A "Terminal" window appears.

3. **Create a cdrom directory by typing**

   ```
   mkdir cdrom1
   ```

4. **Mount the CD-ROM device (as root) by typing**

   ```
   mount -F cdfs /dev/cdrom/c1t2l0 /cdrom1
   ```

5. **Copy the desired files from your CD-ROM to your hard disk by typing**

   ```
   cp -r /cdrom1 $HOME/cdromfiles
   ```

The files are copied to your *home* directory. For example, they would be copied to the */home/chris/cdromfiles* directory if it existed.

Finding Files

If you cannot remember the name of a file you created or the location of a directory, you can use the **find** command. This powerful command is one of the most commonly used in UnixWare; you can search the entire directory structure if necessary.

To use **find**, type

```
find pathname options
```

where *pathname* is one or more directories to search and *options* is the action you want to take once the file or directory is located.

For example, if you want to find and print all of the files and directories below the *bin* directory in your *home* directory, type

```
find $HOME/bin -print
```

UnixWare will find the *bin* directory and list its contents, plus the contents of any subdirectories, to the screen. (You can also use **Find** on the desktop, of course.)

If the listing is large, you may want to pipe the output to **pg** (page) to view the output one screenful at a time. Or you can use the **grep** command to filter out all but a particular filename. You can also limit output by using the **-xdev** option to not check devices or remote file systems. For example,

```
find -xdev /home -print | grep memo
```

For more information on the **find** command and options, see the *Command Reference*.

Printing Files

To print a simple text file, type

```
lp file
```

This sends *file* to the default printer for your system. To specify a particular printer, use the **-d** *printer* option, where *printer* is replaced by the name of the printer you want to use. For more information on printing, see the chapter "Setting Up and Configuring Printers" later in this handbook, or if you have an Application Server, see the "Print Service Administration" section in the *System Administration* guide.

Determining Disk Space

When you add software packages or create large amounts of data on your hard disk, it is important to check for free disk space periodically. Running out of disk space can cause you to lose important data.

You can determine how much disk space is free and how much disk space is used on your system by typing either of two commands: **du** or **df**. The **df** command looks at file systems only and tells you how big they are. On the other hand, the **du** command looks at the files you give it and determines how much space is taken up by each file and directory below those points in the file system.

Suggestion ▼ ▼ The desktop also provides a "System Status" window, described in the chapter "Monitoring and Tuning Your System" later in this handbook that shows the disk space you have available and how to change the amount of disk space you have. You can also use the **dfspace** command to check your disk space.

Using the *du* and *df* Commands

The **du** (Disk Usage) command determines how much space files and directories are using.

The **df** (Disk Free) command determines free disk space and disk space in use. This command lists the file systems available on your system, how much space is used, and the total size. This is done both for blocks (data) and files. Therefore, you can tell how many more files you can create on the file system and how big they can be.

To use these commands, type

du *pathname*

or

df *pathname*

where *pathname* is the directory and subdirectories you want to access. The *pathname* is optional for both commands. If no *pathname* is specified, your current directory is used. Usually, you would use **df** without a *pathname* to list disk usage for all file systems. UnixWare returns the disk usage in 512-byte blocks (depending on your file system type).

Using a Text Editor

A text editor has its own set of commands that allows you to create, move, add, and delete text in files, as well as cut and paste data from other files. More advanced text editors allow you to run programs on the text (such as sort programs) and do complex search and replace operations.

Since configuration files may need modification as you use UnixWare (several files described in this handbook may need to be modified with a text editor), you need to become familiar with at least one text editor.

You can edit files using one of two methods:

◆ The UnixWare Desktop Text Editor

◆ A UnixWare command-line editor such as *vi*

Most configuration and system files that need to be edited require you to be the root user. The root user has complete control over the UnixWare operating system; some files can *only* be edited by root.

To open a "Terminal" window for *vi* as a root user, do the following:

Procedure

1. **Double-click on the Applications folder in the UnixWare Desktop.**

2. **Double-click on the Terminal icon in the Applications folder.**

   A "Terminal" window opens along with a command-line prompt.

3. **To become a root user, type *su* and the root user password when prompted.**

Note

To know if you are a root user, type **id** in the "Terminal" window. Your current user ID appears. A user ID of `uid=0 root` indicates that you are the root user. If you are not a root user, your username appears.

See the *Desktop User Handbook* for information on how to use the UnixWare Text Editor. See "Using vi at the Command Line" next for information on how to use the UNIX *vi* editor.

Using vi at the Command Line

The *vi* editor is a screen editor that enables you to edit any text files on your system. To use this editor, double-click on Terminal in the Applications folder. This displays a "Terminal" window.

To start *vi* and edit a file, at the prompt type

vi *filename*

Note

Make sure you are in the directory containing the desired file or type the full pathname of the file.

Modes of Operation

The *vi* editor has the following two modes of operation:

◆ Command mode

◆ Text input mode

When you begin an editing session, you are in command mode. This means that you can move around in a file, search for patterns, and request changes to existing text. But you *cannot* create text in this mode. To do this, you must be in text input mode.

One way to move to text input mode is to type **i** (insert). This allows you to begin adding text to the right of the text cursor. When you are finished entering text, press <Esc> to return to command mode.

Using a few *vi* Commands

This section explains how to modify a simple file and provides only enough information so that you can modify any configuration file used in this handbook.

To open a "Terminal" window and use *vi*, do the following:

Procedure

1. **To use *vi*, double-click on Terminal in the Applications folder.**

   This opens a "Terminal" window with the shell prompt, such as

   ```
   $
   ```

2. **Change (*cd*) to the directory in which your file resides by typing**

   cd *dirname*

   For example, to go to */etc/conf/bin*, type **cd /etc/conf/bin**.

Suggestion

You can type **cd** with no options to go to your *home* directory or type the full pathname. For information on how the file and directory structure works, see "Overview of the UnixWare File System" earlier in this chapter.

3. **To make sure you are in the desired directory, type**

   pwd

4. **To open a file, type**

   vi *filename*

5. **To move through the file in command mode, use the arrow keys or type the h (move left), j (move down), k (move up), or l (move right) keys. For example, to move several lines or characters down, type**

```
nj
```

where *n* is the number of lines to move. For example, if you want to move 10 lines down, type

```
10j
```

6. **To enter insert mode, position the cursor in front of the text to insert and type**

```
i
```

You can now start typing your text. When you want to move to another line in the file to make another change, press <Esc> to move to command mode and use the arrow keys as described in Step 5.

The following table lists simple *vi* commands, what they do, and provides an example.

Table 2-2
Simple *vi* Commands

Command	Description	Example
dd	To delete lines in command mode, position the cursor at the line to delete and type **dd** or *n***dd**	If you type **10dd**, this means that you want to delete the line your cursor is on plus the nine lines below that line.
x	To delete a character within a sentence in command mode, type **x** with the cursor on the character to delete.	If you type the word "replaace" and you want to remove the extra "a," place the cursor over one of the a's and type **x**.
dw	To delete a word within a sentence in command mode, position the cursor on the first character of the word and type **dw**.	If you want to delete the word "replace" in a sentence, place the cursor in front of the "r" and type **dw** (delete word).
r	To replace a character in command mode, type **r** on the character to replace and type the new character.	If you want to replace the character "i" in the word "replice," place the cursor on the "i," type **r** and type the new character, such as **a**.

Table 2-2

Simple *vi* Commands

Command	Description	Example
cw	To replace a word in command mode, position the cursor on the first character of the word, and type **cw** and type the new word, then press <Esc>.	If you wanted to change the word cat to **panther**, place the cursor over cat, type **cw** and type **panther**.
u	To undo a mistake you made at the last command, in command mode type **u**. This takes you to your previous display before changes were made.	
ZZ	To exit your file and save your changes in command mode, type **ZZ**.	To exit your file without saving changes, type :**q!**

For more information on *vi*, see your UNIX System V operating system documentation.

3 *Configuring Your User Environment*

This chapter describes how to set up your user environment and includes information on

◆ How to set up, change, and test your video display for your console

◆ How to add and delete users and groups from your system

◆ How to change files that control the Window Manager

Overview

To obtain the best possible video resolution on your screen and provide the maximum number of colors allowed, you may need to reconfigure your display using Display Setup. Your display, however, is highly dependent upon the amount of video memory you have on your video adapter, so you may experience limitations.

You can also set up several other users or groups on your system who may need to work on your system. You can assign each user permission to perform certain setup and configuration tasks, or you can assign all tasks (similar to the privileges of the system owner) to one user other than the system owner.

Important ▼ Permissions for the tasks in User Setup must be configured correctly for each user. Throughout this handbook, setup permissions are required for many of the procedures.

Using Display Setup

Almost all video display boards and monitors allow resolutions and colors greater than those offered by standard VGA mode (16 colors and 640x480 dots per inch which is the default). If your board and monitor do, you can use Display Setup to enhance your desktop. This means your screen display will have higher resolution and a greater selection of colors and you will be able to view more information. The only limitation you may experience is that your icons and text will be smaller. (In this case, you can use Font Setup to select a larger font if desired. See the *Desktop User Handbook*.)

Important ▼ Only one user should be allowed to use Display Setup at a time. If several Display Setup windows are open at a time with different configurations, the Display Setup program could become corrupted.

Almost all boards and monitors are compatible with standard VGA mode. Because Display Setup changes apply to the video displays for all users who start up the desktop from the console, you need system owner permission to use Display Setup.

Note ▼ Before you begin configuring Display Setup, be sure you have the Change Video Display Setup permission, as described in "Assigning User Permissions" in this chapter.

Before you begin to change your video configuration, check your video board documentation. On some older video board models, sometimes a jumper pin may need to be changed. Also, if you have a DOS or Independent Hardware Vendor (IHV) diskette that came with your board, you may need to do some setup work for it before you continue here.

To configure your video display, double-click on Display Setup in the Admin Tools folder.

The "Display Setup" window appears:

Figure 3-1
Display Setup

```
┌─────────────────────────────────────────────────────────────────────┐
│  ─┐                          Display Setup                           │
│                                                                      │
│   View:   Detected Choices                                           │
│                                                                      │
│         Hardware Detected: ATI Mach-64 chipset                       │
│   Vendor                    Chipset     Description                  │
│                                                                      │
│    Standard VGA             STDVGA        Standard VGA, 640x480, 16 colors │
│                                                                      │
│     Video Memory Detected: Unable to detect memory size              │
│                                                                      │
│   Video Memory (Megabytes):     1/2    1    2    3    4              │
│                                                                      │
│    Model     Resolution   Monitor   Colors                          │
│    VGA         640x480     STDVGA     16                             │
│                                                                      │
│   Monitor Size:    14            in    cm                           │
│                                                                      │
│            Test     Save     Standard VGA    Reset    Cancel    Help │
│   ┌──────────────────────────────────────────────────────────────┐  │
│   │ Vendor is the brand or make of your graphics card. Chipset is the model of its │
│   │ graphics processor (sometimes called the graphics controller or accelerator). │
│   └──────────────────────────────────────────────────────────────┘  │
└─────────────────────────────────────────────────────────────────────┘
```

The "Display Setup" window shows you the current settings for your video display and detects the characteristics of your installed video board.

Changing Your Video Display

Warning ▼ Ensure that you are knowledgeable about your video board and monitor. Otherwise, your monitor may display garbled information and in some cases, you could damage your hardware. For example, setting a higher frequency (Hz) or resolution than your monitor allows could damage your monitor or controller. See your video board and monitor documentation for information.
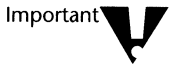
Important ▼ Due to lack of industry hardware standards, it is possible that Video Display Setup could detect a different board than you have or may not detect your exact board type.

Once the "Display Setup" window appears on your system, do the following to change the configuration of your video board:

1. **Set any or all of the desired options:**

   View. Verify that the entry in the Hardware Detected line matches the video board you have installed. If it does not, select *View*, then *All Choices* from the menu.

   Vendor/Chipset/Description.

   > **Vendor.** This is the name of your video board manufacturer plus your video board model. For example, Diamond is the company name and SpeedStar is the model.

   > **Chipset.** This is the type of video chip used in your video board. For example, the Diamond SpeedStar chipset is ET4000, or a COMPAQ® chipset is Q Vision™.

   > **Description.** This describes the video board: ISA, EISA bus types; 4-bit, 8-bit; manufacturer's name, and so on.

   Click on the arrow to the right of the Vendor/Chipset/Description list for available choices unless UnixWare has detected your video board already. Scroll up or down to select the desired entry. The default is Standard VGA.

   Video Memory (Megabytes). Click on the number of megabytes of memory that is available on your video card.

   Model/Resolution/Monitor/Colors. The only choices compatible with the selected video board are displayed. The choices from which you may select are based on your monitor type and resolution.

   > **Model.** This is the name of your video board type, such as QVision.

   > **Resolution.** This is the height and width of your video display, in pixels; for example, 640x480.

   > **Monitor.** This is the monitor frequency and other defaults, such as interlaced.

   > **Colors.** This lists the number of colors that display on your screen, for example, 16 or 256.

   Click on the arrow to the right of the Model/Resolution/Monitor/Colors list for available choices. Scroll up and down to select the desired entry.

   You can select 16 or 256 colors. To decide which resolution you are allowed, keep in mind that if for example you select 256 colors, the width times height must be less than or equal to the amount of memory you have. The 16 colors option requires half as much memory.

The following table shows the allowed values for your memory:

Table 3-1
**Recommended Color
and Resolution Values**

Memory Amount	Recommended Colors & Resolution
1 MB	16 colors & 640x480 resolution; 16 colors & 1024x768 resolution; 256 colors & 1024x768 resolution.
2 MB or more	16 or 256 colors and any resolution: 640x480, 1024x768, or 1024x1280.

The resolution depends on how much memory you have and what is detected by the system. For example, 1024K is 1 MB and 480 is less than 1 MB. If you have less than 1MB of memory, you must select the minimum allowable number of colors and the lowest resolution (for example, 640x480 resolution and 16 colors). You can then determine what your video resolution should be.

If you have 2 MB of memory, you can select any combination of colors and resolution. The more memory you have, the more your performance will improve.

Monitor Size. Verify that the Monitor Size, in height and width, matches in inches or centimeters the monitor you are using.

If it does not, click on the arrow next to the Monitor Size box and select your monitor size from the preset entries, or select Other.

If you select Other, use the up and down arrows to scroll to the desired Height and Width fields in inches (click on *in*) or centimeters (click on *cm*).

2. **Click on the desired action.**

   Test. We strongly recommend that you test your video display for best results. Go to "Testing Your Video Display."

   Save. Click if you are sure of your selected settings and you do not want to test your display.

   Standard VGA. Click to return to the standard display.

Note ▼

If you do not know what your video display is, you can select the Standard VGA button. This gives you a low resolution, 16-color setting that works on most video

displays. After selecting an invalid configuration, you may have to shut down your system and power off before the new settings will work.

Reset. Click to reset your changes to the original settings.

Testing Your Video Display

Testing your video display ensures that your settings work with your hardware.

Warning ⚠️ In some rare cases, hardware damage may occur if incorrect settings are used. Before you try to save new video display settings, you should test them.

1. **Click Test in the "Display Setup" window.**

   The "Display Setup Test" window appears.

Figure 3-2
Test

```
┌─────────────────────────────────────────────────────────────┐
│ ... │              Display Setup: Test                       │
├─────────────────────────────────────────────────────────────┤
│                                                               │
│  When you click the 'Continue' below, a Test Pattern will be │
│  displayed. If the pattern and the text appear normal then    │
│  the new video board settings may be used. If not, then you   │
│  must choose a different set of options in the Video Display  │
│  Setup window.                                                │
│                                                               │
│                       * WARNING *                             │
│                                                               │
│  If you have selected settings that are incompatible with     │
│  your hardware. (e.g. you selected the wrong vendor) you might │
│  not be able to read the display after ending the test or     │
│  might even damage your hardware.                             │
│                                                               │
│  If you cannot read your display after ending the test, press │
│  the <Ctrl>, <Alt> and x keys at the same time to exit the    │
│  desktop. If you still cannot read your display after this     │
│  then you must reboot (restart) your computer to reset the    │
│  display. Be sure to warn any other users of your system      │
│  before rebooting. You can reboot your computer by pressing   │
│  the <Ctrl> <Alt> and <Del> keys at the same time.            │
│                                                               │
│  Click 'Continue' now to begin the test.                      │
│                                                               │
│    ┌──────────┐         ┌────────┐          ┌──────┐          │
│    │ Continue │         │ Cancel │          │ Help │          │
│    └──────────┘         └────────┘          └──────┘          │
└─────────────────────────────────────────────────────────────┘
```

Once the "Test" window appears on your screen, do the following to test the new video display settings:

2. Click Cancel to exit the test.

3. Click Continue to run the test.

Various screens with warnings and other messages appear. A clean test pattern appears on your screen if the settings are correct. If the settings are incorrect, the screen will appear garbled.
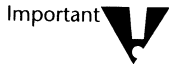
Important ▼ If you test your video and the screen appears garbled, the correct settings may also appear garbled when tested until after you shut down your system and turn the power off and on again.

4. Click Save if the test pattern is OK; otherwise, reboot your system, change the settings and try the test again.

5. Exit the desktop and log back in for the changes to take effect.

Note ▼ In some rare cases, your screen may appear scrambled. If this happens, press <Ctrl>+<Alt>+<X> to exit the desktop and <Ctrl>+<Alt>+<Delete> to reboot your system.

If you have performed all of these tasks and your video display still appears garbled or is unusable, see "Troubleshooting" later in this handbook.

Making Your Video Adapter Work with UnixWare

This section provides information about video adapters and video related issues and requires some knowledge of video boards and the command line.

Video adapters for many popular video boards are included in UnixWare. We have identified some video adapters that may not work correctly even after you have used Display Setup.

See the following sections if you have one of these adapters installed in your system and you are having problems with your video display.

Blank Screen Savers and S3, Mach, Mach64, and P90000 Cards

Note ▼ This section is not referring to the UnixWare Desktop screen saver.

The blanking screen saver facility does not work with S3, Mach, Mach64, or P90000 video boards. We suggest that you turn off your monitor if you are not going to use it for an extended period of time. This will not only protect your monitor, but will also ensure that energy-conserving monitors function properly.

Compaq Q Vision Video Boards

This section discusses problems with the QVision video adapter.

Fonts Not Rendered Correctly

In some cases, fonts are not drawn properly. We have seen this in xterm and XV 3.0. To fix this problem, do the following:

Procedure

1. **Double-click on Applications in the UnixWare Desktop.**

2. **Double-click on Terminal in the Applications folder.**

   A "Terminal" window is displayed.

3. **Type** *su* **to become root.**

4. **Type**

   ```
   cd /usr/X/lib/display
   ```

5. **Add the following lines to** *LIBQV-OPTIONS.*

   ```
   ONE-BIT-RECTANGLES=off
   ```

Graphical Login Not Working

You may have a problem starting XDM if you are running a 1MB Q Vision EISA video card. XDM will start and stop several times and then leave your video display unreadable.

To fix this problem, force the system to use the ISA driver, which works fine.

Procedure

1. **Double-click on Applications in the UnixWare Desktop.**

2. **Double-click on Terminal in the Applications folder.**

A "Terminal" window is displayed.

3. **Type *su* to become root.**

```
cd /usr/X/lib/display
mv libqv256lfb.so.2 libqv256lfb.so.2.orig
```

Graphics Don't Start

If you are using a Compaq Q Vision EISA video board and are having problems with graphics not starting, and have less than 128 MB of main system memory, use *vi* to put the following line in the */usr/X/lib/display/LIBQV-OPTIONS* file:

```
LFB-ADDR=128
```

If you have more than 128 MB of main system memory, place the following line in the */usr/X/lib/display/LIBQV-OPTIONS* file:

```
LFB-ADDR=256
```

If you still have a problem after editing the *LIBQV-OPTIONS* file, you must disable the EISA driver and use only the ISA driver. As the root user, type the following:

```
cd /usr/X/lib/display
mv libqv256lfb.so.2 libqv256lfb.so.2.orig
```

Screen Goes Blank

If you select a display resolution that is too high for your monitor, your screen may go blank. To fix this problem, do the following:

Procedure

1. **Shut down and power off your system.**

2. **Power your system back on and reboot.**

3. **Use Display Setup to select a resolution that works on your monitor.**

For more information on Display Setup, see "Using Display Setup" earlier in this chapter.

VPROBE Does Not Work

The graphical **setvideomode** (Display Setup) or the text-based **setvideomode** in a "Terminal" window may not find a Q Vision board, even though one is installed in the system.

To identify properly the Q Vision card, run the text-based **setvideomode** from the console only.

ETW32 and WD90C31 Cards

You cannot try more than one mode at a time when using ETW32 and WD90C31 boards. After testing one mode (with Display Setup or with **setvideomode**), you must exit and run the test again to select another mode.

Mach32-bit Video Cards (VLB, PCI, EISA)

If you see corrupted icons and other drawing problems on the screen, the Linear Frame Buffer may be conflicting with other hardware on your system.

To correct this problem, disable the *lfb* option on 32-bit Mach32 cards by placing the following line in */usr/X/lib/display/ULTRA_Options*:

```
use-linear-frame-buffer=no
```

Mach64 with 4MB Configurations

If you have a Mach64 video card with 4 MB of memory, you must specify a memory size of 2 MB (that is, 2048 K) when prompted by either the **setvideomode** (non-graphical) or Display Setup (graphical) utilities.

P9000 Video Cards

If you have a P9000 video board, you cannot use Display Setup to switch to high-resolution mode. You must execute the following command as the root user:

```
/usr/X/lib/display/setvideomode -inoperable -vinfo p9k
```

Making Your Video Drivers Work with UnixWare

Since most of the popular video boards come in several varieties (even though the model number remains the same), these drivers are provided with minimal options. However, on some video boards, you may be able to get better performance by fine tuning your driver. See the corresponding *README* file for the desired driver in */usr/X/lib/display/README.driver name*.

Using User Setup

Note ▼ Before you begin setting up or changing user accounts, be sure you are logged in as the system owner.

User Setup is used to manage user accounts on your system. You can add, delete, and change properties and permissions for these accounts. You can also maintain group accounts defined on your system.

There are three types of accounts you can set up:

◆ **User accounts**. This is an account for a user who wants to log in to your system and use files or directories or perform specific tasks (such as a setup task) on your system. The system owner must specify (in User Setup) the functions administrators can perform.

◆ **Group accounts**. This is for a set of users who belong to a group, such as *docs*. This group can be allowed to perform special tasks, share files, and so on. Each member in the group account must also be set up with a user account.

◆ **Reserved accounts**. These are for system processes, such as *UUCP*, *sysadm*, *cron*, and so on, that enable your system to operate correctly. If you have an Application Server, see the *System Administration* guide for more information.

To set up user accounts, double-click on User Setup in the Admin Tools folder:

The "User Setup" window appears. This window displays an icon for each regular user account you set up on your system.

Figure 3-3
User Accounts
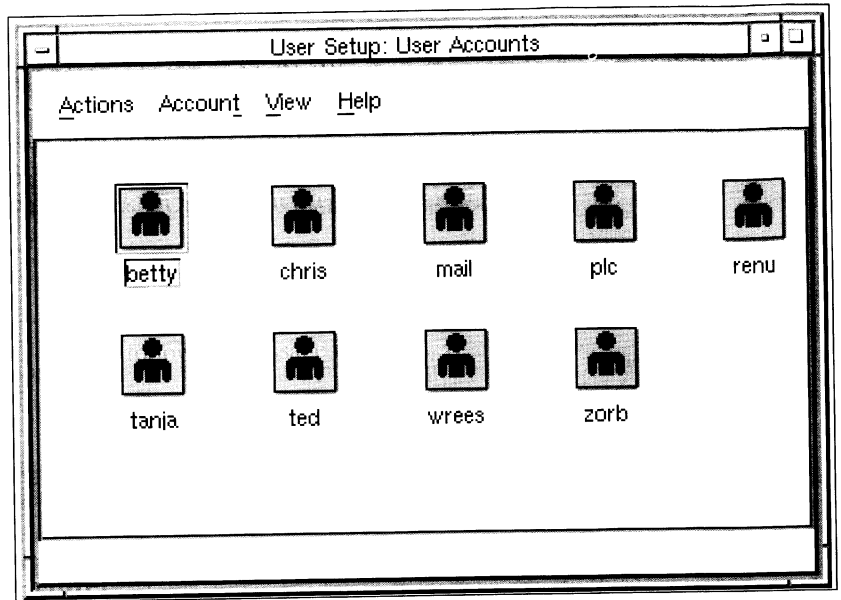
From this window, you can add and delete a new user as well as view and change permissions and properties.

Adding a New User

This task describes how to add new users to the system. After adding a user, you can modify the user account properties as well as assign permissions for performing administrative functions (see "Changing User Account Properties" later in this chapter).

To add a new user account, be sure you are in the "User Accounts" window and do the following:

Procedure

1. **Click on *Account* in the menu bar and select *New*.**

   The "Add New User Account" window appears:

Figure 3-4
Add New User
Account
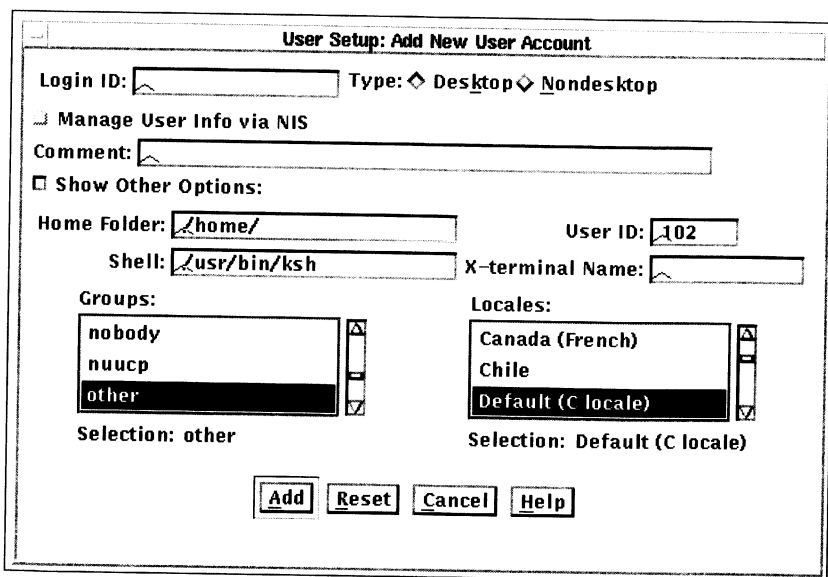
2. Set the desired options:

Login ID. Type a unique name the user will enter when logging in to your system. Use lowercase letters.

Type. Click on Desktop to set up the user to use the desktop, or Non-Desktop to set up the user as a command-line only user (see the chapter "UnixWare Command-Line Tools" earlier in this handbook for more information).

Manage User Info via NIS. Click on Manage User Info via NIS to indicate that account information for this user is being managed on an NIS server. Some of the Show Other Options fields become inactive when you turn this option on. The values for these fields must reside in the NIS database. If you have an Application Server, see "NIS Administration" in the *System Administration* guide for more information.

Note ▼ The user account information must be added on the NIS server before you can add the new account to the local system; otherwise, User Setup will return an error.

Comment. Type any other information about the user (for example, the full name of the user).

Suggestion ▼ If you want to add a new user with the defaults, type the new username in the Login ID option and press <Enter>. A "Confirmation" window appears. Click Yes and type a password.

Show Other Options. Click to display the following additional options:

Home Folder. Indicates the location where the user's files will be stored. By default, the *home* folder is */home/login _ID*, where *login_ ID* is the name of the user you are adding.

User ID. Indicates the ID to be assigned to the user. If the user being added has a user ID on another system, type the same number (this is helpful if they are on the network and sharing files).

Shell. Specifies the command interpreter that should be used when the Terminal application is started or when the command line is used by the new user (for example, */usr/bin/sh*, */usr/bin/ksh*, or */usr/bin/csh*).

See the chapter "UnixWare Command-Line Tools" earlier in this handbook for information on shell types.

X-terminal Name. Specifies the name of another workstation or X terminal on the network from which the user can log in. This allows the new user to log in to your system and display the UnixWare Desktop on their system without having to type the X terminal name each time.

The X terminal or workstation must be configured to TCP/IP networking. See the chapter "Setting Up and Configuring TCP/IP" for information on setting up TCP/IP.

Groups. Specifies the group to which you want the new user to belong.

When a group is selected, the group name appears in the Selection option.

Locales. Specifies the language or locale assigned to the user. (This setting affects the language and format in which the time, date, and so on, are displayed.)

Note ▼

You cannot change this setting for a user while the user is logged in to UnixWare.

When a locale is selected, the locale appears in the Selection option.

3. **Click on Add to add the new user.**

   A "Confirmation" window appears. Click Yes.

4. **When prompted, type the new user's password. See the *Installation Handbook* for information on how to use passwords.**

5. **Set the permissions for the account.**

   See "Assigning User Permissions" later in this chapter.

Viewing User, Group, and Reserved Accounts

The "User Setup" window displays an icon for each user or group with an account on the system.

Viewing Group or Reserved Accounts

This task allows you to view all of the groups and reserved accounts currently set up on your system.

To view group and reserved accounts, do the following:

Warning ▼ Do not change group or reserved accounts or your system may not run correctly. Create a new account instead.

Procedure ▼ 1. **Click on** *View* **in the menu bar.**

2. **Select the desired option:**

   Group. Displays icons for groups defined on your system.

   Reserved. Displays icons for reserved system accounts, such as **lp** or **bin**. Reserved accounts are for special users. These are actually system processes that allow your system to run correctly.

Viewing User Accounts

To return to viewing user accounts, do the following:

Procedure ▼ 1. **Click on** *View* **in the menu bar.**

2. **Select** *Users*.

Deleting a User

To delete a user account from the desktop, do the following from the "User Setup" window:

Procedure ▼ 1. **Click on the user account you want to delete.**

Warning ▼ Do not delete reserved accounts or pre-existing groups. Deleting pre-existing groups could cause permission problems when users attempt to read or access certain files and could prohibit you from performing certain tasks on your system. Deleting reserved accounts or groups could severely disable your system.

2. **Click on *Account* in the menu bar and select *Delete*.**

   A "Confirmation" window appears.

3. **Set the desired options:**

   Remove User's Files. Click to delete all files in the user's *home* folder.

   Backup User's Files. Click to back up copies of the user's *home* folder before deleting the login.

4. **Click on Yes to delete the user's login.**

   Another " Confirmation" window about deleting the files appears. The user's icon will disappear from the "User Setup" window if specified.

Changing User Account Properties

This task allows you to change the properties of a user's account, for example, you could change a non-desktop user to a desktop user, or change a user's shell or user ID.

To change the properties of a user on the desktop, do the following from the "User Setup" window:

Procedure

1. **Click on the icon for the user whose properties you want to change.**

2. **Click on *Account* in the menu bar and select *Properties*.**

   The "User Account Properties" window appears.

3. **Follow Step 2 in "Adding a New User."**

4. **Click on OK to save the changed properties and close the window.**

   A "Confirmation" window appears. Click Yes to modify the account.

Assigning User Permissions

You can give another user permission to perform certain tasks on your system, such as shutting down the system or administering printers, after you have given that user an account on your system.

To assign these permissions, do the following from the "User Setup" window

1. **Click on the icon for the user to whom you will assign permissions.**

2. **Click on *Account* in the menu bar and select *Permissions*.**

   The "User Permissions" window appears. By default, a new user is automatically given permissions for Access Disks, Tapes, etc, and Access Remote Systems.

3. **Set the desired options:**

   Additional permissions may appear if you have purchased and installed add-on software packages.

   Many of these options require administrative and UNIX system knowledge.

   Account *<username>* has Owner Privileges. Click on the button at the top of the window to assign the selected user the same permissions to your system as those of the system owner; that is, the user can perform the same tasks as the system owner. If you click on this option, all options in this step are enabled. Go to Step 4.

   Shutdown System. Click to allow the selected user to shut down your system using the Shutdown icon.

   Access Disks, Tapes, etc. Click to allow the selected user to use a floppy diskette or CD-ROM folder.

   Access Remote Systems. Click to allow the selected user to access a remote UnixWare system or the Remote Access icon.

   Change Dialup Setup. Click to allow the selected user to use the "Dialup Setup" window to add, configure, or remove modem or direct connections to your system.

   Change Internet Setup. Click to allow the selected user to configure TCP/IP and network connections to remote systems on your system using the "Internet Setup" window.

   Administer Printers. Click to allow the selected user to add, configure, and remove printers on your system using the "Printer Setup" window.

   Administer UNIX Mail. Click to allow the selected user to perform administrative mail tasks in the "Mail Setup" window.

   Add/Remove Fonts. Click to allow the selected user to install and remove fonts on your system using the "Fonts" window.

Add/Remove Applications. Click to allow the selected user to install, manage, and remove applications on your system using the "Application Installer" window.

Advertise Local Folders/Files. Click to allow the selected user to share your local files and folders with remote systems using the "File Sharing" window.

Connect to Remote Folders/Files. Click to allow the selected user to connect to remote files and folders using the "File Sharing" window.

Access System Monitor. Click to allow the selected user to perform system monitor tasks, such as setting the system alarm or viewing how system resources should be used, in the "System Monitor" window.

Change System Tunables. Click to allow the selected user to change the kernel tunable parameters in the "System Tuner" window.

Start and Stop Processor (multiprocessor systems only). Click to allow the selected user to use Processor Setup to start a processor after licensing.

Change Display Setup. Click to allow the selected user to change the colors and resolution displayed on your system using the " Display Setup" window.

Setup Network Installation. Click to allow the selected user to set up installation of Personal Edition or Application Server applications from the Install Server on the network.

Administer MHS Mail. Click to allow the selected user to set up the MHS mail gateway on your system using the "MHS Setup" window.

Access NetWare Setup. Click to allow the selected user to set up NetWare access on your system using the "NetWare Setup" window.

Access Install Server (requires the Application Server product). Click to allow the selected user to configure your system as an Install Server using the Install Server icon in the "NetWare Server" window.

Share Applications. Click to allow the selected user to advertise applications on your system using the "Application Sharing" window.

Hardware Setup. Click to allow the selected user to change hardware settings using the "Hardware Setup" window.

4. **Click on OK to save the assigned permissions and close the window.**

Adding a New Group

This task allows you to add new groups to the system. After adding a group, you can modify the group account properties (see "Changing Group Account Properties" later in this chapter).
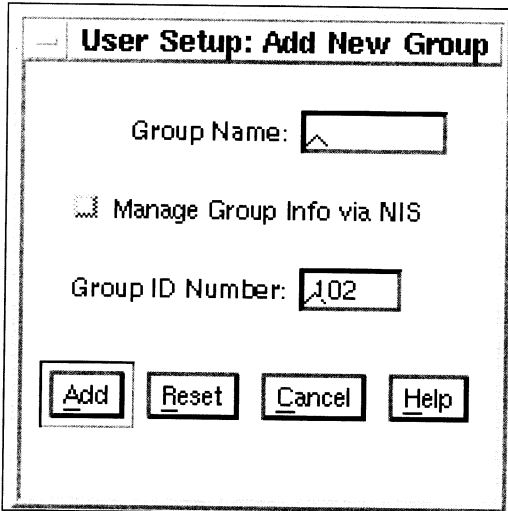
To add a new group, do the following from the User Setup window:

Procedure

1. **Click on *View* in the menu bar and select *Groups*.**

2. **Click on *Group* in the menu bar and select *New*.**

   The "Add New Group" window appears.

Figure 3-5
Add New Group

3. **Set the desired options:**

   Group Name. Type the name of the group account to set up.

   Manage Group Info via NIS. Click on Manage Group Info via NIS to indicate that account information for this group is being managed on the NIS server. The Group ID Number option becomes inactive when you turn on this option. If you have an Application Server, see "NIS Administration" in the *System Administration* guide for more information.

Group ID Number. This option is filled in by the system. Type a new number to overwrite the existing one if desired. For example, if the group is defined on another system, you should use the same number here.

Note ▼ Do not use 0-99, as they are reserved.

4. **Click on Add to add a new group.**

A "Confirmation" window appears. Click Yes.

Deleting a Group

This task allows you to delete one or more groups from your system.

Warning ▼ Do not delete any group accounts that came with your system (if the ID is less than 100). System damage could occur.

To delete a group, do the following:
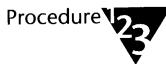
Procedure ▼ 1. **Click on *View* in the menu bar and select *Groups*.**

2. **Click on the icon for the group you want to delete.**

3. **Click on *Group* in the menu bar and select *Delete*.**

A Confirmation window appears.

4. **Click on Yes to delete the desired group.**

Changing Group Account Properties

To change the properties of a group on your system, do the following from the "User Setup" window:
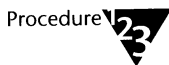
Procedure ▼ 1. **Click on *View* in the menu bar and select *Groups*.**

2. **Click on the group whose properties you want to change.**

3. **Click on *Group* in the menu bar and select *Properties*.**

The "Group Account Properties" window appears.

4. **Change the desired settings. See Step 3 in "Adding a New Group."**

5. Click on OK to save the changed properties.

A "Confirmation" window appears. Click Yes.

Changing User Accessibility

Once in a while, users may install UnixWare and not include some important packages that should have been installed. For example, the user is not set up to run on the desktop or the user may not be the system owner. Consequently, the user cannot log in to the desktop or cannot perform system owner tasks.

If this happens to you, you can solve these problems using the command line.

Creating a Desktop User at the Command Line

You can perform this task if you were not set up as a desktop user when you installed UnixWare or if you want to set up other users to run on the desktop.

To create a desktop user, do the following:

Procedure
1. Log in as root and open an "xterm" window.

2. Type

```
/usr/X/adm/dtadduser login-id
```

where *login-id* is the user to be added to the desktop.

Suggestion
You can also set up root to be a desktop user if desired.

Creating a System Owner at the Command Line

You can perform this task if you did not create a system owner when you installed UnixWare or if you want to set up additional owner privileges to other users.

To allow a user to have system owner privileges, do the following:

Procedure
1. Log in as root and open an "xterm" window.

2. Type

`/usr/X/adm/make-owner` *login-id*

where *login-id* is the user to be added to the desktop.

You can also set up other users to have owner privileges using this command.

Customizing Your Graphics Environment

In addition to using the procedures in the *Desktop User Handbook* for changing desktop settings, you can also modify certain files at the command line to customize your environment further.

Several underlying files control the look and feel of your desktop, the fonts used, the colors used, and so on. The following sections identify files that can be modified from the command line.

The *app-defaults* directory (*/usr/X/lib/app-defaults*) stores files that contain settings used by the X Window System™ applications. You can modify these files to affect the behavior of applications, but you must be logged in as root.

You can edit the following files, located in your *home* directory:

◆ *.Xdefaults*. This file contains settings used by the desktop and applications. Settings include the number of buttons on your mouse, font preferences, and so on. When you make changes through the desktop Preferences icons, your preferences are recorded in the *.Xdefaults* file.

Important Configuring the *.Xdefaults* file requires advanced X Window System knowledge. Do not modify this file unless you understand the settings you want to change. Also, do not run the desktop while editing this file; otherwise, your changes may be overwritten.

◆ *.mwmrc*. This file allows you to change the appearance and behavior of the Motif window manager.

◆ *.olinitrc*. This file contains commands to start applications, including the desktop, when you log in.

The variables you change in these files are called resources. Three types of resource variables exist: Boolean (`True`, `False`), string (`foreground: white`), or numeric (`borderWidth: 4`). These are the only allowed variable types you can use to edit these files.

The following sections contain example files and editing changes.

Editing the *.Xdefaults* File

The *.Xdefaults* file contains settings that control your desktop, such as fonts, colors, background designs, folder window settings, and so on.

If you want to change the number of mouse buttons you have, for example, you can edit the *.Xdefaults* file.

To edit this sample file, do the following:

1. **Open a "Terminal" window.**

2. **Using a text editor such as *vi*, edit the *.Xdefaults - hostname* file as desired. Type**

   ```
   vi .Xdefaults - hostname
   ```

   where *hostname* is the name that appears when you type **uname -n**.

3. **Replace**

   ```
   *numMouseBtns: 2
   ```

   with

   ```
   *numMouseBtns: 3
   ```

   if you have three mouse buttons.

4. **Type**

   ```
   xrdb -load .Xdefaults
   ```

   for the changes to take effect immediately.

You can also

◆ Change the visual appearance of the cursor when dragging an icon (for example, `*enableDragIcon:` **True**)

◆ Change scrollbar thickness (for example, `*XmScrollBar*shadowThickness:` **2**)

See your X Window System documentation for information on adding and changing the values in *.Xdefaults*.

Editing the *.mwmrc* File

To take full advantage of Motif Window Manager functionality, you can create and customize a *.mwmrc* file in your *home* directory.

To create this file, do the following:

1. **Copy the default *.mwmrc* to your *home* directory by typing**

   ```
   cp /usr/X/lib/system.mwmrc $HOME/.mwmrc
   ```

2. **Using a text editor such as *vi*, edit the *.mwmrc* file as desired.**

3. **Exit your "Terminal" window, log out, and log back in for the changes to take effect. You can also select *Restart* in the desktop menu.**

See the **mwm**(1) manual page in the *Command Reference* or your X Window System documentation for information on Motif window manager resources you can modify.

Editing the *.olinitrc* File

To edit this file, do the following:

1. **Using a text editor such as *vi*, edit the *.olinitrc* file as desired.**

2. **Exit your "Terminal" window, log out, and log back in for the changes to take effect.**

4 *Setting Up and Configuring Printers*

This chapter describes ways to set up your printers on the desktop and perform other print tasks at the command line, and also includes information on

◆ How to add and reconfigure printers, both local and remote, at the desktop

◆ How to set a default printer at the desktop

◆ How to share printers at the desktop

◆ How to delete printers at the desktop

◆ How to control printing at the command line

Overview

This chapter explains how you can set up

◆ **Parallel Printers**. These printers are connected to parallel ports. Parallel ports are synchronous ports that exist on UNIX or PC systems and are represented by LPT1 or LPT2. PCs normally require different connector types from a UnixWare system and a 36-pin connector to the printer. Data is transferred one byte at a time over eight wires. Your parallel printer is connected to a parallel port. Check your printer documentation if you do not know your port type.

◆ **Serial Printers**. These printers are connected to serial ports. Serial ports are asynchronous ports that exist on UNIX or PC systems and are represented by COM1 through COM4 (if applicable) or none. Serial ports also support modems and a mouse and require different connector types. These ports cannot support graphics without special device drivers. Your serial printer is connected to a serial port. Check your printer documentation if you do not know your port type.

◆ **Remote UNIX System Printers**. This allows you to connect to a remote UNIX system and print to its printers across a TCP/IP network (your system administrator can show you where the printers are located).

◆ **Remote NetWare Printers**. This allows you to connect to a remote NetWare system and print to its printers.

◆ **DOS Merge™**. This allows you to configure the *doslp* printer required to print from DOS Merge.

◆ **Default Printers**. This allows you to select which printer to use when selecting to print from a menu.

◆ **NetWare Print Queues**. This allows you to print jobs stored in NetWare print queues on your local UNIX printer.

Using Printer Setup

Use Printer Setup to add, delete, change, manage, or control printer properties for serial, parallel, remote UNIX system, or remote NetWare printers.

To start Printer Setup, double-click on the Printer Setup icon in the Admin Tools folder.

Note ▼ To add, delete, share, or control a printer, or to change printer properties, you must have permission to administer printers (see "Assigning User Permissions" in the chapter "Configuring Your User Environment" earlier in this handbook).

The "Printer Setup" window appears (this window will be empty until you configure a printer for your system):

Figure 4-1
Printer Setup
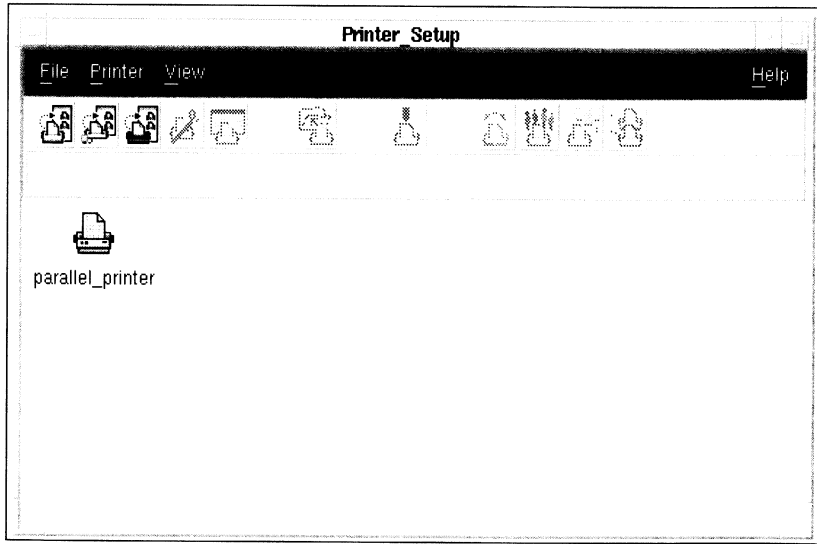
Adding and Reconfiguring Printers

This section discusses how to add or reconfigure the following:

◆ A parallel printer

◆ A serial printer

◆ A remote UNIX system printer

◆ A remote NetWare printer

◆ A local UNIX printer servicing a remote NetWare print queue (*Nprinter*)

Naming Your Printer

When naming your printer, follow the UNIX System V operating system standards. For example, you can name your printer using 1-255 printable ASCII characters. You cannot use special characters such as / \ : ; , * ? ~ or spaces. NetWare 3.11 naming conventions cannot be used if spaces are included in the printer name.

Note ▼ If you want to reconfigure a printer, you cannot change the printer name. You must add the printer as a new printer to change its name and delete the old one.

Methods for Setting Up Your Printers

You can add, change, delete, and assign printers using one of the following methods:

◆ The menu bar

◆ The tool bar

To use the menu bar, follow the instructions in each section.

To use the tool bar, click on the desired icon directly under the menu bar and the next window opens. Each icon represents a different printer setup function. For example, the first icon will add a local printer.

Your system displays a brief message about what the icon represents when you position the mouse pointer over the icon.

Adding a Parallel Printer

To add a parallel printer to UnixWare, do the following from the "Printer Setup" window:

Procedure **1. Click on *Printer* in the menu bar and select *Add Local Printer.***

The "Add Local Printer" window appears:

Figure 4-2
Add Local Printer

```
┌─────────────────────────────────────────────────────────────┐
│ ⌐         Printer_Setup : Add Local Printer                  │
│ Local Printer Name    │ parallel│                            │
│ Printer Model                                                │
│ ┌─────────────────────────────────────────────────────────┐ │
│ │ Canon Bubble Jet 10ex                                   │ │
│ │ Canon Bubble Jet 130e                                   │ │
│ │ Canon Bubble Jet 200                                    │ │
│ │ Canon Bubble Jet 300                                    │ │
│ └─────────────────────────────────────────────────────────┘ │
│                                                              │
│ Connection Type              Serial        Parallel         │
│                                                              │
│ Port                         LPT1      LPT2       Other      │
│                                                              │
│                                                              │
│ Send Mail if Printer Fails   Yes     No                     │
│                                                              │
│ Print Banner Page by Default  Yes    No                     │
│                                                              │
│ Allow Banner Page Override   Yes     No                     │
│                                                              │
│ Show Other Options                                          │
│                                                              │
│      Add          Reset          Cancel        Help         │
└─────────────────────────────────────────────────────────────┘
```
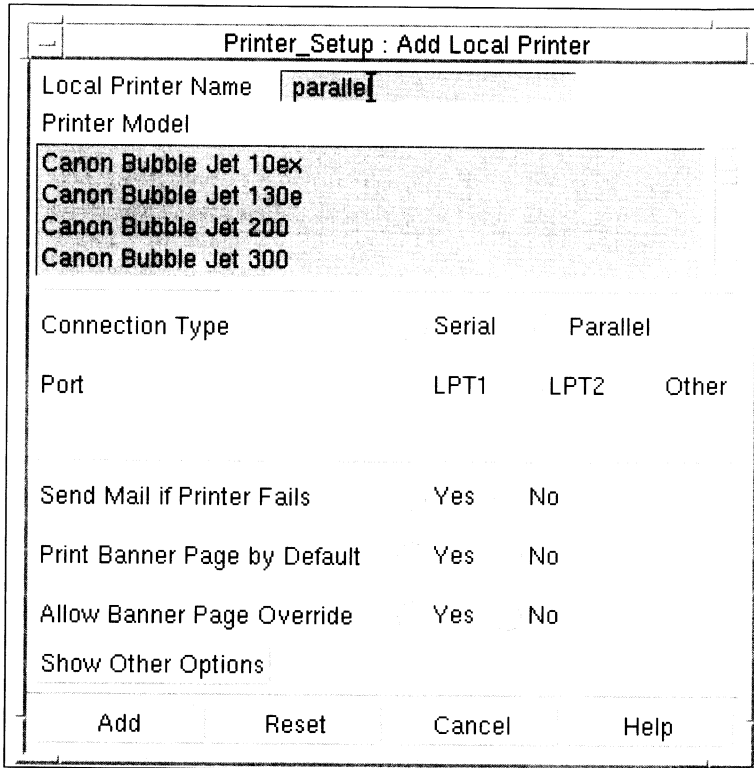
2. Set the desired options:

Local Printer Name. Type a name to identify the printer.

Name the printer *doslp* if you are configuring the printer definition to be accessed from DOS.

Printer Model. Scroll up or down to locate your printer type and click on the printer type (make, model, or PostScript®) you are adding.

Select DOS Printer as your printer type when you want normal DOS filtering (all output is passed to the printer unchanged). A DOS application recognizes the type of printer to which it is printing and will format data to be printed accordingly. You should choose DOS Printer to correspond with *doslp* in the Printer Name option.

If your printer is not on the list, click on a supported printer type (check the printer manual for supported printer emulation modes). Some printers, such as the OKI 320 can use either a Proprinter® or an EPSON® printer

driver. If the printer type is unknown, click on Other, which provides minimum printing capabilities.

Connection Type. Click on the Parallel button.

Port. Click on LPT1 or LPT2, depending on which parallel port the printer is using. If you select Other, type the port device pathname or the name of an existing file that should receive printer output.

Parallel ports are synchronous ports that exist on UNIX or PC systems and are represented by LPT1 or LPT2.

Serial ports are asynchronous ports that exist on UNIX or PC systems and are represented by COM1 or COM2.

Send Mail if Printer Fails. Click on Yes or No. If you select Yes (the default), mail about the print failure is sent to the system owner or last user that modified the printer's properties if other users are allowed to administer printers.

Print Banner Page by Default. Click on Yes (the default) to print a banner page by default. The banner page is the first page printed and displays the requestor's name plus other information.

If you select No, a banner page is not printed by default.

Allow Banner Page Override. Click on Yes (the default) to allow a user to indicate whether or not the banner page should be printed.

If you select No, the default (see Print Banner Page by Default) is used and you do not want to allow an override.

Show Other Options. Click on this box to display a window of other printer options.

The "Options" window appears:

Figure 4-3
Options

```
┌─────────────────────────────────────────────┐
│  ┌──┬──────────────────────────────────────┐ │
│  │──│      Add Local Printer : Options      │ │
│  ├──┴──────────────────────────────────────┤ │
│  │                                          │ │
│  │   Page Length   ┌0─────────┐    chars    │ │
│  │                 └──────────┘             │ │
│  │   Page Width    ┌0─────────┐    chars    │ │
│  │                 └──────────┘             │ │
│  │   Char Pitch    ┌0─────────┐    chars    │ │
│  │                 └──────────┘             │ │
│  │   Line Pitch    ┌0─────────┐    chars    │ │
│  │                 └──────────┘             │ │
│  │                                          │ │
│  │    OK       Reset     Cancel     Help    │ │
│  │                                          │ │
│  └──────────────────────────────────────────┘ │
└─────────────────────────────────────────────┘
```
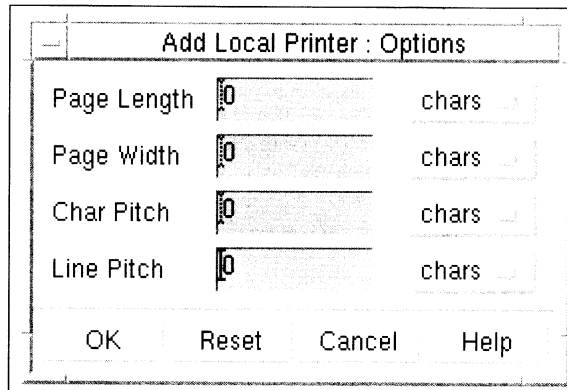
2a. **From this window you can select Page Length, Page Width, Char (character) Pitch, and Line Pitch values in inches, centimeters, or characters by selecting the option box next to each value.**

Note ▼ Leave the text box blank if you are using the default paper size for your printer.

Page Length. Click on the text box, type the paper length in inches or centimeters, and click on In or Cm; or type the number of lines allowed on a vertical page and click on Chars. The default is 0.

Page Width. Click on the text box, type the paper width in inches or centimeters, and click on In or Cm; or type the number of characters allowed across a page and click on Chars. The default is 0.

Char Pitch. Click on the text box, type the width of each character in inches or centimeters, and click on In or Cm; or type the number of characters allowed per inch and click on Chars. The default is 0.

Line Pitch. Click on the text box, type the height of each line in inches or centimeters, and click on In or Cm; or type the number of lines allowed per inch and click on Chars. The default is 0.

2b. **Click on OK to save the settings and close the window.**

3. **Click on Add to save the settings, add the printer, and close the window.**

Refer to the *Desktop User Handbook* for information on how to print a file at the desktop.

Note ▼▼▼ After adding a local parallel printer, you can enable remote access, as described later in "Sharing Your Local Printer with Remote Systems" if you want to allow remote UNIX systems to print to your local printer. If you want to enable remote access from a NetWare system, see "Connecting a Local Printer to a NetWare Print Queue" later in this chapter. You can also make this the default printer. We suggest that you always select a default printer.

Reconfiguring a Parallel Printer

Once you add a parallel printer, you can print using the factory-set configuration settings. If you want to change the configuration settings, follow the procedures described earlier in "Adding a Parallel Printer" but select *Properties* from the *Printer* menu and click OK.

Adding a Serial Printer

To add a serial printer, do the following from the "Printer Setup" window:
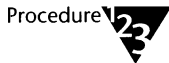
Procedure ▼**2**▼

1. **Click on *Printer* in the menu bar and select *Add Local Printer.***

   The "Add Local Printer" window appears.

2. **Click on the Serial button at the Connection Type option.**

   The "Add Local Printer" window appears with new serial options:

Figure 4-4
Add Local Printer

```
┌─┬─────────────────────────────────────────────────────┬─┐
│ ─│          Printer_Setup : Add Local Printer          │ │
├──┴─────────────────────────────────────────────────────┴─┤
│  Local Printer Name   │ serial                            │
│  Printer Model                                            │
│  ┌──────────────────────────────────────────────────┐    │
│  │ Canon Bubble Jet 10ex                            │    │
│  │ Canon Bubble Jet 130e                            │    │
│  │ Canon Bubble Jet 200                             │    │
│  │ Canon Bubble Jet 300                             │    │
│  └──────────────────────────────────────────────────┘    │
│                                                           │
│  Connection Type              Serial      Parallel        │
│                                                           │
│  Port                         COM1    COM2    Othe        │
│                                                           │
│  Serial Configuration                                     │
│                                                           │
│  Send Mail if Printer Fails     Yes    No                 │
│                                                           │
│  Print Banner Page by Default   Yes    No                 │
│                                                           │
│  Allow Banner Page Override     Yes    No                 │
│                                                           │
│  Show Other Options                                       │
│                                                           │
│      Add         Reset         Cancel        Help         │
└───────────────────────────────────────────────────────────┘
```

3. Set the desired options:

Local Printer Name. Type a name to identify the printer.

Suggestion

Name the printer *doslp* if you are configuring the printer for DOS.

Printer Model. Scroll up or down to locate your printer type and click on the printer type (make, model, or PostScript) you are adding.

Select DOS Printer as your printer type when you want normal DOS filtering (all output is passed to the printer unchanged). A DOS application recognizes the type of printer to which it is printing and will format data to be printed accordingly. You should choose DOS Printer to correspond with doslp in the Printer Name option.

If your printer is not on the list, click on a supported printer type (check the printer manual for supported printer emulation modes). Some printers, such as the OKI 320 can use either a Proprinter or an EPSON printer driver. If the printer type is unknown, click on Other, which provides minimum printing capabilities.

Connection Type. Click on the Serial button. A Serial Configuration box appears below the Port option.

Port. Click on COM1 or COM2, depending on which serial port the printer is using. If you select Other, type the port device name or the name of an existing file that should receive printer output.

For information on ports, see the Ports option in "Adding a Parallel Printer" or check your printer documentation.

4. **Click on Serial Configuration.**

A "Serial Configuration" window appears. Check that the communications parameters for the printer are set properly. Compare the baud rate, parity (if enabled), stop bits, and character size to the settings for the printer. Change any settings as necessary, then click on OK.

You may have to verify the correct settings for your printer by checking your printer manual or by calling the printer manufacturer. See the following section "Reconfiguring a Serial Printer" for steps on changing serial port settings.

4a. **Set the desired options in the "Serial Configuration" window:**

Baud Rate. Choose the value that matches the line switching speed of your printer.

Parity. Click to set the parity to Even (even number of bits transmitted), Odd (odd number of bits transmitted), or None (default is None).

Stop Bits. Click 1 or 2 (the default is 1). These bits are transmitted after each character.

Character Size. Click 7 or 8 (the default is 8). To print accented characters or other non-English characters, you must select 8 and ensure that your printer is set to 8.

4b. **Click on OK to save the communications settings and close the window.**

5. **Set the desired options:**

Send Mail if Printer Fails. Click on Yes or No. If you select Yes (the default), mail about the print failure is sent to the system owner or last user that modified the printer's properties if other users are allowed to administer printers.

Print Banner Page by Default. Click on Yes (the default) to print a banner page by default. The banner page (the first page printed) displays the requestor's name and other information.

If you select No, a banner page is not printed by default.

Allow Banner Page Override. Click on Yes (the default) to allow a user to indicate whether or not the banner page should be printed.

If you select No, the default (see Print Banner Page by Default) is used and you do not want to allow an override.

Show Other Options. Click on this box to open a window with other printer options.

Figure 4-5
Options

Add Local Printer : Options

Page Length	0	chars
Page Width	0	chars
Char Pitch	0	chars
Line Pitch	0	chars

OK   Reset   Cancel   Help
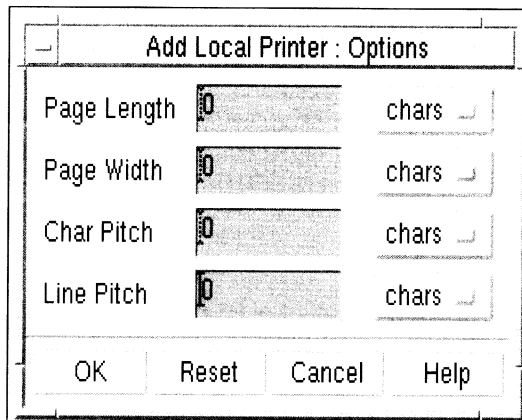
5a. **From the window, you can select Page Length, Page Width, Char (character) Pitch, and Line Pitch values in inches, centimeters, or characters by selecting the option box next to each value.**

See this option under "Adding a Parallel Printer" for more information.

5b. **Click on OK to save the settings in the "Options" window.**

6. **Click on Add to save the settings, add the printer, and close the window.**

To make sure the printer is available for printing, see "Controlling a Printer" later in this chapter.

Note▼▼ After adding a local serial printer, you can enable remote access, as described later in "Sharing Your Local Printer with Remote Systems" if you want to allow remote UNIX systems to print to your local printer. If you want to enable remote access from a NetWare system, see "Connecting a Local Printer to a NetWare Print Queue" later in this chapter. You can also make this the default printer. We suggest that you always select a default printer.

Note▼▼ If your printer does not work, check the serial cable. UnixWare requires that all hardware handshaking signals are handled; but not all serial cables support handshaking. You may need a null modem on the end of the cable.

Reconfiguring a Serial Printer

Once you add a serial printer, you can print using the factory-set configuration settings. If you want to change the configuration settings, follow the procedures described earlier in "Adding a Serial Printer" but select *Properties* from the *Printer* menu and click OK.

Adding a Remote UNIX System Printer

Before you decide to add a remote system printer, find out which printer is physically closest to you for routing your print jobs.

Also, identify the system to which the printer is attached, what type of UNIX it runs (System V or BSD®), and the name of the printer known to that system. The owner of the remote system must configure that printer to allow your system to send print jobs to it. Otherwise, you cannot set up your system to print remotely.

Note▼▼ If your system is not configured for DNS access, then an entry for the remote UNIX system to which the printer is connected must be in your */etc/hosts* file. You also must have your system configured for TCP/IP networking. See the chapter "Setting Up and Configuring TCP/IP" later in this handbook for more information on setting up TCP/IP.

To configure access to a printer attached to a remote UNIX System V or Berkeley UNIX (BSD, such as Sun®) printer, do the following from the "Printer Setup" window:
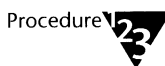
Procedure▼ **1. Click on *Printer* in the menu bar and select *Add UNIX Printer.***

The "Add Remote UNIX Printer" window appears.

Figure 4-6
Add Remote UNIX
Printer

```
┌─────────────────────────────────────────────────────────────┐
│ ─│         Printer_Setup : Add Remote UNIX Printer          │
│ Local Printer Name    [I                                     │
│ Printer Model                                                │
│ ┌──────────────────────────────────────────────────────────┐│
│ │ Canon Bubble Jet 10ex                                    ││
│ │ Canon Bubble Jet 130e                                    ││
│ │ Canon Bubble Jet 200                                     ││
│ │ Canon Bubble Jet 300                                     ││
│ └──────────────────────────────────────────────────────────┘│
│ Remote Operating System Type          System V      BSD     │
│ Remote System [I                                            │
│ ┌─────────────────────────┐  ┌─────────────────────────┐   │
│ │ Domain Name Server >     │  │                          │   │
│ │ System Files >           │  │                          │   │
│ │                          │  │                          │   │
│ │                          │  │                          │   │
│ │                          │  │                          │   │
│ │                          │  │                          │   │
│ └─────────────────────────┘  └─────────────────────────┘   │
│ Remote Printer Name [I                                      │
│      Add           Reset          Cancel          Help      │
└─────────────────────────────────────────────────────────────┘
```
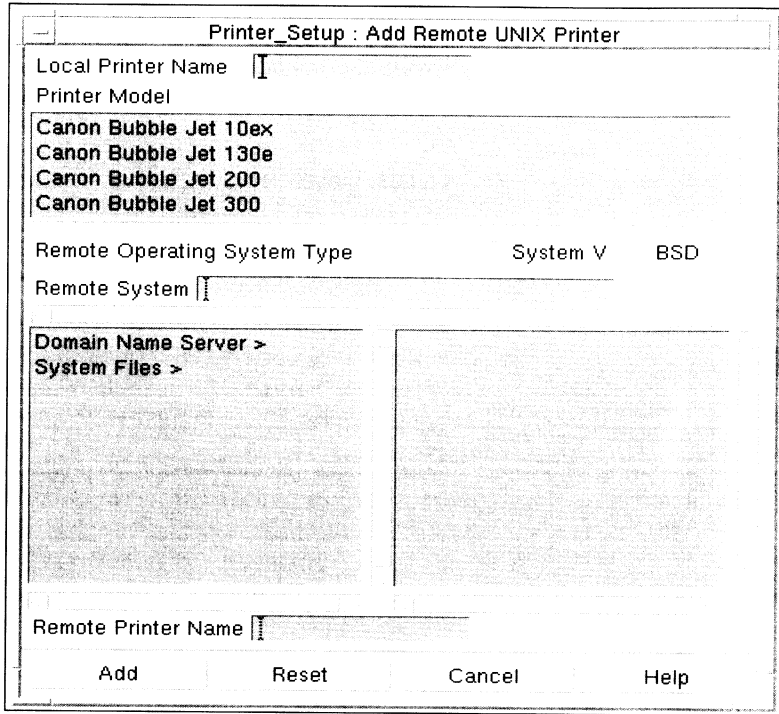
2. Set the desired options:

Local Printer Name. Type the name that you want to use for the printer as it will be known on your system.

Suggestion ▼

Name the printer *doslp* if you are configuring the printer for DOS.

Printer Model. Scroll up or down to locate your printer type and click on the printer type (make, model, or PostScript) you are adding.

Select DOS Printer as your printer type when you want normal DOS filtering (all output is passed to the printer unchanged). A DOS application recognizes the type of printer to which it is printing and will format data to be printed accordingly. You should choose DOS Printer to correspond with *doslp* in the Printer Name option.

Remote Operating System Type. Click on System V or BSD, depending on the operating system of the remote machine (you may have to ask your system administrator or the remote system owner for this information).

Remote System. Click on the desired type of listing: Domain Name Server, Network Information Server, or System Files (*/etc/hosts*), containing the name of the system that the printer is connected to, then locate and select the system. You can also type the full pathname in the field.

> **Domain Name Server.** Click on the name of a domain and any subdomains until you find a domain listing that contains the system. See the chapter "Setting Up and Configuring TCP/IP" later for information on how to set up DNS access.

> **Network Information Service.** Click on the name of an NIS domain until you find a listing that contains the system. If you have an Application Server, see "NIS Administration" in *Network Administration* guide for more information.

> **System Files.** The contents of your */etc/hosts* file are displayed if you used Internet Setup to add an entry for the desired system to your */etc/hosts* file. See the chapter "Setting Up and Configuring TCP/IP" or the *System Administration* guide for information on */etc/hosts*.

Remote Printer Name. Type the name of the printer, as it is known, on the remote system (you may have to ask your system administrator or the remote system owner for this information).

3. **Click on Add to save the settings, add the printer, and close the window.**

Sending Print Jobs to Remote Systems

This task allows you to connect to a remote system and print to the remote system printer.

Before you can use a printer on a remote UNIX System V or BSD system, you must make sure the printer is available for printing from your system as follows:

1. If the remote system is UnixWare, use the procedure documented in "Sharing Your Local Printer with Remote Systems" later in this chapter. Do this on the remote system to ensure that it allows your system to print to it.

2. If the remote system is UNIX System V but does not support the desktop, use the **lpsystem** command line utility on the remote system to enable your system to print using the remote system (if you have an Application Server, see "Print Services Administration" in the *System Administration* guide).

   The procedure is as follows:

   Log in to the remote system as root only if you have root access to the remote system. If not, check with the system owner of the remote system.

   Open a "Terminal" window and type the following at the command line:

   lpsystem -T *timeout* **s5** *system*

   where *timeout* specifies the length of time in minutes that the print service should allow a network connection to be idle, **s5** is the file system type, and *system* is replaced by your local system's name. You can use the System Status icon in Admin Tools (see the chapter "Monitoring and Tuning Your System" later for more information) to view your system name or type **uname -n** in a "Terminal" window.

3. To print to a printer on a remote System V or BSD system (for example, a Sun system), the remote system must be able to locate your system.

   Your system must exist in a DNS server database or in the */etc/hosts* file on the system where the printer resides. The remote system must allow print jobs to be accepted from users on your system. (If you have an Application Server, see the information on **lpadmin** in "Print Services Administration" in the *System Administration* guide.)

   An entry in */etc/lp/Systems* must exist on both your system and the remote system where the printer exists.

Note

If either system has UnixWare 2.0 or later, the correct **lpsystem** default entries may already exist in */etc/lp/Systems*.

The local system must also have access to the DNS server that contains the local system's address. An **lpsystem** entry must exist on the local system.

## Reconfiguring a Remote UNIX System Printer

Once you add a remote UNIX system printer, you can print using the factory-set configuration settings. If you want to change the configuration settings, follow the procedures described earlier in "Adding a Remote UNIX System Printer" but select *Properties* from the *Printer* menu and click OK.

Adding a Remote NetWare Printer

Before you decide to add a remote system printer, find out which printer is physically closest to you. Also, be sure NetWare is set up and you have access to NetWare servers. See "Using NetWare Setup" in the chapter "Setting Up and Configuring NetWare Connectivity" of this handbook.

Also, you need to find out to which NetWare system the printer is attached.

To configure access to a remote NetWare printer, do the following from the "Printer Setup" window:

Procedure
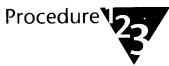
1. **Click on *Printer* in the menu bar and select *Add NetWare Printer*, or select *Add a Remote NetWare Printer* from the tool bar.**

   The "Add NetWare Printer" window appears.

Figure 4-7
Add NetWare Printer

```
Printer_Setup : Add NetWare Printer

Local Printer Name    I
Printer Model
Canon Bubble Jet 10ex
Canon Bubble Jet 130e
Canon Bubble Jet 200
Canon Bubble Jet 300

NetWare Server  :
NetWare Printer :
File Servers                    Printers
    311APPS
    AARDVARK
    ACURA
    AMOK
    APRIL
    ARIELLE


Print Banner Page by Default        Yes    No

Allow Banner Page Override          Yes    No

Send Form Feed by Default           Yes    No

Allow Form Feed Override            Yes    No

        Add         Reset       Cancel      Help
```
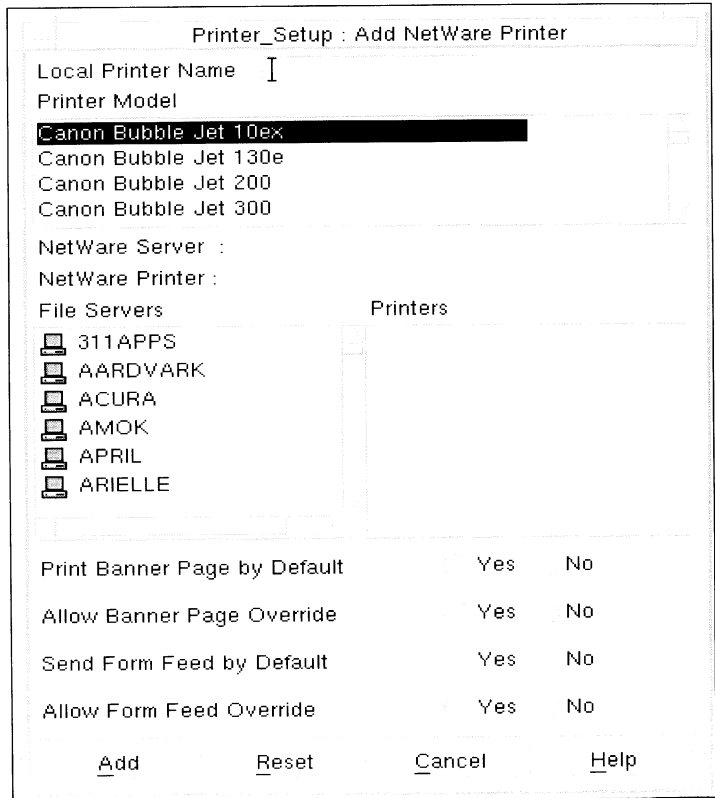
2. **Set the desired options:**

Local Printer Name. Type the name that should be used for the printer as it will be known from your system.

Name the printer *doslp* if you are printing from DOS.

Printer Model. Scroll up or down to locate your printer type and click on the printer type (make, model, or PostScript) you are adding.

Select DOS Printer as your printer type when you want normal DOS filtering (all output is passed to the printer unchanged). A DOS application recognizes the type of printer to which it is printing and will format data to be printed accordingly. You should choose DOS Printer to correspond with doslp in the Printer Name option.

If your printer is not on the list, click on a supported printer type (check the printer manual for supported printer emulation modes). Some printers, such as the OKI 320 can use either a Proprinter or an EPSON printer driver. If the printer type is unknown, click on Other, which provides minimum printing capabilities.

File Servers. Click on the name of the NetWare server to which the printer is connected. Use the scrollbar to scroll up or down the list. You may be asked to authenticate to the server. Type your NetWare login and password for the server. The file server is highlighted and a list of printers appears in the box labeled Printers.

Printers. Click on the printer to which you want to send print jobs. The selected printer is highlighted.

3. **Set the desired options:**

Print Banner Page by Default. Click on Yes (the default) to print a banner page by default. The banner page (the first page printed) displays the requestor's name plus other information.

If you select No, a banner page is not printed by default.

Allow Banner Page Override. Click on Yes (the default) or No to allow a user to indicate whether or not the banner page should be printed.

If you select No, the default (see Print Banner Page by Default) is used and you do not want to allow an override.

Send Form Feed by Default. Click on Yes (the default) to request a form feed (automatically advancing a form to the top of the next page) by default before a printer starts printing a requested job.

Allow Form Feed Override. Click on Yes (the default) to allow users to indicate whether or not form feed should be sent.

4. **Click on Add to save the settings, add the printer, and close the window.**

Reconfiguring a Remote NetWare Printer

Once you add a remote NetWare printer, you can print using the factory-set configuration settings. If you want to change the configuration settings, select *Properties* from the *Printer* menu, follow the procedures described earlier in "Adding a Remote NetWare Printer" and click OK.

Connecting a Local Printer to a NetWare Print Queue

This task allows you to make a local printer available to NetWare users. When you connect a local UnixWare printer to a NetWare print queue, print jobs sent to that queue are serviced by the local printer.

Warning
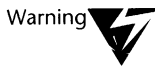
Only one printer should be placed in the NetWare queue at a time. Otherwise, the print job may print out on the wrong printer.

To allow print jobs sent to a NetWare print queue to print to your local printer, do the following:

Procedure

1. **Set up your printer as a local UNIX printer (see "Adding a Serial Printer" or "Adding a Parallel Printer" earlier in this chapter).**

2. **Select the printer icon.**

3. **Click on *Printer* in the menu bar and select *Nprinter*.**

   A "NetWare Print Server Connection Status" window appears and asks you if you want to connect to a NetWare Print Server.

4. **Click on Yes to connect to a NetWare Printer Server.**

   The "NPrinter" window appears.

Figure 4-8
NPrinter

Printer_Setup : NPrinter

Connect parallel_printer to NetWare Print Server

File Servers	Print Servers	Remote Printers
3-NUC		
AARDVAF		
AMOK		
ARIELLE		
ATG		
ATL-DOC		
ATL-WAN		
ATM		

Connect   Cancel   Help
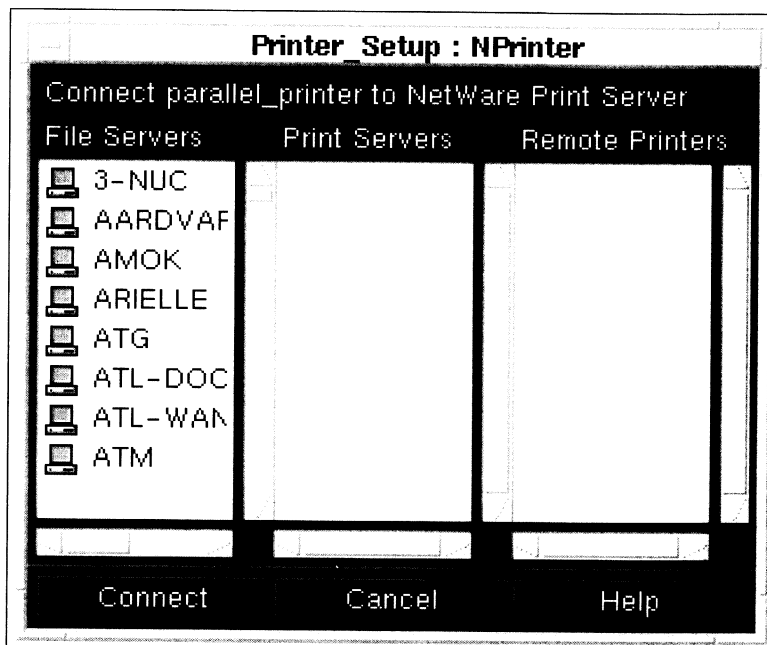
5. **Set the desired options:**

   File Servers. Click on the name of the NetWare server that contains print jobs you want to service. Use the scrollbar to scroll up or down the list. You may be asked to authenticate to the NetWare print server. Type your NetWare login and password for the server. The selected file server is highlighted and a list of print servers appears in the Print Servers box.

   Print Servers. Click on the name of the print server that will be sending jobs to your printer. The selected print server is highlighted; a list of available NetWare queues that can service the local UNIX printer appears in the Remote Printers column.

   Remote Printers. Click on the name of the desired NetWare queue to your local printer. This must be set up on the NetWare system as a NetWare print queue.

6. **Click on Connect to connect your local printer to a selected file server and print server.**

Disconnecting a Local Printer from a NetWare Print Queue

To disconnect a remote NetWare print queue from your local UNIX printer, select the printer that is currently connected to a NetWare print queue and do the following:

Procedure
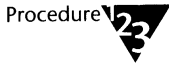
1. **Click on *Printer* in the menu bar and select *Nprinter*.**

2. **Click on the desired action in the "NetWare Print Server Connection Status" window: Yes, No, or Help.**

   The following message is displayed.

   ```
   Printer n is connected to print server n as a
   remote printer. Do you want to disconnect?
   ```

3. **Click on Yes to disconnect service to a remote NetWare print queue.**

Choosing a Default Printer

Each user on a system can choose a default printer of their own so that all print requests initiated from the user's desktop automatically go to that printer.

To define a default printer for your account, do the following from the "Printer Setup" window:

Procedure

1. **Click on the printer icon you want to be your default printer.**

2. **Click on *Printer* in the menu bar and select *Make Default*.**

   An arrow will appear on top of the printer icon when selected as the default.

To make a different printer your default, follow Steps 1 and 2 again.

Sharing Your Local Printer with Remote Systems

To enable a remote UNIX system to print to a local printer on your system using the Printer Setup utility, define the remote system first in Internet Setup (see the chapter "Setting Up and Configuring TCP/IP"). You must either have an entry in the */etc/hosts* file on your system or obtain the system's address from a DNS server.

To share a local printer (attached to your system) with users on a remote system to which you have access, do the following from the "Printer Setup" window on your system:

Procedure

1. **Click on the printer you want to share.**

2. **Click on _Printer_ in the menu bar and select _Set Remote Access_.**

   The "Set Remote Access" window appears.

3. **Click on one of the following options that appears in the righthand side of the "Set Remote Access" window:**

   Allow All Systems Except. Click to allow access to your printer by all remote systems that can connect to your system except those you exclude in Step 4.

   Deny All Systems Except. Click to deny access to your printer by all remote systems that can connect to your system except those you include in Step 4.

4. **Click on the remote system that should be moved to the Allow or Deny exception list by using the Add, Remove, and Remove All options.**

Note

   Perform this task for each system you want to add to the list.

5. **Click on Add to add the system to the list.**

6. **Click on OK to save the settings and close the window.**

Deleting a Printer

This task allows you to remove a printer that is no longer in use.

To delete a printer, do the following from the "Printer Setup" window:

Procedure

1. **Click on the printer icon you want to delete.**

2. **Click on _Printer_ in the menu bar and select _Delete_.**

3. **Click on OK at the "Query" confirmation window.**

Controlling a Printer

A printer is automatically *enabled* when added; however, after a printer is *disabled* (because of a paper jam or because the printer is out of paper) or if it fails to enable when added, it must be enabled manually. Whether the printer is enabled or disabled, print requests can be sent to the print queue where they are held until they can be printed.

To enable or disable a printer on your system or to set your printer to accept or reject print requests, do the following from the "Printer Setup" window:

Procedure

1. **Click on the printer whose status you want to modify.**

2. **Click on *Printer* in the menu bar and select *Control*.**

   The "Control Printer" window appears.

3. **Set the desired options:**

   New requests. Click on Accept or Reject to allow or prevent print jobs from being placed in the queue.

   Printer. Click on Enabled or Disabled to allow or prevent the printing of jobs that are in the print queue.

   If your printer will not enable, an error message will appear. Make sure you have checked these items if you cannot print:

   ◆ Check to make sure your printer has paper, check your cables, and check to make sure your printer is online.

   ◆ Check to make sure the print scheduler is running. You can do this by typing **ps -eaf | grep lpsched** at the command line in a "Terminal" window. If it is running, you will see a line that ends with `lpsched` (without grep).

   ◆ If you configured a DOS printer, try to print from a "DOS" window.

   ◆ If you configured a UNIX printer, try to print from a "Terminal" window. See "Printing at the Command Line" later in this chapter.

   ◆ If printing does not work, you may have to change the address of your parallel port. UnixWare expects the parallel port to have beginning and ending addresses of 378 and 37F. See the appendix "Troubleshooting" later in this handbook for more information.

4. **Click on Apply to save the settings and close the window.**

Allowing Users Access to Your Printers

To allow other users to access your printers, do the following from the "Printer Setup" window on your system:

Procedure

1. **Click on the printer you want other users to access.**

2. **Click on *Printer* in the menu bar and select *Set User Access*.**

   The "Set User Access" window appears.

3. **Set one of the desired options:**

   Allow All. Click to allow access to your printer by all users who are on your system or local users who can access your printer. The users' names appear in the Allow List.

   Deny All. Click to deny access to your printer by all users who are on your system or local users who can access your printer. The users' names appear in the Deny List.

   Allow. Click to allow the selected user access to your printer in the Allow List.

   Deny. Click to deny the selected user access to your printer in the Deny List.

4. **Click on OK to save the settings and close the window.**

Note

Perform this task for each printer to which you want users allowed or denied.

Controlling Printers and Printing Files at the Command Line

This section describes ways to enable, disable, and print at the command line. These methods are not described in the *Desktop User Handbook*.

To perform these tasks, double-click on Terminal in the Applications folder on the UnixWare Desktop.

Controlling Printers

The following steps initiate a printer for printing:

1. Open a "Terminal" window.

2. Instruct LP Print Service to accept print requests for the new printer by typing

   accept *printername*

3. Activate or enable the new printer by typing

   enable *printername*

   Only local printers can be enabled. You can enable several printers at onc by typing one after another with a space separation. For example,

   enable *printer1 printer2 printer3*

You can also reject a printer or disable a print request by using the **reject** an **disable** commands. Check the *Command Reference* for information on option available with the **enable**, **disable**, **accept**, and **reject** commands.

If you are an administrator, you can change the access permissions for */usr/bin/enable* so that other users can execute this command, for example, yo can type

chmod 755 /usr/bin/enable

to allow all users to enable and disable printers.

Printing at the Command Line

This section describes simple printing tasks you can perform at the comman line. For complete information on the LP Print Service utility, see "Print Service Administration" in the *System Administration* guide.

The LP Print Service is a set of software utilities that allow you to print and check print status while you perform other tasks on your desktop.

We suggest that you use the desktop for most printing tasks, but you may wai to use the following commands if you are working at the command line. See

the chapter "UnixWare Command-Line Tools" for information on how to use the command line.

The following table shows the print commands supported both on the desktop and at the command line.

Table 4-1
Desktop and Command-Line
Print Commands

Tasks	Command	Desktop
Make printers available	*accept/reject* */enable/disable*	Yes Yes
Start/stop print service	*lpsched/lpshut*	No
Report status of printers	*lpstat*	No
Submit & cancel requests	*lp & cancel*	Yes

Note ▼ Your *$PATH* variable should be set to search for */usr/sbin* and */usr/lib* to use the **lp** commands without having to specify the full pathname. See the chapter "UnixWare Command-Line Tools" for more information.

The following sections list basic print functions.

Starting Print Requests

To initiate a print job, open a "Terminal" window and type

```
lp filename
```

where *filename* is the name of the file you want to print.

Note ▼ This command prints an unformatted text page only. To customize your printing (for example, to print on a PostScript printer), see your *Desktop User Handbook* or UNIX documentation.

Cancelling Print Requests

To cancel a print job, open a "Terminal" window, then check the request-id by typing

`lpstat -o`

to receive a list of all print requests on the system.

To cancel the print job, type

`cancel` *request-id*

Checking the Print Status

To display the status of a print job and the LP Print Service, open a "Terminal" window and type

`lpstat -t`

This displays information about the following:

◆ Printers currently available

◆ Printers currently active

◆ Current print requests

You can also use several different options to display information about your print request. For more information on this command and other options, see the **lpstat**(1M) command in the *Command Reference*.

5 *Installing and Sharing Applications*

This chapter explains how to install applications and troubleshoot applications, and also includes information on

◆ How to remove UnixWare applications

◆ How to use Icon Setup to assign icons to applications and data files

◆ How to use the Install Server for network software installation

◆ How to share your applications with remote systems

◆ How to add and remove packages from the command line

◆ How to troubleshoot some UnixWare applications

Overview

Several different media types and methods are available for installing UnixWare and its applications on your computer. You can install from CD-ROM, floppy disk, cartridge tape, an install server over the network, or from applications stored in a local or remote file system.

UnixWare provides an "Application Installer" window for installing applications. See the *Installation Handbook* for information on initial UnixWare installation. It also includes an "Icon Setup" window for defining the behavior of applications and related data files. Commands are also provided for installing applications.

This chapter describes how to add and remove UnixWare applications. It also describes how to set up and share applications after they are installed.

Using Application Installer

Use Application Installer to install, remove, and check the properties of UnixWare system applications and application sets, including third-party applications.

Note ▼ To install or delete applications with Application Installer, you must have permission to add/remove applications (see "Using User Setup" in the chapter "Configuring Your User Environment" earlier in this handbook).

To use Application Installer, double-click on the App Installer icon in the Admin Tools folder.

The "Application Installer" window appears:

Figure 5-1
Application Installer
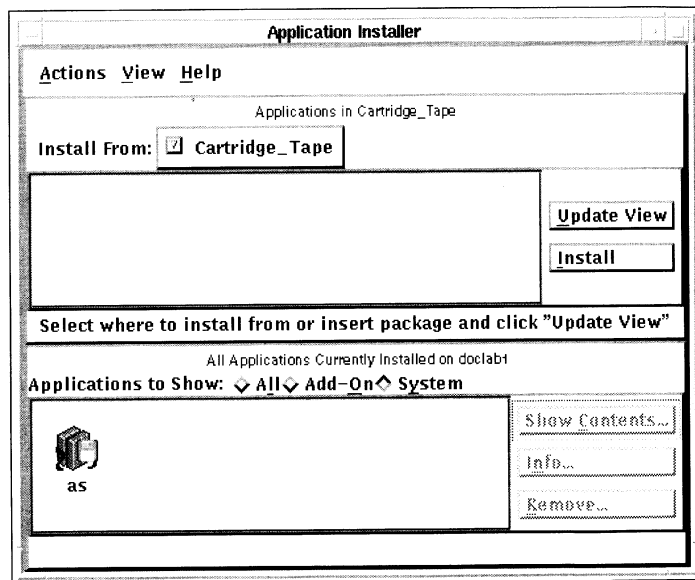
The "Application Installer: Cataloging" window appears as the Application Installer catalogs all the applications you currently have installed on your system and displays them in the bottom part of the Application Installer window. Applications contained on removable media (floppy disk, CD-ROM, tape, etc.) are cataloged and shown on the top part of the window.

When cataloging is finished, the cataloged applications appear in the window. A set consists of several application packages and is represented by an icon consisting of two books and a floppy disk (see the icon for *as* in the previous figure). A single application package is represented by a single book and floppy disk (see the *ed* icon in the previous figure).

From this window, you can install UnixWare system applications and application sets from floppy diskette, cartridge tape, CD-ROM, or a remote system. You can also remove installed applications or application sets, check properties from this window, or copy application icons into folders.

You can change the window to display only system or add-on packages by clicking on one of the desired buttons at Applications to Show:

Add-On. Click to view applications that are not part of the Application Server or Personal Edition operating system.

System. Click to display basic UnixWare software.

All. Click to view both Add-On and System software.

Installing Applications and Application Sets

This task allows you to install your favorite applications.

Note
If you are installing a SCO® application, see "Setting Application Options" in this chapter. A SCO application is one that is created for the SCO version of the UNIX operating system.

To install UnixWare system applications and application sets, insert the appropriate software medium and do the following from the Application Installer window:

Procedure
1. **Click on the selection box next to the Install From: option.**

   A list of installation media appears.

2. **Click on the medium that contains the application (Disk A, Disk B, CD-ROM, Folder, Network, and so on).**

   Packages available on the medium are displayed. If you are installing from cartridge tape, be sure your tape is completely rewound before you install from tape. If you are installing from Network, you must type the UnixWare server name, then click on Update View to see the packages available.

The Cartridge Tape icon in the Disks-etc. folder has a rewind option on its icon menu that you can use to rewind your tape.

3. **Click on the uninstalled application or application set icon(s).**

4. **Click on Install.**

   The "Add Application" window appears and may require your response. The new application or application set is installed on your system.

5. **If you are using several diskettes to install your packages, click on Update View after you install a diskette to view your installed packages or sets.**

Note When you install applications, a mail message is sent to your mailbox. You can read this message from the "Mail" window or by using the **mailx** command.

Viewing Installed Applications

Application sets (containing several application packages) and individual packages are displayed in the "Application Installer" window.

To view the contents of installed application sets or individual packages, do the following from the "Applications Currently Installed on *Your System Name*" window:
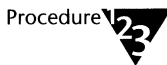
Procedure 1. **If the application (or set) is not on the screen, click on the Add-On, System, or on the All button to display the application. Use the scrollbar to scroll up or down the list.**

2. **Click on the icon representing the application package or set whose contents you want to view.**

3. **Click on the Show Contents button.**

   One of the following events occurs:

   ◆ If the icon represents an application package, a window appears displaying the executable programs that come with the application.

   ◆ If the icon represents an application set, a window appears and displays icons representing the individual packages in the set. (Click on a package, then click on Show Programs to see the executable programs that are in the package.)

Not all applications are packaged as sets. If you want to view the contents of an application that is not packaged as a set, clicking on Show Contents in the Application Installer window will display a window listing the program icons associated with the application.

Setting Application Options

Some applications require that you set special options before you can install them from the Application Installer. In particular, you may need to set a special option, the SCOMPAT Environment Variable, when you install some Santa Cruz Operations (SCO) UNIX applications.

To change the SCOMPAT Environment Variable, do the following in the "Application Installer" window:

Procedure ▼

1. **Click on *Actions* in the menu bar and select *Options*.**

   The "Options" window appears.

2. **Type the number relating to the operating system expected by the SCO application.**

   For SCO UNIX release 3.2, you would type **3.2**. The default is 3.2.

3. **Click on OK to set the new SCOMPAT option.**

Copying Application Icons to Folders

After you have installed an application or an application set onto your system, you can copy the icons for the individual application programs associated with the application to your Applications folder (or other folder, such as Admin Tools or Networking). This allows you to start the application program by double-clicking on its icon.

Note ▼▼ Some applications automatically install application programs onto the desktop. A new install of the Personal Edition, for example, automatically installs all the standard UnixWare programs, in icon form, into the appropriate folders on your desktop.

To copy an individual application program from an application package to the appropriate folder, do the following from the "Application Installer" window:

Procedure ▼

1. **If the application is part of a set, double-click on the set icon first (which appears in the bottom half of the window). Otherwise, go to the next step.**

Icons representing packages in the set appear.

2. **Double-click on the desired application package.**

   A window appears containing icons representing application programs contained in the package.

3. **Click on the individual application program you want to install to a folder.**

4. **Click on the Copy to Folder button.**

   The "Copy to Folder" window appears.

5. **Click on one of the following to select which users should receive the new icon:**

   Self. Copies the program to your own Applications folder only.

   Current Desktop Users. Copies the program to the Applications folders for each user currently set up to use the desktop.

   Current and Future Desktop Users. Copies the program to the Applications folders for each current desktop user, and also sees that it is added to the Applications folder for each new desktop user that is subsequently set up.

   **Specific Users**. Copies programs to the Applications folders of each user you choose.

6. **Click on the OK button.**

   An icon for the selected application program is copied to the Applications folder (or other folder). UnixWare returns you to the previous window.

Removing Installed Applications or Application Sets

This task allows you to remove unused or old applications if desired.

To remove installed application packages or application sets, do the following from the "Application Installer" window:

Procedure
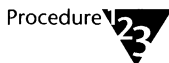
1. **Click on the icon of the application or application set you want to remove.**

2. **Click on the Remove button.**

The "Delete Application" window appears.

3. **Type *y* to remove the application or *q* to quit without removing the application.**

The "Application Installer" window stays open.

4. **Press <Enter>.**

Note ▼ Review your screen messages to make sure your application was removed. The package or set icon should disappear from the screen if it was successfully removed.

Viewing Properties of Installed Applications

This task allows you to view an application name, type, version, and so on.

To view the properties of applications or application sets installed on your system, do the following from the "Application Installer" window:

Procedure ▼ 1. **Click on the application or set.**

2. **Click on the Info button.**

The "Properties" window appears.

3. **View the following options:**

Application Name. Displays the abbreviated name of the application.

Description. Displays the full name of the application.

Category. Displays whether the application is a single application or an application set.

Vendor. Displays the name of the company that produced the application.

Version. Displays the version number of the application.

Architecture. Displays the type of computer for which the application was written. (For example, i386 includes other Intel® processors in the same family, such as i486 and Pentium chips.)

Date Installed. Displays the date and time the application was installed.

Size (blocks). Displays the number of blocks of disk space the application consumes. (By default, there are 2048 blocks in a megabyte.)

4. **Click on Cancel to close the window.**

Shrinking the App Installer Window

This task allows you to decrease the height of your window.

To unclutter the screen by only displaying the top or the bottom part of the window, do the following:

Procedure

1. **Click *View* in the menu bar.**

2. **Select one of the *Hide...* options.**

   To view the full window again, click on *View* in the menu bar and select the *Show...* menu item.

Using Icon Setup

Icon Setup lets you assign both an icon that represents a file, folder, or application and the actions that take place when you use the mouse on that icon. It does this by allowing you to define icon classes.

Icon class information describes how a file in that class behaves when you use the *New*, *Open* (double-click), or *Print* menu items (under the *File* option in the menu bar of a window) or when you drag-and-drop a file onto it. It also describes other information about the class, such as the file extension to look for and the actual icon that represents the class.

To use Icon Setup, double-click on the Icon Setup icon in the Admin Tools folder.

The "Icon Setup" window appears.

Figure 5-2
Icon Setup
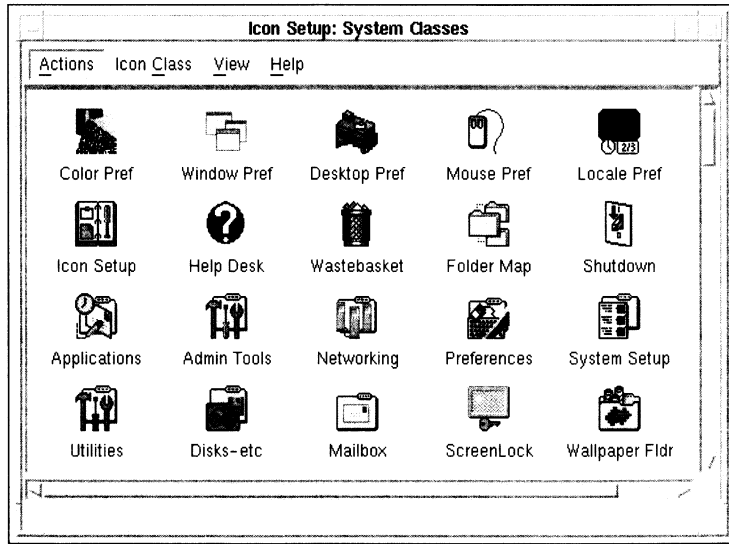
This window shows icons, where each icon represents an icon class that affects the behavior of all users' desktops (System Classes, shown above) or just your desktop (Personal Classes, shown by default). Each icon has a set of properties associated with it. All users can change or add their own personal icon classes, but only a system owner can change or add system icon classes. Most system classes cannot be changed.

Note The order of these icons is significant. The system checks the icons in the order shown to determine which class is matched to a file. Because personal classes are checked after system classes, any user can override the icon class for any icon they display on their Folder windows by adding a personal class.

Viewing Icon Classes

This task allows you to view the icon classes on your system.

To view either the personal or the system icon classes, do the following from the "Icon Setup" window:

1. **Click on *View* in the menu bar.**

2. **Select *Personal Classes* or *System Classes*.**

   Icons representing the selected type of icon class are displayed.

3. **Double-click on an icon to display the properties for that class.**

Defining a New Icon Class

Icon classes let you associate data files, folders, and applications with icons and define the actions that are taken when you work with the assigned icon.

To define a new icon class, do the following from the "Icon Setup" window:

1. **Click on *View* and select *Personal Classes* or *System Classes*.**

   The selected icon classes are displayed. (Remember that only a system owner can change or add system classes.)

2. **Click on *Icon Class* in the menu bar and select *New*.**
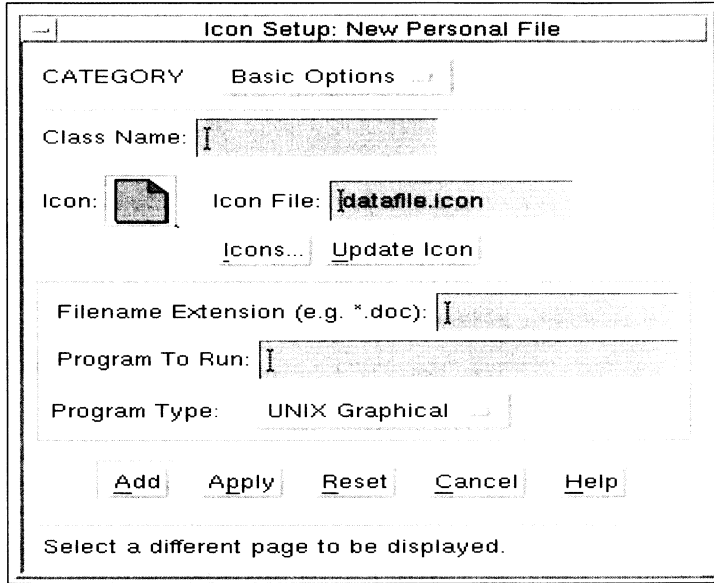
3. **Click on one of the following:**

   File. To add an icon class for a data file.

   Folder. To add an icon class for a folder.

   Application. To add an icon class for an application.

A window appears displaying the options available for the File, Folder, or Application icon you are creating. The following is an example of the "New Personal File" window:

Figure 5-3
Adding a New File
Icon Class

```
┌─────────────────────────────────────────────────────┐
│ ┌──┐          Icon Setup: New Personal File          │
│ └──┘                                                  │
│                                                        │
│   CATEGORY      Basic Options    ▿                    │
│                                                        │
│   Class Name: │I                              │       │
│                                                        │
│   ┌──────┐                                            │
│   Icon: │ ▢  │    Icon File: │dataflle.icon      │    │
│   └──────┘                                            │
│                  Icons...  Update Icon                │
│                                                        │
│   Filename Extension (e.g. *.doc): │I            │    │
│                                                        │
│   Program To Run: │I                            │     │
│                                                        │
│   Program Type:    UNIX Graphical    ▿               │
│                                                        │
│        Add   Apply   Reset   Cancel   Help           │
│                                                        │
│   Select a different page to be displayed.           │
└─────────────────────────────────────────────────────┘
```

4. **Set the desired Basic Options in CATEGORY. Options vary based on whether you are adding a File, Folder, or Application icon class.**

   File Icon Class Options:

   The "New Personal File" window displays a file icon class.

   > **Class Name**. Lets you enter the icon class name of the selected icon. Enter a name that describes these types of files.

   > **Icon**. Lets you enter the icon that represents the class.

   > **Icon File**. Lets you enter the name of the file that contains the icon associated with the selected class. A picture of the icon appears next to the Icon: tag. (Unless a full pathname is given, the icon file is expected to reside in the */usr/X/lib/pixmaps* folder.)

   > Click on Icons to see a choice of icons in the "Icon Library" window. If you typed the name of an icon file, click on Update Icon to see the icon for the new name.

   > **Filename Extension**. Lets you enter the pattern used to identify the file class. For example, a document file class icon could represent any file that ends in *.doc*, so you would enter **.doc* in this field. To match an exact filename, type the whole filename without using an asterisk (*). You could leave this field blank (see the option "File Typing" later in

this chapter). You can enter any valid command line regular expression in this field.
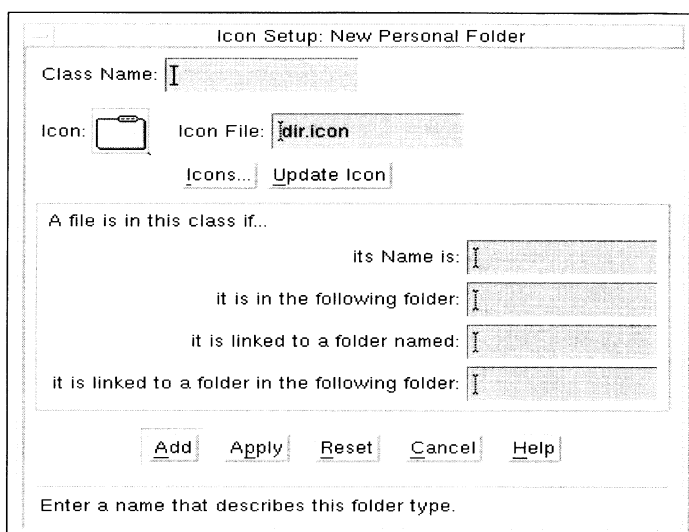
Program to Run. Enter the name of the program that should be used when opening files of this type.

Program Type. Click on the box to indicate whether the program specified in Program to Run is a UNIX Graphical, UNIX Character, DOS, or MS Windows application. (A UNIX character application is run in a "Terminal" window; a graphical application is not.)

Folder Icon Class Options:

The "New Personal Folder" window displays a folder icon class.

Figure 5-4
Adding a New Folder
Icon Class

Icon Setup: New Personal Folder

Class Name: I

Icon: Icon File: dir.icon

Icons...   Update Icon

A file is in this class if...

its Name is: I

it is in the following folder: I

it is linked to a folder named: I

it is linked to a folder in the following folder: I

Add   Apply   Reset   Cancel   Help

Enter a name that describes this folder type.

Class Name. Lets you enter the file class name of the selected icon. Enter a name that describes these types of folders.

Icon File. Lets you enter the name of the file that contains the icon associated with the selected class. A picture of the icon appears next to the Icon: tag. (Unless a full pathname is given, the icon file is expected to reside in the */usr/X/lib/pixmaps* directory.)

Click on Icons to see a choice of icons in the "Icon Library" window. If you typed in a name of an icon file, click on Update Icon to see the icon for the new name.

its Name is. Lets you enter the pattern used to identify the folder's class.

it is in the following folder. Type a folder name if you want all folders that reside in this folder to be assigned to this icon class.
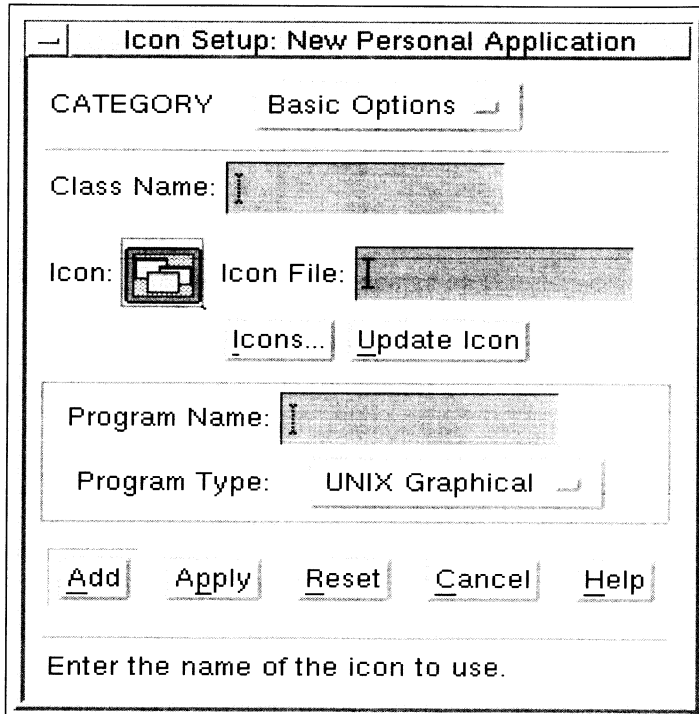
it is linked to a folder named. Type a folder name if you want all icons linked to the folder to be assigned to this icon class.

it is linked to a folder in the following folder. Type a folder name if you want all icons that are linked to a folder in this folder to be assigned to this icon class.

Application Icon Class Options:

The "New Personal Application" window displays an application icon class.

Figure 5-5
Adding a New
Application Icon Class

Icon Setup: New Personal Application

CATEGORY   Basic Options

Class Name:

Icon: Icon File:

Icons...   Update Icon

Program Name:

Program Type: UNIX Graphical

Add   Apply   Reset   Cancel   Help

Enter the name of the icon to use.

Class Name. Lets you enter the file class name of the selected icon. Enter a name that describes these types of applications.

Icon. Lets you enter the icon file type as an icon.

Icon File. Lets you enter the name of the file that contains the icon associated with the selected class. A picture of the icon appears next to the Icon: tag. (Unless a full pathname is given, the icon file is expected to reside in the */usr/X/lib/pixmaps* directory.)

Click on Icons to see a choice of icons in the "Icon Library" window. If you typed the name of an icon file, click on Update Icon to see the icon for the new name.

Program Name. Lets you enter the pattern or name of the application program.

Program Type. Click on the box to indicate whether the program specified for Program Name is a UNIX Graphical, UNIX Character, DOS, or MS Windows application. (A UNIX character application is run in a "Terminal" window; a graphical application is not.)

5. **For a File or Application class, click on CATEGORY next to Basic Options. For a Folder class, skip to Step 7.**

Note

In most cases, you need only fill in the Basic Options to create an icon class.

6. **Select from any of the following icon class properties windows:**

File Typing. The "New Personal" (File or Application) window appears. This window lets you enter file attributes, such as the folder it is in or the file it is linked to. Change any of the following attributes for the new class:

it is in the following folder. Type a folder name if you want all files that reside in this folder to be assigned to this icon class.

it is linked to a file (or program) named. Type a filename if you want all icons linked to the file to be assigned to this icon class.

it is linked to a file (or program) in the following folder. Type a folder name if you want all icons that are linked to a file in this folder to be assigned to this icon class.

Icon Actions. This window lets you enter actions that occur when you use the mouse or the icon menu on the icon. It also lets you use the icon class as an option when creating a new file. Change any of the following attributes for the new class:

Display icon in File:New window? (File only) Click on Yes if you want the icon to appear as a choice for a new type of file when you

create a new file within a folder window. (For example, from a folder window, click on *File* then click on *New*. By default you'll see Folder and Datafile as choices for the class of file you are adding. When you select Display icon in "New" window, the class is available to use to create a new file.)

These options appear in the "New Personal File" window:

To Open File. Displays the command to be executed when a file of this class is opened.

To Print File. Displays the command to be executed when a file of this class is printed.

These options appear in the "New Personal Application" window.

To Run Program. Displays the command to be executed when an application of this class is opened.

To Process a Drop. Displays the command to be executed when an icon is dropped on an application of this class.

Program can load several files at once. If this box is selected, the program can take more than one file as input at a time.

For the To Open, To Print, To Run or To Process a Drop text boxes, you can use the following variables

%F	Expands to the full path name of the file.
%f	Expands to the base name of the file.
%L	Expands to the full path of the file to which a symbolic link points.
%l	Expands to the base name of the file to which a symbolic link points.
%S	Expands to the full pathname of a file that is dropped on a file of this type.
%s	Expands to the base name of a file that is dropped on a file of this type.
%{S*}	Expands to a space-separated list of full pathnames for files that are dropped on a file of this type; filenames are not within quotes.

%{"S*"}	Expands to a space-separated list of full pathnames for files that are dropped on a file of this type; each filename is enclosed in quotes.
%{s*}	Expands to a space-separated list of base filenames for files that are dropped on a file of this type; filenames are not within quotes.
%{"s*"}	Expands to a space-separated list of base filenames for files that are dropped on a file of this type; each filename is surrounded within quotes.

Note ▼ Quotes (") are used to indicate that the expanded value should be enclosed within quotes, as in "%F", "%f", "%L" and "%l".

Note ▼ The %s and %S variables are only used in the To Process a Drop field in the Icon Actions category of the "New Application Type" window. The * character is used to indicate that they should be expanded to a list of filenames and are used with an application that can handle multiple files in one invocation when it is dropped on. They can take one of the forms shown previously.

This option appears in the "New Personal File" window.

Templates. The "Templates" window appears. Templates provides a way to create a new file that is already formatted in a way that it can be used for a particular application or contains standard headers for a memo or report.

> **File Name.** Type the name of a template file for the class. When a new file is created using the New option from a folder window, and a template is defined for the selected class, that template can be used to create a file for that class. The file specified in this text box is usually a file formatted for a particular application. (You can click on the Find button to select the template file from the file system.)

> **Add, Modify, or Delete.** Click on one of these buttons to change the list of existing templates associated with this icon class.

7. **Click Add to add the new icon class to the list of existing classes and close the window.**

An Example of a New Icon Class

An example of adding a new icon class is shown next. This is an icon class for a word processing data file class.

Follow the procedure in "Defining a New Icon Class" to open the window needed to add a new icon class. Add the information described next to the "New Personal File" window. The "Basic Options" window appears first. The following table shows the values we filled in for this example:

Table 5-1
Basic Options

Field Name	Value
Class Name	myword
Icon File	docfile3.icon
Filename Extension	*.myw
Program To Run	/usr/bin/myword
Program Type	UNIX Graphical

In this example, after you fill in the fields, you can click on Add to add the new class. The new class is *myword*. The *docfile3.icon* file is used to represent the file class and is located in the */usr/X/lib/pixmaps* folder. You could click on the Icons button to select the icon or simply type it into the field.

Because the Filename Extension is set to *.myw*, when you open a folder window, any file that ends with *.myw* matches the class. The */usr/bin/myword* (Program To Run) application is run and the current file is used as input when you open (double-click on) a file of this class.

Because the application that is run with files of this class is a UNIX graphical program, the application is simply executed. (If the application were a UNIX character application, it would be run in an xterm window; if it were a DOS or MS Windows applications, DOS or MS Windows starts and the application runs in that environment.)

Icon Setup was designed to let you add a new class by simply filling in the Basic Options. However, you can further define the behavior of an icon class by filling other class options. If, instead of just clicking on Add after you filled in the Basic options in the previous example, you clicked on the CATEGORY button in the window, you could request screens that let you define additional class information.

Continuing with the previous example, the following table contains examples of options you could add for the *myword* file class. Add this information to the Icon Actions and Templates options screens:

Table 5-2
Icon Actions

Field Name	Value
Display icon in File: New Window?	Yes
To Open File:	exec /usr/bin/myword "%F"
To Print File:	exec /usr/bin/mywordp "%F"

By clicking on Yes for Display icon in "File: New Window?", the icon for this class will appear in the "File: New" window when you create a new file in a folder window. (Yes is the default.) The other two fields we filled in (To Open File and To Print File) define exactly what occurs when you Open (double-click) or Print (from the File menu or icon menu) an icon of this class. An open executes the *myword* application with the current file as input. A print executes a special application (*mywordp*) that is used for printing files of this class.

Table 5-3
Templates

Field Name	Value
File Name:	/home/chris/template/mytemp.myw

The File Name field on the Templates option screen lets you define templates that could be used to represent files of this class. The advantage is that you can create several files, already filled with information, that you can use as a starting point when you create a new file. Later, when you create a new file from a folder window, you not only can choose to create a file of this class, you can start with it filled with a memo, report, or other useful template you create

In the previous example, we created a template in *myw* format that we stored in a template directory under chris's home directory. By clicking on the Add

button, you can add this to the list of templates. You can add as many templates as desired. (Templates you want to make available to other users could be added to the */usr/X/lib/template* directory. You must be a system owner to add files to this folder.

Deleting or Modifying an Icon Class

Once you create an icon class, you can delete or modify it by doing the following:

Procedure

1. **Click on *View* in the menu bar and select *Personal Classes* or *System Classes*.**

   The selected icon classes are displayed. (Remember that only a system owner can change or delete System Classes.)

2. **Click on the icon for the class you want to delete or modify.**

3. **Click on Icon Class.**

4. **Set one of the desired options:**

   Delete. To delete the selected icon class.

   Properties. To change the selected icon class. Change any of the information described in "Defining an Icon Class."

Overview of Setting Up and Installing Packages from an Install Server

The Install Server is an administrative tool provided with the Application Server for installing products and packages from that Application Server onto a UnixWare client. You can use the Install Server to install a copy of the Personal Edition or Application Server products or packages across a NetWare or TCP/IP network.

Setting Up an Install Server

For example, if you want to be able to install copies of the Personal Edition onto several UnixWare client systems, using the network install diskette shipped with UnixWare you would first set up one Application Server system to become the Install Server, then the UnixWare client systems can attach to

that server and a copy of the Personal Edition that resides on the Install Server can be copied onto the client.

Before UnixWare packages or products can be installed onto a client from an Install Server, however, an Install Server must be set up on an Application Server system .To configure an Install Server, see the section, "Setting Up and Administering an Install Server" in the chapter "Installing Add-on Software" of the part "System Setup and Configuration" in the *System Administration* guide first.

The following sections describe how to install packages onto your client once an Install Server is set up on an Application Server.

Note

If you are a system administrator and you want to use the Install Server as a server, you must have the Setup Network Installation permission, as described in "Using User Setup" in the chapter "Configuring Your User Environment" of this handbook. There are also other requirements that must be met. See the *System Administration* guide for more information.

If you want to use the Install Server as a client, your network must be configured and the Install Server must be enabled.

To install a copy of the Personal Edition or Application Server from a preconfigured Install Server, see the *Installation Handbook* first.

Installing Packages from an Install Server at the Desktop

To install packages and sets from the desktop, do the following:

Procedure
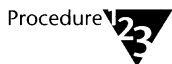
1. **Double-click on Admin Tools in the UnixWare Desktop.**

2. **Double-click on App Installer in the Admin Tools folder.**

3. **Follow the instructions in the section, ""Using Application Installer" earlier in this chapter.**

Installing Packages from an Install Server at the Command Line

To install an application from a UnixWare Install Server onto your system from the command line, do the following:
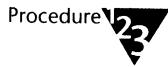
1. **Determine the system name of the Install Server, the name of the package you want to install, and the location of the package in the Install Server's file system.**

   Often packages are installed in the directory */var/spool/dist* or are simply available from a file system mounted from CD-ROM. Ask your system administrator.

2. **Double-click on Applications in the UnixWare Desktop.**

3. **Double-click on Terminal in the Applications folder.**

   A "Terminal" window is displayed.

4. **Log in as root or type *su* and the password from a "Terminal" window.**

5. **Type the following command:**

   pkginstall [-n *network*] **-s** *source packages*

   where *source* is the location of the packages and *packages* is the names of the packages you want to install. The *source* variable can be either a *system_name* (in which case, the packages are assumed to be in the */var/spool/dist* directory) or *system_name:directory* to specify the directory on the remote system that contains the packages. Each package name is also the directory name used to represent the package.

   If your Install Server is configured to use both TCP/IP and IPX/SPX networking, you can force **pkginstall** to use the network of your choice. For IPX/SPX, replace the **-n** *network* option with **-n ipx**; for TCP/IP replace it with **-n tcp**.

Sharing Applications

You can share applications on your system with other UnixWare system users by using Application Sharing, which advertises to other machines that you have applications available for their use.

Note

Before you can advertise your applications to other users, you and the remote system owner must open the NetWare Setup icon and turn on peer-to-peer networking, as described in "Using NetWare Setup" in the chapter "Setting Up and Configuring NetWare Connectivity" of this handbook.

In addition, to use Application Sharing, you must have permission to share applications (see "Using User Setup" in the chapter "Configuring Your User Environment" earlier in this handbook).

To configure Application Sharing, do the following:

Procedure ▼
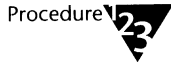
1. **Open the window containing the application you want to advertise to users on other systems.**

2. **Double-click on the Application Sharing icon in the Admin Tools folder.**

   The "Shared Applications" window appears:

Figure 5-6
**Application Sharing-
Shared Applications**
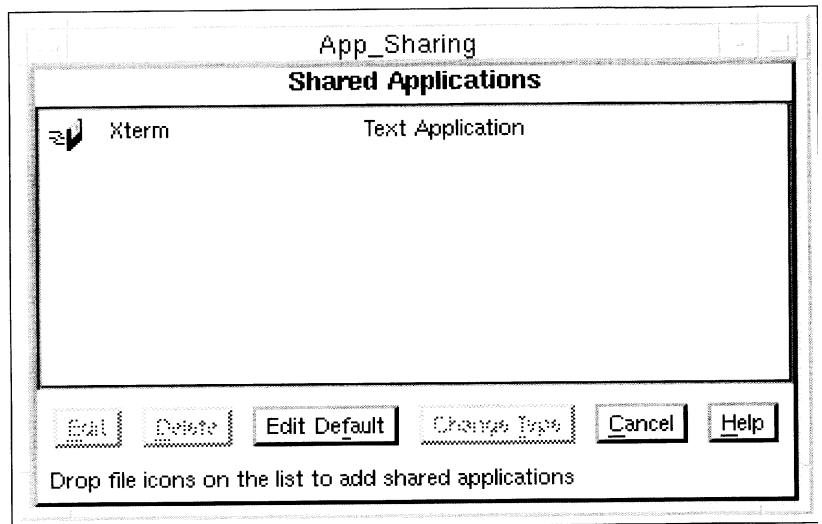
3. **Drag-and-drop the application icon onto the "Application Sharing - Shared Applications" window.**

4. **Click on Cancel to close the window.**

   The application is now available to other users.

To remove an application from the "Shared Applications" window, click on the application icon and click on Delete. Your application is no longer shared.

Warning Only experienced UNIX system users should attempt to edit these files. If the files are edited incorrectly, Application Sharing for that file will be disabled.

Adding and Removing Packages and Applications at the Command Line

When you install UnixWare, you add several packages by default. Later, you may want to add other packages or remove some packages and add others.

The */var/sadm* directory contains two subdirectories that include information about where packages are stored:

Install. Contains information on packaging install, plus a log of all files on the system and the package to which each file belongs.

Pkg. Contains installation or removal scripts for each package or set, plus data used by the scripts.

Adding Packages

The Application Installer is the preferred method for adding packages to UnixWare.

To add packages from the command line, use the **pkgadd** command as follows:

Procedure

1. **Double-click on Applications in the UnixWare Desktop.**

2. **Double-click on Terminal in the Applications folder.**

   A "Terminal" window appears.

3. **Log in or type** *su* **to become root.**

4. **Type**

```
pkgadd -d medium
```

where *medium* is replaced by the *medium* on which the software is contained. For example, use **ctape1** for the first cartridge tape drive or **diskette1** for the first floppy disk drive.

5. **Insert the medium and press <Enter>, as instructed.**

   A list of packages on the medium is displayed.

6. **Select the number that corresponds to the package you want to install**

7. **Answer any questions required by the specific application.**

8. **When you receive a message that installation is complete, reboot the system if required by the application.**

See the *Command Reference* for more information on **pkgadd**.

Removing Packages

The best way to remove a package is by using Application Installer.

If you prefer to use the command line, do the following:

Procedure

1. **Double-click on Applications in the UnixWare Desktop.**

2. **Double-click on Terminal in the Applications folder.**

3. **Log in or type *su* to become root.**

4. **Type**

   ```
   pkgrm
   ```

   A list of packages installed on your system will display in numerical order

5. **Select the number that corresponds to the package you want to remove.**

6. **Reboot your system if the package removes drivers that require you to rebuild the kernel.**

   The system returns a message to rebuild your kernel.

See the *Command Reference* for more information on **pkgrm**.

Troubleshooting Applications

Applications created specifically for UnixWare usually can be installed using the Application Installer icon and run by simply starting the application's executable.

Applications designed for other UNIX systems may rely on minor, but sometimes contradictory, operating system features. For example, an application may expect the operating system version to be set to Release 3.2, or may use a terminal definition that conflicts with one delivered with UNIX System V. In almost all cases, a few simple steps resolve these problems.

The applications tested on UnixWare include applications originally targeted for the following operating systems and versions:

◆ Microsoft® XENIX® System V/386 Release 2.2.3

◆ Santa Cruz Operation (SCO) XENIX System V Release 2.3.1.

◆ ISC UNIX System V Release 3.2

◆ AT&T® UNIX System V/386 Release 3.2

The following tips contain information to help you run your applications from these other versions of UNIX in UnixWare.

◆ Follow installation instructions that come with the application. Some applications will not install with the Application Installer. However, UnixWare has other popular commands for installing applications: **tar**, **cpio**, **custom**, and **pkgadd**.

◆ The **custom** command, which is used to install many SCO applications, checks for the operating system release number to know how to install the application. If your custom installation fails, before attempting to install again, delete the file by the name of the application in */etc/perms*.

◆ Many SCO applications read the installation files to hard disk using the **tar** command, then run an application-supplied install script to complete the installation. Because UnixWare device names are different than those in SCO UNIX systems, you may need to use **tar** as shown in the following examples:

```
tar -xvf /dev/rdsk/f?
tar -xvf /dev/rdsk/f?t
tar -xvfi /dev/rdsk/f?t
```

where *?* is replaced by **0** or **1**, depending on which diskette drive you are using.

◆ Software distributed in **pkgadd**(1M) format on cartridge tapes may vary in storage capacities. For example, if the tape cannot be read on a 120 MB tape drive, it may have been written on a higher density tape drive. Take the tape to a machine with a 150 MB tape drive. Use the **pkgtrans**(1) command to read the tape onto the machine. The data can then be transferred to the target machine via a network or other media. Then use **pkgadd**(1M) to install the application from a directory. See the **pkgadd**(1M) and **pkgtrans**(1) manual pages for details.

◆ By default, the **pkgadd** command is invoked in "quiet" mode. This is true whether you invoke **pkgadd** directly or through the Application Setup icon. The quiet mode may inhibit presentation of prompts by the application, so if your application installation appears to be stalled, try typing **y**. The problem may simply be that the application's prompts have been inhibited.

◆ The **displaypkg**, **pkginfo**, and **custom** commands may not display information about packages installed in formats they are not familiar with. Try each of the package display commands if the application you are looking for does not appear with the first command you try.

◆ Check that you have enough disk space. Many applications will tell you how much disk space you need to install the application (either in the documentation or when you start installation). Type **/etc/dfspace** from a "Terminal" window to make sure you have enough space.

◆ Check the device names. Different versions of UNIX have different device names associated with floppy, CD-ROM, and tape devices.

◆ Some SCO applications check that your operating system is running System V Release 3.2, and fail if it is not. You can fool the application into thinking UnixWare is a 3.2 system by typing:

```
SCOMPAT=3.2;export SCOMPAT
```

from the command line just before you install the product from a "Terminal" window.

◆ When using an application in ASCII or a "Terminal" window, some function keys may not work. See "Keyboard Problems " in Appendix A, "Troubleshooting."

◆ If the SCO application installs by copying an archive file containing all the application's files and executables to disk, you may exceed your **ulimit**. The **ulimit** sets the maximum file size that can be created on the system. It prevents greedy users or runaway processes from creating files that will consume an entire hard disk. To increase your **ulimit**, type the following:

```
ulimit 40000
```

You must be a root user from a "Terminal" window. After this, you can create a file that is up to 40,000 blocks in size. This should be fine.

◆ Check for environment variables. When you try to run the application, the application may require that some variables be set. In particular, the *PATH* variable may need to be set to find the application or another variable may need to be set to find libraries used by the executable. These variables should be listed in the application's documentation.

◆ If you are running an application from an xterm window, the <F10> key may not work. If this happens, try using the <Ctrl>+<f>+<0> instead of <F10>. This problem may occur when using Application Installer or **pkgadd** for installing packages coded at the menu bar.

◆ You should always install applications from the system console rather than from a remote terminal.

◆ If the application recommends the product be installed by a particular login (such as root), be sure to log in as that user. If you don't, the installation may fail or you may have permissions problems later on.

◆ Some applications are designed to be installable on multiple operating systems and provide installation options that let you select the operating system you are using. If SVR4.2 MP is not a choice, select the most recent operating system, e.g., SVR4.2 or SVR4.0. If UNIX System V is not a choice, try choosing the native operating system for the application.

◆ Some applications that were written for UNIX System V Release 3.2 (or earlier releases) require that the application must be run on a SVR3.2 compatible file system , such as the s5 file system , or that the number of files on the file system be limited. You must specify the file system type and maximum number of files when the file system is created; once the file system exists, the type and file limit for the file system cannot be changed.

◆ In general, applications can be installed on any file system that provides sufficient hard disk space. Occasionally, an application will check for sufficient space on the root(/) file system , regardless of the file system on which you are installing the application. If space in the root partition is insufficient, your installation will fail. The workaround is to edit the installation script so that it checks the file system on which the application is actually being installed.

◆ Certain applications may not work if your system name is not the same as your node name. With particular applications, if your system name is changed after they have been installed the application may stop working.

To determine your current system name and node name, click on a "Terminal" window and type

uname -a

The first word on the output line is the system name and the second word on the output line is the node name. If an application is no longer working and your system name is not the same as your node name, log in as root and type

setuname -s *nodename*

nodename should be replaced with the nodename as returned by the use of the **uname -a** command described previously.

◆ Device names vary between different vendors' operating systems. If an application tries to access devices that don't exist, there are a few things you can try. See the manual pages **fd**(7) (floppy disk), **qt**(7) (cartridge tape), or **hd**(7) (hard disk) to determine the name of the device you need to reach. You can then either change the application (if possible) to access the correct device name or create a new device node based on the major and minor numbers of the device you want to access. See **mknod**(1M).

◆ If your application was written for SCO XENIX, you may need to put
/usr/eac/bin at the beginning of your PATH variable. To do this, add the
following to your *.profile* file prior to the line containing
`$HOME/.olsetup`.

`PATH=/usr/eac/bin:$PATH; export PATH`

This is especially important if your application tries to run **awk** or **cc**, or
tries to create XENIX executables.

◆ The **csh**, **ksh**, and **sh** shells have different ways of setting environment
variables. If an application tries to set environment variables for a **csh** shell
without using the **setenv** command, the variables will not be set. Examine
installation scripts for the shell they are intended to use and, if possible,
use the recommended shell. Otherwise, you may need to edit the shell
script to execute it successfully on another shell.

◆ If a SCO application that was not installed by **custom** fails to execute and
dumps core, run **fixshlib** on the executable as follows:

`fixshlib` *executable-name*

If **fixshlib** produces warning or error messages, then it was unnecessary to
run **fixshlib**. Do not run **fixshlib** on applications written for AT&T or ISC
Release 3.2-based systems. If you do by mistake, you must remove and
reinstall the application because the executables will become unusable.

◆ An application may fail to install or run because of incorrect permission
settings on a file or directory. Such a failure will usually be reported by the
installation script or program executable. Check permissions on files
indicated by application error messages and change them appropriately
using the **chmod** command. In particular, file and directory permissions
must be set appropriately to enable non-root users to install an application.

◆ Some applications were not designed to run in a "Terminal" window. If an
application will not display properly in a "Terminal" window, try running
the application at the console or in a virtual terminal.

◆ SCO XENIX systems (and some earlier versions of UNIX System V) rely
on some specific values for device control functions for *ioctls*. If an
application fails and generates an error from the *ioctl* system call or
displays strange characters, try invoking the application by inserting
scompat in front of the command line used to invoke the program. See the
scompat(1) manual pages for more information.

◆ Many applications can run in either graphics or character modes. Try the character mode before trying the graphics mode. There are often fewer incompatibilities when running in character mode.

◆ Many X applications written for SCO Open Desktop require that the DISPLAY variable be set to **:0**, instead of the default unix:0.0. Before you run an X application, start up the graphical user interface, set the DISPLAY variable, and invoke the application. Set the variable by typing

```
DISPLAY=:0;export DISPLAY
```

◆ If you are having display problems when you run an application, consider the definition of your terminal type in the xterm window when you start the application. Terminal and printer definitions are contained in a database of files and directories in */usr/share/lib/terminfo*. Some pre-SVR4.0 systems used a single file (*/etc/termcap*) to hold terminal and printer definitions.

◆ When the **mapstr**(1) command is executed, it picks up function key definitions from */usr/lib/keyboard/strings*. If you are running a SCO application and the function keys seem incorrect, run

```
mapstr /usr/lib/keyboard/scostrings
```

◆ When executed, **mapkey** picks up the keyboard mappings from */usr/lib/keyboard/keys*. You can copy and change the keys file as needed and run **mapkey**. If you are running a SCO application and the keyboard mappings seem incorrect, run the **mapkey** command with the */usr/lib/keyboard/scomap* file. See the **keyboard**(7) manual page for further information.

You can run **mapkey** with the **-V** option to change keyboard mappings fo the current virtual terminal or run it without **-V** option to affect all virtua terminals being used on the system.

◆ The **lp** command delivered with the SCO UNIX System 3.2 formats prin jobs for PostScript printers by default. The current UNIX System V version of **lp**, however, does not use the PostScript filter by default. Therefore, any application that expects **lp** to interpret the files they print a PostScript files, without using the **-Tpostscript** option, will not print properly.

◆ Some applications require you to designate a system default printer. To do this, run the following command: **lpadmin -d** *printer* and replace *printer* with one of your system's printers.

◆ Some XENIX applications require that the Application Compatibility Package be installed on your system. This package comes with UnixWare, but is not necessarily installed by default.

If the application does not work properly after trying these tips, contact the application's vendor.

6 *Setting Up and Configuring Hardware*

This chapter explains how to set up and configure new hardware and also includes information on

◆ Adding new hardware controllers and peripherals

◆ Configuring new hardware controllers

◆ Removing hardware controllers and peripherals

◆ Rebuilding your system

◆ Viewing and/or changing device driver configuration data

Overview

After you have installed UnixWare, you may want to add other pieces of hardware. When you add a device such as a new controller, you may also be required to configure the IRQ, change the memory address, configure a device driver for installed software, and so on. You can do these using the Device Configuration Utility (DCU) on the desktop.

You may also need to remove old hardware and replace it with new hardware, or check and change your current configuration. You can also do this using the DCU utility.

Note ▼ After installing or any time you change hardware on your system, create a new disaster recovery floppy diskette or tape to reflect your new configuration. See the chapter, "Recovering Your System" in this handbook for information on how to create a disaster recovery diskette.

After that, you may need to rebuild your kernel (see "Rebuilding Your System" in this chapter).

Hardware Definitions and Examples

Throughout this chapter, the term controller refers to any hardware device (typically a board) that is directly attached to your system I/O bus (motherboard). A peripheral refers to any hardware device that is attached to a controller. A device driver refers to a software program that allows UnixWare to access controllers and the peripherals that are connected to these controllers.

For example, to add an external CD-ROM drive, you would install (or already have installed) a CD-ROM controller and then you would attach the CD-ROM drive to this controller. The controller can either be a dedicated CD-ROM controller board (that allows communication between your system and a single peripheral) or a SCSI Host Bus Adapter (an HBA, which allows communication between your system and multiple peripherals).

A second example is adding an Ethernet networking board. This board serves as a controller since it attaches directly to the system I/O bus and enables communication between your system and an external network.

In both examples, a device driver must be configured so that UnixWare can access the controller.

Note ▼ For UnixWare to access peripherals that are connected to a controller, the device driver configuration must match the hardware parameter values for the controller. See the chapter "Before You Begin," in the *Installation Handbook*.

Adding New Hardware Controllers and Peripherals

This task allows you to add new pieces of hardware to your system.

To add a new hardware controller or peripheral, do the following:

Procedure ▼ **1. Manually configure the new hardware, if necessary.**

Some hardware requires manual configuration. For example, you may have to set jumper pins on a hardware card. Check the documentation provided with the hardware you are installing.

◆ If you add a new controller, be careful when setting the IRQ, memory address range, I/O address range, and Direct Memory Access (DMA) channel. You generally need to select values that do not conflict with existing hardware configuration parameters. However, some controllers support shared IRQ values. When multiple controllers share the same IRQ values, the software device drivers for these controllers must operate at the same Interrupt Priority Level (IPL). For example, two DPT controllers supported by the same device driver will operate at the same IPL. In addition, software device drivers of the same class, HBA drivers for example, will operate at the same IPL.

To view the existing hardware controllers on your system, invoke the DCU utility by following the steps in "Viewing or Changing Device Driver Configuration" later in this chapter.

◆ If you attach a peripheral to a SCSI host bus adapter, manually set the SCSI target ID.

If you attach a peripheral to a non-SCSI controller, configure the device using the hardware manuals provided with the controller and peripheral.

To view existing hardware data, open a "Terminal" window, log in as root, and type:

```
/etc/scsi/pdiconfig -l
```

2. **Shut down your system by clicking on the Shutdown icon in the desktop or by typing**

```
shutdown -y -i0
```

3. **When prompted, turn off the system power switch.**

4. **Connect the new hardware controller(s) and/or peripheral(s).**

Insert any needed hardware controller(s) into your system and connect the new hardware peripheral(s) to the controllers (hardware boards and/or host bus adapters). For details, see the documentation that came with your hardware.

5. **Turn on the power for your system and all electrical hardware devices that are connected to your system.**

If the hardware you are installing has its own power cord, plug in the power cord and power up the hardware.

6. Run any hardware-specific software.

Some hardware devices have software that must be run before you can boot UnixWare. When installing a new controller (for example, a networking board), do the following:

◆ If your system came with a platform configuration utility, run that utility. This is typically true for EISA, Micro Channel Architecture (MCA), and Peripheral Component Interface (PCI) systems. For details, see the documentation that came with the hardware.

◆ If the controller came with an initialization program, run that program. For details, see the documentation that came with the hardware.

Many platform configuration utilities and/or hardware initialization programs require a DOS operating system. Your original UnixWare media includes a diskette that provides a limited DOS operating system. To use this diskette, do the following:

6a. Insert the DOS diskette into your system boot drive and reboot your system.

6b. When the DOS prompt is displayed, replace the DOS diskette with the platform configuration utility diskette or initialization program diskette. (Follow the instructions for your program. See your hardware configuration documentation.) Then press \<Enter>.

6c. Configure your hardware by following the instructions provided in your hardware documentation.

6d. After configuring the hardware, remove the diskette from the boot drive.

7. Turn on the power to your system. If the power is already turned on, reboot your system.

Then follow the instructions in "Configuring New Hardware Controllers and Peripherals" next.

Configuring New Hardware Controllers and Peripherals

This task allows you to configure your devices once they have been added to your system.

Do the following to verify that UnixWare is properly configured to access the new hardware and, if necessary, to revise your software configuration:
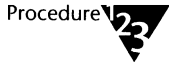
Procedure

1. **Double-click on Applications in the UnixWare Desktop.**

2. **Double-click on Terminal in the Applications folder.**

3. **Log in as root or type *su* to become root.**

4. **Verify that UnixWare configured a device driver to access the new controller.**

   If you are not sure whether the device driver is configured, go to "Viewing or Changing Device Driver Configuration" later in this chapter for instructions on how to verify this using the DCU utility.

5. **Make sure the device driver is configured to access the new controller.**

   Use the following table to decide what to do next.

If	Then
The device driver for the controller is installed and has been automatically configured...	Go to Step 8.
The device driver for the controller is installed but has not been configured...	Go to Step 7.
The device driver for the controller has not been installed...	Go to Step 6.

6. **Install the device driver in your system.**

   Many device drivers are provided with your UnixWare system and on the UnixWare HBA diskette. Your hardware vendor may also provide HBA diskette(s). An HBA diskette contains packages; each package provides a specific device driver.

Beginning with UnixWare 2.0, it is no longer necessary to run the **pdiadd** command to add drivers from the HBA floppy, except for non-PCU devices that are installed using non-default configurations (such as a different interrupt vector, I/O address, and so on, than those listed in the *System* file). As long as the hardware exists in your system when the package is added, installation is automatic.

For example, if you use **pkgadd** to add an Adaptec 1542 controller and do not change any parameter values, you do not need to run **pdiadd**. However, if you change a parameter value, such as the IRQ setting, from its default (11) to another value such as 12, you will have to run **pdiadd**.

Insert the HBA diskette into the system disk drive and then use the Application Installer to install the package. See the chapter "Installing and Sharing Applications" earlier in this handbook.

If the controller you are installing is a networking board, its device driver may be provided in the Network Interface Card Support package (*nics*). In this case you need to install (or, if already installed, reinstall) the *nics* package.

7. **After the device driver is installed, a message may be displayed indicating additional actions that you must perform to configure the device driver. Follow the instructions displayed on the screen.**

   The package installation software displays a message if additional actions are required. Typical actions that you may need to perform are:

   ◆ Using the DCU utility (as described in "Viewing or Changing Device Driver Configuration" in this chapter) to specify the controller's hardware parameters to the device driver.

   ◆ Rebuilding your kernel (as described in "Rebuilding Your System" later in this chapter) or rebooting your system.

8. **After configuring the device driver for a controller, additional device-specific configuration may be needed. For example:**

   ◆ If you added a printer to your system, you may need to configure the printer. See the chapter "Setting Up and Configuring Printers" earlier in this handbook.

   ◆ If you added a modem to your system, you may need to configure the modem. See the chapter "Setting Up Modems and Other Serial Communications" later in this handbook.

   ◆ If you added a hard disk then you need to use the **diskadd**(1M) command. See "Storage Devices and File Systems Administration" in the *System Administration* manual for information on the **diskadd** command.

Removing Hardware Controllers and Peripherals

This task allows you to remove pieces of hardware from your system. Do the following to remove a hardware controller and/or peripheral:

Procedure

1. **If you are removing a controller from your system, decide whether the device driver parameter settings for the controller should be removed from the system resource database.**

   UnixWare automatically detects when some controllers (for example, supported EISA, MCA, or PCI hardware) are installed on the system. If such controllers are removed from the system, UnixWare removes the controller's device driver parameter settings from the system resource database. This is because UnixWare will automatically detect if such controllers are reinstalled and will automatically configure their device drivers.

   However, if UnixWare cannot detect whether a controller is installed on your system, the controller's device driver parameter settings are not automatically removed from the system resource database. If you do not intend to reinstall such controllers, you should use the DCU utility to remove the controller's device driver settings manually from the system resource database.

   To remove the controller's device driver parameter settings from the system resource database, do the following (see "Viewing or Changing Device Driver Configuration" later in this chapter):

   1a. **Double-click on Admin Tools in the UnixWare Desktop.**

   1b. **Double-click on Hardware Setup in the Admin Tools folder to invoke the DCU utility.**

   1c. **From the DCU main menu, select *Hardware Device Configuration*.**

   1d. **From the "Hardware Device Configuration" screen, move the cursor to the row containing the device driver settings for the controller.**

   1e. **If the value in the first field is *Y*, change the value to *N*.**

   1f. **Exit the "Hardware Device Configuration" screen.**

   1g. **Select *Apply Changes and Exit DCU*.**

2. **Decide whether to disable access temporarily to a hardware controller.**

   If you are moving a controller or peripheral to another system and plan to reinstall it later, you may want to disable access temporarily to a hardware controller. This keeps the device driver settings for the controller in the system resource database. Later, when you want to reactivate the controller, you can change the *unused* value back to the name of the device driver.

   Note ▼ As described in Step 1, when some controllers are removed from the system, UnixWare automatically deletes the corresponding device driver settings from the system resource database.

   To keep the device driver parameter settings for a controller in the system resource database, do the following (see "Viewing or Changing Device Driver Configuration" later in this chapter):

   2a. **Invoke the DCU utility .**

   2b. **From the DCU main menu, select *Hardware Device Configuration*.**

   2c. **From the "Hardware Device Configuration" screen, move the cursor to the row containing the device driver settings for the controller.**

   2d. **Change the value in the Device Name field to *unused*.**

   2e. **Exit the "Hardware Device Configuration" screen.**

   2f. **Select *Apply Changes and Exit DCU*.**

   To reactivate the controller, change the *unused* value back to the name of the device driver.

3. **After deconfiguring the device driver for a controller, additional device-specific deconfiguration may be needed.**

4. **Shut down your system. Type**

   ```
   shutdown -y -i0
   ```

5. **When prompted, turn off the system power switch.**

6. **If the hardware peripheral(s) that you are removing have power switches, turn them off.**

7. **Remove the hardware controller(s) or peripheral(s).**

8. **Turn on the power for your system and all electrical hardware devices that are connected to your system.**

9. **If your system came with a platform configuration utility (this is typically true for EISA, MCA, and PCI systems), run that utility.**

   Many platform configuration utilities and/or hardware initialization programs require a DOS operating system. Your original UnixWare medium includes a limited DOS operating system.

10. **Reboot your system.**

Rebuilding Your System

Sometimes when you add new hardware or whenever you change the kernel configuration, you need to rebuild your kernel. For example, when you add a new device driver, the package installation software prompts you to rebuild the kernel if doing so is necessary.

The preferred way to rebuild the kernel is to use the **idbuild** command. If the rebuild fails, you can use the error messages that **idbuild** displays to determine the problem.

To rebuild your kernel, open a "Terminal" window, log in as root, and type

```
/etc/conf/bin/idbuild -B
```

The **-B** option indicates that you want the kernel rebuilt now. UnixWare attempts to rebuild the kernel and displays error message(s) if the rebuild fails.

If you changed any kernel configuration parameters, verify that you selected valid and nonconflicting values. You can do this by executing the DCU. See the chapter "Monitoring and Tuning Your System" for more information.

Note ▼ The new kernel is placed in */stand/unix* and the previous kernel is saved in */stand/unix.old*. If you have a problem rebooting with the new kernel, you can still reboot using the old kernel. To do so, press <Enter> when the Booting UnixWare... message is displayed. Then, at the [boot]# prompt, type

KERNEL=unix.old

go

Invoking and Navigating in the DCU Utility

The DCU utility lists the hardware controllers and device drivers configured on your system and allows you to assign hardware parameter values (IRQ, memory address range, and so on) for the device drivers.

How to Invoke the DCU Utility

There are three ways to invoke the DCU utility:

1. During installation. Early in the UnixWare installation process, you are prompted to enter the DCU utility. Select this option to invoke the DCU user interface.

2. After installation, from the desktop. Double-click on Admin Tools at the UnixWare Desktop and double-click on Hardware Setup.

3. After installation, from the command line. Open a "Terminal" window, log in as root, and execute this command: **/sbin/dcu**.

In each of the previous choices, the DCU main menu is displayed.

Figure 6-1
DCU Main Menu
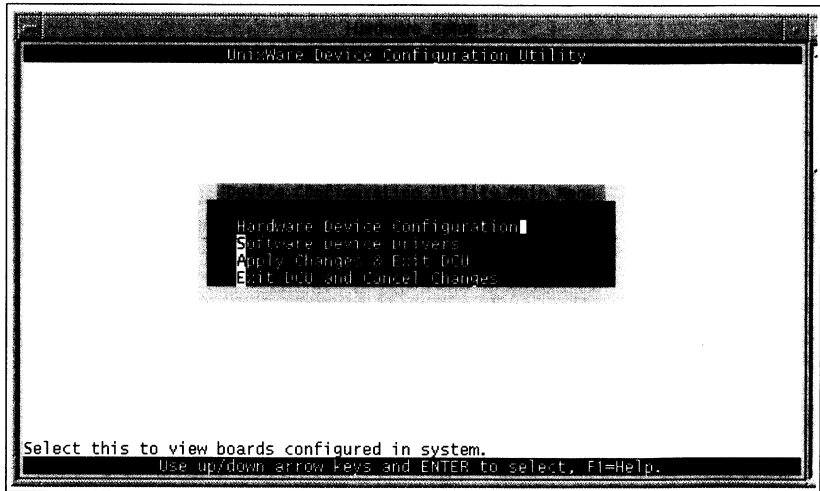
How to Navigate in the DCU Utility

To navigate in the DCU utility, you can use named keys and function keys. Named keys are the keys that do something other than print an alphanumeric or special character. Named keys include <Enter>, <Tab>, <PgUp>, and <PgDn>. Function keys are those labeled <F1> through <F10>.

Every DCU screen displays a bar at the bottom which lists the keyboard navigation choices in effect for that screen. It also displays field-specific information when appropriate.

The following key definitions apply in all DCU screens:

Key	Definition
<F1>	Displays help for the current screen.
<F2>	Displays valid choices for a field.
<Tab>	Moves the cursor to the next field on a screen.
<Shift>+<Tab>	Moves the cursor to the previous field on a screen.
Arrow Keys	Moves the cursor up/down/left/right within a field.

Key	Definition
<PgUp>, <PgDn>	Moves to the previous/next page in a multi-page screen.
<Enter>	Enters the selection and continues (on screens with multiple fields, <Enter> moves the cursor to the next field).
<F10>	On screens with multiple fields, applies sections and continues (on other screens, <F10> is the same as <Enter>).

The following key definitions apply when you are in the online help system.

<F1>	Gets a menu of related help screens.
<PgUp> or Up Arrow	Goes to previous page of a help screen.
<PgDn> or Down Arrow	Goes to the next page of a help screen.
<Esc>	Exits help system and returns to the current screen.

What to Do If Your Named Keys Do Not Work

If you are running the DCU utility on an ASCII terminal or an X-terminal, the named keys may not work. In these cases, a sequence of alternate keystrokes is two or three says that, when typed, are equivalent to pressing that named key.

For example, you can access online help while using the DCU utility by pressing <F1>. If the function keys on your terminal do not work, you can press <Ctrl>+<F>+<1>. This sequence is typed by holding down <Ctrl> while pressing <F>, then pressing <1>. The sequence of alternate keystrokes for <F10> is <Ctrl>+<F>+<0>.

Viewing or Changing Device Driver Configuration

UnixWare automatically determines the hardware settings for many hardware controllers. However, some hardware controllers cannot be detected automatically. You can use the DCU utility to specify their hardware settings. We suggest that you run the DCU utility whenever you add new hardware controllers to check whether UnixWare properly configured the device drivers

1. **Use the following table to decide which option to select from the DCU Main Menu:**

If	Then
You want to view the hardware controllers currently configured on your system and/or to change their device driver parameter settings (IRQ, memory address range, I/O address range, and DMA channel)...	Select *Hardware Device Configuration.* Follow the instructions in the "Viewing or Updating Device Hardware Configuration" section of this chapter.
You want to view or activate device drivers configured on your system and/or add a new instance of a controller to your current configuration...	Select *Software Device Drivers.* Follow the instructions in the "Viewing or Updating Software Device Drivers" section of this chapter.

Repeat this step until you are satisfied with the hardware settings.

Note ▼▼ Hardware configuration updates requested through the "Hardware Device Configuration" and "Software Device Drivers" screens do not take effect until you select *Apply Changes and Exit DCU* from the DCU main menu. If you do not want to implement these changes, cancel the updates by following the instructions in Step 2.

2. **Select whether to implement your device driver configuration updates.**

   2a. **To apply the configuration changes that you requested in Step 1, select *Apply Changes and Exit DCU* from the DCU main menu.**

   The device driver configuration changes are applied and the DCU utility exits.

   2b. **To end the DCU session without saving the configuration changes that you requested in Step 1, select *Exit DCU* and *Cancel Changes* from the DCU main menu.**

   The device driver configuration that existed before entering the DCU utility remains in effect and the DCU exits.

3. **If you implemented the new device driver configuration updates, you may be required to reload the driver or rebuild and reboot the system before the changes will take effect.**

   Drivers that have been converted to be autoconfigurable will require the driver to be reloaded, if already loaded, for the changes to take effect.

Drivers that are not configurable or static will require you to rebuild your kernel using the **idbuild** command followed by a reboot for the changes to take effect. For more information on the **idbuild** command, see "Rebuilding Your System" earlier in this chapter.

When you exit the DCU utility after installation, you are returned to the UnixWare Desktop, command-line interface. When you exit the DCU utility during installation, you are returned to the next step of the installation process

Viewing or Updating Hardware Device Configuration

These tasks allow you to view your current hardware configurations and change them if necessary.

For example, if you configured an Adaptec 1542 controller, you have a PS/2 mouse, and both are using IRQ 12, you must change the IRQ setting for the controller to some other valid value; the IRQ setting for the PS/2 mouse cannot be changed.

To view the hardware controllers configured on your system or to change their device driver parameter settings, do the following:

Procedure

1. **Select** *Hardware Device Configuration* **from the DCU main menu.**

   An initial message may display which informs you that the "Hardware Device Configuration" screen is being generated.

   After a short time, the "Hardware Device Configuration" screen is displayed. Each row represents a device configured on your system, along with its software device driver parameter settings.

Figure 6-2
Hardware Device
Configuration
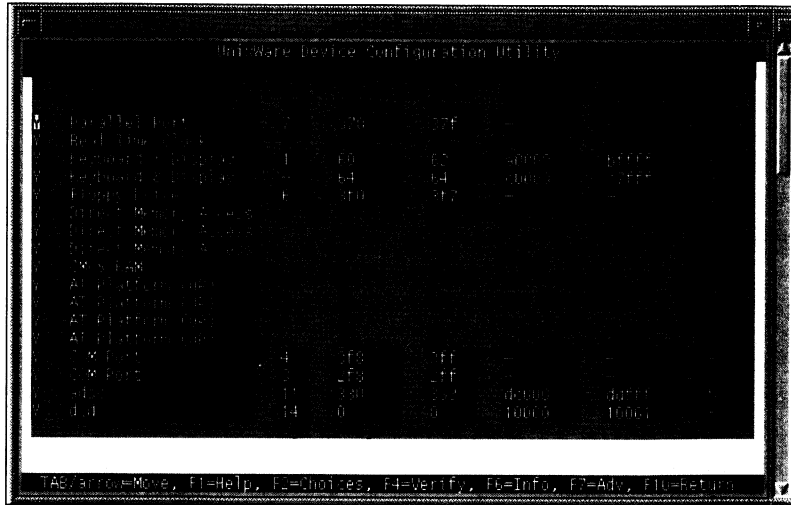
Note The dash (-) character indicates that the entry does not require a value for that specific field because it is not required by the device driver.

This screen contains eight fields:

◆ The first field indicates whether the hardware controller should be configured on your system. **Y** (Yes) indicates that the controller should be configured; **N** (No) indicates that the controller should not be configured.

◆ The second field, the Device Name field, provides the name of the hardware controller.

If the device name is UNKNOWN, this means that on EISA and MCA systems, this is an entry from NVRAM (Non-Volatile Random Access Memory) that the DCU utility cannot map to a driver name. For example, if you have installed a networking board but have not installed the corresponding software for the board, it will be listed as UNKNOWN.

◆ The third field, the IRQ field, lists the current interrupt vector (IRQ) value for the hardware controller.

◆ The fourth and fifth fields, the IOStart and IOEnd fields, list the start and end values for the hardware controller's I/O address range.

◆ The sixth and seventh fields, the MemStart and MemEnd fields, list the start and end values for the hardware controller's memory address range.

◆ The eighth field, the DMA field, lists the DMA channel for the controller.

Note ▼ Steps 2 through 5 can be performed in any order and as often as desired.

2. **To view additional information about any of the entries, move the cursor to the row containing the hardware controller data and press <F6>.**

The name of the controller is repeated along with its board ID, the device driver for the controller, the hardware bus type, and (if used by the device driver) the valid values for the IPL, interrupt type (ITYPE), interrupt vector (IRQ), I/O address range, memory address range, DMA channels, and bind CPU. See the **System**(4) manual page for more information.

Press <Enter> to return to the "Hardware Device Configuration" screen.

3. **Change a device driver parameter for any of the devices according to the following table:**

If	Then
The parameter is listed on the "Hardware Device Configuration" screen...	Move the cursor to the field for the parameter you want to change.
	Redefine the parameter by typing over the existing entry, or press <F2> and follow the instructions for using a *Choices* menu that follows this table.
You want to change the Bind CPU, unit number, IPL, or ITYPE parameter values, or any optional device-specific parameters...	Press <F7> to display the "Advanced Parameter Selection" screen.
	Move the cursor to the field for the parameter you want to change.
	Redefine the parameter by typing over the existing entry, or press <F2> and follow the instructions for using a *Choices* menu that follows this table.

The following list explains how to use the *Choices* menu:

◆ Pressing <F2> forces you to make a choice from the *Choices* menu. To keep the current value in the parameter field, be sure the cursor is positioned on that value and press <Enter>.

◆ If there are more than two valid choices, a menu displays all choices. Move the cursor to your selection and press <Enter>.

◆ If there are only two valid choices, the current value is replaced in the field by the alternate choice when you press <F2>. To restore the original value, press <F2> again.

◆ If there are no other valid choices, the field will not change and a message appears at the bottom of the screen.

4. **To deactivate a controller (that is, to keep its data in the system resource database but not to configure the controller for use by the system), change the Device Name field for this device to *unused* by following the instructions in Step 3.**

   This step is useful if you plan to add the controller to your system later, since you will not have to enter its hardware configuration data again, or if you want to disable all peripherals temporarily that are attached to a controller.

5. **To delete a controller from the system resource database, set the first field of the entry for the hardware device to *N* (No).**

6. **Press <F4> to verify your selection. (This step is optional.)**

7. **Correct any hardware parameter conflicts.**

   If multiple devices have the same IRQ or DMA values, overlapping I/O address ranges, or overlapping memory address ranges, the system may not boot or your system may be unable to access your hardware.

   To prevent this from happening, active devices must have unique IRQ and DMA values as well as I/O and memory address ranges that do not overlap. (Active devices are all the controllers listed on the "Hardware Device Configuration" screen whose first field does not contain the value N (No) and whose second field does not contain the value unused.)

   The only exceptions are controllers that support shared IRQ values. When multiple controllers share the same IRQ values, the software device drivers for these controllers must operate at the same IPL. For example, two DPT

controllers, supported by the same device driver, will operate at the same IPL. In addition, software device drivers of the same class, HBA drivers for example, will operate at the same IPL.

Repeat Steps 3 through 6 to resolve the conflict. (You can choose to resolve it or ignore it, however.)

8. **To return to the DCU main menu, press <F10>.**

9. **Select *Apply Changes and Exit DCU* to save your changes.**

Viewing and Updating Software Device Drivers

These tasks allow you to view your current device driver configuration and update it if necessary. Updating includes adding additional or new controllers for a specific driver.

To view or activate device drivers configured on your system or to specify the hardware controller parameters for a device driver, do the following:

Procedure

1. **From the DCU main menu, select *Software Device Drivers*.**

   This menu classifies drivers into several categories: Network Interface Cards, Host Bus Adapters, Communication Cards, Video Cards, Sound Boards, and Miscellaneous.

2. **Select a device driver category or select *All Software Device Drivers* to select all the device drivers.**

Note

Device drivers created for systems prior to UnixWare 2.0, or device drivers that do not take full advantage of the UnixWare 2.0 device driver configuration capabilities, are listed under the Miscellaneous category.

The "Software Device Drivers" screen for the selected class(es) of device drivers is displayed.

Figure 6-3
Software Device
Drivers
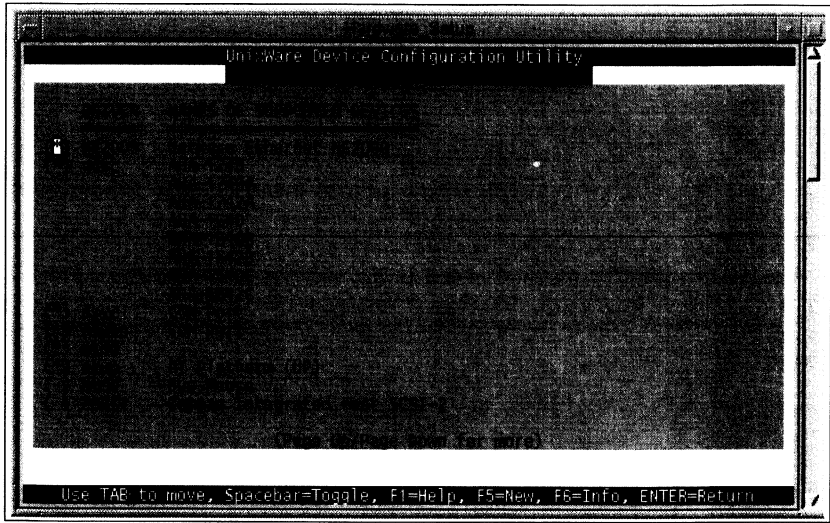
This screen contains three fields:

◆ The first field indicates whether the device driver is active on the system (that is, the system can access hardware controllers for active device drivers and does not attempt to access hardware controllers for inactive device drivers). An asterisk indicates that the device driver is active; if there is no asterisk then the device driver is inactive.

◆ The second field lists the device driver name.

◆ The third field lists the hardware controllers that the device driver supports (if available).

Many device drivers support multiple controllers. The "Software Device Drivers" screen lists the controllers supported by each device driver. If a device driver is inactive, UnixWare cannot access any of the controllers that the device driver supports.

Note ▼ Steps 3 through 5 can be performed in any order and as often as desired.

3. **To obtain additional information about any of the device drivers, move the cursor to the device driver status (active or inactive) field and press <F6>.**

The device name is repeated along with the driver name; whether or not it is configured; the logical unit number; and valid values for the IPL,

ITYPE, IRQ, I/O address range, memory address range, DMA channel, and Bind CPU.

Press <Enter> to return to the "Software Device Drivers" screen.

4. **To change the status to active for a device driver, move the cursor to the device driver status field for the device driver and press the <SpaceBar>.**

Warning

Do not deactivate a device driver from this screen. To deactivate a single controller, do so from the "Hardware Device Configuration" screen. (See "Viewing or Updating Hardware Device Configuration" earlier in this chapter.)

If you want to add a new controller, the device driver that supports this controller must be active. If you are an experienced administrator who is installing UnixWare 2.0, and if there are device drivers on your HBA diskettes that you are sure will not be needed on your system, you can instruct the installation software not to install these device drivers. To do so, remove the asterisk next to each of these device drivers.

5. **To specify a new controller (hardware device) for a device driver, do the following:**

Note

To cancel this action at any time before the <F10> key (apply the changes) is entered in Step 5d, press <F8>.

5a. **Move the cursor to the field containing the device driver status.**

5b. **Press <F5>.**

The "New Hardware Configuration" screen is displayed. The default values may also be displayed. This screen contains the fields for the

◆ Device name

◆ IPL

◆ ITYPE

◆ IRQ

◆ I/O address range start address

These parameters are optionally used by some drivers and may have preset values which you may need to reset or change.

◆ UNIT

◆ I/O address range end address

- ◆ Memory address range start address

- ◆ Memory address range end address

- ◆ DMA channel

- ◆ Bind CPU

5c. **Press <F2> to display the choices and change the values.**

To move between fields, press <Tab> or <Enter>. If you are unsure of the valid values for this particular field, repeat Step 3.

5d. **Optionally, you can press <F4> to verify that valid values are entered in each field and to check for conflicts before you apply the changes. If an error is reported, repeat from Step 5a to update the parameter settings. If the verify succeeds or the message** `Driver does not support the verify function` **appears, press <Enter> to continue.**

Note ▼ To see if there are any device-specific parameters, apply the changes you have made, then navigate back to the main menu and select "Hardware Device Configuration." Position the cursor on the line for the device you want to examine. Press <F7> to display the "Advanced Parameter Selection" screen.

6. **To apply the changes and return to the "Software Device Driver" screen, press <F10>, then press <Enter>.**

If a configuration error is reported, repeat Step 5c to update the parameter settings.

7. **To view or update the device driver information for another category, go back to Step 2. To return to the DCU main menu, select *Return to DCU Main Menu*.**

Note ▼ If you defined any new controllers, view the "Hardware Device Configuration" screen and verify that the new hardware parameters do not conflict with the existing hardware controllers. See the previous section, "Viewing or Updating Hardware Device Configuration" in this chapter.

7 Setting Up and Configuring Mail

This chapter explains how to set up mail and the MHS gateway and also includes information on

◆ How to set up and configure UnixWare mail

◆ How to configure the MHS gateway on a UnixWare server

◆ How to set up an MHS gateway on a NetWare server

Important Some of the information in this chapter assumes you are knowledgeable about mail-related topics such as domains, clusters, and a smarter host (described later in this chapter). If you have an Application Server, see the *System Administration* guide for information on clusters and smarter hosts.

Overview

Mail services provide electronic communications between users on the same system, or between systems connected together on a network. All UNIX mail programs process incoming mail and store it in a mailbox. In most systems, mail is stored in /var/mail, which is also known as a user's mailbox. To be able to communicate with other systems, mail should be set up on the desktop using the Mail Setup program. By default, however, a basic mail service is set up without any additional modification. So if you decided not to customize your mail services, the mail program would still work.

It is often desirable to assign a single name to a set (cluster) of computers for mail routed outside your local area. Mail Setup in this chapter also allows you to set up a cluster.

Further, you can set up a Smarter Host in Mail Setup. A Smarter Host is a reference to a UNIX system where remote mail will be shipped if the mail destination is not known to the local system. If set up, all non-local messages would be sent through the Smarter Host. See "Setting Mail Variables" later in this chapter.

NetWare users often rely on an MHS gateway to route MHS mail to non-MHS mail systems. If you need to establish an MHS gateway at your site, you can do this by using MHS Setup which establishes a connection from your UnixWare system. You do not need to set up an MHS gateway unless you need to send mail to MHS users.

Files and Directories Referenced in this Chapter

Before you set up the UnixWare mail variables, you may want to know about the following files and directories:

/bin/mail. This is a UNIX program that is normally only used for mail routing and serves as a back-end to the desktop mailer. This is referred to in the Log messages variable in Mail Setup; see "Using Mail Setup" later in this chapter.

/etc/mail/mailsurr. This file contains a program for routing mail and is executed by */bin/mail*.

/usr/lib/mail/mailsurr.proto. This file is a prototype for *mailsurr*. The *createSurr* program uses this prototype to create the *mailsurr* file. See *mailsurr.proto* in the *Command Reference* for more information.

/etc/mail/namefiles. This file contains a partial list of alias files and directories to be searched by the **mailalias** command. By default, this list consists of */etc/mail/names* (an alias file) and */etc/mail/lists* (a directory of mailing lists). See **mailalias** in the *Command Reference* for more information.

/var/mail. This subdirectory contains a mailbox assigned to each user as well as mail log files. This is referred to in the Log messages variable of Mail Setup. See "Using Mail Setup" later in this chapter.

Using Mail Setup

The following setup tasks describe how to customize your UNIX mail system. For example, you can set up a smarter host to route messages through a central system or you can log messages.
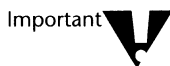
Important ▼ Files under the */etc/mail* directory are programmatically generated and changes could be lost at any time. If you need to edit your *mailsurr* file, edit *mailsurr.proto* and run the *createSurr* program.

To configure UnixWare Mail, you must have permission to change Mail Setup (see the Administer UNIX Mail option in "Using User Setup" in the chapter "Configuring Your User Environment"). The system owner automatically has permission to use this setup feature by default.

To access Mail Setup, double-click on the Mail Setup icon in the Admin Tools folder.

The "UNIX Mail Setup" window appears:

Figure 7-1
UNIX Mail Setup-
Basic Variables

UNIX Mail Setup

Category: Basic

Variables

Smarter Host:

Cluster Name:

Route All Msgs to Smarter Host?   Yes   No

Accept Mail Addressed to the Domain?   Yes   No

Log Messages?   Yes   No

Description

This string may be set to the name of a mail system that has better alias and routing information available than the local system. Any mail that the local system cannot route will then be sent to the smarter host.

OK   Reset   Cancel   Help...

Setting Mail Variables

To set the mail variables, do the following:

Procedure

1. **Set the desired options in Category: Basic or Extended.**

2. **Provide the following variables, as appropriate:**

Note

When you click on a variable label, information about the variable appears in the Description box at the bottom of the window.

Basic. The Basic Mail Setup category shows the most commonly changed UnixWare mail variables

> **Smarter Host.** If desired, type the name of a system that will be used to route mail sent from your system inside or outside of your network if the destination is not recognized by your system. A smarter host is a system that is configured to act as a mail server and knows how to reach computer systems and networks that your system may not recognize.

> **Cluster Name.** Type a name (blank spaces are acceptable) that represents a closely coupled set of systems, called a cluster. For example, you could mount */var/mail* onto a server so that all mail delivered to client systems seems as though it is coming from one server, even though it may not be.

> **Route All Msgs to Smarter Host?.** Click on Yes to have all mail messages not destined for users on other systems sent to the smarter host (described previously). The smarter host will then route each message to its correct destination.

> **Accept Mail Addressed to the Domain.** Click on Yes to have mail accepted for the local domain if a system name is not specified and will be sent to the local system.

> **Log Messages?.** Click on Yes to keep a record of all incoming and outgoing mail messages that pass through */bin/mail* on your system in */var/mail/:log*. The */var/mail/:errors* file logs mail errors.

> Click on No if you do not want to keep a record of all incoming and outgoing mail messages.

Extended. The Extended Mail Setup category (which includes the variables in the Basic Mail Setup category) shows and allows you to change less commonly used mail variables, such as adding a debug level to your mail.

When you select Extended, the following window appears:

Figure 7-2
UNIX Mail Setup -
Extended Variables

```
┌─────────────────────────────────────────────────────────┐
│                    UNIX Mail Setup                     · │
│                                                         │
│              Category:    Extended                      │
│                                                         │
│                    Variables                            │
│                                                         │
│              Smarter Host:  I                           │
│           Add a 'Date:' Line?        Yes      No        │
│           Add a 'From:' Line?        Yes      No        │
│        Add a 'Received:' Line?       Yes      No        │
│               Debug Level:  I                           │
│              Cluster Name:  I                           │
│          'Remote From:' String:  I                      │
│     Failsafe Forwarding System:  I                      │
│          Delete Empty Mail Files?    Default            │
│              Domain Name:  I                            │
│           Mailsurr Env Var's:  I                        │
│         Mailsurr Mailcnfg Var's:  I                     │
│           Compile Mailsurr File?     Yes      No        │
│     Route All Msgs to Smarter Host?  Yes      No        │
│   Accept Mail Addressed to the Domain?  Yes    No       │
│                                                         │
│                    Description                          │
│  This string may be set to the name of a mail system    │
│  that has better alias and routing information          │
│  available than the local system.  Any mail that the    │
│  local system cannot route will then be sent to the     │
│  smarter host.                                          │
│                                                         │
│     OK            Reset         Cancel        Help...   │
└─────────────────────────────────────────────────────────┘
```

Use the scrollbar to view all of the variables.

Smarter Host. If desired, type the name of a system that will be used to route mail sent from your system inside or outside of your network if the destination is not recognized by your system. A smarter host is a system that is configured to act as a mail server and knows how to reach computer systems and networks that your

system may not recognize if your system is not connected to the destination but the smarter host is, if it has a better alias file, or you want to hide your local system so all mail from your company appears to come from the same system.

Add a 'Date:' Line?. If you select Yes, a Date header line is added automatically to mail messages sent out if a Date header does not already exist. The default is No.

Add a 'From:' Line?. If you select Yes, a From header line is added automatically to mail messages sent out if a From header does not already exist. The default is No.

Add a 'Received:' Line?. If you select Yes, a Received header line is added automatically to mail messages received by your system if a Received header does not already exist. The default is No.

Debug Level. Add a debug value (between 0 for no debugging and 9 for maximum debugging) to generate information about each attempt to send mail. This information is stored in */tmp/MLDBGprocess id*, where *process id* is the process identification of the */bin/mail* program. The default is 0.

Cluster Name. Type a name (blank spaces are acceptable) that represents a closely coupled set of systems, called a cluster. For example, you could mount */var/mail* onto a server so that all mail delivered to client systems seems as though it is coming from one server even though it may not be.

'Remote From:' String. Type a string with the message you want to send in the From header line and which you want to use instead of your system name or the smarter host name. This offers more security; your system name or smarter host name are not used.

Failsafe Forwarding System. Type a system name where *system* is the name of the system that stores your system's */var/mail* directory. This is used when you share the same */var/mail* directory with several systems using NFS and other networked file systems.

If the */var/mail* directory is not available when mail is sent because the system that physically contains that directory is not working, mail is delivered to the correct mail directories when the system comes back up.

Delete Empty Mail Files?. Click on Yes to display a menu and to have the system automatically delete empty mailboxes (the default permissions are 660 to delete the mailboxes). This option saves disk space and simplifies your directory structure.
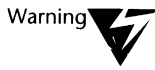
Domain Name. Type the domain name you want to use for mail if different than your default domain name.

Warning ▼

The following two options, Mailsurr Env Var's and Mailsurr Mailcnfg Var's, require advanced knowledge of the mail system.

Mailsurr Env Var's. Type a comma-separated list of environment variables to be passed through to the **mailsurr** commands.

Mailsurr Mailcnfg Var's. Type a comma-separated list of *mailcnfg* variables to be passed through to the **mailsurr** commands as environment variables.

Compile Mailsurr File?. Click on Yes to have mail:

- Recompile */etc/mail/mailsurr* to create *mailsurr* if *mailsurr* was modified after it was compiled.

- Use *Cmailsurr* rather than *mailsurr* for configuration.

- The default is No. See **mailsurr**(4) in the *System Files and Devices Reference* for more information.

Route All Msgs to Smarter Host?. Click on Yes to have all mail messages that are not destined for the local system to be sent through the system designated as the smarter host. The default is No.

Accept Mail Addressed to the Domain. Click on Yes to have mail accepted for the local domain if a system name is not specified and will be sent to the local system.

Log Messages?. Click on Yes to keep a record of all incoming or outgoing mail messages that pass through */bin/mail* on your system in */var/mail/:log* or */var/mail/:errors*.

Route local messages through MHS?. Click Yes to have your incoming mail messages routed through the MHS gateway if the mail is addressed to your system and if another user on your system is not using your address.

Add a 'Message ID:' Line?. Click on Yes to add a message identifcation string to the Header field. The default is No.

Convert to 7-Bit Headers?. Click on Yes to convert incoming 8-bit headers to 7-bit headers. The default is No.

Convert to 7-Bit MIME?. Click on Yes to convert incoming messages to 7-bit MIME (Multipurpose Internet Mail Extensions). The default is No.

Convert non-MIME to MIME?. Click on Yes to convert to MIME. This allows additional character sets, audio, video, and so on to be added to mail messages. The default is No.

Add a 'To:' Line?. Click on Yes to add a To field to the header if it is missing when mail comes in. The default is No.

If you have an Application Server, see the *System Administration* guide for more information on these fields.

3. Click on OK to save your changes and exit.

Using MHS Setup

This section describes how to set up the UnixWare side of the MHS gateway from your desktop.

If you are not setting up an MHS gateway on your UnixWare system, skip this section. If you are not sure if you need to set up a gateway, read "Determining the Need for an MHS Gateway" in the next section.

Important

The */etc/mail* directory is programmatically generated and changes could be lost at any time. If you need to edit your *mailsurr* file, edit *mailsurr.proto* and run the **createSurr** program.

Note

To configure MHS Mail, you must have permission to change MHS Setup (see the Administer MHS Mail option in "Assigning User Permissions" in the chapter "Configuring Your User Environment"). The system owner automatically has permission to use this setup feature by default.

Use MHS Setup to configure the UnixWare side of a gateway between MHS and UNIX mail systems. We suggest configuring one MHS gateway per site. Supporting one gateway on one system rather than several gateways on many systems reduces administrative work.

We suggest you use a production system (such as an Application Server) rather than a desktop system for MHS gateway purposes. If you assign a gateway on a user's desktop system and the gateway goes down, mail will be rejected.

All other systems should be set up to send mail going to an MHS address (see "UnixWare Applications" in the *Desktop User Handbook*) to the single UnixWare system running the gateway. For example, you can set smarter hosts to point to the MHS gateway system (see "Using Mail Setup" earlier in this chapter for information on smarter hosts).

Non-UnixWare systems can access the gateway by forwarding mail to the gateway system.

Determining the Need for an MHS Gateway

Before you decide to set up an MHS gateway, you need to understand what it is and how it is configured.

The following questions may help you determine if you need to set up a gateway:

1. What is an MHS gateway?

   The UnixWare MHS gateway is a set of programs that allow UnixWare and NetWare mail to send and receive messages from an MHS mail system. To accomplish this, the gateway translates between the Internet RFC822 mail format and the MHS SMF71 mail format. This gateway places SMF71 messages into the MHS incoming mail queue and retrieves SMF71 messages destined for UnixWare from an outgoing mail queue.

2. When do I need an MHS gateway?

   You should use the gateway if you need to exchange messages between a UnixWare mail system and an MHS mail system. Only one MHS gateway is required per site; so there is no need to set up a gateway on every UnixWare system at your location.

3. Do I need to run MHS Setup on each UnixWare Desktop?

   No. Only run MHS Setup on the system you are configuring as the UnixWare side of the MHS gateway. The other systems must be set up to send MHS-bound mail to the gateway system. For example, you can set smarter hosts to point to the MHS gateway system (see "Using Mail Setup" for information on setting up smarter hosts). The MHS Setup program does not configure access to smarter hosts.

Configuring the MHS Gateway

This section discusses how the MHS gateway site administrator can configure the MHS gateway and describes how to do the following:

◆ Set up the MHS gateway and gateway account

◆ Configure the UnixWare gateway through MHS Setup on the UnixWare desktop

This section assumes you are knowledgeable about NetWare MHS or NetWare Global MHS. Many of the functions in this section apply only to the site administrator of the NetWare MHS gateway system.

Configuring MHS

An MHS gateway, configured on a NetWare file server, functions as a transfer agent for incoming and outgoing mail through NetWare and UnixWare. When mail comes in to an MHS network, the MHS host automatically routes the mail to a drop box (gateway directory) on a server. UnixWare then retrieves the mail from the server and transfers it to individual systems.

In order for MHS to work, the MHS gateway administrator must configure MHS from both NetWare and UnixWare.

From the NetWare MHS server side, the administrator must do the following:

◆ Set up an MHS gateway on the server that contains the NetWare MHS host

◆ Set up a gateway account on the MHS host NetWare file server

See the next section and your Novell MHS documentation for more information.

From the UnixWare side, the administrator of the UnixWare system on which the MHS gateway resides must run MHS Setup at one UnixWare system for each gateway (see "Determining the Need for an MHS Gateway") earlier in this chapter.

Setting Up the NetWare Side of an MHS Gateway

To set up the NetWare side of the MHS gateway, the NetWare administrator must do the following:

◆ Ensure that the appropriate NLMs are installed on your NetWare file server (see the chapter "Setting Up and Configuring NetWare Connectivity" and the *NLM Installation and Administration* manual).

◆ Create a new gateway on the MHS host. Use gateway version 71 or SMF71, depending on your MHS software.

◆ Set up an account on the MHS host. If MHS is installed, an account is already set up. See your MHS administrator for account information.

◆ Set up MHS routes for users who will be sending and receiving MHS mail through the gateway.

◆ Name the directory that contains the mail folder /mhs.

For information on configuring the NetWare side of the MHS gateway, see your Novell MHS documentation.

Setting Up the UnixWare Side of an MHS Gateway

To set up the UnixWare side of the MHS gateway from a UnixWare system, double-click on MHS Setup in Admin Tools.

Once the MHS mail gateway is set up, mail being sent to an MHS address will be sent out through the gateway to the MHS mail system. For information on how to use MHS Mail and UNIX mail, refer to the chapter, "UnixWare Applications" in the *Desktop User Handbook*.

Note ▼▼▼   In the file */usr/lib/setup/MHS_Setup/setup.def*, change DEBUG to **MHSLOGIN**.

Setting Up the Gateway

To start MHS Setup, double-click on the MHS Setup icon in the Admin Tools folder.

The "MHS Mail Setup" window appears:

Figure 7-3
MHS Mail Setup

```
                                    MHS Mail Setup

                   Variables                              Description

                                              This is the name of the MHS
       MHS Gateway: I                         gateway that is configured on your
                                              MHS mail server.
    Internet Gateway:

     MHS File Server:

        MHS Volume:

      MHS Directory:

         MHS Login:

      MHS Password:


          OK              Reset              Cancel              Help...
```

Procedure

**1. Set the following variables. Your NetWare system administrator can
provide you with this information if necessary:**

Note

When you click on a variable label, information about the variable appears in the
Description box.

MHS Gateway. Type the name of the MHS gateway that was configured
on your MHS mail server.

Internet Gateway. Type the name to be used to designate your MHS
gateway in UNIX mail (we suggest the name *mhs*).

If your system is configured with a domain name, the name entered in this
field will be acknowledged as if it were a sub-domain. For example, if you
want UNIX mail sent to the domain *mhs.Novell.COM* to go through the
MHS gateway and your system's domain is *Novell.COM*, type **mhs**. To
reach users in a domain, mail would have to be addressed to
`user@`***mhs.novell.com***, where `user` is the login ID of the user who
receives the mail. See the chapter "UnixWare Applications" in the *Desktop
User Handbook* for information on mail addressing.

If your system is not configured with a domain name, this field contains a
special name that directs mail to route through the gateway. For example,

if you want UNIX mail sent to *mhs* to go through the MHS gateway, type **mhs**.

MHS File Server. Type the name of the NetWare server containing the MHS directory. The UnixWare MHS gateway expects the NetWare side of the gateway to be on this server.

MHS Volume. Type the name of the volume on the NetWare server containing the MHS directory. Normally, this is the *sys* volume.

MHS Directory. Type the name of the directory on the NetWare server under the NetWare MHS volume.

MHS Login. Type the name of the login account on the NetWare server used to access the MHS gateway directory.

MHS Password. Type the password for the MHS login. For security reasons, the password does not display.

After you exit this field, a window appears in which you enter the password a second time. The two passwords are then compared for accuracy.

Poll Frequency. Type the number of times per hour to have the gateway checked for incoming MHS mail. Type **0** to turn off the gateway.

If you want to set the poll frequency to a value other than 0 (such as a positive integer, which turns the gateway on), all other text boxes in this window (previously described) must be filled in. When Poll Frequency is 0, the gateway will not route mail.

Gateway SMF Version. Type the gateway version you used (70 or 71) when you set up the NetWare side of the MHS gateway. For more information, see "Setting Up the NetWare Side of an MHS Gateway" earlier in this chapter.

2. **Click on OK to apply changes to the MHS gateway configuration and close the window.**

.

8 Setting Up Modems and Other Serial Communications

This chapter describes how to set up a modem and change serial configuration files and also includes information on

◆ How to use dialup networking devices

◆ How to set up a dialup connection to a remote system

◆ How to add remote system entries and serial device entries

◆ How to configure a dumb terminal to a serial port

Important ▼ This chapter requires knowledge of data communication setup.

Overview

For many years, serial communication was the dominant method for networking UNIX systems. Though Local Area Networks (LANs) have become more prevalent for connecting UNIX systems, serial communication is still widely used. Here are some of the most popular types of serial communications:

◆ Dumb terminals. Connecting several dumb terminals to the serial ports on a single computer is a cost-effective method for accessing files and running character-based applications.

◆ Telephone communications. If you need to reach a remote system over telephone lines, UnixWare supports high-speed serial connections over a variety of modems.

◆ Direct connections. Two systems that are physically close to each other can be joined with a single cable connecting their serial ports.

Note ▼ Though TCP/IP is most widely used with connectionless networks such as Ethernet, UnixWare includes features that let you communicate with TCP/IP over serial connections. Both PPP (Point-to-Point Protocol) and SLIP (Serial Line Internet Protocol) provide serial interfaces to the Internet. PPP and SLIP setup are described in "TCP/IP Administration" in the *Network Administration* guide.

UnixWare provides a graphical interface (Dialup Setup) for configuring serial communications. Alternatively, you can edit configuration files (in the */etc/uucp* directory) using standard text editors to set up serial communications. Both methods are described in this chapter.

Using Dialup Setup

Use Dialup Setup to set up communication with remote systems and dumb terminals through direct connections or modems.
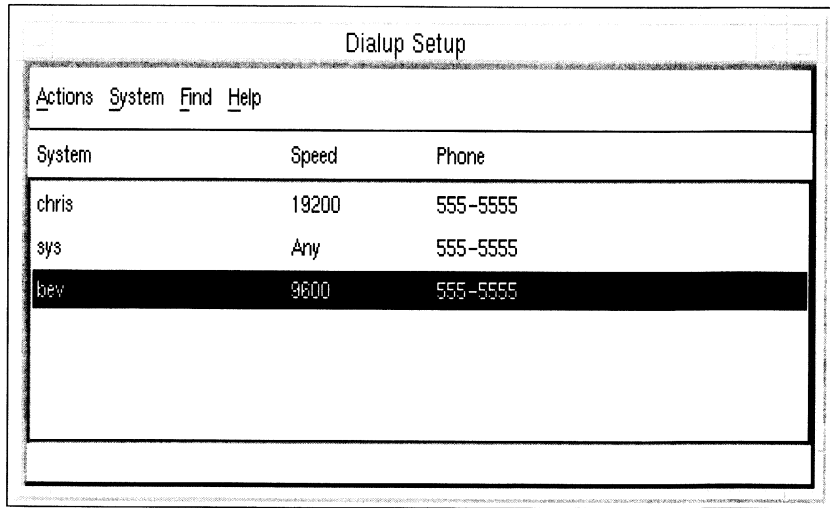
Note ▼ To use Dialup Setup, you must have permission to change Dialup Setup. For more information, see "Using User Setup" in the chapter "Configuring Your User Environment" earlier in this handbook.

To use Dialup Setup, double-click on the Dialup Setup icon in the Networking folder (which is in the Admin Tools folder).

A window appears, similar to the following (the window is empty until you add a remote system entry):

Figure 8-1
Dialup Setup


```
                              Dialup Setup

  Actions  System  Find  Help

  System                 Speed        Phone

  chris                  19200        555-5555

  sys                    Any          555-5555

  bev                    9600         555-5555
```

From this window, you can add a dialup device or a remote system entry.

When you add a dialup device or system, you can make it appear on the desktop as an icon, named after the port or the remote system. For example, a dialup device icon might be named COM1 or COM2, depending upon the port.

When you add a remote dialup system entry, a line of text describing that system appears in the "Dialup Setup" window. The remote dialup system entry becomes a remote dialup system icon when you drag the text line onto an open folder. The remote dialup system icon is named after the remote system. For example, the remote dialup system icon might be named *prism* after the remote system of the same name.

With a remote system icon, you can log in to a remote dialup system and transfer files between the remote dialup system and your UnixWare system. To set up an icon corresponding to a remote system, drag the text line into an open folder. You will see an icon appear in the folder with the name of the remote system.

Whether you use Dialup Setup or the remote dialup system icon to log in to a remote system, you must first add a dialup device.

Working with Dialup Devices

A dialup device entry represents a connection either to a modem or to another directly connected computer system or terminal. With UnixWare, you must add and configure these dialup devices before you can connect to remote dialup systems or terminals.

Note ▼ If you are connecting a dumb terminal directly to a serial port, configure the port as Direct and Incoming. After you have connected the terminal to the serial port and pressed <Enter> from that terminal, the system displays a login prompt.

If you have problems configuring your modem for dialup services, see the appendix "Troubleshooting" in this handbook.

Adding a Dialup Device Entry

This task allows you to add a modem or other communications devices to your system.

To add a dialup device entry, do the following from the "Dialup Setup" window:

Procedure ▼ **1. Click on *Actions* in the menu bar and select *Setup Devices*.**

The "Devices" window appears, similar to the following (the window is empty until you add a device):

Figure 8-2
Devices
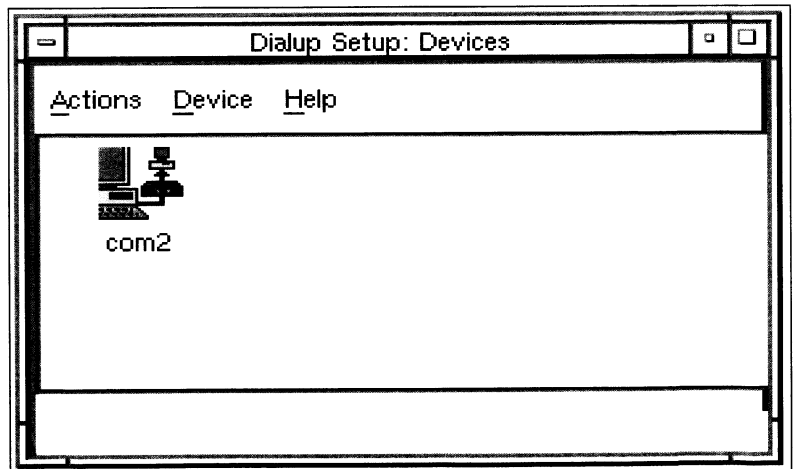
2. **Click on *Device* in the menu bar and select *New.***

The "Add New Device" window appears:

Figure 8-3
Add New Device

Dialup Setup: Add New Device

Port: ◇ Com1 ◇ Com2 ◇ Other

Connects to: ⬚7 Hayes

Configure Port As: ◇ Bi-Directional ◇ Outgoing Only ◇ Incoming Only

Speed: ◇ 300 ◇ 4800 ◇ 19200 ◇ Other
◇ 1200 ◇ 9600 ◇ 38400
◇ 2400 ◇ 14400 ◇ Auto-Select

Port is: ◇ Enabled ◇ Disabled

⬚Add⬚ ⬚Reset⬚ ⬚Cancel⬚ ⬚Help⬚
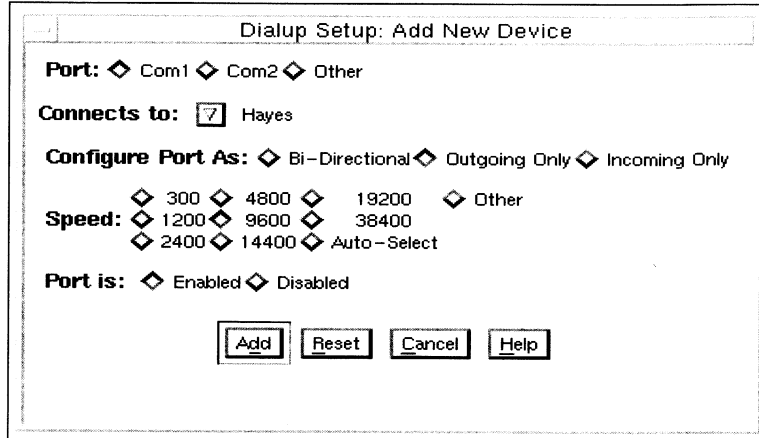
3. **Set the desired options:**

Port: Click on COM1, COM2, or Other, depending on which port you cabled for dialup. If you select Other, you must type the device name of the port. (The device must exist in the */dev* directory or you can create the entry using the **mknod** command.)

Connects to. Click on the arrow to view a list of supported devices including modems and direct connections. Click on the appropriate device type.

Configure Port As. Click on Bi-Directional, Outgoing Only, or Incoming Only, depending on whether you want to allow connections on the port to be made in both directions, to only call out, or only allow calls to come in, respectively. (Bi-Directional and Incoming start up a *ttymon* port monitor to listen for incoming call requests.)

Speed. Click on the desired transfer speed for incoming and outgoing connections (through modems, terminals, or other devices) depending on what is selected in Configure Port As. (Auto-Select is the default, which allows incoming calls to request the speed and outgoing calls to use 9600 baud or lower speeds as supported by the modem.)

Note If your device supports a throughput speed of 14.400, you should select 19.200 as the speed. If you select 14.400, Dialup Setup will accept it and the next time you display this entry it will appear at 19.200.

> **Port is**. This indicates whether or not the port is enabled and available for incoming or outgoing data transfer. System administrators can disable the port temporarily using this option for multiport board or modem maintenance. The device can then be taken offline without having to delete and add the device entry again.

> **4. Click on Add to add the device and close the window.**

> An icon representing the port appears in the "Devices" window.

Modifying, Deleting, or Copying a Dialup Device

This task allows you to change, delete, or copy a device once it has been connected.

Once you have added a dialup device, to change or remove the dialup device from the "Dialup Setup" window, or copy an icon representing the device into a folder, do the following:
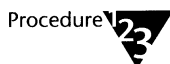
Procedure **1. Click on *Actions* in the menu bar and select *Setup Devices*.**

The "Devices" window appears.

2. Click on the dialup device you want to modify or delete.

3. Click on *Device* in the menu bar.

4. Click on one of the following:

Copy To Folder. To add a copy of the device icon to a folder. The "Copy To Folder" window appears. Choose the folder into which you want to copy the device, then click on Copy.

Once a device icon is added to a folder, you can double-click on it to place a call to that device (for remote login). See the *Desktop User Handbook* for further descriptions on how to log in to a remote system using a device icon.

Delete. To delete the device.

Properties. To view or change device properties. The "Device Properties" window appears, displaying information for the selected entry. Change any of the options, then click on OK.

Setting Up Access to a Remote Dialup System

If you know the name of the system to which you want to connect, and if you have already added a dialup device as described earlier in "Adding a Dialup Device Entry" you can configure a remote dialup system icon so you can easily log in to and transfer files to the remote system.

Note ▼ The system must be accessible by using a modem and the telephone, or it must be directly connected to your system through a serial port.

Adding a Remote Dialup System

This task allows you to add a remote dialup system.

To add an entry for a remote dialup system, do the following from the "Dialup Setup" window:

Procedure ▼ 1. **Click on *System* in the menu bar and select *New*.**

The "Add New System" window appears:

Figure 8-4
Add New System
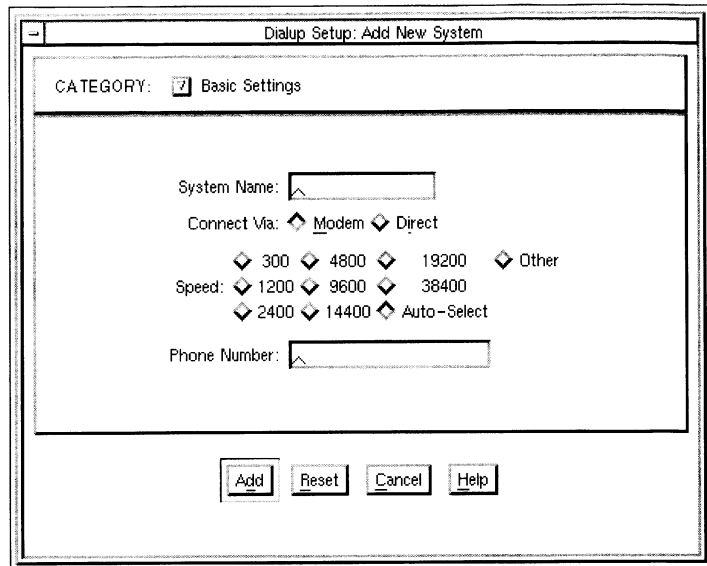
2. **Set the desired options:**

   System Name. Type the name of the remote system.

   Connect Via. Click on Modem or Direct, depending on the device to be used to connect to the remote system.

   Speed. Click on the speed that matches the speed on your modem or port. Click on Auto-Select if you are not sure of the speed. For a direct connection, click on 19200.

   Phone Number. Type the telephone number to call. This field is not available for direct connection.

   To add a four-second pause, add a "-" to the phone number entry. Type a "=" to add a "wait for secondary tone." For example, typing **9=6055551212---6527** tells the modem to dial 9, wait for an outside dial tone, dial 6055551212, wait 12 seconds, then dial 6527.

3. **Click on Basic Settings next to CATEGORY.**

4. **Click on Login Sequence.**

   The Login Sequence is optional. You need it if you want to do file transfers to the remote system.

5. **Fill in the login sequence (Prompt and Response) and click on the Add button next to the Current Login Sequence box.**

The login sequence defines the conversation that goes on between your system and the remote system when you transfer a file to the remote system. The Prompt defines what the remote system says; Response defines how your system responds. You can add several Prompt/Response lines. The following is an example of a typical sequence:

Prompt	Response
in:--in:	nuucp
word:	nuucp password on remote system

In this example, your system expects the remote system to send the letters *in:* (the last part of login:). If your system doesn't receive *in:*, it sends a newline and looks for *in:* again. In response to *in:*, your system sends nuucp (to login as nuucp). When the remote system responds with *word:* (for password:), your system sends whatever the password is for the nuucp login on the remote system. At this point the remote system is ready to accept remote file transfers.

6. **Click on Add to add a remote system and close the window.**

Modifying, Deleting, or Copying a Remote Dialup System Icon

Once a new dialup system entry is created, you can modify it, delete it, or copy an icon representing that new system to one of your folders. Later, you can log in remotely to the system by double-clicking on the icon or transfer files to the system by dragging and dropping files on the icon.

To modify, delete, or copy a remote system icon, do the following from the "Dialup Setup" window:

Procedure

1. **Click on the remote system entry you want to modify, delete, or copy into a folder.**

2. **Click on *System* in the menu bar.**

3. **Set one of the desired options:**

Copy To Folder. To add a copy of the system icon to a folder. The "Copy To Folder" window appears. Choose the folder into which you want to copy the system, then click on Copy.

Delete. To delete the system entry.

Properties. To view or change system properties. The "System Properties" window appears, displaying information for the selected entry. Change any of the options, then click on OK.

See the *Desktop User Handbook* for descriptions on how to log in or transfer files to a remote system using a system icon.

Searching for a Remote Dialup System Entry

If you have many remote dialup system entries in the "Dialup Setup" window, you can search the list to find the desired entry quickly.

To search for a remote dialup system entry, do the following from the "Dialup Setup" window:

Procedure

1. **Click on *Find* in the menu bar.**

2. **Click on either First or Last to select the first or last system entry in the list, or Search to search for an entry you specify.**

   For searches, a pop-up window appears in which you can type the system name you are interested in. Click on Find to find the name.

Using Serial Communications Configuration Files

When you add and modify entries for systems and serial devices using the "Dialup Setup" window, underlying configuration files are set up. You can also work with these configuration files directly, most of which are located in the */etc/uucp* directory, by using any text editor.

Configuration files described in this section include:

Systems. Describes the remote systems with which you can communicate.

Devices. Describes the serial ports you use for modem and direct communications and names the devices connected to each port.

Dialers. Describes the dialup devices connected to your serial ports. This information includes the chat scripts that need to occur between your system and the modem (or other device).

Other files contain information for monitoring incoming calls for serial communication. These configuration files, which are part of the Service Access Facility (SAF), are contained in the */etc/saf* directory.

Adding Remote Systems

When you add a system name using the "Dialup Setup" window, the system creates an entry in the */etc/uucp/Systems* file. The following is a system entry for a system named *jaguar* you can reach over a dial-out modem:

```
jaguar Any ACU Any 5551212
```

The system name here is **jaguar**. (Use that name with **cu**, **uucp** or other commands that would allow you to communicate with the system.) The first *Any* says you can contact the system any time of the day or night. ACU (Automatic Call Unit) says you can reach the system by dialing out over a modem. There must be at least one ACU entry in the Devices file (see the following section). The second *Any* says to use any line speed supported by the ACU to call the system. The final field (5551212) represents the telephone number used to call the remote system using the modem.

You can add your own systems by putting additional entries in the Systems file. A description of each of the fields is contained within the file */etc/uucp/Systems*.

Adding Serial Devices

When you add a device using the "Devices" window, it creates an entry in the */etc/uucp/Devices* file. The following is a device entry for an automatic call unit (such as a modem) connected to the COM2 port on your system:

```
ACU tty01,M - Any hayes
```

The **ACU** represents a dial-out modem. A connection to any remote system that needs to call over telephone lines can use this entry. The second field shows that the ACU is connected to the COM2 port (*/dev/tty01*) and that the port can be opened without waiting for a carrier (*,M*). The word *Any* says to use any speed requested by the connection that is supported by the modem (9600 baud

is used by default). The word *hayes* says that the modem is a Hayes®-compatible modem, which is represented by an entry in the Dialers file. (The dash in the third field is a placeholder that is ignored. You would only use that field if the dialer and the modem were separate devices attached to separate ports.)

You can add your own serial devices by putting additional entries in the Devices file. A description of each of the fields is contained within the file (*/etc/uucp/Devices*).

Adding Dialer Entries

Dialers and other devices used for connecting to remote systems with serial communications are contained in the */etc/uucp/Dialers* file. Within this file there are entries for Hayes, Ventel, Telebit® and other popular modems.

The essential information in Dialers entries are the chat scripts associated with each modem. The chat script describes the conversation that goes on between the UnixWare system and the modem in order to establish the connection.

The following is the Dialers entry for a basic Hayes-compatible modem:

```
hayes =,-, "" \M\dAT\r\c OK\r ATDT\T\r\c CONNECT
   \r\m\c
```

When you try to complete a connection to a remote system over a Hayes modem, the following sequence occurs:

1. UnixWare sends **AT** to the modem to check that the modem is ready.

2. After the modem responds **OK**, UnixWare sends **ATDT** (to ask the modem to dial a number) along with the telephone number passed to it for the remote system.

3. When the connection is established, the modem responds **CONNECT**, and UnixWare can proceed to send data to the remote system.

The control codes used in the previous example are as follows:

\c. No new line.

\d. Delay two seconds.

\m. Turn off CLOCAL flag.

\M. Turn on CLOCAL flag.

\r. Carriage return.

\T. Use the phone number supplied in the Systems file.

You can add your own dialers by putting additional entries in the Dialers file. A description of each of the fields, along with valid control codes, is contained within the file */etc/uucp/Dialers*.

Note ▼ If you want to use pulse dialing rather than tone dialing, for example, refer to the instructions in the */etc/uucp/Dialers* file for information on how to modify your *Devices* file for pulse dialing.

Using Other Configuration Files

Besides the *Systems*, *Devices*, and *Dialers* files, there are several other files that may be useful for configuring serial communication. Special files contained in the */etc/uucp* directory are used to poll remote systems, set permissions on what remote systems can do on your system, and set up dialer abbreviations.

The following are descriptions of the */etc/uucp* configuration files. For descriptions of the format of these files, see "Network Services Administration" in the *System Administration* guide if you have an Application Server, or check the descriptions contained within each of these files.

Permissions. Specifies login, file access, and command execution permissions that remote computers have to your system.

Devconfig. Used to configure basic networking over a TCP/IP connection.

Sysfiles. Allows you to create other files to store Systems, Devices, and Dialers information. Useful for separating systems and devices that use different network connections.

Limits. Limits the maximum number of basic networking daemons that can be active at a time for file transfers (*uucico*), remote execution (*uuxqt*), and schedules for contacting remote systems (*uusched*).

Dialcodes. Allows you to specify abbreviations for telephone numbers. Later, when you add telephone numbers to the Systems file, you can use the abbreviations to represent potentially long dialing sequences.

Poll. Specifies when to poll remote systems. You can add a system name and the hour(s) of the day it should be contacted.

Grades. Used to define the job grades assigned to queued communications to remote systems. This allows you to set priorities for file transfers.

Monitoring Incoming Serial Communications

When you add a device through Dialup Setup that allows incoming calls or bi-directional connections, an entry is added to the */etc/saf/ttymon1/_pmtab* file. This entry starts a daemon process which listens for incoming calls on the port and provides a login prompt for a user to log in over the modem or direct connection.

The following is an example of an entry:

```
tty01:u::reserved:reserved:login:/dev/tty01:bhr:0:
  /usr/bin/shserv:60:auto:ldterm:login\: :::::#
```

This entry starts a ttymon process that listens for connection requests on the COM2 port (*/dev/tty01*). The transmission speed is negotiated (**auto**). Once the connection is established, the system presents a login prompt (**login\:**).

This is not an entry you would want to create manually. However, you might want to modify it. For example, you could hard code a particular line speed instead of using auto (line speeds are listed in the */etc/ttydefs* file) or you could change the login prompt.

Configuring Serial Ports for Modems

When configuring a ttymon to monitor serial ports with modems attached, do not use the autobaud feature for "smart" modems for incoming or bi-directional lines. By a "smart" modem, we mean a modem that can speak at different speeds between the line and the serial port.

Instead, use **ttymon** to monitor the line at the highest baud rate that the modem can support (for example, 9600) by doing the following:
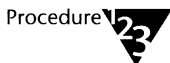
Procedure

1. **Double-click on Applications in the UnixWare Desktop.**

2. **Double-click on Terminal in the Applications folder.**

   A "Terminal" window appears.

3. **Change to the** *etc/saf/ttymon* **directory.**

4. **Edit the file** *etc/saf/ttymon/_pmtab* **by changing all occurrences of the word** `auto` **to the desired speed (for example, 9600).**

5. **Stop ttymon by typing**

   ```
   sacadm -k -p ttymon
   ```

6. **Start ttymon by typing**

   ```
   sacadm -s -p ttymon
   ```

Note that many smart modems remember the speed at which the last communication occurred, so, if you use **cu** over a port at a different speed than the speed set by **ttymon**, the modem continues to use the speed specified by **cu**. Use the same speed for outgoing **cu** connections that **ttymon** uses to monitor incoming connections.

Using Dumb Terminals

Adding a dumb terminal to your UnixWare system consists of creating a device entry, as described in "Working with Dialup Devices" earlier in this chapter, and connecting the terminal to a serial port.

You can attach as many dumb terminals to your system as is supported by your hardware configuration. Serial port boards are available to add 8, 16, or more ports to your system.

Though there are no restrictions to the number of terminals you can connect to UnixWare, there are restrictions regarding how many users can be simultaneously logged in. A Personal Edition system can have only two users logged in at the same time; an Application Server can have an unlimited number of users logged in.

Dumb terminals will not allow you to run the desktop or graphical applications. However, you can use the UNIX shell and character-based applications from a dumb terminal.

Configuring Dumb Terminals

You need to configure your user environment to be able to use a dumb terminal effectively. In particular, you must set the terminal type and the PATH to your applications. You can also add things like the default text editor.

The easiest way to add terminal, path, and other user information is to open the *.profile* file within the user's *home* directory, then add lines for *TERM*, *PATH*, and *EDITOR* to the file. Following is an example:

PATH=$HOME/bin:$PATH:/usr2/bin;export TERM
TERM=wyse150;export TERM
EDITOR=vi;export EDITOR

In this example, the terminal type is set to a **wyse150** character terminal. A *bin* directory in the user's *home* directory is added to the path, as well as a *bin* in the */usr2* directory which might contain shared character-based applications. The text editor is set to the *vi* utility by default.

Definitions for different terminal variables are contained in directories within the */usr/lib/terminfo* directory. In the previous example, you could replace **wyse150** with the name of some other *terminfo* file. By assigning the correct terminal definition, you can run applications that need to control the entire screen (such as *vi* or the OA&M tool).

Later, when you try to log in to UnixWare using the dumb terminal, if your user account was added as a desktop user, you will see a prompt to start the desktop Type **n** (no) to see a shell command prompt. You can start your UnixWare shell session at this time.

9 *Setting Up and Configuring TCP/IP*

This chapter describes how to set up your system to use TCP/IP and also includes information on

♦ How to configure access to a remote TCP/IP system

♦ How to set up access to a router

♦ How to set up access to a DNS or NIS server

♦ How to use TCP/IP protocols

♦ How to use the bootp dynamic host configuration

♦ How to configure additional TCP/IP files at the command line

Overview

TCP/IP is a set of protocol suites and utilities that let you communicate among computer systems. Besides being the most popular means of communicating among UNIX systems, TCP/IP is also the dominant way to connect with computer systems world-wide over the Internet.

To use TCP/IP you don't have to have a connection to the Internet. You can just as easily use TCP/IP to connect a few computers in an office. All you need is an Ethernet or Token-Ring connection between your systems. Then do some simple configuration as described in this chapter.

Once configured, TCP/IP lets you log in to remote systems, transfer files, and execute applications remotely. Likewise, you can share devices among systems, such as printers, tape drives, and CD-ROM devices.

Obtaining an Internet Number

In order for all computers connected to the Internet to communicate with one another, the Network Information Center (NIC) controls addresses and names so that they are unique across the entire Internet. If your organization wants to connect to the Internet, you can apply to the NIC for an Internet network address and a domain name. You can assign host numbers and system names within the assigned network ID and domain. The following is a typical Internet address: 123.46.117.11.

To contact the NIC, call (800) 444-4345 or write to Network Solutions, InterNIC Registration Services, 505 Huntmar Park Drive., Herndon, VA 22070. The NIC will assign a network number and class. You can identify your network class by comparing your assigned number with the following examples:

1. **Class A address: 120.110.125.52**

   The 120 number is the network address the NIC assigns. The first segment of a network ID for a Class A network must be between 0 and 127. (110.125.52 is the host ID which you assign.)

   Class A network addresses are rarely given out by the NIC.

2. **Class B address: 133.16.117.11**

   The 133.16 number is the network ID the NIC assigns. The first segment of a network ID for a Class B network must be between 128 and 191. (117.11 is the host ID which you assign.)

   Class B network addresses are also rarely given out by the NIC.

3. **Class C address: 209.79.178.11**

   The 209.79.178 number is the network ID the NIC assigns. The first segment of a network ID for a Class C network must be between 192 and 255. (11 is the host ID which you assign.)

   Class C network addresses are often given out by the NIC.

Using Internet Setup

This section discusses how to use Internet Setup to configure your system for TCP/IP networking. Using Internet Setup, you can

- Specify your system's network address

- Configure your system's netmask and broadcast address

- Set up access to a DNS server, NIS server, and default router

- Configure your system for UUCP routing

- Set up remote user access to your system or login account

- Add entries to your */etc/hosts* file

- Browse a list of systems for a specified domain and copy an icon for the system to a folder

Note To set up any of the previously listed items other than browsing and setting up remote user access to your login account, you must have Change Internet Setup permissions. For information on assigning permissions, see "Using User Setup" in the chapter "Configuring Your User Environment" in this handbook.

Most of this chapter describes how to use the Internet Setup window to configure TCP/IP. From this window, you can configure access to other systems on your local network. This allows you to log in to and share files with these systems.

If you want to communicate with other systems on remote networks—that is, networks your system is not directly connected to but can reach through routers or gateways—you must configure access to a router and/or a DNS server. See "Setting Up Routing" and "Accessing a Domain Name Service (DNS) Server" for more information.

Configuring Your System for TCP/IP Networking

Depending on whether or not you typed a TCP/IP address when you installed UnixWare, one of these three windows will appear.

1. If you did not type a network address for TCP/IP, the "Configure Local System" window appears. Go to the section "Setting Up Your System If an Internet Address Was Not Added at Installation" in this chapter.

2. If you did not configure DNS but typed a TCP/IP address, the "Systems List" window appears. Go to the section, "Setting Up Your System if an Internet Address but Not a DNS Address Was Added at Installation" in this chapter.

3. If you typed a DNS address, the "Domain Listing" window appears. Go to the section "Setting Up Your System if a DNS Address Was Added at Installation" in this chapter.

Setting Up Your System If an Internet Address Was Not Added at Installation

To configure your system for TCP/IP networking, do the following:

Procedure

1. **Double-click on Admin Tools in the UnixWare Desktop.**

2. **Double-click on Networking in the Admin Tools folder.**

3. **Double-click on Internet Setup.**

   If you did not enter a network address for TCP/IP during installation, Internet Setup automatically displays the "Configure Local System" window the first time you double-click on Internet Setup.

   The "Configure Local System" window appears:

Internet Setup: Configure Local System

System Name: guilab2

Network Address:

Comment:

Domain Name:

Name Server:

Network Address:

OK Reset Cancel Help
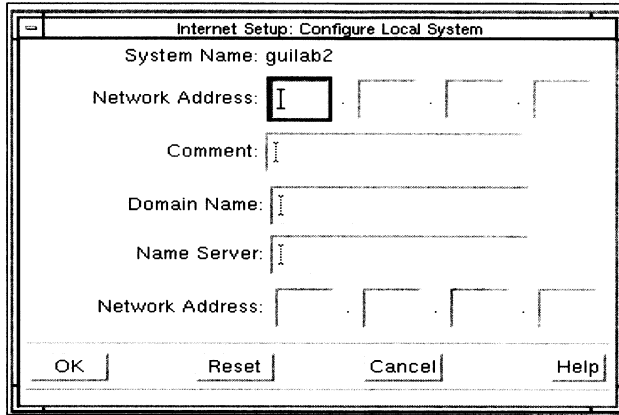
4. Set the desired options.

System Name. This option displays your system name.

Network Address. Type the network address. If you do not know your network address, ask your system administrator, who can assign an address for you.

Comment. Type any comment such as your name or the location of your UnixWare system.

Note Fill out the next four options only if your organization has access to a DNS server.

Domain Name. Type the name of the domain to which you belong (your group or organization). The domain name must have a *.com*, *.edu*, *.gov*, and so on, for the extension. For example, *site1.companyA.com*, could be a domain name you would use.

Name Server. Type the name of your organization's primary DNS server.

Network Address. Type the address for the DNS server.

5. Click on OK to apply the changes and close the window.

The "Internet Setup" window appears with your system's name and address added to the Systems List.

Setting Up Your System If an Internet Address but Not a DNS Address Was Added at Installation

If you did not type a DNS address but you did type an Internet address when you installed UnixWare, the "Systems List" window appears:

Figure 9-2
Systems List
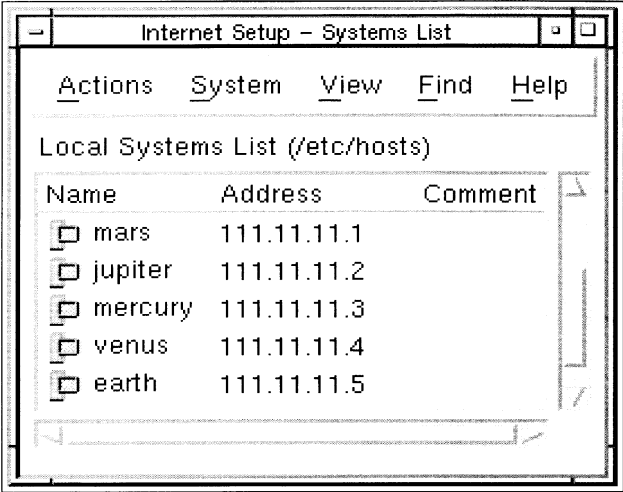
For information on setting up your netmask and router, go to the section, "Specifiying a Netmask and Default Router," in "Setting Up Routing" this chapter.

Setting Up Your System if a DNS Address Was Added at Installation

If you typed a DNS address when you installed UnixWare, the "Domain Listing" window appears:
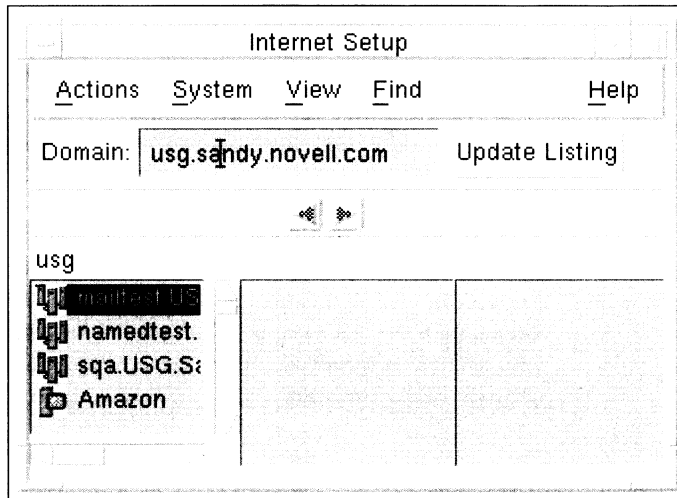
```
┌─────────────────────────────────────────────────────────┐
│                     Internet Setup                       │
│                                                          │
│   Actions   System   View   Find           Help          │
│                                                          │
│   Domain:  │ usg.sandy.novell.com │   Update Listing     │
│                                                          │
│                         ◄  ►                             │
│                                                          │
│   usg                                                    │
│   ┌──────────────────┬──────────────┬──────────────┐    │
│   │ manftest.US      │              │              │    │
│   │ namedtest.       │              │              │    │
│   │ sqa.USG.Sa       │              │              │    │
│   │ Amazon           │              │              │    │
│   └──────────────────┴──────────────┴──────────────┘    │
└─────────────────────────────────────────────────────────┘
```

For information on setting up your netmask and router, go to the section "Specifiying a Netmask and Default Router" in "Setting Up Routing" in this chapter.

Setting Up Routing

Though the Internet requires every system that communicates on it to have a unique address, the Internet is not a single network. Rather, it is a collection of physical networks, operated and maintained by individual organizations.

To communicate with systems that are not on your local area network, there must be at least one router connected to your network. Routing can be handled by a dedicated router or you can configure a UnixWare system to route between two or more networks.

If you are using TCP/IP only to communicate with systems on a single local area network, you can skip this section on routing.

Netmask and Broadcast Address

A system netmask determines which part of a network address is considered to be the network ID and which part is the system ID. This allows information in a network to be routed properly so that two or more computer systems can communicate. For example, suppose a network is being managed as a Class B

network and your network address is 128.1.1.101. With a Class B style netmask, the first two parts of the network address, 128.1, would be the network ID and the last two segments, 1.101, would be the system ID, thereby identifying your specific system within that network. A Class C style netmask indicates that the first three segments of the network address should be the network ID.

A system broadcast address uses the same concepts described previously, however, instead of a unique system ID, a special broadcast system ID is generated. All systems on a network recognize this broadcast address as indicating that each system should pay attention to the message. This allows your system to broadcast a message to all other computer systems on the network when necessary.

Default Router

When you configure your system for TCP/IP networking, you can immediately communicate with other systems on your physical network. However, to provide access to systems on other physical networks (for example, a system connected to a different set of network interfaces and cabling) or the Internet a company will set up one or more routers or gateways that know how and when to allow messages to cross over from one network to another. If you need to communicate with systems outside your network, you can specify a default router through which your system can route its messages.

Note ▼ This router must determine how to get to the desired network or must determine how to reach another router that knows how to get to the desired network.

The router must be directly attached to your network. If your network has several routers, each of which can reach different networks, then you might choose to configure your system to listen for broadcasted routing information rather than specifying a default router. (Ask your administrator whether or not the routers in your network are broadcasting their routing tables. The **routed** program on your system listens for these broadcasts.) When routers broadcast their routing tables, computer systems on the network can use this information to determine the best way to reach another network rather than sending their messages to the default router to do this for them.

Specifying a Netmask and Default Router

Once you configure your system for networking, you can contact other systems on your local network. To access systems outside your local network, you may have to configure your system's netmask address and broadcast address. You

may also have to specify a router that allows you to connect to systems outside your local network.

To set up your system for routing, do the following:

1. **Double-click on Admin Tools in the UnixWare Desktop.**

2. **Double-click on Networking in the Admin Tools folder.**

3. **Double-click on Internet Setup.**

   The "Internet Setup" window appears. (If DNS is configured for your system, the Domain Listing window appears. Otherwise, a System List is shown.)

Figure 9-4
Internet Setup

```
 ┌──────────────────────────────────────────────────┐
 │ ▭ │      Internet Setup – Systems List      │ ▫ │ ▢ │
 │   ┌──────────────────────────────────────────────┐
 │   │  Actions   System   View   Find   Help       │
 │   ├──────────────────────────────────────────────┤
 │   │  Local Systems List (/etc/hosts)              │
 │   │  ┌───────────────────────────────────────┐    │
 │   │  │ Name        Address        Comment    │    │
 │   │  │ ▓ mars      111.11.11.1                │    │
 │   │  │ ▓ jupiter   111.11.11.2                │    │
 │   │  │ ▓ mercury   111.11.11.3                │    │
 │   │  │ ▓ venus     111.11.11.4                │    │
 │   │  │ ▓ earth     111.11.11.5                │    │
 │   │  │                                        │    │
 │   │  └───────────────────────────────────────┘    │
 └──────────────────────────────────────────────────┘
```
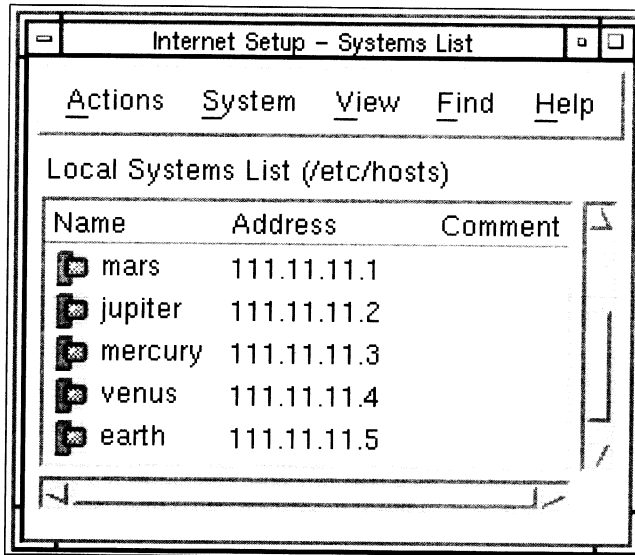
4. **Click on *Actions* in the menu bar and select *Routing Setup*.**

   The "Routing Setup" window appears.

Figure 9-5
Routing Setup
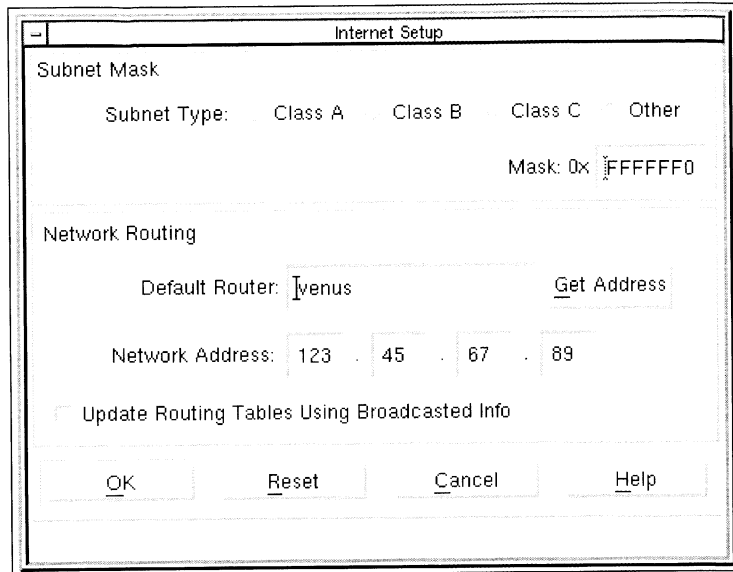
4a. **Set the desired option to set up a subnet mask:**

Subnet Type. Click on the appropriate class (A, B, C, or Other). If you do not know your class, check with your system administrator. If your network is not configured as a standard class network, select Other. The Mask text box appears. Type the netmask ID in hex format; for example, FFFF0000.

Network ID. This option displays the network identifier in the local system address, based on the currently selected Subnet Type.

System ID. This option displays the portion of your address that is unique to your system. This is based on the currently selected Subnet Type.

Note ▼ The previous options appear only if you select Class A, B, or C for Subnet Type. The portion of the address that represents the network ID and system ID changes as you select different classes.

4b. **Set the desired option to specify a default router.**

Default Router. Type the name of the system used as a router within your local network. Include the full domain name of the system.

Network Address. If the default router's address is not displayed and if your system is configured for DNS, click on Get Address and

the system will look up the address of the router for you. Otherwise, type the default router's address.

Update Routing Tables Using Broadcasted Info. Click to run the *routed* program (the router daemon, *routed*). See the *Command Reference* for more information on *routed*.

5. **Click on OK to save the changes and close the window.**

Accessing a Domain Name Service (DNS) Server

A DNS server is a system that is specially configured to know about all systems in your local domain. When you request information on a system in a different domain, the DNS server knows how to contact another DNS server to determine whether that server has information on the specified system. This type of communication continues until an appropriate DNS server is found.

Note If information about a particular system is maintained on a DNS server in another part of the world, a time limit on your system may expire before the information is finally returned. If this should happen, you should try the task again since the information might be available the second time. If you will be accessing that system frequently, you may want to use the Copy To System List feature to save the address for the system in your local */etc/hosts* file.

DNS servers allow an administrator to manage all information centrally about systems on the network. In addition, you do not have to store information about all other systems on the network in your */etc/hosts* file. You can avoid this task by configuring your system to access the DNS server to retrieve this information.

To set up your system to access a DNS server:

Procedure
1. **Double-click on Admin Tools in the UnixWare Desktop.**
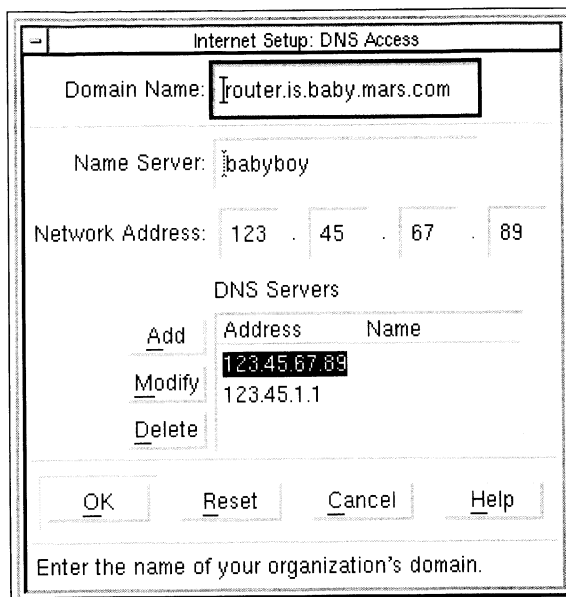
2. **Double-click on Networking in the Admin Tools folder.**

3. **Double-click on Internet Setup.**

    The "Configure Local System" window (or the "Domain Listing" window if DNS is configured for your system) appears.

4. **Click on *Actions* in the menu bar and select *DNS Access*.**

    The "DNS Access" window appears.

Figure 9-6
DNS Access

```
┌─────────────────────────────────────────────┐
│ ┌─┐      Internet Setup: DNS Access          │
│ └─┘                                          │
│                    ┌───────────────────────┐ │
│    Domain Name:    │ router.is.baby.mars.com│ │
│                    └───────────────────────┘ │
│                                              │
│    Name Server:   babyboy                    │
│                                              │
│  Network Address:  123  .  45  .  67  .  89  │
│                                              │
│                    DNS Servers               │
│                                              │
│           Add    Address       Name          │
│                  ▐123.45.67.89▌              │
│          Modify  123.45.1.1                  │
│                                              │
│          Delete                              │
│                                              │
│  ┌──────┐  ┌───────┐  ┌────────┐ ┌──────┐   │
│  │  OK  │  │ Reset │  │ Cancel │ │ Help │   │
│  └──────┘  └───────┘  └────────┘ └──────┘   │
│                                              │
│  Enter the name of your organization's domain.│
└─────────────────────────────────────────────┘
```

5. **Set the desired option:**

   Domain Name. Type the name of your organization's domain (local). The
   domain name must include an extension such as *.com*, *.edu*, or *.gov*. For
   example, *site1.companyA.com* is a typical format of a domain name.

   Name Server. Type the name of your organization's primary DNS serve

   Network Address. Type the address of the DNS server specified in Name
   Server.

   DNS Servers. Use the scrollbar to move up and down the list of servers.

6. **Click on Add to add the current entries in the Name Server and
   Network Address boxes into the scroll list.**

7. **Click on OK to save the changes and close the window.**

Accessing a Network Information Service (NIS) Server

An NIS server is a system that is specially configured to centrally manage different types of administrative data in your network environment. For example, an NIS server may manage information regarding all users on a network. When an application needs information about a user, for example, the request for that information is redirected to the NIS server. Setting up an NIS server allows an administrator to manage different types of administrative data on a single system rather than having to go to each system on the network.

UnixWare allows you to configure your system to access an NIS server. Once you have done this, you can use User Setup to indicate that administrative information for specific users is being managed on the NIS server, or use the command line to configure this for other system services.

Note ▼▼▼ Configuring your system to access NIS does not automatically enable NIS for any specific service such as user or host management. See "Using User Setup" in the chapter "Configuring Your User Environment" to change permissions for users.

To set up your system for NIS access, do the following:

Procedure ▼▼▼

1. **Double-click on Admin Tools in the UnixWare Desktop.**

2. **Double-click on Networking in the Admin Tools folder.**

3. **Double-click on Internet Setup.**

4. **Click on *Actions* in the menu bar and select *NIS Access*.**

   The "NIS Access" window appears.

5. **Set the desired options:**

   NIS Domain Name. Type the name of your organization's local domain.

   NIS Server. Type the name of your organization's primary NIS server.

   Existing NIS Servers. Use the scrollbar to move up and down the list of servers and click on one of the following options.

6. **Click on Add to add the current NIS Server entry to the scroll list.**

7. **Click on OK to save the changes and close the window.**

Viewing the Domain List

When you configure your system for DNS access, you can display a list of systems associated with your organization or other organizations.

The Domain Listing displays a list of systems in a specific domain. By default, Internet Setup displays a list of systems in your local domain.

To display a Domain Listing, do the following:
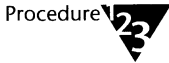
Procedure

1. **Double-click on Admin Tools in the UnixWare Desktop.**

2. **Double-click on Networking in the Admin Tools folder.**

3. **Double-click on Internet Setup.**

4. **Click on *View* in the menu bar and select *Domain Listing*.**

   The "Domain Listing" window appears. By default, it displays a list of systems in your local domain.

5. **Type the desired domain name (the name of the domain in which the system you are searching for resides) in the Domain Name text box.**

6. **Click on Update Listing.**

   If sub-domains exist under the specified domain, they appear at the top of the Domain Listing. The icon representing a domain is different from the icon representing a system.

7. **Display the contents of a sub-domain by double-clicking on the sub-domain entry.**

   A new list displaying the contents of that sub-domain appears to the right.

   Continue to click on sub-domains to display subsequent sub-domains until no more exist. Only three levels of domains can appear on your screen at a time. If you have more than three levels, use the left and right arrow in the center of the window to move back and forth through the listings.

8. **Search through the listings until you locate the desired system. Click on the system entry to do an action for that system.**

Copying a Domain Listing Entry to the Systems List

You can copy any system entry from the Domain Listing to the Systems List. By adding a system to the Systems List, you can prevent the possibility of not being able to communicate with a remote system because the DNS server is not available to get the address for you.

To copy a system from the Domain Listing to the */etc/hosts* file, do the following:

Procedure

1. **Double-click on Admin Tools in the UnixWare Desktop.**

2. **Double-click on Networking in the Admin Tools folder.**

3. **Double-click on Internet Setup.**

4. **Click on *System* in the menu bar and select *Copy to Systems List*.**

   A "Confirmation" window appears.

5. **Click on OK to apply the changes and close the window.**

Viewing the Systems List

The Systems List displays the entries in your */etc/hosts* file.

To view the Systems List, do the following:

Procedure

1. **Double-click on Admin Tools in the UnixWare Desktop.**

2. **Double-click on Networking in the Admin Tools folder.**

3. **Double-click on Internet Setup.**

4. **Click on *View* in the menu bar.**

5. **Select *Systems List*.**

   The "Systems List" window appears.

Note

If your system is not configured for DNS access, this is the only view available.

Adding a New Systems List Entry

This task allows you to add new entries.

To add a new entry to the Systems List, do the following:
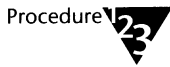
Procedure

1. **Double-click on Admin Tools in the UnixWare Desktop.**

2. **Double-click on Internet Setup in the Networking folder.**

Note

Make sure you are in the Systems List view. (Click on *View*, then click on *Systems List*.)

3. **Click on *System* in the menu bar and select *New*.**

   The "Add New System" window appears.

4. **Set the desired options:**

   System Name. Type the name of the system with which you want to communicate.

   Network Address. Type the network address. If your system is configured for DNS access, click on Get Address and Internet Setup will search the address for you.

   Comment. Type any comment, for example, the location of the system, or the name of the system owner.

5. **Select Add to save the changes and close the window.**

Deleting a Systems List Entry

This task allows you to remove an entry.

To remove an entry from the Systems List, do the following:
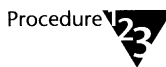
Procedure

1. **Double-click on Admin Tools in the UnixWare Desktop.**

2. **Double-click on Internet Setup in the Networking folder.**

Note

Make sure you are in the Systems List view. (Click on View, then click on Systems List.)

3. **Click on the entry you want to delete.**

4. **Click on *System* in the menu bar and select *Delete*.**

   The system asks you if you are sure you want to delete the entry.

5. **Click on OK.**

Viewing a System List Entry's Properties

This task allows you to check the properties of an entry in the system.

To view the properties of a system entry, do the following:

Procedure

1. **Double-click on Admin Tools in the UnixWare Desktop.**

2. **Double-click on Networking in the Admin Tools folder.**

3. **Double-click on Internet Setup.**

4. **Click on the desired system in the Domain Listing or the Systems List.**

5. **Click on *System* in the menu bar and select *Properties*.**

   The "System Properties" window appears.

Note

   If you are in the Domain Listing, you cannot make any changes to the system properties. If you are in the Systems View, you can make changes which will update the */etc/hosts* file.

   ◆ If you are in the Domain Listing view, this window displays the system name and the corresponding network address.

   ◆ If you are in the Systems List view, you can make changes to the properties as follows:

   5a. **Type the desired system name if different from the listed system name.**

   5b. **Type the address for that system or, if you have DNS access, click on Get Address for Internet Setup to find the address.**

   5c. **Type any comment, if desired.**

   5d. **Click on OK to save the changes and close the window.**

Searching for a System Entry

This task allows you to search for a system entry.

To search for a system, do the following:
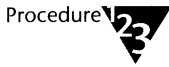
Procedure

1. **Double-click on Admin Tools in the UnixWare Desktop.**

2. **Double-click on Networking in the Admin Tools folder.**

3. **Double-click on Internet Setup.**

4. **Click on *Find* in the menu bar.**

5. **Click on the desired option.**

   First. This option locates and highlights the first system entry in the Domain Listing or Systems List.

   Last. This option locates and highlights the last system entry in the Domain Listing or Systems List.

   Search. Type the name of the desired system. Internet Setup locates and highlights the system in the Domain Listing or the Systems List.

   Search. Click to find the desired entry.

   Cancel. Click to close the window.

   Help. Click to access online help.

Copying an Icon for a Remote System to a Folder

You can create an icon for any remote system in your Domain Listing or Systems List. You can then double-click on the icon to log in or drag-and-drop a file to it to transfer files to the remote system.

To create an icon for the remote system, do the following:
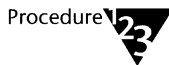
Procedure

1. **Double-click on the Admin Tools folder on the UnixWare Desktop.**

2. **Double-click on Networking in the Admin Tools folder.**

3. **Double-click on Internet Setup.**

4. **Click on the desired system in the Domain Listing or Systems List.**

5. **Open the folder to which you want to copy the remote system icon.**

6. **Drag-and-drop the remote system icon to the folder.**

Creating an Icon for a Remote System Using the "Copy To Folder" Window

This task allows you to create a remote system icon.

To create an icon for a remote system, do the following:

Procedure

1. **Double-click on the Admin Tools folder on the UnixWare Desktop.**

2. **Double-click on Networking in the Admin Tools folder.**

3. **Double-click on Internet Setup.**

4. **Click on the desired system in the Domain Listing or Systems List.**

5. **Click on *System* in the menu bar and select *Copy To Folder*.**

6. **Click on the folder or Parent Folder to move through the list of available folders and select the desired folder.**

7. **Type a name for the icon in the As: field.**

   By default, this name is the same as the system name.

8. **Click on Copy.**

   A remote system icon representing that system appears in the folder.

Setting Up Remote User Access

This task allows you to set up your system so that users on other systems can log into and copy files to and from your system without entering a password.

Warning

Use this feature with care. Users to whom you give access rights to your system will not be prompted for a password. If you set up access to your personal account, the specified user will be able to access all your files and perform any system activity that you are allowed to perform.

Using the "Remote User Access" window, you can configure access rights for remote users who have local accounts or set up access to your personal account.

When you configure access for the entire system, you specify which remote users with local accounts may access the local system (from the remote system) without being prompted for a password. This is sometimes necessary to allow those users to run applications that need to retrieve data from the local system or perform some activity on behalf of the user (for example, run a backup program). The system and user who are given access are considered to be trusted.

When you configure access to your personal account, you specify which remote users may log in to your account or copy files to your directories without being prompted for a password. You might set up access to your account in this manner if a co-worker needs to access your account from another system freely to perform file transfers or run applications.

Important ⚠ The user who is logging in effectively becomes you, and therefore has access to all your files and programs. Use this feature with caution.

To set up local system access for remote users, do the following:
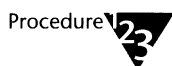
Procedure ▼

1. **Double-click on Admin Tools in the UnixWare Desktop.**

2. **Double-click on Networking in the Admin Tools folder.**

3. **Double-click on Internet Setup.**

   The "Internet Setup" window appears. Access the view that lists the system from which users will log in, then select the system.

   Note ▼ If you configured your system for DNS access, by default, the Domain List appears.

4. **Click on *System* in the menu bar and select *Copy To Systems List*.**

   For more information on copying entries to a Systems List, see "Copying a Domain Listing Entry to the Systems List" and "Viewing the Systems List" earlier in this chapter.

5. **Click on *View* in the menu bar and select *Systems List*.**

6. **Click on the name of the system for which you want to allow user access to your system.**

7. **Click on *Actions* in the menu bar and select *Remote User Access*.**

The "Remote User Access" window appears.

8. **Set the desired options:**

Remote System Name. This is the system name you selected in the main "Internet Setup" window. To configure local access for a different system, type over the existing name and press <Tab>.

Remove Password Restriction For. This option is set to "Access to your Personal Account" by default. In this case, you are setting up remote user access to your login account.

You can set access rights for Remote Users with Local Accounts if you have Change Internet Setup permission. Remote users who have an account (of the same user name) on your system will then be able to log in and perform file transfers without supplying a password.

Users on *<system name>* Who May Freely Access Their Account/Your Account. Click on one of the following items:

No One. Select this if you do not want remote users to access their account or your account without a password. This is the default.

Self. Select this if you will be logging in to this system from the remote system using the same login ID. You will not be prompted for a password.

All Users. This option is available only if you select Remote Users with Local Accounts in the Set Access Rights For option and if you want any user on the remote system to be able to log in without having to provide a password. The user must have an account on your system.

Specific Users. Select this if you want only specific users to be able to access your account (or their own account) without entering a password.

This window expands to include additional fields for adding users to the list. See "Adding, Deleting, and Modifying Users for System Access" for more information.

9. **Click on OK to apply the changes and close the window, or click on Apply to save the changes only.**

Adding, Deleting, and Modifying Users for System Access

To add, change, or delete a user who can access your system, refer to the appropriate subsection.

Adding Specific Users

This task allows you to add to a list users who will access your system.

Warning ▼ Use this option with caution. Any user added to this list can log in to your account, or their own, and access files without entering a password.

To add a user to the list of users who can access their account or yours, do the following:
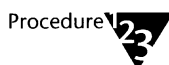
Procedure ▼

1. **Double-click on Admin Tools in the UnixWare Desktop.**

2. **Double-click on Networking in the Admin Tools folder.**

3. **Double-click on Internet Setup.**

4. **Click on *Actions* in the menu bar and select *Set Local Access*.**

   The Remote System Name field contains the name of the system to which other users will log in.

5. **Click on Specific Users.**

   The window expands and additional options appear.

6. **Type the desired login ID in the Login ID text box.**

7. **Click on Add under the Allowed Users option.**

   The Login ID moves to the Allowed Users box.

8. **Repeat Steps 6 and 7 for each user to add to the list.**

9. **Click on OK to apply the changes and close the window.**

Deleting Specific Users

This task allows you to remove a name from a list of users who can access your system.

To remove a user from the Allowed Users list, do the following:

Procedure
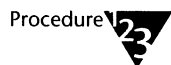
1. **Click on the desired login ID in the Allowed Users list.**

2. **Click on Delete to remove the login ID.**

3. **Repeat Steps 1 and 2 for each user to delete from the list.**

4. **Click on OK to apply the changes and close the window, or click on Apply to save the changes only.**

Modifying Specific Users

This task allows you to change the status of users who can access your system.

To make changes to the Allowed Users list, do the following:

Procedure

1. **Click on the desired login in the Allowed Users list.**

   The message `Indicate a specific user who may log in` appears.

2. **Change the login ID in the Login ID text box.**

3. **Click on Modify.**

   The Login ID moves to the Allowed Users box.

4. **Click on OK to apply the changes and close the window.**

Setting Up UUCP File and Message Transfers

The UnixWare UUCP facility allows you to send and receive file transfers and electronic mail over dialup and TCP/IP networks.

Note

Your system can be configured to send mail using the UnixWare SMTP service rather than UUCP. See the chapter "Setting Up and Configuring Mail" in this handbook.

To send UUCP messages, both your system and the remote system have to be configured for UUCP transfers. Once this is done, mail can be sent between the two systems and you can use the Remote Access desktop tool to send files to the remote system using the UUCP facility. See the *Desktop User Handbook* for information on remote access. Files sent to you through UUCP can be retrieved from the UUCP Inbox located in your Mailbox folder.

To set up UUCP transfers between a remote system and your local system, do the following:

Procedure

1. **Double-click on Admin Tools in the UnixWare Desktop.**

2. **Double-click on Networking in the Admin Tools folder.**

3. **Double-click on Internet Setup.**

4. **Select a system from the Systems List or Domain Listing.**

5. **Click on *Actions* and select *UUCP Transfer Setup*.**

   The "UUCP Transfer Setup" window appears.

6. **Set the desired options:**

   System Name. This option displays the name of the system currently selected in the "Internet Setup" window. To change the system name, type over the existing name and press <Tab>.

   Network Address. By default, the address for the currently selected system appears. If you changed the name in the System Name text box, this option will become blank.

   If you have DNS access, click on Get Address and the system will search the address of the system for you.

   If you do not have DNS access, obtain the address from your network administrator and type it in.

   Current Status. Accepting From indicates that UUCP file transfers are currently being accepted for the selected system. Rejecting From indicates that they are not.

7. **Click on Accept to have the Internet Setup window add the system to the */etc/uucp/Systems.tcp* file or on Reject to have the Internet Setup remove the system from the */etc/uucp/Systems.tcp* file.**

Dynamically Configuring TCP/IP (bootp)

To set up TCP/IP on a UnixWare system, you typically add your system name and IP address. Then, you either add the names and internet address of all systems you can reach or the identity of the DNS server that provides this information. You also can define routes to other networks by identifying routing and netmask information.

A bootp server lets you configure basic TCP/IP information for a group of systems. As a result, by simply adding a system name to your UnixWare system, you can get the remaining basic TCP/IP information you need to configure your system from the bootp server.

Later, you can obtain changed TCP/IP information from the bootp server. This feature is particularly valuable if you need to change information for a whole set of systems at once.

The following are ways you can use bootp features to configure TCP/IP:

◆ **Configure a bootp server**. Before you can use bootp features, you or another system on the network, must configure a bootp server. Bootp server configuration must be done by editing configuration files from a "Terminal" window. There is no graphical interface. For information on configuring a bootp server, see the *Network Administration* guide.

◆ **TCP/IP installation**. When you install TCP/IP on your UnixWare system, TCP/IP checks if there is a bootp server offering information about your system (based on its system name). If there is, a menu of this information is displayed. This could include the internet address for your system, as well as the name and address of name server and router systems. You can accept or change this information. The *Installation Handbook* describes how to use bootp features during installation.

◆ **Update bootp clients**. If your network address, DNS server, router, or other TCP/IP information changes, you can grab the new information from your bootp server. From a UnixWare system, use the **/etc/inet/menu** command to read the bootp information and update your system with it, as appropriate. The following section describes how to update TCP/IP information from your bootp server.

Updating TCP/IP bootp Information

Networks in large organizations are dynamic. Systems are added or removed, routers change, or new DNS servers may be assigned. If information changes on a network that affects all the systems on that network, a bootp server is an efficient way of distributing that information.

The following procedure describes how to get updated TCP/IP information from a bootp server that has new information needed by your system:

Procedure
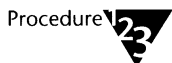
1. **Double-click on Applications in the UnixWare Desktop.**

2. **Double-click on a "Terminal" window in the Applications folder.**

   A "Terminal" window opens.

3. **Type *su* to become root.**

4. **Type the */etc/inet/menu* command.**

   The "Inet Setup Values" window appears.

Figure 9-7
Inet Setup Values


```
                                    Terminal
  Optionally enter the TCP/IP values you know, other values can be set later.

  +---------------------Inet Setup Values from System Files----------------------+
  |                                                                              |
  |          Node Name  doclab1                                                  |
  |                     NE2000_0                                                 |
  |   System IP Address 157.65.172.129                                          |
  |                                                                              |
  |     System Netmask  0xffffff00                                              |
  |   Broadcast Address 157.65.172.255                                          |
  |   Router IP Address 157.65.172.254                                          |
  |                                                                              |
  |     DNS Domain Name abc.baby.com                                            |
  |    DNS IP Address 1  157.65.208.177                                         |
  |    DNS IP Address 2                                                         |
  |    DNS IP Address 3                                                         |
  |                                                                              |
  | Network Frame Type  Ethernet II                                            |
  |                                                                              |
  +------------------------------------------------------------------------------+

  The router on your local network should have the format 123.45.67.90
   TAB/arrow=Move, F1=Help, F6=System File Values, F8=Cancel/Exit, F10=Apply.
```

5. **Move the cursor to each field and press the <F1> key to see a description of the field.**

The bootp server will fill in some or all of the values on the "Inet Setup Values" window. Fill in or change the desired fields. (Node Name and Device Handle can't be changed from this window.)

Note ▼▼▼ Ethernet SNAP frame types will not work with bootp. The default is Ethernet II.

6. **Press <Enter> to accept the changes. New values take effect the next time you boot your system.**

Internet Browser Overview

The GetInetBrowser icon in Admin Tools allows you to access the Internet Browser. This browser is useful for searching, locating, retrieving, and displaying documents from all over the Internet. For information on how to use this browser, see the *Desktop User Handbook*.

One word of caution, however, for administrators who allow users to access the internet in this manner. This feature could use up a great amount of network traffic and users may spend a large amount of time using this feature. You can remove the browser and deny access of the browser to other users through App Installer.

Configuring TCP/IP at the Command Line

This section describes how to set up TCP/IP networking at the command line in a "Terminal" window.

Setting Up TCP/IP Values

This task allows you to set up values at the command line.

Information that defines the interfaces to your system's networking boards for TCP/IP is located in */etc/confnet.d/inet/interface*.

Procedure ▼▼▼ 1. **Log in as root or type *su* to become root.**

2. **Using a text editor such as *vi*, edit the file *interface*.**

Note ▼▼▼ You can also run **/etc/confnet.d/configure -i** which will configure TCP/IP by asking you several questions. The **configure** command, however, does not let you change the broadcast and other **ifconfig** options. See **ifconfig**(1M) for further information.

3. **If you have subnetting, you can change an entry for an interface board to reflect your subnetting. For example,**

```
wd:0::/dev/wd_0:netmask 255.255.255.0 -trailers::
```

configures a WD80x3 board to use a mask of FF.FF.FF.00. Some systems need the broadcast option for routing to occur.

The following example shows an interface entry with broadcast:

```
wd:0::/dev/wd_0:netmask 255.255.255.0 broadcast
  137.65.208.255 -trailers::
```

The broadcast argument represents an IP address of 137.65.208.*xx*, where *xx* is the local address for a system.

The interface IP address for remote systems is located in */etc/inet/hosts*. (This file is also linked to */etc/hosts*, from which it is most commonly used.)

Changing Your TCP/IP Address

This task allows you to change your current Internet address.

To change your Internet address for TCP/IP, you must run a script:

Procedure

1. **Change to the */etc/confnet.d* directory by typing**

```
./configure -i
```

UnixWare prompts you with a series of questions and you are asked to identify an interface or LAN board. If you have one LAN board in your system, only one is listed.

2. **Enter your board, host name, IP address, and *ifconfig* parameters (ClassC defaults to a netmask of 0xffffff00 in the */etc/confnet.d/inet/interface* file).**

3. **Ensure that your */etc/hosts* table is correct. (Your system name and IP address should appear in */etc/hosts* as you entered it in Step 2.)**

4. **Ensure that your */etc/confnet.d/inet/interface* file is correct.**

If you have one LAN board installed (for example, an Ethernet NE2K), two lines at the bottom of the file should be uncommented (delete the #):

```
lo:0:localhost:/dev/loop::add_loop:
ne2k:0::/dev/ne2k_0:netmask 0xffffff00
    broadcast 137.65.44.255 -trailers::
```

Note ▼ The previous lines are dependent upon your IP address and the type of LAN board installed.

If multiple lines exist on your LAN board, delete all but the last line in the example.

5. **Shut down and reboot your system to have the changes take effect.**

Configuring TCP/IP Interfaces at the Command Line

Configuring TCP/IP allows your UnixWare system to communicate with other systems on your local network without changing the interface to that network. However, there are two cases in which you must run the **configure** command to change your network interface:

- ◆ If all the systems related to your network number are not connected to your local network (that is, your network makes use of subnets)

- ◆ If you have multiple networking boards installed in your system

If any of these are true, you must change your network configuration.

Procedure ▼ 1. **Log in or type** *su* **to become root.**

2. **Type**

   cd /etc/confnet.d

   and press <Enter>.

3. **Type**

   ./configure-i

   and press <Enter>. A list of your network boards (devices) appears.

4. **At the prompt, type the menu item number of the board you want to configure and press <Enter>.**

   An explanation of an Internet address appears.

5. **If you are configuring your first network board, type the name of your computer at the prompt and press <Enter>.**

    If you are configuring your second network board, press <Enter> only.

6. **At the prompt, type your Internet address (if it is different from the address listed) and press <Enter>.**

    The following message appears:

    ```
    Configure host <hostname> with default Ethernet
      ifconfig options? Info message is long (yes no
      ClassC BerkeleyC info; default: info):
    ```

    Each option is described next. In addition, see "Obtaining an Internet Number" in this chapter for an explanation of classes of Internet addresses

    ◆ Type **Yes** to use the default **ifconfig** options. For information on *ifconfig* options, see the **ifconfig**(1M) manual page in the *Command Reference*.

    ◆ Type **No** if you are on a non-Class C network. You will be prompted to enter your netmask and broadcast.

    ◆ Type **ClassC** if you are on a Class B network and you want to do Class C subnetting. This adds a netmask (ffffff00), a broadcast Ethernet segment of 255 (xxx.xxx.xxx.255), and no trailers.

    ◆ Type **BerkeleyC** if you are on a BerkeleyC network. This adds a netmask, a broadcast Ethernet segment of 0 (xxx.xx.xxx.0), and no trailers.

    ◆ Type **info** for online help.

7. **When you have typed the desired option, press <Enter>.**

    If you have more than one network board in your system, you will be asked if you want to set up the system as a gateway (see Step 8).

    If you have only one network board, go to Step 9.

8. **At the prompt (if displayed), type yes, no, or unchanged and press <Enter>.**

9. **To see the configuration you just modified, type**

   ```
   ifconfig -a
   ```

10. **Reboot your system.**

Using TCP/IP Protocols

A variety of TCP/IP protocols exist at the application layer. Here is a description of some that are more widely used.

Using rlogin

The rlogin protocol allows you to log in to a remote system. This protocol can only be used to log in to UNIX systems across the Internet.

Note ▼ You must be authorized to log in to the remote system.

To use rlogin, do the following:

Procedure ▼
1. **Type**

   rlogin *remote system name*

   A prompt appears from the remote system. If an administrator or user has not set you up with a login, you may be prompted for a password.

2. **To log out, press <Ctrl>+<d> or type exit.**

Suggestion ▼ You can also use the Remote Access icon to perform rlogin at the desktop. See the *Desktop User Handbook*.

For more information on the **rlogin** command, see the *Command Reference*.

Using telnet

The telnet protocol enables terminals and terminal-oriented processes to communicate on a network running TCP/IP. It is implemented as the program **telnet** on your local system and the daemon *telnetd* on the remote system. The **telnet** protocol provides a user interface through which two hosts can open communications with each other, then send information on a character-by-

character or line-by-line basis. The application includes a series of commands, which are documented in **telnet**(1) in the *Command Reference*.

The **telnet** command can communicate with many different types of systems, whereas, **rlogin** can only communicate with UNIX systems.

To use **telnet**, do the following:

Procedure

1. **Type**

   ```
   telnet remote system name
   ```

   At the login prompt, enter you login name. Then when prompted, enter your password.

   You may now enter commands to the remote system as if you were on you client system. To customize your environment, however, you must set up a *.profile* file on the remote system.

2. **To log out, type**

   ```
   quit
   ```

The *telnetd* daemon on the remote host handles requests from the **telnet** command. For more information about *telnetd*, see **telnetd**(1M) in the *Command Reference*.

Using telnet to Log in to Another System as Root

By default UnixWare security does not allow users to log in to another system as root. However, you can:

Procedure
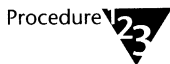
1. **Log in as a non-root user and type *su* to become root.**

2. **Edit the */etc/default/login* file on the remote system.**

3. **Comment out this line by adding a # at the beginning of the line:**

   ```
   #CONSOLE=/dev/console
   ```

The File Transfer Protocol (FTP) transfers binary and ASCII files to and from a remote network. The protocol includes the **ftp** command on the local system and *ftpd* daemon on the remote system. The **ftp** program allows you to specify at the command line the host with which you want to initiate file transfer and options for transferring the file. The *ftpd* daemon on the remote host handles the requests from your **ftp** command.

Note

Depending on the type of file you want to transfer, *ftp* uses various options. The options to *ftp*, as well as the commands you invoke through the *ftp* command interpreter, are described in **ftp**(1) in the *Command Reference* as well as the services provided by the ftpd daemon, **ftpd**(1M).

For example, one way to use **ftp** is to do the following:

Procedure

1. **On your local system, change to the directory in which you want the remote file placed on your local system. Type**

   cd *directory name*

2. **Log in to the remote system by typing**

   ftp *remote system name* or *Internet address*

3. **At the** Name: **prompt, enter your login name and password.**

4. **You may now enter commands on the remote system as if you were on your client system.**

   To customize your remote *ftp* environment, however, you must set up a *.profile* file on the remote system.

   For example, if you want to transfer a file from the remote system to the local system, at the ftp> prompt, change to the directory in which you want your file placed on your local system and type

   ftp> **cd** */directory name*

   Then type

   ftp> **get** *filename*

   This copies the desired remote file to your local system.

5. **When you are finished copying the desired file from the remote system and you want to log out, type**

`quit` or press <Ctrl>+<d>

Your local system prompt appears.

Running ftp from a Shell Script

To run **ftp** from a shell script, do the following:

Procedure

1. **Set up a new file named *.netrc* in your *home* directory.**

2. **Change the permissions of *.netrc* by typing**

`chmod 700 .netrc`

3. **The file should contain these values.**

system *hostname* **login** *username* **password** *user password*

where *hostname* is the name of your system, *username* is the name of the user, and *user password* is the password for the user logging in

The following example shows a shell script you can transfer from a local system to a remote system.

```
/usr/bin/ftp hostname << EOF
put outfile
bye EOF
```

Using **ftp**, the *.netrc* file locates the correct user name and password.

10 *Sharing Files and Folders Remotely*

This chapter describes how to configure File Sharing (which is an interface to NFS®) from both the "File Sharing" window and the command line, and also includes information on

◆ Connecting remote resources (share-items) to your system

◆ Disconnecting remote resources from your system

◆ Sharing your resources with remote systems

◆ Making your resources unavailable to remote systems

◆ Listing shared resources

◆ Listing mounted (connected) resources

)verview

File Sharing allows you to set up your UnixWare system to share files and folders (called share-items) with other NFS-compatible systems.

Essentially, File Sharing lets you connect a remote file, folder (directory), or entire file system to a point in your file system. Once you have connected a remote folder to your system, you can move down the directory structure to access all files and folders below that point in the remote system.

File Sharing is an excellent way of doing workgroup computing. You can share a folder containing files that must be accessed by several users by connecting that folder to the file system on each user's computer. Then each user can work on the files while maintaining only one physical copy of the files.

Using File Sharing

File Sharing is available on your system if you have an Application Server or if you have a Personal Edition with the optional NFS add-on package. Before you can use File Sharing, you must use Internet Setup to configure your system for TCP/IP networking, as described in the chapter "Setting Up and Configuring TCP/IP" earlier in this handbook.

Note To configure File Sharing, you must have one or both of the following User Setup permissions: Advertise Local Folders/Files or Connect to Remote Folders/Files. For more information on assigning setup permissions, see "Using User Setup" in the chapter "Configuring Your User Environment" earlier in this handbook.

To configure File Sharing, do the following:
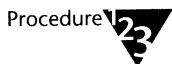
Procedure

1. **Double-click on Admin Tools in the UnixWare Desktop.**

2. **Double-click on the Networking folder.**

3. **Double-click on File Sharing in the Networking folder.**

   The "Remote Share-Items" window appears (the window is empty until you add a share-item):

Figure 10-1
Remote Share-Items

File Sharing Setup: Remote Share-Items

Actions View Share-Item Help

memos

memos connected: Share-Item available for use.
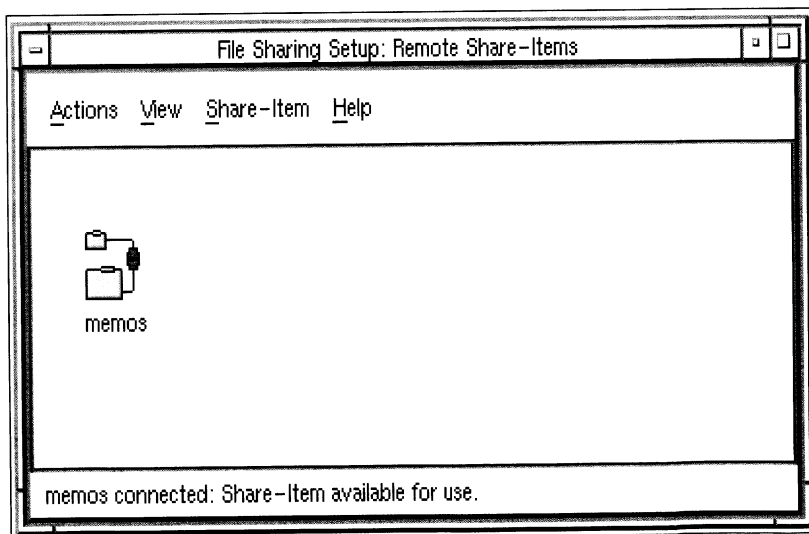
Starting Up NFS

Before you can share files with users on other systems, access files with users on other systems, or access files they make available to you, NFS must be running on your system. Typically, NFS is started when you start your system. However, under some circumstances, NFS may not have started up properly.

To ensure that NFS is currently running, from the "File Sharing Setup" window do the following:

Procedure

1. **Click on** *Actions* **in the menu bar and select** *Status*.

    The "Status" window appears:

Figure 10-2
Status
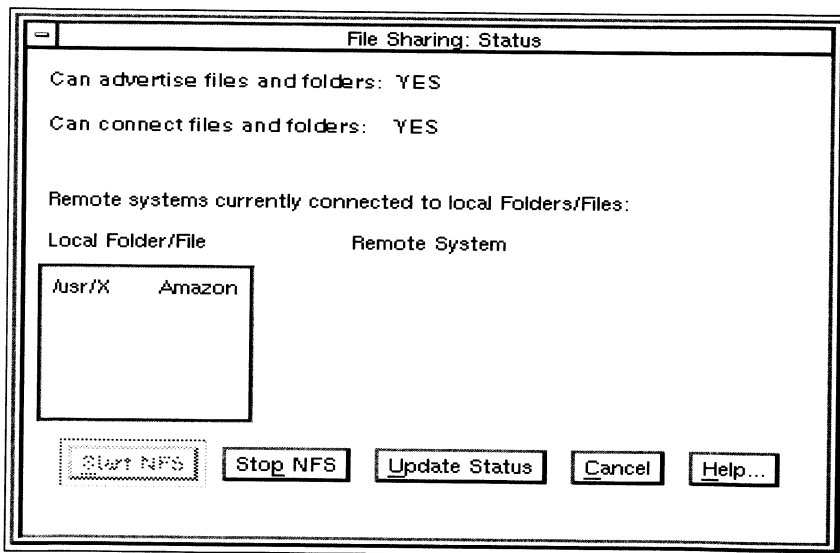
2. **If the Start NFS button is disabled, NFS has already been started. You can skip to Step 4.**

    Notice that, when NFS is running, YES appears next to the advertise and connect messages at the top of the window. This means that your system is in a state where you can share your files and folders with remote systems and that you can connect remote files and folders to your system. Also, local folders being used by remote systems are listed on the window.

3. **If the Stop NFS button is disabled, then NFS is not running. Click on Start NFS.**

   When NFS starts, a confirmation message appears in the bottom left corner of the window pane.

4. **Click on Cancel to close the window.**

   After starting NFS, you are ready to view share-items, share file and folders with other systems, use a share-item from another system, and remove share-items.

Viewing Shared Files and Folders (Share-Items)

From the "File Sharing" window, you can view share-items that you are making available (advertising) to other systems (local share-items) or share items that other systems are advertising (remote share-items). The local share-items view must be active for you to advertise a file or folder. Likewise, the remote share-items view must be active for you to access share-items advertised by other systems.

To view share-items, start NFS as described previously, then follow these steps from the "Remote Share-Items" window.

To view local share-items, do the following:

Procedure

1. **Click on *View* in the menu bar and select *Local*.**

   The "Local Share-Items" window appears, allowing you to view the share-items you are advertising from your system.

To view remote share-items, do the following:

2. **Click on *View* in the menu bar and select *Remote*.**

   The "Remote Share-Items" window appears again, allowing you to view those remote share-items you have added to this window.

Sharing Files with Remote Systems (Creating Local Share-Items)

This task allows you to create a share-item so you can share files with remote systems.

To create a local share-item (a file or folder on your system that will be shared with other systems), start NFS on your system (as described previously) and do the following from the "Remote Share-Items" window:

Procedure

1. **Click on *View* in the menu bar and select *Local*.**

   The "Local Share-Items" window appears. (The window is empty until you add a share-item):
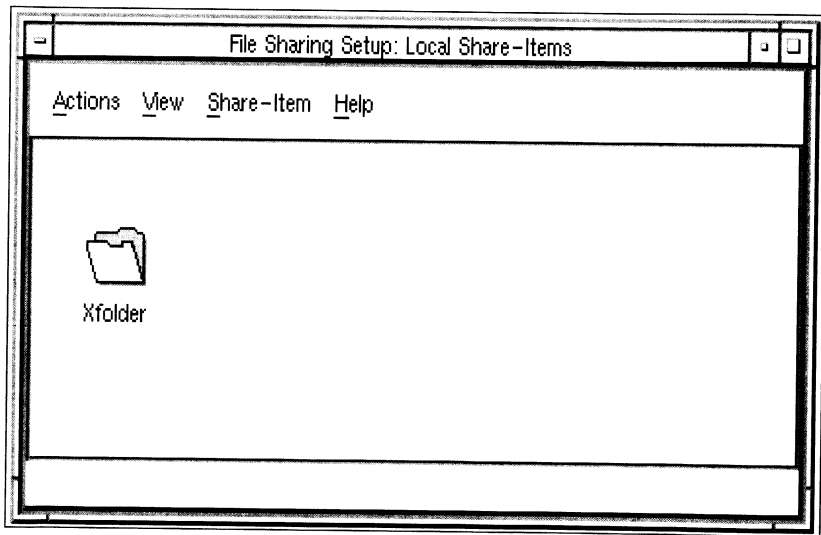
2. **Click on *Share-Item* in the menu bar and select *New*.**

   The "Add New Share-Item Local" window appears:

Figure 10-4
Add New Share-Item
Locally
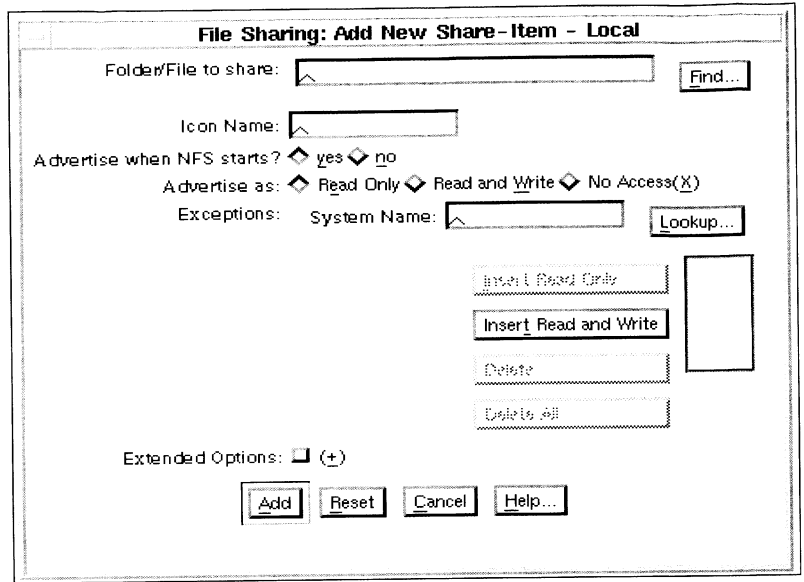
3. Set the desired options:

Folder/File to share. Type the name of the folder or file you want to share with other systems or click on Find to view a list of folders and files. Selec the folder or file you want to share from this list and click on OK.

Icon Name. Type a name to identify the share-item in the "File Sharing" window. By default, the name of the file/folder being shared is used as the icon name.

Advertise when NFS starts?. Click on Yes to advertise the share-item now and every time you start NFS, or click on No to advertise the share-item now only. NFS normally starts whenever you turn on your system.

Advertise as. Click on Read Only to allow other systems to use but not change or create files and folders associated with the share-item, or click on Read and Write to allow full access to the share-item, or click on No Access to allow access to only those systems in the Exceptions list.

Exceptions: System Name. If you want to add a system whose access t the resource is an exception to the `Advertise As` status, type the nam of the system to share the item with, or click on Lookup to view a list of systems from which to choose. Use the following four buttons to act on th list:

Insert Read-Only. Click to add the system name to the exception list and assign it read-only access to the share-item.

Insert Read and Write. Click to add the system name to the exception list and assign it read and write access to the share-item.

Delete. Click to delete the selected system name from the exception list.

Delete All. Click to delete all system names from the exception list.

Extended Options. Click to display the Other Command-line Options field.

Other command-line options. Type the command-line options, if any, you want to add to the **share** command. For more information, refer to the NFS options to the **share**(1M) command in the *Command Reference*.

4. **Click on Add to advertise the share-item.**

An icon representing the advertised share-item appears in the "Local Share-Items" window, with the folder icon open.

Accessing Files Available from Other Systems (Remote Share-Items)

This task allows you to set up your system to access share-items on another system.

To access another system's share-item from your system, start NFS at your system as described previously and do the following from the "Remote Share-Items" window:

Procedure

1. **Click on *Share-Item* in the menu bar and select *New*.**

The "Add New Share-Item—Remote" window appears:

Figure 10-5

Add New Share-Item Remotely

```
File Sharing: Add New Share-Item - Remote

Remote System Name: [  ]          [ Lookup... ]

Available Share-Items
┌─────────────────────────┐
│                         │
│                         │
│                         │
└─────────────────────────┘

[ Show Available Share-Items ]

          Icon Name: [  ]
Share-Item to connect: [  ]
Local Folder to connect it to: [  ]          [ Find Folder... ]

Connect Share-Item as: ◇ Read Only ◆ Read and Write
Connect when NFS starts? ◇ yes ◆ no
      Extended Options: ☐ (+)

         [ Add ]  [ Reset ]  [ Cancel ]  [ Help... ]
```
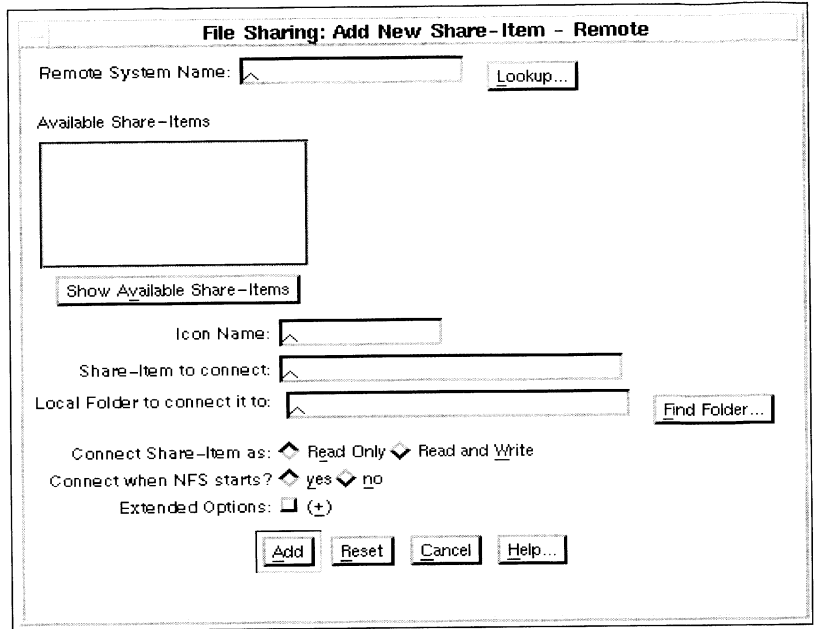
2. Set the desired options:

Remote System Name. Type the name of the system with the desired share-item and press <Tab>, or click on Lookup to view a list of systems. Select a system from the list and click on OK.

Show Available Share-Items. Click to show the list of share-items available from the chosen remote system. Click on the share-item you want to use.

Icon Name. Displays the icon name that will be used to represent this share-item in the "File Sharing" window. You can type a new icon name or use the default name.

Share-Item to connect. Displays the name of the share-item you selected

Local Folder to connect it to. Type the name of an empty folder on your system from which you want the contents of the share-item to be accessible, or click the Find Folder button to display a list of folders on the system. If you type the name of a folder that does not exist, you will be asked if you want to create it when you click on Add. When the share-item is connected, you can access its contents by opening the folder specified in

this field. When the share-item is not connected, this folder is empty (or will display its local contents if it was not originally empty).
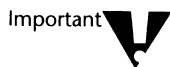
Choose an empty folder; otherwise, all contents of the local folder are inaccessible when the remote share-item is connected.

Connect Share-Item as. Click on Read Only to be able to use but not change the files and folders within the share-item, or click on Read and Write to allow full access to the share-item. (The remote share-item must be advertised as Read and Write for you to be able to select Read and Write.)

Connect when NFS starts?. Click on Yes to connect to the share-item now and every time you bring up the system, or click on No to connect to the share-item now only.

Extended Options. Click to use the Connection Is and Other Command-line Options fields.

> **Connection is**. Click to select a Soft or a Hard connection. For example, if you were copying a file from your system to a remote folder and the folder was disconnected (because the remote system became unavailable), a hard connection would cause your system to wait for the folder to be reconnected and would then complete the copy, effectively freezing your system until this happened. With a soft connection, after a short time the copy operation would fail and your system would be usable again.

Attempts at making requests across a hard connection never fail but continue indefinitely until the resource once again becomes available. For this reason, you should not use hard connections unless you have a pressing need for the request not to fail.

> **Other command-line options**. Type options to the **mount** command. For more information, see the **mount**(1M) options in the *Command Reference*.

3. **Click on Add to use the share-item.**

An icon representing the remote share-item appears in the "Remote Share-Items" window. You can now open the specified local folder to access the remote share-item.

Removing Share-Items

You can remove share-items that you are advertising on your system (local share-items) by unadvertising or deleting the share-items. You can remove access to share-items that other systems are advertising (remote share-items) by disconnecting or deleting the share-items. When you unadvertise or disconnect share-items, you disable them temporarily, leaving them available to advertise or connect to your system later. When share-items are deleted, they are removed from the list of share items. The associated icon is also removed. If the user wants to share that item in the future, it will have to be added to the share item list at that time. Note that access to the share item, and not actual data, are removed from the local or remote system.

Removing Local Share-Items

This task allows you to remove a local share-item from your system.

To make share-items that you are advertising on your system (local share-items) unavailable to remote systems, do the following from the "Remote Share-Items" window:

Note Before unadvertising or deleting a share-item, make sure no remote users are accessing the share-item. Otherwise, the users may not be able to save their current changes. Check the "File Sharing Status" window to see which local share-items are currently connected to by remote systems.

Procedure 1. **Click on** *View* **in the menu bar and select** *Local.*

2. **Click on the icon for the share-item you want to remove or unadvertise by selecting one of the following options:**

   Unadvertise. Click on *Actions* in the menu bar, then on *Unadvertise* to unadvertise the share-item. This makes the share-item unavailable to remote systems, but does not delete it from your "File Sharing" window. (If the share item is advertised by default, the item is shared again the next time you reboot your system.)

   Delete. Click on *Share-Items* in the menu bar, then on Delete to delete the share-item permanently from the "File Sharing" window.

Removing Remote Share-Items

This task allows you to make unavailable on your system share-items advertised on a remote system.

To make share-items that another system is advertising (remote share-items) unavailable to users on your system, do the following from the "Remote Share-Items" window:

Procedure

1. **Click on** *View* **in the menu bar and select** *Remote*.

2. **Click on the icon of the remote share-item you want to remove by selecting one of the following options:**

   Unconnect. Click on *Actions* in the menu bar, then on *Unconnect* to unconnect the share-item. This makes the share item unavailable to users on your system, but does not delete it from your "File Sharing" window.

   Delete. Click on *Share-Items* in the menu bar, then on *Delete* to delete the share-item permanently from the "File Sharing" window.

Using NFS Commands

You can use commands to perform all basic file sharing functions, as well as many more advanced features than you can do with the "File Sharing" window. These NFS commands also work on other UNIX systems that you connect to that may not have the UnixWare Desktop.

Because the NFS commands interface was designed before the UnixWare Desktop existed, some of the terminology differs between the two interfaces. For example, the files and directories you share are called share-items in the desktop and resources from the command line. In the desktop, you connect folders to your system; in the command line, you mount directories on your system. From the desktop, you need system owner permissions to share resources; from the command line, you typically need root permissions.

You must execute NFS commands from a shell as the root user. To access a shell from the desktop, double-click on the Terminal icon in the Applications folder.

The following is a list of basic NFS features and the commands you use to perform them.

◆ Connect remote resources to your system (**mount** command)

◆ Disconnect remote resources from your system (**umount** command)

◆ Share your resources with remote systems (**share** command)

◆ Make your resources unavailable (**unshare/unshareall** commands)

◆ List available resources (**dfshares/share** commands)

◆ List mounted resources (**mount/dfmounts** commands)

To use most of the NFS commands, you must have root permissions. However, any user may type **/sbin/mount** or **/usr/sbin/share** to see mounted remote resources or shared local resources.

Using the mount Command

To mount a remote file or directory, you use the **mount** command, which is the same command you would use to mount a local file system from a hard disk. Also use **mount** to see all file systems mounted on your local system.

When you use the **mount** command to mount a remote resource, you simply need to identify the resource as a remote NFS file system (*-F nfs*), the name of the remote system and directory or file you want to use, and the local point in the file system where it should be mounted. Other mount options let you specify special attributes of the mount.

The following is an example:

```
mount -F nfs abc:/archives /archives
```

The previous example connects the directory */archives* from the system named **abc** to the local directory */archives*. If this command completes successfully, you can type **ls /archives** to see the contents of the remote directory.

By adding the **-o** option, you can specify options for the **mount** command. For example, you can indicate that the resource be mounted read/write or read-only, that **setuid** programs be allowed or restricted, and that the mount attempts be done in the background. The following is an example of the **mount** command used with several options:

```
mount -F nfs \
  -o ro,soft,retry=3,rsize=1024,wsize=1024 \
  abc:/archives /archives
```

The previous example mounts the remote resource with five options. The resource is added read-only (*ro*), the mount is a soft mount (*soft*), if the mount request does not work, retry the mount up to three times before failing (*retry=3*), set the read buffer size to 1024 bytes (*rsize=1024*), and set the write buffer size to 1024 bytes (*wsize=1024*).

If you want the resource to be mounted automatically each time the system is started, you can add this mount information to the */etc/vfstab* file. The entry in the */etc/vfstab* file for the previous example is as follows:

```
abc:/archives - /archives nfs - yes \
  ro,soft,intr,retry=3,rsize=1024,wsize=1024 -
```

The word *yes* in the example says to mount the resource automatically when NFS starts up (usually at system boot time). If you were to specify *no* instead, the resource must be mounted manually.

Once you add an entry to the */etc/vfstab* file, you can use the **mount** command without using all the options to complete the mount. For example, if the previous entry existed in your *vfstab* file, you could mount the resource by typing:

```
mount /archives
```

and the resource would be mounted with all the options from the *vfstab* file filled in automatically.

Using the umount Command

To unmount a mounted NFS resource, you can use the **umount** command with an option of either the mount point of the resource or the server and pathname. For example, type

```
umount /archives
```

to unmount the */archives* directory from your system. Likewise, you could use the server and remote pathname to obtain the same results. Type

```
umount abc:/archives
```

Using the share Command

Use the **share** command to share selected files and directories with remote systems, to list those resources you are currently sharing with others, or to share your resources on an on-going basis. You can add share information to the */etc/dfs/dfstab* file.

The following is an example of the **share** command:

```
share -F nfs -d "Chris home directory" /home/chris
  CHRIS
```

In the previous example, the directory */home/chris* on your local system is made available to any system that has permission to use NFS resources from your system. The description `Chris home directory` is attached to the resource. The name `CHRIS` is associated with the shared resource. Because you did not specify the read or write permissions, it is shared read/write by default.

To have the resource shared automatically every time you start up NFS (usually at boot time), add the entire **share** command to the */etc/dfs/dfstab* file. The following is an example of the *dfstab* file with a **share** command added:

```
#ident"@(#)/etc/dfs/dfstab.sl 1.1 1.0 10/31/92 22222 Novell"
#ident "$Header: rstab.sh 1.2 91/04/26 $"

# place share(1M) commands here for automatic execution
# on entering init state 3.
#
#share [-F fstype][-o options][-d "<text>"]<pathname> <resource>
# e.g,
# share -F rfs -d "/var/news" /var/news NEWS
/usr/sbin/share -F nfs -o ro,rw=abc:def /home/chris CHRIS
```

Only one share request (`CHRIS`) is contained in the previous example. A few options were added to illustrate how to apply different permissions to remote systems that want to use the share item. The **-o** option says that one or more options follow. In this case, the item is shared read-only to all systems (**ro**) except for systems named *abc* and *def* (**rw=abc:def**) which have read and write permissions.

After you have made your share requests, you can list the items you are sharing using the **share** command. Type **share**. An example of the output from the **share** command is shown next:

```
# share
  CHRIS /home/chris ro,rw=abc:def "Chris home
  directory"
```

Using the unshare Command

Use the **unshare** command to make a resource unavailable to remote systems; for example, to unshare the resource shown in the previous example type

```
unshare -F nfs /home/chris
```

If you want to unshare all your shared resources, you can use the **unshareall** command, by typing

```
unshareall
```

All of your NFS shared resources are then unshared. Remember that **unshare** and **unshareall** only unshare a resource temporarily if the resource was set up to be shared automatically. To unshare a resource permanently, remove the share entry from the */etc/dfs/dfstab* file.

Using the dfshares Command

Use the **dfshares** command to see what NFS resources are available from remote systems. Type **dfshares**, followed by **-F nfs** (to indicate NFS resources), then the name of the remote system whose resources you want to list. For example, by typing

 # dfshares -F nfs abc

RESOURCE	SERVER	ACCESS	TRANSPORT
abc:/var/spool	abc	–	–
abc:/home/chris	abc	–	–

This shows the resources available from the system named abc.

Using the dfmounts Command

Use the **dfmounts** command to view the resources from your system that are being used by other systems. With no options, **dfmounts** shows you which of your local resources are currently mounted by other systems.

For example, by typing

 # dfmounts -F nfs abc

RESOURCE	SERVER	PATHNAME	CLIENTS
SPOOL	abc	/var/spool	mars, venus, jupiter
CHRIS	abc	/home/chris	harry, venus, mercury

This shows that two resources from the system named abc (SPOOL and CHRIS) are currently mounted by remote systems. SPOOL represents the directory */var/spool* and CHRIS represents the */home/chris* directory on abc. The names under the CLIENTS heading show which systems currently have the resource mounted.

11 Setting Up and Configuring NetWare Connectivity

This chapter describes how to connect NetWare and UnixWare and also includes information on

◆ The packages installed on UnixWare that allow you to connect to NetWare

◆ An overview of Internetwork Packet eXchange™ (IPX™) and various NetWare protocols

◆ How to configure IPX for two or more network boards

◆ How to set up NetWare connectivity using the UnixWare Desktop

◆ The NetWare UNIX Client (NUC) and the features provided with it that allow you to connect to NetWare

◆ How to access NetWare files from UnixWare

◆ How to manage remote UnixWare systems using Simple Network Management Protocol (SNMP™)

◆ How to set up terminal emulators for DOS and MS Windows

Note▼ The information in this chapter requires knowledge of NetWare and IPX administration.

Overview

In order to work with files and directories on a NetWare server, connectivity between UnixWare and NetWare must be established. This involves understanding the packages installed on UnixWare that relate to NetWare connectivity, setting up the desktop to connect to NetWare servers which includes turning on the NetWare UNIX Client, setting up your IPX address, turning on desired protocols, and enabling single login.

You will also have to install NetWare Loadable Modules™ (NLM™s) on your NetWare server, then learn more about the NUC and the various components that comprise the NUC.

When you are set up and can log in to a NetWare server, you can use a terminal emulator to do your work, or you can access an "XCONSOLE" window to work on a NetWare system.

NetWare connectivity from UnixWare opens up a whole world of other resources to make your work easier and faster.

NetWare Connectivity Packages

This section provides an overview of the UnixWare and NetWare integration capabilities provided by the following UnixWare software packages: *nwnet*, *nuc*, *nwsup*, *nsu*, and *netmgt*.

Note The default Personal Edition and Application Server installation includes the *nwnet* and *nuc* packages.

To use the capabilities provided by the *nwsup* and *snmp* packages, you must first install them as described in the *Installation Handbook*.

nwnet. This package, which is installed with UnixWare by default, provides:

◆ IPX and Sequenced Packet eXchange™ II (SPX™II) NetWare protocols and NetWare protocol stack daemons, *npsd* and *sapd*, described later in this chapter.

◆ NetWare configuration and graphical administration tools, described later in this chapter.

◆ Novell Virtual Terminal™2 (NVT™2) server software, described later in this chapter.

◆ The *nprinter* daemon for accepting jobs from NetWare print queues onto UnixWare printers, described in the chapter "Setting Up and Configuring Printers" earlier in this handbook.

◆ Application sharing software, described in the chapter "Installing and Sharing Applications" earlier in this handbook.

nuc. This package, which is installed with UnixWare by default, provides:

◆ NUC software, including the NUC file system and automounter, NetWare auto-authentication and single login tools, NUC command line and graphical utilities, and associated administration tools such as the Application Programming Interface (API) Requestor, NetWare APIs, the NUC daemon, and the remote applications client.

Note ▼ The *nwsup* requires the installation of the *nwnet* package.

nwsup. This package, which is not installed with UnixWare by default, provides NLMs that do the following:

◆ Allow tighter integration of UnixWare/NetWare file sharing through NFS

◆ Provide access to the NetWare server console

See "NetWare Rights and UnixWare Permissions in Files and Directories" later in this chapter for more information.

The *nwsup* package also provides terminal emulators for DOS and MS Windows which are compatible with NVT2 and which allow a DOS or MS Windows user to log in to a UnixWare system with the *nwnet* package installed.

Note ▼ The *nwsup* requires the installation of the *nwnet* package.

nsu. This package, which is installed with UnixWare by default, includes UnixWare daemons and NetWare NLMs that allow you to back up a UnixWare system from a NetWare server using Novell's Storage Management System (SMS). Backups can be configured to run over IP or SPX. See the *NLM Installation and Configuration* guide for more information on SMS TSA.

Note ▼ This package requires the *nwnet* package.

netmgt. This package, which is installed with UnixWare by default, provides SNMP instrumentation, tools, and modules that enable management of a UnixWare system from an remote machine on a NetWare or TCP/IP network. See "Network Management Through SNMP" later in this chapter for more information.

Once the *nwnet*, *nuc*, *nwsup*, and *netmgmt* packages previously mentioned are installed, you may need to copy some NLMs off of your UnixWare system and onto a NetWare server for the UNIX name space (see "NetWare Rights and UnixWare Permissions in Files and Directories"). After that, you are set up to access and work on NetWare servers.

Configuring and Using NetWare Networking Protocols

The following information provides an overview of IPX and NetWare protocols. If you are familiar with IPX and you now want to configure IPX from the desktop, skip to "Using NetWare Setup" later in this chapter.

NetWare Protocol Overview

The IPX protocol is the main protocol used to transfer data from your UnixWare system to a NetWare server.

This section provides a description of the protocols that make client-server communications possible on NetWare networks. It explains packet structures defined by each protocol. It also describes how workstations, routers, and file servers transmit or receive packets.

If you plan to set up NetWare using the desktop, you need a basic understanding of the NetWare protocols.

Most computer networks require information that is transferred between two nodes (workstations or servers) to be broken up into blocks, called packets. Sending information with packets makes a transfer between nodes and any intermediate nodes (bridges or routers) more manageable. In addition, each packet contains control information used for error checking, addressing, and other purposes. The protocols used on the network define the content of this control information.

In most cases, multiple protocols exist within a packet; each protocol defines a different portion of the control information for the packet, and the control information for each protocol serves a different purpose. When multiple protocols are used, the control information for the highest level protocol is first placed around the data, then the control information for each subsequent protocol in the protocol stack is added to the beginning or end of the packet. This is called enveloping.

To standardize the definition of protocols, several standards organizations were formed by governments and corporations. One of these groups, the International Standards Organization (ISO), has developed a model called the Open Systems Interconnection (OSI) model. This model specifies how protocols should be defined in the future. The OSI model separates the functions required for effective computer communications (such as error checking and addressing) into the following seven catagories or layers. These

layers are: Application, Presentation, Session, Transport, Network, Datalink and Physical.

The protocols used by NetWare do not all correspond exactly to the OSI model definitions. NetWare uses a variety of protocols. Some were developed specifically for NetWare; some are used throughout the networking industry. The protocols required for communications between NetWare workstations and file servers are as follows:

◆ Medium-access Protocols (MAC) provide bit-level (0,1) error checking.

◆ IPX provides the best connectionless transport.

◆ SPXII provides a guaranteed delivery, session-oriented transport.

◆ Routing Information Protocol (RIP) maintains routing information and provides routing services to IPX.

◆ Service Advertising Protocol (SAP) provides dynamic service advertising on the network.

◆ NetWare Core Protocol™ (NCP™) defines connection control and service request encoding for client/server interaction.

Medium-Access Protocols (MAC)

MAC protocols (such as 802.5 Token-Ring or 802.3 Ethernet) provide bit-level error checking through cyclic redundancy checking (CRC). This CRC which is added to every transmitted packet, assures that 99.9999 percent of the packets received are corruption free.

MAC protocols define the addressing for each node on a NetWare network. This addressing is provided by each network interface card.

Internetwork Packet eXchange (IPX)

The IPX protocol is a datagram, connectionless protocol that does not require an acknowledgement for each packet sent. Other NetWare protocols such as SPXII, SAP, RIP, and NCP are built on top of IPX.

The IPX protocol provides both IPX services and RIP services. As LAN drivers deliver packets to IPX, the IPX driver uses RIP to determine the route for

packets outbound to other networks. Packets addressed to a local host are routed by IPX to the applications.

When setting up NetWare from the desktop, you will need to configure your IPX internal LAN address and maximum hops, plus other information. See "Using NetWare Setup" later in this chapter or the *Command Reference*.

IPX Addressing

IPX delivers packets using a 12-byte network address, which consists of three address components:

◆ Network address (4 bytes). Identifies a specific logical network or LAN on an IPX internetwork; all NetWare servers, routers and clients cabled to this segment with a common frame type must use the same network address.

◆ Node address (6 bytes). Identifies the individual nodes on the network. The factory-defined IX number on the NIC usually defines node addresses for client workstations. Server machines can have a logical node address.

◆ Socket address (2 bytes). Identifies processes or functions within a node. The destination for a packet is the socket address.

The following example illustrates an IPX address (it is usually represented in hex bytes). The address 01010393.0123456789ab.0451 represents the net, node, and socket as in the following:

01010393.	0123456789ab.	0451
Net	Node	Socket

Sequenced Packet eXchange (SPXII)

The SPXII is a connection-oriented, reliable, sequenced transport protocol. This protocol provides message-level service (for reliability) rather than packet-level service.

SPXII also provides flow control which regulates the speed with which packets are sent and received by both sending and receiving processes.

As a message service, SPXII provides enhanced throughput. This protocol reduces the amount of traffic on the wire by negotiating for large packets and reducing the number of acknowledgements.

Applications using SPXII do not need to determine packet size. The SPXII driver handles packet size for the application.

When setting up NetWare, you may want to turn on SPXII and enter other information such as the maximum number of SPXII connections and sockets for your network. See "Using NetWare Setup" later in this chapter.

NetWare Virtual Terminal Service (NVT2)

The NVT2 service establishes terminal connections between DOS workstations and UNIX systems over SPXII.

NVT2 servers advertise remote login service and listen for SPX connection requests on the advertised socket. The NVT client then sends connection requests to the advertised socket.

Since NVT2 uses SPXII and each NVT2 connection requires a server SPXII connection, the maximum allowed SPXII connections which you specify in the "NetWare Setup" window should be at least 100.

With UnixWare, the NVT2 server uses the Service Access Facility (SAF-configured) listener to handle connect requests and the SAP daemon to handle advertising. When NVT2 is turned on in the "NetWare Setup" window, a script registers the SAF listener process on the NVT2 socket and NetWare Protocol Stack Daemon (NPSD) informs the SAP daemon to advertise NVT2. See "Using NetWare Setup" later in this chapter or the **nwcm** utility in the *Command Reference* for more information on NVT2.

If SPXII should go down normally, NVT2 will go down and come back up when SPXII comes back up.

If SPXII goes down abnormally (such as a crash), NVT2 will go down and come back up, but the service will remain registered with SAF and will be invalid. In this case, the protocol stacks must be brought back up manually.

Nprint Service

This service allows you to make a local printer available to NetWare users by connecting a local UnixWare printer to a NetWare print queue. See the chapter "Setting Up and Configuring Printers" for more information on *Nprinter*.

Routing Information Protocol (RIP)

The RIP allows routing information exchange on a NetWare internetwork. The single packet structure defined by the RIP allows the following exchanges of information:

◆ Workstations locate the fastest route to a network number by broadcasting a route request.

◆ Routers request routing information from other routers to update their own internal tables by broadcasting a route request.

◆ Routers respond to route requests from workstations and other routers.

◆ Routers perform periodic broadcasts to make sure that all other routers are aware of the internetwork configuration.

◆ Routers perform broadcasts whenever they detect a change in the internetwork configuration.

Service Advertising Protocol (SAP)

The SAP allows service-providing nodes—such as file servers, print servers, gateway servers, and client workstations—to advertise services and addresses. The SAP makes adding and removing services on an internetwork dynamic. As servers are booted, they advertise services to other nodes through the SAP; when they are brought down, they use the SAP to indicate that services are no longer available.

Through the SAP, clients on the network can determine what services are available on the network, and obtain the internetwork address of the nodes where they can access those services. This is an important function since a workstation cannot initiate a session with a file server without the server address.

A gateway server, for instance, will broadcast a SAP packet periodically (usually every 60 seconds, the period defined for all servers advertising with

the SAP) onto the network segment to which it is connected. The SAP agent in each router on that segment copies the information contained in the SAP packet into an internal table called the Server Information table. Because the SAP agent in each router keeps up-to-date information on available servers, a client wanting to locate the gateway server can access a nearby router for the correct internetwork address.

When setting up NetWare, you will need to turn SAP on and enter the number of services you will be advertising to use this feature. See "Using NetWare Setup" for more information.

NetWare Core Protocol (NCP)

The NCP makes interaction between clients and file servers possible by defining connection control and service request reply/encoding.

The NCP provides its own session control and packet-level error checking instead of relying on other protocols for these functions. Consequently, the modularity of the protocol stack is reduced, but runs more efficiently.

Each NCP request packet submitted on a given connection must be assigned a sequence number by the client. The first request is assigned the number 1; that number is incremented by 1 for each subsequent request. When a file server finishes processing a request, it places the sequence number for that request in the response packet. The client can then make sure it is receiving the correct responses for the requests submitted.

For more information on IPX, SPXII, RIP, SAP, or NCP, see your NetWare documentation.

IPX Auto-Discovery

If a NIC was already installed in your system when you installed UnixWare, the auto-discovery feature automatically detected the IPX network number, frame type, and network device name for the network(s) connected to your node. This option is activated at installation so IPX configuration is automatic unless you install additional network boards later or need to change your IPX configuration.

Each time you boot UnixWare or shut down to move your system to another physical location, IPX reconfiguration is unnecessary because auto-discovery takes care of that for you.

If you did not have a network board installed when you installed UnixWare, or if you want to add more network boards, only then is it necessary to reconfigure IPX using NetWare Setup (described next).

For more information on how to use auto-discovery, see the Enable IPX Auto-Discovery option in "Using NetWare Setup" or the **nwdiscover** manual page in the *Command Reference*.

Occasionally, UnixWare may detect a frame type other than the one you need because it checks for frame types in a specific order. If this happens, refer to the "Troubleshooting" appendix later in this handbook.

Using NetWare Setup

The NetWare Setup icon allows you to configure IPX if you install additional network boards or reconfigure IPX and your LAN boards.

Note   It is important that you understand networking and NetWare when selecting NetWare options here; many of these options require knowledge of both.

You can also set the network number, adapter, frame type, and so on, by changing the settings in the configuration manager using the command line. For more information, see the **nwcm** utilities in the *Command Reference*.

To configure IPX using NetWare Setup, do the following:

Procedure
1. **Double-click on Admin Tools at the UnixWare Desktop.**

2. **Double-click on Networking in the Admin Tools folder.**

3. **Double-click on NetWare Setup.**

The "NetWare Setup" window appears:

Figure 11-1
NetWare Setup

Figure 11-1 NetWare Setup

```
NetWare Setup

File    Action    View                                    Help

              Server Name:   doclab1

          NetWare UNIX Client:    On    Off

     Enable IPX Auto Discovery:    On    Off

        IPX Internal LAN Address:  0x0

            IPX Maximum Hops:      16

       Logical LAN Configuration:   LAN options...

      Sequenced Packet eXchange:   On    Off

      Peer to Peer Communication:   On    Off

          Network Management:    Network options...

          Diagnostics Daemon:    On    Off

  Remote NUC Auto Authentication:   On    Off

      Enable NetWare Single Login:   On    Off

This parameter, when set to on, enables NetWare UNIX Client
Services. When set to off, NetWare UNIX Client Services are
disabled.

Supported values: on, off
Default: on
```

A text area is displayed at the bottom of the window. When you select an option, helpful messages will appear in this window.

4. **Set the desired options:**

Server Name. The UnixWare node name is set as the server name that appears in this field.

NetWare UNIX Client. Click to On if your UnixWare system is connected to NetWare and you want to start the NetWare UNIX Client when you boot UnixWare. See "NetWare UNIX Client (NUC) Overview" later in this chapter for more information. Click to Off if your UnixWare box is not connected to NetWare network or if you do not want to start the NetWare UNIX Client when you boot UnixWare.

Enable IPX Auto-Discovery. This option is turned On by default when you install UnixWare. This feature allows the detection of various characteristics of the NetWare network your system is connected to.

After your network boards are checked, this option is turned off. If you want to add new boards after installation, you may do so by turning the option on again, shutting down your system to insert the new board, and turning your system back on again.

See "IPX Auto-Discovery" earlier in this chapter for more information.

IPX Internal LAN Address. Type the address of your internal LAN (up to four hex bytes), for example, 01010348. This address allows your UnixWare system to communicate with your network board. You must type the address in this field for the Logical LAN configuration to become active.

IPX Maximum Hops. Type the maximum number of systems through which data, such as a file, must transfer from the source to the destination; for example, 5 hops means the most your file passes through is five nodes. UnixWare will validate the value you enter. The default is 16 which is also the maximum value.

Logical LAN Configuration. Click to display the Logical LAN dialog box. See "Configuring Your Logical LAN" in the next section.

Sequenced Packet eXchange. Click to On to turn on remote NVT and other services. Also known as SPXII, this option is also used to configure the number of SPXII sockets. If turned on, see "Configuring SPXII" in this chapter for more information. Click to Off if you do not want to configure sockets or turn NVT on.

Each socket represents a remote SPXII connection. The default is 100; the minimum allowed is 5; the maximum allowed is 1024.

Peer to Peer Communication. Click to On to advertise your applications to other users. By default, this option is turned on. See "Configuring SAP" in this chapter.

Network Management. Click to enable the NetWare Protocol Stack (NPS) network management. See "Managing Your Network" later in this chapter.

Diagnostics Daemon. Click to On to run the daemon. This option is turned off by default. This daemon answers diagnostic requests from other diagnostics applications on various nodes on the network. For example, a diagnostics application can query each node on the network for

configuration information using the IPX Configuration Request Packet and the diagnostics daemon will respond to the application using an IPX Configuration Response Packet.

Remote NUC Auto-Authentication. This option is turned on by default which allows you to authenticate automatically to a NetWare server. Click to Off if you do not want auto-authentication.

See "Authenticating to a NetWare Server from UnixWare" later in this chapter for more information.

Enable NetWare Single Login. This option is turned On by default. This option provides single login when login names and passwords are synchronized between a NetWare server and UnixWare.

If you turn this option off, single login is disabled system wide which means an individual user cannot enable single login through NetWare Access if the option is turned off here.

See "NetWare UNIX Client (NUC) Overview" later in this chapter.

5. **Click on *Actions* in the menu bar and select *Save Current Settings* to set up NetWare, close the window, and save the settings; or click on *Restore Previous Settings* to restore your original settings; or click on *Restore Default* to restore the system default settings.**

Configuring Your Logical LAN

Your logical LAN consists of the frame types used with your network board. You can have up to four logical LAN connections per physical LAN board.

When you turn on the Logical LAN Configuration option in the "NetWare Setup" window, the "Logical LAN Configuration" window appears.

To configure your LAN, do the following:

Procedure

1. **Select the desired LAN (you can reconfigure unavailable LANs).**

   The "Logical LAN Configuration" window appears:

Figure 11-2
LAN Configuration

```
                        NetWare Setup
                   Logical LAN:  1

              IPX LAN Device:      /dev/NE2000_0

              IPX LAN Frame Type:       Ethernet II

         IPX External LAN Address:  0x8941AC00

      LAN Speed (kilobytes/second):  10000

   This parameter specifies the frame type.


              OK            Cancel           Help...
```

2. **Set the desired options:**

   IPX LAN Device. Click on the desired device; for example, */dev/NE2000_0*. This is the physical network board you want to use, such as Ethernet NE2000.

   IPX LAN Frame Type. Click on the desired logical frame type, for example, Ethernet II or 802.2.

   IPX External Net Address. Type the number assigned by your network administrator in this text field. This must be four hexbytes; for example, 0x89413000.

   LAN Speed (Kilobytes/Second). Type the transfer speed in Kilobytes (Kb). The default is 10000 Kb. The speed is dependent upon your network type, for example, an Ethernet II network is 10 MB/sec. Ask your network administrator for the correct transfer speed.

   LAN ticks (speed) is an element in the data advertised in the RIP products RIP converts the transfer speed into LAN ticks.

3. **Click on OK to save your changes and exit.**

4. **Repeat Steps 1 through 3 to configure another LAN type.**

Configuring SPXII

This option allows you to configure your maximum number of SPXII connections and sockets and turn NVT2 on for remote use.

To configure SPXII, do the following:

Procedure
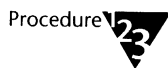
1. **Click to ON at the Sequenced Packet eXchange option.**

   A "Sequenced Packet eXchange" window is displayed.

2. **Select the desired options:**

   SPX Network Remote Login (NVT). Click to On to allow a remote NVT login. Click to Off to deny a remote NVT login.

   Maximum SPX Connections. Type the maximum number of connections you want for SPXII. The default is 100.

   Maximum SPX Sockets. Type the maximum number of sockets you can use simultaneously for listening to incoming connect requests from other endpoints. The default is 50.

3. **Click on OK to save your changes and exit.**

Configuring SAP

This option allows you to specify services to advertise.

To configure peer to peer communications, do the following:

Procedure
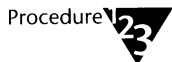
1. **Click to ON at the Peer to Peer Communication option.**

    A "Peer to Peer Communication" window appears.

**Figure 11-4
Peer to Peer
Communication**
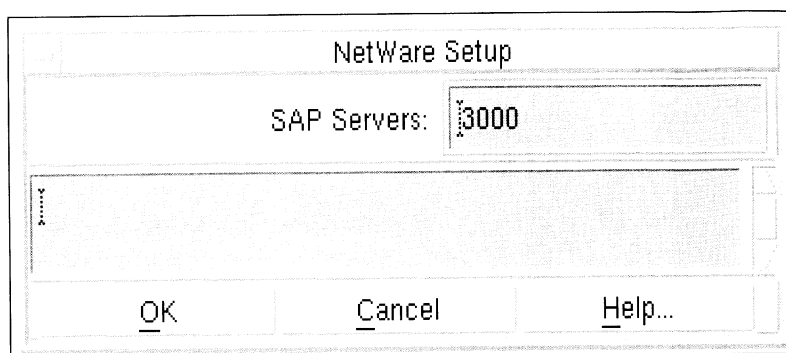
2. **Type the maximum number of services you want to advertise.**

    The default is 3000.

3. **Click on OK to save your changes and exit.**

Managing Your Network

This option allows you to turn on network management services.

To use this option, do the following:

Procedure

1. **Click on the Network Management option.**

    A "Network Management" window appears.

Figure 11-5
Network Management

```
NetWare Setup

        NPS Network Management:      On     Off

        Network Management Trap Time:  5


```
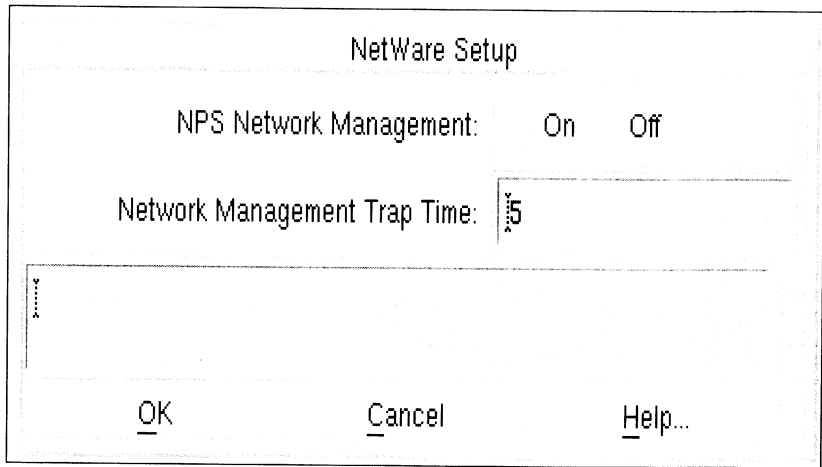
2. **Set the desired options:**

   NPS Network Management. Click to On to enable monitoring of the NetWare for UNIX Management Protocol stack. This allows data on IPX/SPX diagnostics to be collected from a protocol stack.

   Network Management Trap Time. Type your trap time in this field. The default is 5 seconds. Trap time is how the system sends network event and alert information to the network management console.

3. **Click on OK to save your changes and exit.**

Configuring IPX at the Command Line

The easiest way to configure IPX is using NetWare Setup at the desktop (see the previous section); however, if you prefer to use the command line to configure IPX, do the following:

Procedure

1. **Log in as root or type *su* to become root.**

2. **Type**

   ```
   cd /etc
   ```

   to change to the */etc* directory.

3. **Using a text editor such as *vi*, edit the *NPSConfig* file.**

4. **Enter your system name and IPX network address located in the top 12 lines of the file.**

   For example,

   ```
   nvt_server_name = system name
   server_name = system name
   internal_network = address
   lan_1_network = address
   ```

   where *system name* can be any name, not necessarily a system name; *address* is your network address.

5. **Reboot your system.**

NetWare UNIX Client (NUC) Overview

In order to provide UnixWare applications with a UNIX system interface to the NetWare server, the NUC was created to map NetWare services into UnixWare. This mapping method retains the local UnixWare semantics but does not compromise the security of the remote NetWare servers. With NUC installed on a UnixWare system, UnixWare system users can directly access files and printers on remote NetWare servers as if those services were local.

The NUC distributes to NetWare all local UnixWare system calls that reference file and print services on a remote NetWare server platform. The NUC provides NCP and IPX-based connectivity from a UnixWare client to NetWare servers.

The NUC requires no changes to existing NetWare server releases and supports all releases of NetWare from Version 3.x to the present. The NUCFS access is possible with only 3.11 or later versions of NetWare with the *NUC.NLM* and NFS name space loaded. Deficiencies associated with older server NCP releases are successfully managed by the NUC. This provides support for a majority of NetWare servers currently in the installed base.

NUC behavior is enhanced over other NetWare client workstations because UnixWare is a multiuser, multitasking, multiprocessor operating system. The NUC software is loaded by default when you install UnixWare on your computer.

The following sections describe the components of the NUC.

The NUC File System (NUCFS)

The NetWare UNIX Client File System (NUCFS) is a UnixWare network file system that provides NetWare file services to a UnixWare platform. With NUCFS installed, UnixWare system users can directly access NetWare files and directories on remote NetWare servers as if they were on a local system. The NUCFS extends UnixWare into the NetWare network operating system through UnixWare semantics. The NUCFS distributes UnixWare file service requests which reference file services on a remote NetWare server platform to the NetWare network operating system.

NUCFS Environments

It is important to understand the concept of name space support on a NetWare server. Name spaces let the NetWare file system support files and file characteristics of diverse desktop operating systems such as DOS, Macintosh, UNIX (NFS), OS/2, and so on. For each name space loaded on a NetWare server, NetWare creates a separate set of directory entries and appends them to the existing directory entry blocks. These directory entries point to the same physical file; however, each entry contains specific information unique to that name space.

The NUCFS operates in the UNIX name space only. You must install the *NUC.NLM* and *NFS.NAM* on the NetWare server and add the UNIX (NFS) name space to the volume you want to mount from UnixWare.

The UNIX name space supports two modes: NetWare mode and UNIX mode. The UnixWare 2.0 version of the *NUC.NLM* must be installed on a NetWare 3.11 or higher server to use NUCFS. You can only mount NetWare volumes on servers that have the *NUC.NLM* installed. For more information on installing the *NUC.NLM* and *NFS.NAM*, see the *NLM Installation and Administration* guide.

UNIX uses the concept of Owner (rwx), Group (rwx), or Others (rwx) for files and directories. The Owner, Group, and Others permissions are mapped in the UNIX name space. The "rwx" represents read, write, and execute permissions for a file or directory. For example, user Bob on UnixWare authenticates to a NetWare server also as Bob in the group Other. Bob changes to a directory (by typing **cd**) to a mounted volume on that server. When Bob types **ls -l** to see a directory listing, he sees a listing similar to the next example, depending on the mode and name space he selected:

1. This example shows the permissions that would appear in the UNIX name space in UNIX mode.

bob=the owner; other, eng, or nogroup=the group.

```
rwxrwxr-x 1 bob other Aug 29 08:33 file1
rw-rw-r-- 1 bob other Aug 27 12:29 file2
rw------- 1 joe other Aug 24 19:20 file3
---rw-----1 meg other Aug 20 20:45 file4
rw-rw-r-- 1 meg eng Aug 1 21:44 file5
rw-rw---- 1 meg eng Aug 22 12:31 file6
------rw- 1 joe eng Aug 23 11:30 file7
```

2. This example shows the permissions that would appear in the UNIX name space in NetWare mode.

```
rwxrwxrwx 1 bob other Aug 29 08:33 file1
rw-rw-r-- 1 bob other Aug 27 12:29 file2
rw-rw---- 1 joe other Aug 24 19:20 file3
---rw-----1 meg other Aug 20 20:45 file4
rw-rw-r-- 1 meg eng Aug 1 21:44 file5
rw-rw---- 1 meg eng Aug 22 12:31 file6
---rw---- 1 joe eng Aug 23 11:30 file7
```

Connections to NetWare Servers

The NUCFS is a stateful file system. This means that the NetWare server knows about its clients and NUCFS keeps information about the state of operation between NetWare and its client. NetWare can send messages to a client; for example, when the NetWare server goes down gracefully, NUC receives a message from the NetWare server. If the NetWare server crashes, no message is received from the server. The requests are timed out and the server is unreachable.

Even though NUCFS is a stateful file system, when the NetWare server goes down or when the connection from NUC to the NetWare server is lost, the links (mounts) do not have to be re-established when the NetWare server or the connection comes back up again.

The NUCFS file system acknowledges that the connection between NUC and the NetWare server is lost and the file system will deny access to NetWare resources as long as the server is down.

When the NetWare server comes back up again, upon access the NUCFS causes the auto-authentication panel to appear and allows you to re-authenticate to the NetWare server. After successful authentication, you can continue without remounting the NUCFS.

If single login is enabled, you will not see an authentication panel and authentication is established automatically; consequently, you would never know that the NetWare server went down and came back up again.

Packet Burst™ Protocol

The NUCFS supports the Packet Burst protocol. This protocol is designed to transmit multipacket messages over the internet and has been optimized for transmitting large multipacket messages without requiring an acknowledgement for each packet sent. The IPX NCP protocol operates on the one-packet-per-response principle. A message in the packet burst protocol consists of a series of packets; one response exists for each message. Once NUC and the NetWare server establish a packet burst connection, packet burst occurs automatically on large read and write requests.

The NUCFS adjusts the burst gap time and the burst window size to adapt to network throughput to provide the highest rate of transmission with the least amount of retransmission.

◆ Burst gap time. This is the amount of time between packet deliveries over IPX and is determined by the median time between packet arrivals.

◆ Burst window size. This is the current maximum message size based on the maximum physical packet size of the network media and request/response buffer size.

All adjustments to these elements are on a message-by-message basis as opposed to a packet-by-packet basis.

The NUC Auto-Mounter (NUCAM)

The NetWare UNIX Client Auto-Mounter (NUCAM) automatically mounts NUCFS file systems. It utilizes the standard UnixWare Desktop manager or the command-line interfaces to navigate the user into a NetWare volume. The */.NetWare* directory is mounted as a NUCAM file system. The NetWare icon in each user's *home* directory is symbolically linked to */.NetWare*. Double-clicking on the NetWare icon in the UnixWare Desktop will display Netware servers as folders. Double-clicking on a NetWare server folder will cause the

auto-authenticator panel to appear if you are not already authenticated to the NetWare server or if login cannot be done transparently using the single login feature.

After successful authentication, double-clicking on a presented volume will automatically mount the specified NetWare volume on `/.NetWare/servername/volumename`.

Note ▼▼▼ Changing a directory to */.NetWare/servername/volumename* will no longer display the "Authentication" window. You can only change to a volume directory if you are already authenticated to a NetWare server.

The NUC Daemon (NUCD)

The NUC daemon (*nucd*) is a background process that manages several threads: *nucmessage*, *nwlogin*, *nucam*, *nucam_unmount*, *devipx*, and *slogin*.

See the *Command Reference* for information on the *nucd* daemon.

The NUC Command-Line Utilities

The NUC includes these utilities: **nlist**, **nwlogin**, **nwlogout**, **nwwhoami**, **setpass**, **mount_nucam**, **mount_nucfs**, and **nwprimserver**.

◆ **nlist**. Displays a list of NetWare users, fileservers, or volumes.

◆ **nwlogin**. Allows a user to log in to a NetWare server at the command line

◆ **nwlogout**. Allows a user to log out of a NetWare server at the command line.

◆ **nwwhoami**. Displays the NetWare server to which a user is attached.

◆ **setpass**. Allows a user to change their password on a NetWare server.

◆ **mount_nucam**. Allows a user to mount the nucam file system.

◆ **mount_nucfs**. Allows a user to mount the nucfs file system.

◆ **nwprimserver**. Allows a user to access and set the primary NetWare server.

See the *Command Reference* for information on these utilities.

The NUC API Requestor

The NUC requestor encodes and decodes NetWare API calls to or from NCP requests. It maintains client connection information and provides transport for NCP requests to a network.

Applications using the NetWare API calls require that connections which the calls use remain available to them until they are no longer needed. The requestor must maintain this guarantee. The requestor will never disconnect a connection that is in use by any process. It, therefore, keeps accurate count of which processes are using a connection.

The NetWare API Calls

The NetWare API calls is a C library of function calls. These calls generate NCPs and provide a host application interface to NetWare. Since NetWare is built on the client-server architecture, any request to the NetWare server must be a client request. UnixWare processes link these libraries to gain access to NetWare network operating system services.

A NetWare API layer provides function calls that allow access to NetWare resources such as files, directories, and so on. These services include the following:

Accounting	Apple file server	File server environment
Path and drive	Data migration	File systems
Bindery	Deleted file	Volume
Queue management	Extended attribute	Directory
Connection	File I/O	Auditing
Synchronization	Messages	Misc. (data swapping, request version information services, etc.)
Transaction tracking	Name space	
Server platform	NCP extension	

See the *NetWare Library Reference for C: Client Functions* (available in the Software Development Kit) for more information.

The *NUC.NLM*

On NetWare servers 3.11 or later, NUC can use the *NUC.NLM* to provide better integration for variations between the UnixWare and NetWare file systems by taking advantage of the UNIX (NFS) name space information available on NetWare volumes. The *NUC.NLM* includes new NCPs to accommodate UNIX operation more successfully.

The following is a list of enhancements for UnixWare 2.0:

◆ It mirrors enhancements made to the NetWare NFS product modules with respect to the access control mapping algorithms. It also synchronizes the confirmation mechanisms between the two products.

◆ Usability is improved by supporting the two user-configurable modes of access control mapping: NetWare and UNIX mode.

NUC.NLM Access Control Modes

NUC.NLM 2.0 provides the NetWare server administrator an option to choose between a UNIX-flavored access control mechanism or a NetWare-flavored access control mechanism through the UNIX mode and the NetWare mode.

NetWare Mode

This mode allows the administrator to control access to the NetWare volume using the traditional NetWare access control methods, such as trustee assignments, inherited rights mask, and so on. In this mode, the access control algorithms will map NetWare rights to UnixWare permissions.

There are, however, several limitations to using this mode when changing permissions using the **chmod** command.

◆ The *rw* permissions cannot be added or deleted from a file or directory. The **chmod** command succeeds but the permissions are not changed.

◆ Only the *x* permission can be added or deleted from a file or directory.

♦ When file or directory permissions (residing in a NUCFS file system which uses the *NUC.NLM* NetWare mode) are changed in the desktop using the **Edit-Properties** command, NUCFS must check to see what the permissions were changed to and then present the changes.

Here are some examples of expected behavior.

♦ *chmod* 444 on a file with 666 permissions succeeds but does not change the permissions.

♦ *chmod* 555 on a file with 777 permissions succeeds but does not change the permissions.

♦ *chmod* 555 on a file with 666 permissions succeeds but changes the permissions to 777.

♦ *chmod* 111 on a file with 666 permissions succeeds but changes the permissions to 777.

The **chgrp** and **chown** commands are not supported in NetWare mode.

UNIX Mode

This mode allows the administrator to control access to the server volumes from UnixWare as well as NetWare. When a change in access control is made from one side, the best possible mapping is done to reflect this change on the other side. For example, if permissions are granted from UnixWare, equivalent trustee assignments are generated for the NetWare login user and the mapped NetWare group(s). In some cases, DOS file attributes may also be modified to ensure best possible file sharing between UnixWare and NetWare platforms.

In either mode, the operations allowed on a file or directory, such as create, access or modify, are controlled by the NetWare effective rights of the NetWare-authenticated login user and on the UnixWare user's identity. (This is because the physical files being accessed reside on the NetWare volume.) For example, the UnixWare user root (uid=0) when attaching to a NetWare server as user Chris will only be allowed access to the server volumes based on Chris's effective rights and will not have any supervisor privileges on the server's file system.

To Begin Using the *NUC.NLM*

Follow these general instructions to use the *NUC.NLM*.

See the *Installation Handbook* for information on how to install the NLM package on UnixWare. See the *NLM Installation and Administration* guide for an overview of *NUC.NLM* and the other NLMs provided with UnixWare, how to install the NLMs on NetWare, and how to configure the NLMs for NetWare and UnixWare.

1. Read the NLM software off of your UnixWare system onto DOS-formatted diskettes.

2. Install the *NUC.NLM* onto the desired NetWare server.

3. Prepare these configuration files for the *NUC.NLM*:

   ◆ *hosts*. Contains the IP address of UnixWare systems accessing the server.

   ◆ *passwd*. Contains */etc/passwd* entries from the UnixWare systems.

   ◆ *nfsusers*. Maps UnixWare user IDs (UIDs) to NetWare user names.

   ◆ *nfsgroups*. Maps UnixWare group IDs (GIDs) to NetWare groups.

4. Configure volumes for UNIX mode support. The two modes of *NUC.NLM* access control (UNIX or NetWare) setting is on a per-NetWare volume basis. To use *NUC.NLM* in UNIX mode, on the server console enter the following command once for each volume that you want to support the UNIX (NFS) name space:

   add nfs name space to volume *volname*

   where *volname* is the name of the volume.

5. Load the *NUC.NLM* onto the desired NetWare server. When loading the NLM, specify the volumes that you want to support the UNIX mode of *NUC.NLM* (the same volumes you specified in Step 4, above). For example,

   load nuc sys doc

   loads *NUC.NLM* in UNIX mode for the *sys* and *doc* volumes; any other existing volumes (for which the UNIX name space has been loaded as in Step 4) will be in NetWare mode.

Steps 1 to 4 need to be done only once; you do not need to do them again unless the configuration of your system needs to be changed.

Step 5 needs to be done each time you start the NetWare server. You can load the *NUC.NLM* automatically from the *AUTOEXEC.NCF* file (see your NetWare documentation) for convenience.

The *NUC.NLM* is fully backward compatible with the existing UnixWare NUC client (UnixWare 1.1). However, because of some changes in the access control mapping algorithms, some of the client commands, such as **ls-l** and **chmod** may produce better results on NetWare servers running the *NUC.NLM 2.0*.

Single Login

This feature provides single login when names and passwords are synchronized between a NetWare server and UnixWare. Passwords are not automatically synchronized. Password storage is done as securely as possible.

Any UnixWare utility which performs user login (such as **login, su,** or the graphical login) stores the user's name and password in a form that can be retrieved by the NUC. The NUC will attempt to use this name and password for the necessary login information to NetWare servers upon access. Only in cases where the UnixWare login name and password are not the same as a NetWare login and password will the user be prompted for this information to gain access to a NetWare server.

System users can turn off single login by using NetWare Setup if desired. See "Using NetWare Setup" earlier in this chapter.

Authenticating to a NetWare Server from UnixWare

This section explains different ways of authenticating to a NetWare server from UnixWare.

From your UnixWare client, you must authenticate to a NetWare server before you are allowed to gain access to NetWare services such as print or file access. Authentication determines who can access the NetWare server and what privileges a user has on the server.

When you authenticate to a NetWare server, you establish a connection between your UnixWare computer and the server. This connection only allows you to access NetWare printers; you cannot access NetWare files and directories until you actually mount a NetWare volume.

There are three ways to authenticate to a NetWare server:

1. Using the auto-mounter through the NetWare icon on the desktop

2. Using the NetWare Access icon on the desktop

3. Using the command line

There are two ways to authenticate to a NetWare server using the desktop: use the auto-mounter or use the NetWare Access icon.

Using the Auto-Mounter to Authenticate to a NetWare Server

This task allows you to authenticate to a NetWare server using the NetWare icon.

To authenticate to a NetWare server using the auto-mounter, do the following

Procedure

1. **Double-click on the NetWare icon at the UnixWare Desktop.**

2. **Double-click on the NetWare server to which you want to authenticate.**

   An "Authentication" window appears if you are not already authenticated to that server:

Figure 11-6
Authentication
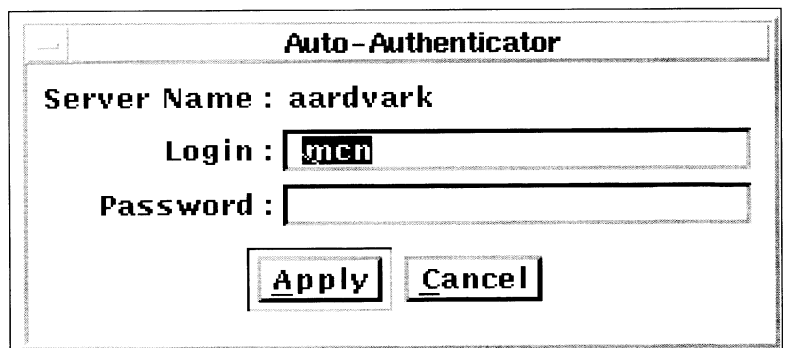
3. **Type your name and password.**

Note

If NetWare Single Login is enabled and if your login name and password are synchronized between UnixWare and NetWare, you will automatically be authenticated to the desired NetWare server without the dialog box popping up.

If NetWare Single Login is disabled, you must type your login and password each time to authenticate to a NetWare server.

Using the NetWare Access Icon to Authenticate to a NetWare Server

To authenticate to a NetWare server using NetWare Access, do the following:

Procedure

1. **Double-click on the Networking folder at the UnixWare Desktop.**

2. **Double-click on NetWare Access in the Networking folder.**

3. **Click on the NetWare server to which you want to authenticate.**

   An "Authentication" window appears.

   If NetWare Single Login is enabled, and if your login name and password are synchronized between UnixWare and NetWare, you will automatically be authenticated to the desired NetWare server.

   If NetWare Single Login is disabled, you must click Login and type your login and password each time to authenticate to a NetWare server.

4. **Type your login name and password and click Apply or press <Enter> if applicable.**

See the *Desktop User Handbook* for more information.

Using the Command Line to Authenticate to a NetWare Server

An alternative method when authenticating at the desktop is to use the command line.

To authenticate to a NetWare server from a "Terminal" window, do the following:

Procedure

1. **Double-click on the Applications folder at the UnixWare Desktop.**

2. **Double-click on Terminal in the Applications folder.**

3. **Type**

   nwlogin *fileserver/username*

where *fileserver* is the name of the server to log in to and *username* is the name of the user who is logging in.

You can use the **nwlogout** command to log out of a NetWare server. For information on more NetWare commands, see the *Command Reference*.

Mounting and Unmounting NetWare Volumes

To gain access to files and directories on a NetWare volume, you mount the NetWare volume to a directory on a UnixWare file system.

When you log in to a NetWare server at the desktop, you will automatically be mounted. When you log in and mount a file system at the command line, you use the **mount** command plus arguments.

Note On UnixWare, the NetWare volumes are automatically mounted using the auto-mounter through the NetWare icon, or by changing into the **/.NetWare/***servername*/*volume name* directory. Through the NetWare icon, the authentication panel appears if you are not already authenticated to the desired NetWare server. You must already be authenticated to the NetWare server to successfully transfer into **/.NetWare/***servername*/*volume name* on the command line. However, you can mount a NetWare volume manually, as described next.

Mounting a NetWare Volume

To mount a NetWare volume from a "Terminal" window, do the following:

Procedure

1. **Double-click on the Applications folder at the UnixWare Desktop.**

2. **Double-click on Terminal in the Applications folder.**

3. **Log in as root or type *su* to become root.**

4. **Type**

   ```
   mount -F nucfs servername/volume: /path
   ```

   where *servername* is the name of the desired server; *volume* is the volume name; and *path* is the desired mount point on your local system.

   For example, to mount the volume *Sys* from the NetWare server *Cats*, (assuming the local directory already exists), you can type:

   ```
   mount -F nucfs Cats/Sys: /Cats/Sys
   ```

This command informs UnixWare that the NetWare volume *Sys* on server *Cats* is to be mounted onto the */Cats/Sys* directory. The NetWare volume will be mounted on a UnixWare directory as a *nucfs* file system.

5. **Type**

   ```
   mount
   ```

   to view mounted file systems.

Unmounting a NetWare Volume

This task allows you to unmount NetWare volumes from the command line.

To unmount a NetWare volume from a "Terminal" window, do the following:

Procedure

1. **Double-click on the Applications folder at the UnixWare Desktop.**

2. **Double-click on Terminal in the Applications folder.**

3. **Log in as root or type *su* to become root.**

4. **Type**

   ```
   umount pathname
   ```

   where `pathname` is the directory that you previously specified as the mount point for the volume.

   For example, if you want to unmount the volume *Sys* on the NetWare server *Cats*, type **unmount /Cats/Sys**.

5. **To unmount all NetWare server volumes, type**

   ```
   umount -F nucfs
   ```

For more information on the **mount** command, see **mount**[nucfs] or **mount**[nucam] in the chapter "Sharing Files and Folders Remotely" or the *Command Reference*.

For more information on authenticating and mounting a server from the "UnixWare Desktop" window, see the *Desktop User Handbook*.

NetWare Rights and UnixWare Permissions in Files and Directories

The methods that NetWare uses to control access to files and directories are different from those used by UnixWare. NetWare maintains more control over files and directories and sometimes the mapping between the two environments is not exact.

This section

◆ Discusses the differences between accessing a file in the UnixWare environment versus accessing a file in the NetWare environment

◆ Reviews the software provided with UnixWare that enables you to affect the access control assigned to a file or directory on NetWare

◆ Shows you how access control on NetWare maps to access control used on UnixWare

Using UnixWare File Commands on NetWare Servers

The following table describes what conditions must exist for you to use various UnixWare Folder window **File** and **Edit** menu commands when accessing a NetWare server volume in one of three possible configurations.

The *NUC.NLM*'s UNIX mode attempts to present UNIX filename and access control semantics on NetWare files so you can effectively use UnixWare commands to change file attributes.

The *NUC.NLM*'s NetWare mode, while providing some limited UnixWare functionality, does not allow most attribute changes from UnixWare.

The UNIX mode and NetWare mode *NUC.NLM*s will function only in NetWare volumes loaded with the NFS namespace.

The next table shows how menu commands react in UNIX mode and NetWare mode.

Table 11-1
Menu Commands in UNIX Mode and NetWare Mode

Menu Command	NUC Only (without NUC.NLM)	NUC with *NUC.NLM* in NetWare Mode	NUC with *NUC.NLM* in UnixWare Mode
File-Open	Must have *Read* NetWare right in current folder.		
File-New	Must have *Create* NetWare right in current folder.		
Edit-Copy	Must have *Read* and *File Scan* NetWare rights in current folder and *Create* NetWare right in target folder		
Edit-Rename	Must have *Modify* NetWare right on file or folder.		
Edit-Move	Must have *Read*, *File Scan*, and *Erase* NetWare rights on file or folder being moved and *Create* NetWare right on target folder.		
Edit-Link	Not supported.	Must have *Read* and *File Scan* NetWare rights in current folder and *Create* NetWare right in target folder	
Edit-Delete	Must have *Erase* NetWare right on file or folder.		
File-Print	Must have *Read* and *File Scan* NetWare rights on file.		
Edit-Properties	Must have *Access Control* NetWare right on file or folder. (The only supported change to file properties is to make files executable for owner, group, and/or other.)		Same as NUC only. (However, all changes to file properties from UnixWare are supported.)

See "NetWare Rights and UnixWare Permissions in Files and Directories" later in this chapter for more information on appropriate permissions for various file operations.

NetWare and UnixWare Filenames

This section explains differences between the way that UnixWare file systems and NetWare volumes name files, and how these differences are handled by UnixWare and NetWare. You need to understand these difference in order to manage properly any NetWare files you access from your UnixWare system.

NetWare and UnixWare use distinctly different filenaming conventions. NetWare uses standard DOS filename conventions, while UnixWare uses a less restrictive set of conventions.

DOS Restrictions on Filenames

DOS filenames are restricted to the following:

◆ They consist of a maximum of 8 characters, optionally followed by a period and up to 3 characters (this is often called an 8.3 filename format).

◆ They cannot contain any of the characters that have special meaning to DOS (that is, the characters * / [ ] : | < > + = ; " " are not allowed).

◆ They do not differentiate between lowercase and uppercase characters (that is, the filenames *abc.doc*, *ABC.doc*, and *ABC.DOC* refer to the *same* file).

UnixWare Restrictions on Filenames

UnixWare filenames are restricted to the following:

◆ They consist of a maximum of 255 different characters.

◆ They cannot contain a null character or a slash (/).

◆ They differentiate between lowercase and uppercase letters (that is, *abc.doc*, *ABC.doc*, and *ABC.DOC* refer to different files).

Copying Files from UnixWare to NetWare

When writing a UnixWare file to a NetWare server volume, care must be taken that the filename already meets the more restrictive DOS filename conventions, or some translation will be done before the file is written.

How translation is done depends upon whether the *NUC.NLM* is installed on the NetWare server, as detailed in the following subsections.

Filenames without *NUC.NLM*

If you are using the NUC on your UnixWare system and you are accessing a NetWare server that does not have the *NUC.NLM* module loaded, no filename

translation is performed for you. Any filenames that you specify for files created on the NetWare server must satisfy DOS filename conventions or the command will fail.

Suggestion ▼▼ For best results, install the *NUC.NLM* module on your NetWare servers to which you will be connecting from UnixWare.

Filenames with *NUC.NLM*

With *NUC.NLM* loaded on the NetWare server, UnixWare filenames are translated to DOS filenames, but only on the NetWare server side. Filenames appear unchanged from the UnixWare side.

The name translations done on the DOS side are as follows:

◆ Any lowercase characters are converted to uppercase.

◆ Any DOS special characters in the filename are dropped (see "DOS Restrictions on Filenames").

◆ If the UnixWare filename is longer than 8 characters, it is truncated to 8 characters. If there are one or more periods in the filename, then up to 8 characters are accepted up to the first period and up to 3 are accepted after the period; any remaining characters are dropped.

◆ If a translated name is the same as the name of a file that is already on the NetWare volume, successive digits are added to the translated filename until a unique filename is formed.

If the addition of digits to the filename causes it to reach 8 characters (or if it is already 8 characters long), then characters are grabbed from the end of the filename and replaced with successive digits until a unique filename is found.

◆ If a UnixWare filename consists of only DOS special characters, its name is translated to *STRANGE*. A second such filename is translated to *STRANGE1*, and so on, until a unique filename is found.

Understanding NetWare Rights and UnixWare Permissions

This section explains differences between the way UnixWare file systems provide access control and the way NetWare volumes provide access control.

You need to understand these differences in order to manage properly any NetWare files you access from your UnixWare system.

NetWare Controls its Own Files

Access to files residing on a NetWare volume is controlled by NetWare using the NetWare access control mechanism. That is, when you attempt to access a file on a NetWare volume, it is NetWare (not UnixWare) that determines whether or not to grant you access to the file.

Therefore, files located on a NetWare server and accessed by UnixWare users must be administered from NetWare.

Activities you need to perform on NetWare include

◆ Creating usernames and groups

◆ Assigning trustee rights to users and groups

◆ Assigning attributes to files and directories

These tasks cannot be performed from the UnixWare client (although some file attributes are set when creating new files or using some file management commands such as **chmod** or **chown**. See the *Command Reference* for information on these commands).

NUC and *NUC.NLM* Provide Access Control

NUC and *NUC.NLM* together provide the ability to access files on NetWare volumes and a permissions or rights translation mechanism that allows you to use UnixWare commands to view and change access control attributes of NetWare files.

Access Control without *NUC.NLM*

Without *NUC.NLM* loaded on the NetWare server, even though NUC software is installed on your UnixWare system, you cannot alter access control attributes on NetWare files.

Displaying File Properties without *NUC.NLM*

When you display **File-Properties** from the desktop or command line, you can access files on a NetWare server without *NUC.NLM*, but your login name and primary group name will be shown as the owner and group for the file. This is true regardless of whether you actually own the file (from the NetWare perspective) or not. The owner permissions on the NetWare file indicate your access control rights as translated to UnixWare permissions.

Changing File Properties without *NUC.NLM*

No permission changes are possible in this mode.

Executing any other UnixWare command that affects access control (for example, **chown** or **chgrp**) results in no change to the NetWare files access control attributes, and the command fails. No error message is returned and the return code of the command is 0 (which normally indicates successful completion of the command).

Other forms of the **chmod** command will not fail; they simply have no effect.

Access Control with *NUC.NLM*

The *NUC.NLM* requires the NFS namespace to be loaded on the target NetWare volume to allow access control.

The following subsections explain how UnixWare access control commands function in UNIX or NetWare mode, and how NetWare file attributes are mapped to UnixWare file attributes in both modes.

UNIX mode requires a UnixWare-to-NetWare file attribute mapping.

File Ownership in NetWare Mode

With *NUC.NLM* loaded on the server in NetWare mode, file ownership on the UnixWare side is determined by the presence or absence of the Access Control right on a NetWare file or directory.

If the Access Control right is granted to your NetWare user login on a particular file or folder, then you are shown as the owner on the UnixWare side. When you create a file or folder, you are shown as the owner if your NetWare user login inherits the Access Control right for the file or folder.

Otherwise, the login *nobody* is shown as the owner.

Displaying File Properties in NetWare Mode

When you look at file properties through the desktop or using UnixWare commands such as **ls**(1) and if *NUC.NLM* was loaded in NetWare mode, NetWare rights on the file are mapped into UnixWare terms for display by the desktop or command line. The UnixWare permissions reported to you indicate the access rights only *you* have on the file.

If you have the NetWare Access right to a file on a NetWare server, then you are shown as the owner from the UnixWare side and you have the owner permissions indicated for the file.

If you do not have the Access right, another UID is shown as the owner, and your primary GID is shown as the owning *gid.* You have the group permissions indicated for the file.

When you access a file, the file might have other NetWare rights assigned to it that allow other users access (including the file owner), but you cannot see that information from UnixWare. You would have to display the file's NetWare rights from a NetWare workstation.

An example follows:

If you log in to a NetWare server and view the properties of a file on which you do not have Access rights, the properties might indicate group *Read* access to the file.

If the NetWare supervisor then grants you the NetWare Access Control right to the file (the Access Control right indicates file ownership as far as UnixWare is concerned) and you now check the file properties again from UnixWare, these properties would show that you have *Owner Read* access to the file.

See "UNIX Mode and NetWare Rights to UnixWare Permissions Mapping" later in this chapter for a summary of how NetWare Rights are mapped to UnixWare permissions when displayed.

Changing File Properties in NetWare Mode

The only allowable permission change is to turn on the Execute permission on a file for Owner, Group, or Other.

File Ownership in UNIX Mode

When running *NUC.NLM* in UNIX mode, the administrator of a NetWare server can set up UID and GID mappings to NetWare Users and Groups. If your UID and GID are mapped when you create a file on a NetWare volume, you will own the file. When you use UnixWare to display file attributes of files you own, your UnixWare user and group IDs are displayed appropriately through the *NUC.NLM*.

If, however, your UnixWare UID and GID are not mapped by the NetWare administrator to a NetWare user and group (using the *nfsusers, nfsgroup*, and *passwd* files), then files you create will be owned by the *nobody* login.

Displaying File Properties in UNIX Mode

In UNIX mode, *NUC.NLM* converts the NetWare ownership and rights on a file or folder to UnixWare terms. When you use the *Edit-Properties* menu command on a NetWare file or folder, *NUC.NLM* translates the NetWare ownership and rights information to UNIX-style output.

The ownership and rights information displayed indicates the equivalent UNIX permissions on the file or folder for the file owner, for anyone belonging to the file owner's group, and for all other users.

Ownership and rights are calculated using the UID or GID and User or Group mapping set up on the NetWare server and the NetWare effective rights on the file or folder.

See "UNIX Mode and UnixWare Permissions to NetWare Rights Mapping" for a summary of how NetWare Rights are mapped to UnixWare permissions on display.

Changing File Properties in UNIX Mode

All changes to ownership and permissions on a NetWare file or folder from UnixWare are sent to the NetWare server through the *NUC.NLM*, which attempts to make appropriate changes to the NetWare rights on the file or folder on your behalf.

If the effective rights on the file or folder allow the change, *NUC.NLM* will make the change. If the change is not allowed by NetWare, *NUC.NLM* will not make the requested change and the operation will fail.

See "UNIX Mode and UnixWare Permissions to NetWare Rights Mapping" for a summary of how UnixWare permissions are mapped to NetWare rights when you set them through the **Edit-Properties** menu command.

UNIX Mode and NetWare Rights to UnixWare Permissions Mapping

The following table shows you how in UNIX mode the NetWare rights settings on NetWare file and folders are translated to UnixWare permissions and owner/group settings on display.

For a summary description of NetWare rights, see "NetWare Rights Summary" in this chapter. See "Managing Files and Folders" in the *Desktop User Handbook* for a description of file and folder properties and permissions.

Table 11-2
NetWare Settings to UnixWare Permissions

File Type	NetWare Right	Equivalent UnixWare Setting(s)
File	*Read*	*Read.*
	Write	*Write.*
	Create	Not translated.
	Erase	*Write* permission set on parent folder.
	File Scan	*Read* and *Execute* set on parent folder.
	Access Control	Used to determine file and folder ownership. A similar process is used to determine group ownership.
		If the NetWare user login you used to log in to the NetWare server owns the file or folder *and* the user login maps to the login you are currently using on UnixWare *and* the Access Control right is set on the NetWare file or folder, then your UnixWare user login is displayed as the owner.
		If your NetWare user login owns the file or folder, but the Access Control right is not set, then the file or folder is shown as belonging to the *nobody* login.
		If your NetWare user login does not own the file or folder, then the owner's *uid* or *nobody* is displayed as the file owner.
	Modify	Not translated.
	Supervisor	Not translated.
Folder	*Read*	Not translated.
	Write	Not translated.
	Create	*Write* permission granted if folder also has the *Erase* and *Modify* rights.
	Erase	*Write* permission granted if folder also has the *Create* and *Modify* rights.
	Access Control	See the *Access Control* right for Files, previously.
	Modify	*Write* permission granted if folder also has the *Create* and *Erase* rights.
	Supervisor	Not translated.

Rights listed as "Not translated" in the previous table may still exist on the NetWare file or folder; they are just not translated to a UnixWare permission on display. See "NetWare Rights Assigned on File Creation in UNIX Mode" and "NetWare Rights Set Through Security Equivalence" in this chapter.

For a summary description of NetWare rights, see "NetWare Rights Summary" in this chapter. See "Managing Files and Folders" in the *Desktop User Handbook* for a description of file and folder properties and permissions.

UNIX Mode and UnixWare Permissions to NetWare Rights Mapping

The following table shows you how ownership and permissions changes are translated to NetWare rights settings on NetWare file and folders.

For a summary description of NetWare rights, see "NetWare Rights Summary" in this chapter. See "Managing Files and Folders" in the *Desktop User Handbook* for a description of file and folder properties and permissions.

Table 11-3
UnixWare and NetWare Ownership and Permissions

File Type	UnixWare Permission	NetWare Rights Setting(s)
File	*Read*	*Read.*
	Write	*Write.*
	Execute	Not mapped to a NetWare right; setting is kept privately by *NUC.NLM* and gives user the permission to execute the file on UnixWare only.
Folder	*Read*	*Read*; if the UnixWare Execute permission is also assigned to the folder, then the NetWare File Scan right is assigned as well.
	Write	*Write*, *Create*, *Erase*, and *Modify.*
	Execute	*Read*; if the UnixWare *Read* permission is also assigned to the folder, then the NetWare File Scan right is assigned as well.

Other NetWare Rights may already exist on the file or folder whose permissions you are attempting to change. They may have been set on the file when the file was created through inheritance or security equivalence. See "NetWare Rights Assigned on File Creation" and "NetWare Rights Set Through Security Equivalence" later in this chapter.

NetWare Rights Assigned on File Creation in UNIX Mode

The process of assigning NetWare Rights when you create a new file on a NetWare volume running *NUC.NLM* in UNIX mode can be quite complex; a complete description is not provided here.

The following rules summarize what NetWare rights are assigned to a file or folder that you create from UnixWare. For a full description of how rights are assigned on file creation, see the *NLM Installation and Administration* guide.

Note that these rights assignments are not applied when *NUC.NLM* is running in NetWare mode.

1. A new file or folder may inherit rights from its parent folder. If both the mapped UID and GID of the user creating the new file or folder are the same as the UID and GID of the parent folder, then the new file or folder inherits all the rights set on the parent folder. If the UID or GID are not the same, then only the *Erase*, *Modify*, and *File Scan* rights may be inherited. The actual rights set depend on the rights set on the parent folder.

2. The *Modify* right is set on a new file if the user has *Write* and *Execute* permissions on the parent folder (or if it is inherited as in Item 1), or if the user's NetWare login inherits the *Modify* right through security equivalence (a feature of NetWare).

3. The *Erase* right is set on a new file or folder if the user has the *Write* permission on the parent folder.

4. The *File Scan* right is set for a new file if the user has *Read* and *Execute* permissions on the parent folder.

5. Additional rights may also be set on a new file if your NetWare login has been made security equivalent to another NetWare user login or group.

NetWare Rights Set Through Security Equivalence

NetWare rights can also be set or denied if your NetWare login has been declared security equivalent by the NetWare administrator to another NetWare user login or group.

Security equivalence effectively transfers another user's or group's effective NetWare rights to your user login or group. This can change the way in which

rights are assigned to new files as well as to the rights set when you change permissions from UnixWare.

NetWare Rights Summary

The following sections list NetWare rights that may be set on files and folders on NetWare server volumes.

Folder Rights

A NetWare user's effective rights on a folder specify the access granted to the user on the folder and to files and folders it contains (unless rights are redefined on a particular file or folder).

Supervisor	Overrides any restrictions set on the folder and all its subfolders, and the files they contain. This right cannot be revoked at a lower level.
Read	Grants the right to open and execute files in the folder.
Write	Grants the right to open and modify (write to) files in the folder.
Create	Grants the right to create files and subfolders within the folder.
Erase	Grants the right to delete the folder, its subfolders, and the files they contain.
Modify	Grants the right to change the attributes on the folder, its subfolders, and the files they contain; also grants the right to change their names.
File Scan	Grants the right to see (list) the names of the files in the folder and its subfolders.
Access Control	Grants the right to change the ownership of the folder and the rights that can be inherited by a new folder or subfolder.

File Rights

A NetWare user's effective rights on a file specify the access granted to the user on the file, and may redefine the rights inherited from the parent folder.

Supervisor	Grants all rights to the file.
Read	Grants the right to open or execute the file.
Write	Grants the right to open and modify (write to) the file.
Create	Grants the right to salvage the file after it has been deleted.
Erase	Grants the right to delete the file.
Modify	Grants the right to change the attributes on the file; also grants the right to change its name.
File Scan	Grants the right to see (list) the name of the file when listing the parent folder's contents.
Access Control	Grants the right to change the ownership of the file and the rights that can be inherited by the file from the parent folder.

Network Management Through SNMP

Network management provides to applications the ability to view and manage many UnixWare client resources from any management console that uses the Simple Network Management Protocol (SNMP) to communicate with network clients.

This frees the network administrator from the need to log in directly to the UnixWare system to change its configuration, and allows the administrator to centralize management of multiple heterogeneous systems on the network.

Enabling and Disabling Statistics Gathering

To start gathering statistics for SNMP managed objects on UnixWare, you need to install the *snmp* package as described in the *Installation Handbook*.

Once you install *snmp*, an SNMP agent (*in.snmpd*) and a SNMP daemon (*hostmibd*) are started automatically whenever the system is rebooted.

The daemons, *hostmibd* and *nwumpsd*, gather statistics on the UnixWare system and on the NetWare protocol stack running on UnixWare, respectively. The SNMP agent gathers additional statistics itself.

Should you need to stop the SNMP agent and daemons, use either the UnixWare desktop (see "Managing Your Network") or the **nwcm**(1M) command (see the description of Folder 11 on the manual page) or by using the **snmp**(1M) command. The same methods can be used to re-start SNMP statistics gathering.

System Statistics Accessed Through a Definitions File

Objects and attributes on a UnixWare client are gathered by SNMP daemons and through the SNMP agent and are placed in files that collectively manage objects and attributes. These files are called Management Information Base (or MIB) files.

The daemon processes on the UnixWare system dynamically collect statistics for managed objects which can be retrieved through the SNMP agent and the definitions file. The MIB can be queried and updated by using industry-standard SNMP commands and interfaces.

Remote SNMP Management Through the SNMP Agent

The *in.snmpd* agent runs on UnixWare and listens on the network for SNMP requests from other systems. The SNMP agent responds to these requests with information from the MIB files that it and the other daemons maintain. A remote user with the proper authorization can also change the information in these files and thereby alter the configuration of the UnixWare system.

Viewing and Changing Statistics in MIB Files

There are two ways to view the statistics in the MIB file

◆ Using a network management console that communicates with clients using SNMP.

◆ Using standard command-line utilities from a shell (such as *ksh*).

No network management console is provided with UnixWare; however, any SNMP console, such as Novell's Management System for Microsoft MS Windows, can be used to manage information in the MIB. The console can be

located on the UnixWare system or on any system connected to the same NetWare network as the UnixWare system.

The following commands are provided with UnixWare for MIB file management:

- **getid**(1M)

- **getone**(1M)

- **getnext**(1M)

- **getmany**(1M)

- **setany**(1M)

See the previous manual pages in the *Command Reference* for more information on these commands and the *Network Administration* guide for more information on UnixWare's SNMP implementation.

Setting Up UnixWare Terminal Emulators for DOS/MS Windows

UnixWare is shipped with two terminal emulation packages. These can be used from a NetWare client running DOS or MS Windows to log in to a UnixWare system on a NetWare network. Host Presenter runs in the MS Windows 3.x environment while TNVT220 runs in the DOS environment.

The *Terminal Emulators for DOS/MS Windows* guide fully describes how to use these terminal emulators once they are installed on a DOS or MS Windows system. This section tells you how to read the emulator software from UnixWare onto a diskette, and how to install the diskette on a system running DOS or MS Windows.

General Procedure for Installing the Terminal Emulators

To use the terminal emulation software, you need a UnixWare system and a system running DOS or MS Windows. These systems must be connected to a NetWare server or a network of servers, and remote login via SPX/NVT must be enabled on the UnixWare machine.

Follow these general instructions to begin using the terminal emulators:

1. Install the *nwnet* and *nwsup* packages on UnixWare.

   To see if these packages are already installed, type

   ```
   pkginfo nwnet nwsup
   ```

   If these packages are not installed, see the *Installation Handbook* for instructions on installing UnixWare packages.

2. Enable remote login via SPX/NVT on UnixWare. See "Configuring SPXII."

3. Read the software from your UnixWare system's hard disk onto a DOS-formatted diskette.

   See "Reading the Emulator Software onto a Diskette."

4. Install the software on the diskette onto a DOS or MS Windows system, as appropriate.

   See "Installing the TNVT220 Terminal Emulator on a DOS Machine" or "Installing the Host Presenter Terminal Emulator on a MS Windows System" later in this chapter, as appropriate.

Reading the Emulator Software onto a Diskette

This section tells you how to read the terminal emulator software from your UnixWare system's hard disk onto a diskette that you can then install on a DOS or MS Windows system.

Note You will need a DOS-formatted diskette to complete this procedure.

To read terminal emulator software, do the following:

Procedure

1. **Log in to the UnixWare Desktop, click on *Go To* in the menu bar and select *Other Folder*.**

2. **Type one of the following in the text box, depending on which terminal emulator you want:**

   ```
   /usr/spool/nwsup/nvt/dos
   ```

   for the TNVT220 emulator for DOS, or

```
/usr/spool/nwsup/nvt/win
```

for the Host Presenter emulator for MS Windows.

3. **Then click on the Open button.**

   A "Folder" window appears that displays the contents of the directory you entered.

4. **Click on *Edit* in the menu bar and select *Select All*.**

5. **Insert a DOS-formatted diskette into a disk drive.**

6. **Double-click on Disks-etc in the UnixWare Desktop.**

7. **Double-click on the icon that corresponds to the diskette drive into which you inserted the DOS-formatted diskette in Step 5.**

8. **Hold down the <Ctrl> key and click on one of the icons in the "dos" or "win" windows (from Step 2) and drag it into the window corresponding to the DOS diskette.**

   UnixWare begins copying the files onto the DOS diskette.

9. **Once the access light has gone out on the disk drive, you can close the "Folder" windows and remove the diskette from the drive.**

Now you can install the emulator software from the DOS diskette onto a DOS or MS Windows system.

Installing the TNVT220 Terminal Emulator on a DOS Machine

On a computer running DOS, insert the diskette containing the TNVT220 software into a diskette drive. At the DOS prompt, type:

```
drive:setup
```

where *drive* is the letter designator for the diskette drive in which you placed the diskette.

The setup program will lead you through the installation of the TNVT220 software on your DOS machine. It will, among other things, make changes to your *AUTOEXEC.BAT* file and other system files.

Starting the TNVT220 Terminal Emulator

TNVT220 requires the NetWare DOS client software to be installed on your DOS machine. The TNVT220 installation scripts will *not* install the NetWare DOS client software for you. If this software is not already installed, see your NetWare documentation or your NetWare system manager for instructions.

If you have just installed the TNVT220 software on your system, you will have to reboot the machine before you can start TNVT220. Otherwise, type:

```
TNVT220
```

at the DOS prompt to start the terminal emulator.

See the *DOS/Windows Terminal Emulators* guide for complete instructions on using the TNVT220 terminal emulator.

Installing the Host Presenter Terminal Emulator on a MS Windows System

The NetWare DOS client software is required for Host Presenter to work on your DOS NetWare client. If this is not already installed on your DOS machine, the Host Presenter installation scripts will attempt to install the NetWare client software from the network. This may or may not succeed. If this software cannot be installed by the installation scripts for Host Presenter, you will have to install it manually. See your NetWare documentation or your NetWare system manager for instructions.

On a computer running MS Windows, do the following:

Procedure

1. **Insert the diskette containing the Host Presenter software into a diskette drive.**

2. **From the MS Windows Program manager, click on *File-Run* from the menu bar.**

   The "File-Run" dialog box appears.

3. **In the Filename text box, type**

   *drive:***setup**

   where *drive* is the letter designator for the diskette drive in which you placed the diskette.

The setup program will lead you through the installation of the Host Presenter software. It will, among other things, make changes to MS Windows and other system files, and will ask you if you want to add an icon for the Host Presenter software to one of your Program Manager groups.

Starting the Host Presenter Terminal Emulator

If you have just installed the Host Presenter software on your system, you will have to reboot the system before you can start Host Presenter. Otherwise, double-click the mouse on the Host Presenter icon in Program Manager, or use the **File-Run** command to run *PRESENTR.EXE*.

See the *DOS/Windows Terminal Emulators* guide for complete instructions on using the Host Presenter terminal emulator.
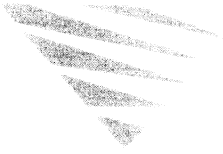
12 *Monitoring and Tuning Your System*

This chapter describes tools for monitoring your system and also includes information on

◆ How to check disk space, system name, available floppy and tape drives, and other basic system information from the "System Status" window

◆ How to check system performance information from the "System Monitor" window

◆ How to change kernel tunable parameters from the "System Tuner" window

◆ How to monitor system warning and logging messages from the "Message Monitor" window

◆ How to use the "Processor Setup" window to bring additional processors online

◆ How to change the swap size on your system

Overview

Because UnixWare is a complex system, you should monitor your system to make sure it is effectively serving those who use it. Disk space, processing power, and RAM are all finite resources. Once you understand where your system is having problems, UnixWare provides tools for monitoring your system's activity and tuning your system to make sure it runs efficiently.

Using System Status

You can view basic information about your UnixWare system by using the System Status utility in the Admin Tools folder. You can also use System Status to set your system's clock, check your system's disk space periodically, or change the time zone your system is on.

To use System Status, double-click on the System Status icon in the Admin Tools folder.

The "System Status" window appears:

Figure 12-1
System Status
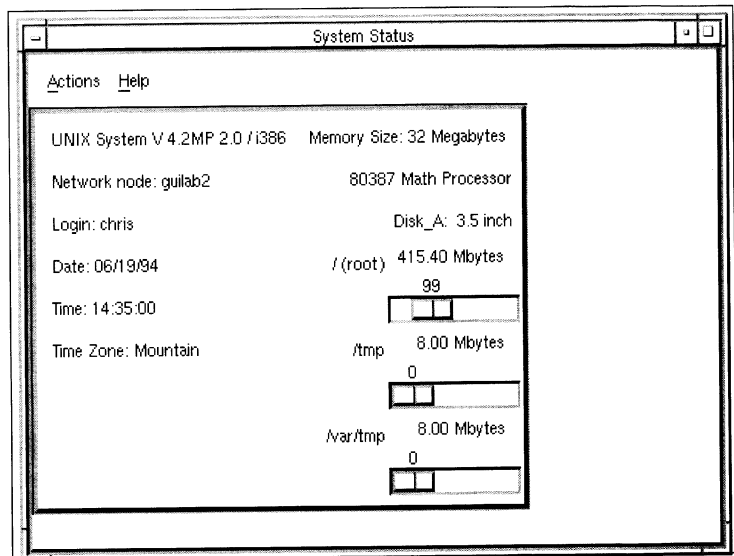
This window displays the following information about your system:

◆ The version of the UNIX system your computer is running.

◆ Your network node name (the name by which other machines recognize your machine).

◆ Your UnixWare login ID (user account).

◆ The current date and time.

◆ Your time zone.

◆ The amount of memory installed in your system.

◆ The type of math coprocessor chip installed, if any.

◆ The size of each floppy disk drive and cartridge tape drive.

◆ The total space (in megabytes, or *MB*) of each file system (where /, root, is the primary UNIX file system).

◆ The amount of used disk space in each file system, represented by the bar and the number above the bar.

Setting System Clock/Time Zone

This task allows you to set your time.

To use the "System Status" window to set the current time or the time zone, do the following:

Procedure

1. Click on *Actions* in the menu bar and select *Properties*.

The "Properties" window appears:

Figure 12-2
Properties

```
┌──────────────────────────────────────────────────────┐
│  ─    │          System Status: Properties             │
│   ┌──────────────────────────────────────────────────┐ │
│   │                                                    │ │
│   │   year [1994] ▲▼   month [May] ▲▼   day [01] ▲▼   │ │
│   │                                                    │ │
│   │   hour [17]  ▲▼   minute [38]  ▲▼                 │ │
│   │                                                    │ │
│   │   update clock every  [60]      second(s)         │ │
│   │   check disks every   [60]      second(s)         │ │
│   │                                                    │ │
│   │   Time Zone: [▼]  Eastern                         │ │
│   │                                                    │ │
│   │       [OK] [Set Defaults] [Reset] [Cancel] [Help] │ │
│   │                                                    │ │
│   └──────────────────────────────────────────────────┘ │
└──────────────────────────────────────────────────────┘
```
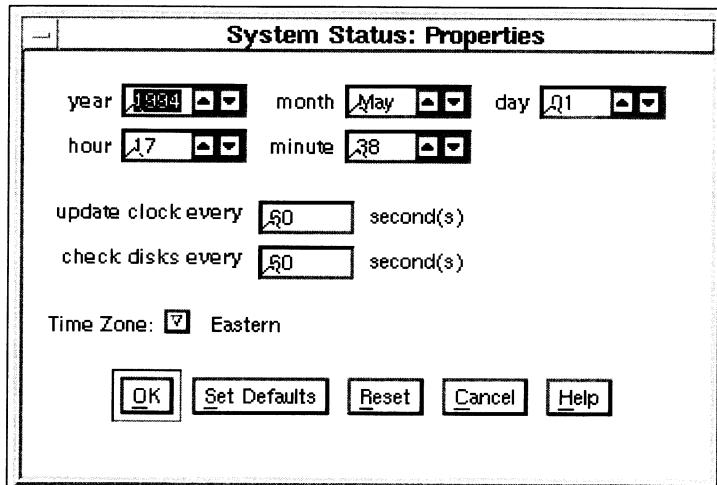
2. **Set the desired options:**

If you are not a system owner, you cannot change the date or time. Only options on how often the clock is updated and the disks are checked will appear on this window.

Year, Month, Day, Hour, Minute. Type the current year, month, date, hour, and minute, or click on the up/down arrows to change the values.
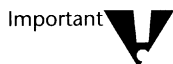
If you change your time to more than 30 minutes, log out of the desktop and log back in; otherwise, if you have a time-sensitive application, that application may not work properly. See the "Troubleshooting" appendix for more information.

Update Clock Every. Type the number of seconds you want to pass before the time displayed in the "System Status" window is updated. The default is 60 seconds.

Check Disks Every. Type the number of seconds you want to pass before the disk space displayed in the window is updated. The default is 60 seconds.

Time Zone. Click on the arrow to view a list of zones. Click on a zone. A menu of specific time zones appears. Click on an entry, then click on OK to save the settings in the "System Status" window.

3. **Click on OK to apply the changes and close the window or Set Defaults to save the current settings for the clock and disks as the defaults.**

Changing Disk Space Monitoring

This task allows you to set up your system to check for available disk space.

To use the "System Status" window to change how often the disk space is monitored and the information is updated in the window, do the following:

1. **Click on *Actions* in the menu bar and select *Properties*.**

The "Properties" window appears.

2. **Type the number of seconds you want to pass before your disks are checked in the Check Disks Every text box.**

3. **Click on Apply to apply the changes and close the window or Set Defaults to save the current settings for the clock and disks as the defaults.**

Monitoring System Performance from the Desktop

The "System Monitor" window allows you to graphically display information about activity on your UnixWare system. This includes information about CPU usage, free memory, free blocks, paging, and swapping.

To display the "System Monitor" window, double-click on the System Monitor icon in the "Admin Tools" window.

The "System Monitor" window appears:
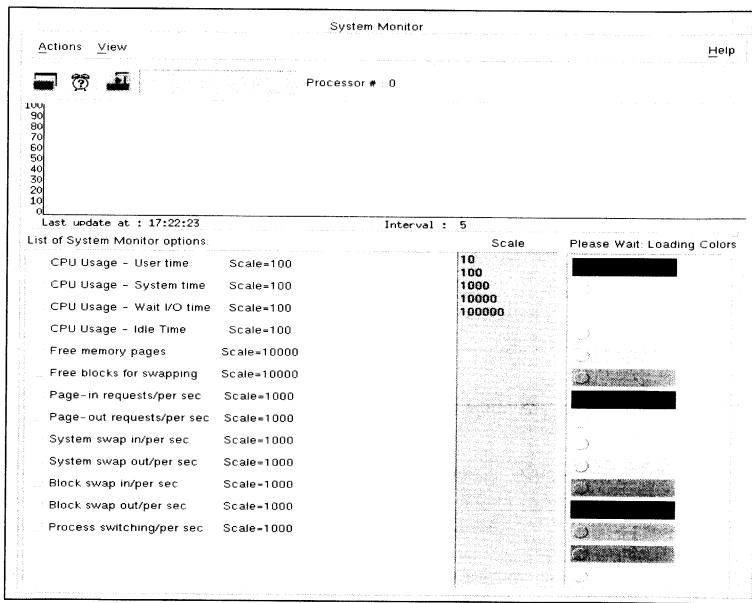
The graph near the top of the "System Monitor" window displays a line representing each of the selected system monitor options. When you first display the window, none of the options are selected. Once selected, each option is represented by a different colored line on the chart. As each of the monitored values change, the chart is updated. By default, the monitor updates every five seconds.

Descriptions of "System Monitor" options are contained in the **sar** manual page in the *Command Reference*.

You can change the following parameters of the graph:

Resize within the window. Press the left mouse button on the small square on the right side of the line that divides the top and bottom sections of the window. Holding the mouse button and move up or down to increase either the top or the bottom area.

Turn display on or off. Click on the check button next to each option to turn on or off the display of that information on the chart.

Change colors. Click on an option and click on a color on the right side of the window. This changes the color of the line representing the option that was last selected. See "Customizing System Monitor Colors" later in this section for more information on settings colors.

Change scale. Click on a number in the middle of the window (10, 100, and so on) to change the scale at which the selected option is presented. The scale for the four CPU Usage options cannot be changed (because they can only be shown as a percentage, such as, out of 100).

Once you have displayed the "System Monitor" window, you can save or play back log data.

You can display options, log your processor, or play back messages using one of the following methods:

◆ The menu bar

◆ The tool bar

To use the menu bar, follow the instructions in each section.

The tool bar eliminates one step (as compared to using the menu bar). To use the tool bar, click on the desired icon directly under the menu bar and the next window opens. Each icon represents a different monitor function. When you position the mouse pointer over the icon, your system identifies the icon as (from left to right): Options, Alarm, or Playback.

Saving Log Data

This task allows you to save data to a file.

To save log data, do the following:

Procedure

1. **Click on *Actions* in the menu bar and select *Log data to file*.**

   A dialog window appears asking for a filename.

2. **Type the filename where you want to log data. By default, the log file is *sys_mon.log.0* in your *home* directory.**

3. **Click on OK.**

   If the file exists, you are asked if you want to overwrite it or append to it.

Stop Logging Data

This task allows you to turn off logging data to a file.

To stop logging data that is currently being logged, do the following:

Procedure

1. **Click on *Actions* in the menu bar.**

2. **Select *Stop logging data*.**

Playing Back Log Data

This task allows you to view saved data.

To play back log data, do the following:

Procedure

1. **Click on *Actions* in the menu bar and select *Playback log data* (or activate the third tool bar button: playback).**

   A window appears asking for the name of the file where you previously stored log data.

2. **Select the filename containing log data you want to play back in one of the following ways:**

   ◆ Type the full path of the filename containing the log data in the Selection box.

◆ Type the full path of the directory containing the log file(s) in the Filters box, followed by an asterisk or any string you want to match. Then click on the Filters button to show all those files. Click on the file you want and it appears in the Selection box. (For example, */home/chris/sysmon** filter matches files in */home/chris* that begin with *sysmon.*)

3. **Click on OK.**

A new dialog window is displayed to show the saved data.

Saving Settings

You can save the settings you chose during a particular System Monitor session. The options you can save are: vertical grid, horizontal grid, time interval, colors for each option, scale for each option, alarm values for each option, and whether the option has been selected or not.

To save System Monitor settings, do the following:

Procedure
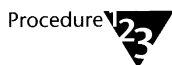
1. **Click on *Actions* in the menu bar.**

2. **Select *Save Settings*.**

Setting System Monitor Alarms

You can set alarms on the "System Monitor" window to alert you when the system goes above or below certain thresholds for selected resources.

To set System Monitor alarms, do the following:

Procedure

1. **Click on *View* in the menu bar and select *Alarms* (or click on the secong tool bar button: Alarm).**

The "Alarm Setup" window appears:

Figure 12-4
Alarm Setup

System Monitor: Alarm Setup

List of selected options

CPU Usage – User time
CPU Usage – System time
CPU Usage – Wait I/O time
CPU Usage – Idle Time
Free memory pages
Free blocks for swapping
Page–in requests/per sec
Page–out requests/per sec
System swap in/per sec
System swap out/per sec
Block swap in/per sec
Block swap out/per sec

Delete Alarm

Beep

Flash Header

Alarm Above:

Alarm Below:

Set Alarm

OK   Cancel   Help

2. **Select the option for which you want to set the alarm.**

3. **Click on one of the following:**

   Beep. To have the System Monitor beep if the level of the selected resource goes above or below the entered value.

   Flash Header. To have the selected option flash on the main window if the level of the selected resource goes above or below the entered value.

4. **Enter a value in either the Alarm Above or Alarm Below boxes.**

   If the resource goes above or below the specified value (the List of System Monitor options in Figure 12-3 gives the value range for each option), the selected alarm is set off and an alarm icon appears next to the options list on the main window. For example, the CPU Usage - User Time option has a scale up to 100. You can set the Alarm Above to be 80 and the Alarm Below to be 10; the alarm will go off if the option extends beyond the specified alarm settings.

5. **Click on Set Alarm.**

Once the alarm has been set, the Delete Alarm button becomes sensitized so that you can delete it if desired.

6. Click on OK to save the settings and close the window.

Setting System Monitor Options

There are several options you can set relating to the "System Monitor" window. By changing the interval, you can set how often (in seconds) the system reports on the resources you selected. You can also turn on or off the vertical and horizontal grid lines.

To change System Monitor options, do the following:

Procedure

1. Click on *Actions* in the menu bar and select *Options* (or click on the options tool bar button).

The "Options" window appears.

2. Set the desired options:

Interval. Click on the up and down arrows or type a new number in the Interval box to change the number of seconds between each time the System Monitor checks system resource usage.

Vertical Grid. Click on Vertical Grid to toggle between turning on or off the vertical lines on the display.

Horizontal Grid. Click on Horizontal Grid to toggle between turning on or off the horizontal lines on the display.

Processor #. If you have a multi-processor system, a list of processors appears. Click on the processor you want to monitor. (The message `This is a single processor machine` appears if you have only one processor on your computer.)

3. Click on OK to have the values take effect immediately.

Customizing System Monitor Colors

Once you select your colors for each option in the List of System Options column in the "System Monitor" window, those options will always appear with the selected color (see a description of the Change Colors option described previously in this section).

The "System Monitor" windows uses 32 colors. The colors in the List of Colors column will randomly change by default each time you open the "System Monitor" window. You cannot change the randomness of the colors in this column, but you can set other colors in the List of System Options column if you do not want those presented in the List of Colors column.

Setting Colors Using the rbg.txt file

To set other colors in the *rbg.txt* file, do the following from the command line:

Procedure

1. **Double-click on Applications in the UnixWare Desktop.**

2. **Double-click on Terminal in the Applications folder.**

   A "Terminal" window appears.

3. **Change to the */usr/X/lib/app-defaults* directory by typing**

   ```
   cd /usr/X/lib/app-defaults
   ```

4. **Using vi or a text editor, open the *System_Monitor* file.**

5. **Add a line to the file for each option you desire. For example. you could type:**

   ```
   *SarOption0*foreground: red
   *SarOption1*foreground: yellow
   *SarOption2*foreground: magenta
   *SarOption3*foreground: blue
   ```

   Each line corresponds to an option in the List of Selected Options in the "System Monitor" window. For example, if you want to assign the first option, CPU Usage - User Time, to use the color red, you would type the first line as listed previously. The second option, CPU Usage - System time, would use the second line, and so on.

   Even though you may select another color from the List of Colors scroll list, click on Save as, and close the window, the next time you open the window, the colors you specified in the *app-defaults* file will override those color selections.

   If you decide you do not want to use the colors you have added to the *app-defaults* file, you can either comment out a line(s) by typing ! at the beginning of the line or delete the line.

6. Close and restart System Monitor for the changes to take effect.

To view a complete list of allowed colors, using the command line in a "Terminal" window, open the *rgb.txt* file. It displays the red, blue, and green color value columns as numbers and lists the allowed color names in the righthand column. You can use these color names to change your color in the app-defaults file.

Setting Colors Using the .sys_mon file

One way of saving your colors, of course, is to use the "System Monitor" window at the desktop. When you select a color for an option in the List of Selected Options, your changes are saved in the *.sys_mon* file. If you prefer to customize your colors in this file rather than by using the desktop, you can.

To set other colors in the *rbg.txt* file, do the following from the command line:

Procedure

1. Double-click on Applications in the UnixWare Desktop.

2. Double-click on Terminal in the Applications folder.

A "Terminal" window appears.

3. Change to become the root user.

4. Using vi or a text editor, open the *.sys_mon* file by typing

```
vi ./sys_mon
```

The files contains a line for each option in the List of Selected Options that appears on the desktop. For example, the first line reads:

```
CPU Usage - User time:100:0:65535:0:1:0:0:0:0:0
```

The second, third, and fourth columns that appear after `User time` (`0:65535:0`) contain the red, blue, and green values for the color you selected. If you know what value you want to change these to, you can modify this file rather than use the desktop.

Tuning System Performance

Everything your system does (running processes, reading files, or saving data) uses part of your system's limited resources of CPU, RAM, and disk space. To prevent users or processes from consuming more than their fair share of these resources, UnixWare has *tunable parameters*.

Each tunable parameter is represented by a name and is set to a specific value on your system. This value defines a limit on a particular system resource that users or processes (programs that are running) can consume. The system also stores the minimum and maximum values allowed for the parameter.

For example, the MAXUP parameter defines the number of processes any system user (besides root) can have running at the same time. By default, the MAXUP parameter is set to 60, with the system limiting the value from between 15 and 60. Within these constraints, no user can have more than 60 processes running at a time.

UnixWare provides a graphical interface for changing your tunable parameters called the "System Tuner" window. This window allows you to display and change your system's tunable parameters, or reset them to their original values. It also prevents you from changing parameters to values that are outside the acceptable limits.

Though the "System Tuner" window is recommended for changing your tunables, you can also change these parameters by editing tunable files with a text editor. We suggest that you avoid editing the tunable files manually, because no error checking is done to keep you from changing parameters to unacceptable values.

If you have an Application Server, see the *System Administration* guide for more information on tunable parameters.

Changing Tunable Parameters from the Desktop

The "System Tuner" window is the preferred method for changing your UnixWare tunable parameters. Dozens of tunable parameters are available for modification through this window. These parameters are divided into categories you can view by clicking on the category button at the top of the window. To see a description of any of the parameters, click on the parameter. A description appears in the text box in the window.

Using the System Tuner Window

To access the "System Tuner" window, double-click on the "System Tuner" icon in the "Admin Tools" folder. (You must have system owner permissions to use this window.)

The "System Tuner" window appears:

Figure 12-5
System Tuner
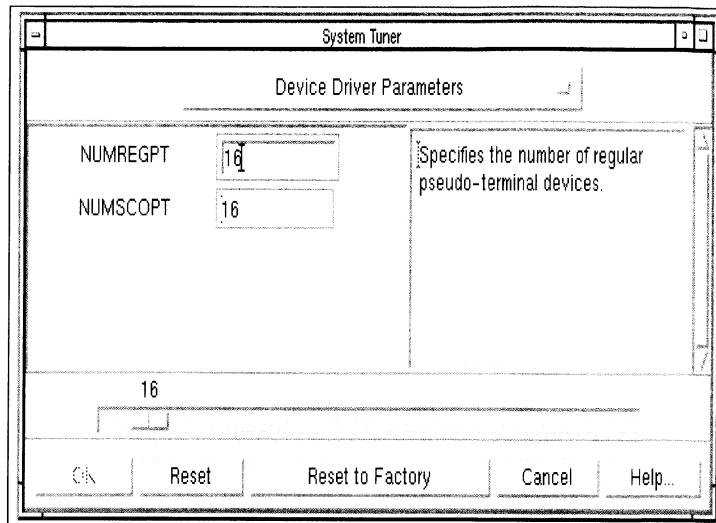
Procedure

1. **If the tunable parameter you want to modify is not shown in the current set of parameters, click on the category button and select the appropriate category.**

2. **Once the tunable parameter you want to change is displayed, click in the text box next to the parameter name.**

   A description of the parameter appears to the right.

3. **To change the value of the tunable parameter, either type the new value or move the slider bar near the bottom of the window until the value you want is displayed.**

   You can also click on auto (if available) to have the system select the value automatically.

4. **Click on OK to save the settings or Cancel to discard the changes you have made.**

   You are asked if you want to rebuild the kernel, to incorporate the new tunable values into UnixWare. Click on Yes to rebuild it now or on No to rebuild it the next time you reboot. If you rebuild the kernel, any errors encountered are placed in the */tmp/kernel_status* file.

   You are asked if you want to reboot now. (New parameters do not take effect until you reboot UnixWare.) If you click on Yes, the system is

rebooted now. If you click on No, you can continue with the old tunables in effect until the next reboot.

The following list contains other features of the "System Tuner" window you should be aware of:

♦ Some parameters have an "auto" box next to the parameter name. Click on auto to have the system automatically assign an appropriate value.

♦ Click on Reset to reset values for all parameters on the current window to the values that appeared when you first brought up the window.

♦ Click on Reset to Factory to reset values to those that were set when UnixWare was installed.

Using the Message Monitor

UnixWare is always sending important error messages, warnings and kernel logging information to the kernel messaging system and the system console. If you are running the desktop from the console (which is normal for UnixWare on a PC), those messages never appear on the screen. The "Message Monitor" window provides a way to see the kernel logging messages from the desktop.

There are several reasons you may want to use the Message Monitor window:

♦ Security. The Message Monitor can reveal attempts by outsiders to connect to your system over the network or attempts to obtain root permissions.

♦ Error Conditions. If you are having trouble writing to your hard disk, accessing a CD-ROM, or talking to the network, the Message Monitor allows you to view these error conditions as they occur.

♦ Software Debugging. If you are developing or debugging software, particularly device driver software, the Message Monitor is an important tool for debugging problems.

To access the Message Monitor, double-click on the Message Monitor icon in the Applications folder.

The "Message Monitor" window appears:

Figure 12-6
Message Monitor

```
                              Msg_Monitor

    File   View   Options                              Help

  Console log for doclab1
```
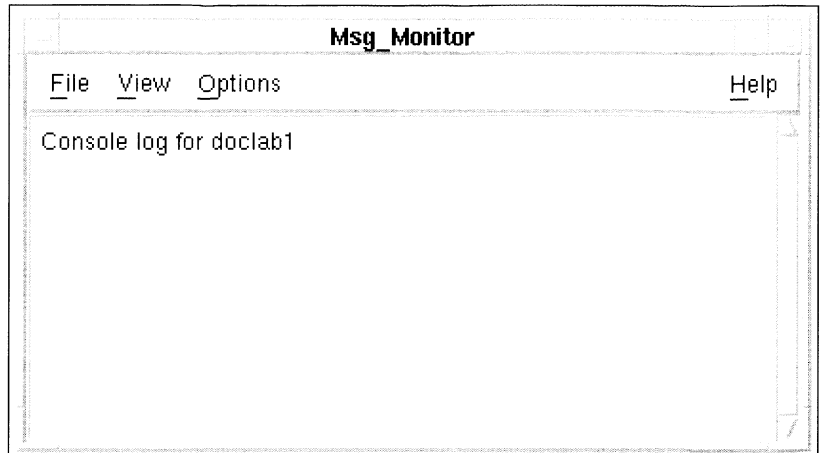
When the "Message Monitor" window appears, it displays the system name fo
the console log and any current messages. (This is useful if you are monitorin§
several systems from one desktop.)

Clearing the Message Monitor

Once you have seen or saved the messages in your "Message Monitor"
window, you can clear the messages.

To clear messages, do the following:

Procedure
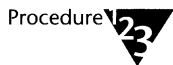
1. **Click on *View* in the menu bar.**

2. **Select *Clear.***

    All messages are cleared from the window.

Saving Messages to a File

To keep a record of the messages that appear on your "Message Monitor"
window, you can save the messages to a new file or append messages to an
existing file.

To save your log messages, do the following:

Procedure
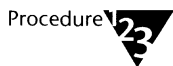
1. **Click on *File* in the menu bar.**

2. **Click on the desired action:**

Save. Saves the current messages to the last specified file. By default, the file */tmp/osmLog* is used.

Save As. Displays a window that lets you type a different file in which to save the messages.

Append To. Displays a window in which you can specify a file to which you want to append the messages.

3. **Click on OK to complete the desired action.**

Alerting You of Messages

If you have limited space on your display, or you simply do not want the "Message Monitor" window open all the time, you can set an option that allows you to minimize the window and alert you only if a new message comes in.

To select one of several methods for alerting you of new Message Monitor messages, do the following:

Procedure
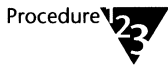
1. **Click on *Options* in the menu bar and select *Notification*.**

2. **Set the desired options:**

Deiconify. After you select this option and minimize the window, the window immediately reappears when the next message comes in (default).

Flash. After you select this option and minimize the window, small balloons on the icon blink when the next message comes in.

Color Change. After you select this option and minimize the window, small balloons on the icon change to a solid color when the next message comes in and remains that way until the user views the messages.

Suggestion

If you prefer, you can change the colors of the balloons. To do this, you must use the command line, however. Open a "Terminal" window and go to */usr/X/lib/app-defaults*. Then type **vi Msg_Monitor**. The colors are listed in the line, `Msg_monitor.colorChangeTuples:....`

Off. Ignores the fact that any new messages have come in. The message appears the next time you open the window, but the icon neither changes nor opens on its own.

3. **Click on the minimize button to minimize the window.**

The next time a message appears, you are alerted in the manner you selected previously.

Using Processor Setup

Use Processor Setup to place a processor online if you have licensed additional processors.

To start Processor Setup, double-click on the Processor Setup icon in the Admin Tools folder.

The "Processor Setup" window appears.

Note ▼ The Change Processor Setup Permissions must be set to use all of the tasks in Processor Setup. See "Using User Setup" in the chapter "Configuring Your User Environment" earlier in this handbook. The system owner automatically has permission to do this.

This window shows the number of processors attached, how many processors are licensed, and which processors are online.

Taking a Processor Online or Offline

This task allows you to attach or detach processors from your system.

Once you have displayed the "Processor Setup" window, you can take processors online or offline as follows:

Procedure ▼ 1. **Click on the icon representing the processor number to take offline or place online.**

2. **Set the desired options:**

   On-line. Click to place the selected processor online after purchasing and installing a license.

   Off-line. Click to take the processor offline.

Viewing Processor Properties

This task allows you to view the state of your processor.

To view the state, processor type, or floating point for a processor:

1. Click on the processor whose properties you want to view.

2. Click on *Actions* in the menu bar and select *Properties*.

The "Processor Properties" window appears.

3. View the following items.

Processor ID. This displays the processor number.

State. This displays either online or offline.

Processor Type. This displays whether it is a 486 or another type.

Floating Point Type. This displays the name of the floating point product.

4. Click on OK to dismiss the window.

Note When adding a new processor, after you shut down and restart your system, a new processor icon and number will appear in the window when you open the "Processor Setup" window.

Changing the Maximum Allowed Size of Files

You cannot create or copy a file that is larger than the limit allowed by the **ulimit** program. When this happens, you must change your default user limit size. This size restriction prevents processes from taking up too much disk space.

Note The default file system limit size also applies to the NUCFS. See "NetWare UNIX Client (NUC) Overview" in the chapter "Setting Up and Configuring NetWare Connectivity" for more information.

Using the ulimit Command

Changing your user limit this way is only valid for the current session.

To change your file size limit, do the following:

1. Log in as root or type *su* to become root.

2. Type

```
ulimit
```

to view your current limit in blocks.

3. **Then type**

   ```
   ulimit new_size
   ```

   to set your limit to the new size for the current session.

   You can also set a limit in the */etc/profile* or */etc/default/login* file to make the setting permanent.

Understanding Swap Space

Real memory on your system often fills with system processes. When this happens, UnixWare must swap (move) idle processes to disk so that memory can be used for active processes.

Swap space is located in a separate disk area on your UnixWare partition. The amount of swap space required for your system varies depending on how you use your system. If you use your system heavily (for example, to run many processes, in particular graphical processes), you will need more swap space.

A typical UnixWare Desktop session uses about 8 MB of swap space. When running DOS on the desktop, for example, each DOS session requires 4.5 MB of swap space per user. Windows uses 7.5 MB of swap space per session.

If you double-click on an application such as Windows and it does not start, you may have run out of swap space. Start the Message Monitor to see if there are messages about running out of memory.

To determine how much swap space is being used, do the following:

Procedure ▼▼▼

1. **Double-click on Applications in the UnixWare Desktop.**

2. **Double-click on Terminal in the Applications folder.**

3. **Type**

```
/usr/sbin/swap -s
```

to view how much swap space is being used. The output may be similar to the following:

```
total: 25104 allocated + 3320d reserved = 28424d
   blocks used, 24912d blocks available
```

To determine the number of megabytes of swap space available, divide the number of blocks available (24912 in the example) by 2048 (equal to 12 MB free swap space in this example).

To determine the total amount of swap space in blocks, add the number of blocks used to the number of blocks available (28424 + 24912 = 53336, in the example). Divide this number by 2048 (for 2K blocks) to determine the total number of megabytes of swap space (about 26 MB in this example).

For example, to add 8 MB of swap space, do the following:

Procedure

1. **Double-click on Applications in the UnixWare Desktop.**

2. **Double-click on Terminal in the Applications folder.**

   A "Terminal" window appears.

3. **Type** *su* **to become root.**

4. **Type**

   ```
   dd if=/dev/swap of=/extraswap count=2048 bs=4096
   swap -a /extraswap
   ```

If you want extra swap space always available, create a script in the */etc/rc2.d* directory. Find the highest number script (a line that contains S75rcp, for example) and create a script such as **S80moreswap** (5 MB more than 75). Then include the **swap -a /extraswap** command in the script.

About Partitions

When you installed UnixWare, the *Installation Handbook* gave you
instructions and some background information on what partitions are and how
to allocate partition space for different operating systems such as DOS and
UnixWare.

The **fdisk** command explained in the *Installation Handbook* is used to partition
your hard disk. You can also change your partition to use another operating
system, such as MS-DOS® or OS/2®. See your *Installation Handbook* for
information.

13 *Recovering Your System*

This chapter describes how to retrieve your files when data is lost and also includes information on

◆ Preventive methods for backing up your system to avoid loss of data if files are mistakenly deleted or corrupted.

◆ Procedures for restoring your system if the system panics, if the system hangs (will not boot), or if the hard disk is corrupted.

Overview

Important You should back up your system on a regular basis. Depending on how much traffic you have on your system and how much work you and other users do on your system, you may want to back up daily or once a week. In case of disk failure or a power interruption, data created after the most recent backup may be lost.

The best time of day to back up your system is at the end of the day. Also, you may want to store a copy of your recovery diskettes or tapes somewhere offsite.

In this chapter, UnixWare provides two methods to protect your system from hardware or software failure or accidental loss of data:

1. The two-step emergency recovery feature. First, create emergency recovery diskettes (see "Creating Emergency Recovery Diskettes" in the next section) and then create emergency recovery tape(s) (see "Creating Emergency Recovery Tape(s)" in this chapter). If your system is later damaged, you can use the emergency recovery diskettes either to correct the damage or to restore your system from the emergency recovery tape(s).

2. The backup and restore feature described in the chapter "Backing Up and Restoring Files" of the *Desktop User Handbook*. This method satisfies most backup and restore needs, except when your operating system or hard disk is corrupted.

This method allows you to select which user data files to back up, which files to restore, or to transfer files from one system to another.

For emergency recovery, the UNIX System partition(s) and if it exists, the system partition (or, depending on the options used when creating the emergency recovery tape, your entire primary hard disk) are backed up. If you restore data using the emergency diskettes and tape(s), the UNIX partition or entire hard disk is overwritten. The backup and restore method allows you to select what is backed up and restored but limits backups and restores to the user data files in your UNIX partition.

Note ▼ The emergency recovery feature also backs up the following file systems if they are mounted on the secondary disk: /usr, /home, and /home2. However, the emergency recovery feature does not back up any other file systems or partitions on the secondary disk. Use the **backup**(1M) or **restore**(1M) commands to back up any additional file systems on the secondary disk.

Suggestion ▼ To provide maximum flexibility with minimal administrative overhead, create emergency recovery diskettes and tape(s) after your system software is installed. (If you later install additional software, create new emergency recovery diskettes and tapes.) Then, on a regular basis, back up user data by following the instructions in the chapter, "Backing Up and Restoring Files," in the *Desktop User Handbook*.

This chapter also discusses system hangs and panics that may occur on your system without warning. Often users cannot determine why this occurs or how to recover from it. The sections "Recovering from a System Hang" and "Recovering from a System Panic" explain why these events occur and how to recover from them.

You can also force a panic on your system if you want to determine why your system is malfunctioning. See "Forcing a Panic on Your System" later in this chapter.

Creating Emergency Recovery Diskettes

This task allows you to create emergency diskettes. These steps are needed to recover your system if UnixWare is later corrupted.

After installing UnixWare, create emergency recovery diskettes by doing the following:

1. **Double-click on Applications in the UnixWare Desktop.**

2. **Double-click on Terminal in the Applications folder.**

   A "Terminal" window appears.

3. **Type *su* to become root.**

4. **Select a working directory.**

   The working directory refers to a file system with at least 22 MB of free space. To determine the amount of free disk space in a file system, type

   ```
   /sbin/dfspace
   ```

   For example, to use the */usr* directory, check whether the output from **dfsize** indicates that the */usr* file system contains enough space. If */usr* is not listed, */usr* is not a separate file system. In this case, if / has 22 MB or more of free space, you can use */usr* as the working directory.

5. **Type**

   ```
   /sbin/emergency_disk -d pathname diskette
   ```

   where *pathname* is the file system you selected in Step 5 and *diskette* is the floppy disk drive where you will insert the diskette (**diskette1** or **diskette2**).

   Note
   If the directory you selected in Step 5 is */usr*, you do not need the *-d pathname* argument.

6. **Insert a diskette into floppy disk drive 1 or floppy disk drive 2 at the prompt.**

   Creating the emergency recovery diskettes takes about fifteen minutes to process. Wait for the next prompt before going to the next step.

7. **When prompted, remove the first emergency recovery diskette, insert the second diskette and press <Enter>.**

   Wait for the emergency_disk processing to complete before going to Step 8.

8. **Remove the diskette from the floppy disk drive.**

9. **Attach labels to both emergency recovery diskettes clearly indicating that they are emergency recovery diskettes. Include the name of the system for which the diskettes were created and number the diskettes in the order they were created.**

   Writing the system name on the labels is critical because a recovery diskette is customized for a particular system and only works on that system.

   Numbering the diskettes is also important because to use the diskettes you must insert them in the same order as they were created.

10. **Store the emergency recovery diskettes in a safe and easily accessible location.**

Creating Emergency Recovery Tape(s)

Note ▼ If your system does not have a tape drive, you should still create emergency recovery diskettes and back up data onto other media or across the network by using the standard back up facilities (see the chapter, "Backing Up and Restoring Files," in the *Desktop User Handbook*).

To create emergency recovery tape(s), do the following:
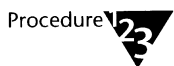
Procedure ▼ 1. **Notify any users on the system that you need to shut down the system to perform a backup and that they should log off.**

2. **Double-click on Applications in the UnixWare Desktop.**

3. **Double-click on Terminal in the Applications folder.**

   A "Terminal" window appears.

4. **Type** *su* **to become root.**

5. **Type**

   ```
   cd /
   /sbin/shutdown -i1 -y -g0
   ```

   The system state is changed to single-user mode.

6. **Insert a tape into cartridge tape drive 1 or cartridge tape drive 2.**

7. **Decide whether to back up the UNIX and system partitions or to back up the entire primary hard disk:**

   ◆ By default, the **emergency_rec** command backs up the UnixWare partition and system partition (if it exists) from your primary hard disk. Also, if the */home*, */home2*, and/or */usr* file systems are on a secondary hard disk and if they are mounted file systems, **emergency_rec** also backs up these file systems. If more than one tape is needed to back up the data, you are prompted for additional cartridge tapes when needed.

   ◆ Optionally, you can have **emergency_rec** back up your entire primary hard disk (UnixWare). In this case you must supply a single cartridge tape that is large enough to contain all the data that is being backed up.

8. **Create the emergency recovery tape(s):**

   ◆ To back up the UNIX and system partitions if they exist, type

     `/sbin/emergency_rec` *tape*

     where *tape* is the tape drive location of your inserted tape (**ctape1** or **ctape2**).

     If multiple tapes are needed to back up your system, you are prompted to insert additional tapes as needed. Wait for this command to finish processing and then go to Step 9.

   ◆ To back up the entire primary hard disk, type

     `/sbin/emergency_rec -e` *tape*

     where *tape* is the tape drive location of your inserted tape (**ctape1** or **ctape2**). Wait for this command to finish processing and then go to Step 9.

9. **Remove the last tape from the tape drive.**

10. **For each tape, attach a label clearly indicating that this is an emergency recovery tape.**

    Include the system name and date on the label. If multiple tapes are created, be sure to number them in the order they were created.

11. **Store the emergency recovery tapes with the emergency recovery diskettes for this system.**

Recovering from a System Panic

Usually a system panics for one of two reasons: either your hardware NMI (Non-Maskable Interrupt) or software are experiencing problems.

To recover from a system panic, you must reboot your system (press <Ctrl>+ <Alt>+<Delete>). If you were working in an application, the application may have saved a backup file automatically. You can retrieve this file after you reboot your system.

In any case, to prevent loss of data, perform backups frequently.

Hardware Panic

A hardware panic can be the result of the following:

◆ The NMI memory chip. If this chip is bad, the system NMI causes a panic.

◆ The power supply. If the power supply is bad, your system will panic.

Software Panic

A software panic can be the result of the following:

◆ A kernel trap. This occurs when the kernel cannot find a way around a process and becomes trapped.

◆ A page fault. This is caused by memory that enters space owned by another process.

When the problem occurs, the kernel debugger is launched if the kernel debugger is loaded on the system, and an error message appears on your console.

Recovering from a System Hang

A system can hang because your hardware I/O or software are experiencing problems.

When data is retrieved from a disk, certain errors stop the retrieval process; rather than performing a data recovery, the system hangs.

If you can still perform keyboard activity but the operating system does not respond or if the Disk Activity light is not illuminated, the problem is probably due to a software hang.

To recover from a system hang, you must reboot your system (press <Ctrl>+ <Alt>+<Delete>). If you were working in an application, the application may automatically save a backup file. You can retrieve this file after your system comes back up.

In any case, to prevent loss of data, perform a backup frequently.

Hardware Hang

Check the following if your Disk Activity lights are on:

1. SCSI bus parity checking/generation. This must be enabled or disabled for all devices on the bus. If all of your devices support SCSI parity, enable this for all devices. If not all of your devices support SCSI parity, disable it for all devices.

2. Terminator power. Make sure the SCSI bus is terminated correctly; each end of the SCSI chain must contain terminators.

3. Cabling. Make sure your cable and connectors are in good condition and that the spacing between devices is correct.

4. Bus device order. Order is important, especially if you are mixing SCSI 1 and SCSI 2 devices.

Software Hang

Software hangs may be caused by applications that consume memory without freeing it.

Check the following if hangs occur frequently:

1. Check your third-party software. It may contain a driver that is not compatible with UnixWare.

2. Disable the desktop and try to re-create the hang while your local system is in text mode. Sometimes the messages will be displayed on the console.

3. Check for adequate swap space which is two times your RAM.

See the chapter "Monitoring and Tuning Your System" for information on swap space or messages that may appear on your monitor which are helpful in determining why your system hangs.

Forcing a Panic on Your System

In instances where your system is hung, you can cause a panic on your system and take a system dump for analysis.

At the console window, press <Ctrl>+<Alt>+<p>. (This is similar to invoking the debugger through <Ctrl>+<Alt>+<d>.)

If the console is redirected to a serial port, press <Ctrl>+<->. (This is similar to invoking the debugger through <Ctrl>+<k>.)

See the **keyboard**(7) manual page in the *System Files and Devices Reference* for more information.

Restoring from the Emergency Recovery Diskettes and Tape(s)

This task allows you to restore your system from the media you created earlier in this chapter.

Follow this procedure if your system will not boot, your system software is corrupted beyond repair, or your hard disk has been reformatted or replaced.

Procedure
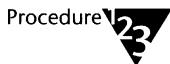
1. **Place the first emergency recovery diskette for this system in the system primary (boot) disk drive and reboot your system.**

2. **If prompted, type the UnixWare serial number.**

   The emergency diskettes are designed to reinstall software and data on a system and not to transfer data between systems. If the serial number prompt appears, the copy of UnixWare installed on your system is different from the copy used to create the emergency recovery diskettes.

   ◆ If you mistakenly inserted the wrong diskette, replace the current diskette with the correct emergency diskette and repeat this procedure

◆ If you want to use this diskette, enter the ten-digit serial number for the version of UnixWare installed on your system. The UnixWare serial number is provided with the original UnixWare software. Entering the serial number confirms that you did not enter the wrong media.

3. **Correct the system damage or restore data from the emergency recovery tape(s).**

The emergency recovery main menu provides options to start a limited UnixWare operating system command-line shell, to restore data from emergency recovery tape(s), to mount or unmount all file systems (if UnixWare data is accessible on the hard disk), and to reboot the system.

Use the up or down arrow keys or the <Tab> key to select the desired choice and then press <Enter>.

◆ If you select to invoke an emergency shell, a shell prompt is displayed and the following commands are available:

Table 13-1
Emergency Recover Shell Commands

cat(1)	fdisk(1M)	mkdir(1)
chroot(1M)	find(1)	mkfs(1)
cpio(1)	fsck(1M)	mount(1M)
date(1)	grep(1)	prtvtoc(1M)
dd(1M)	ksh(1)	rm(1)
disksetup(1M)	labelit(1M)	stty(1)
echo(1)	ln(1)	vi(1)
edvtoc(1M)	ls(1)	

Use these commands to investigate and fix the problem. Then press <Esc> to return to the main menu.

Note ▼ The emergency recovery shell is designed for advanced users only.

◆ If you select to reinstall your system, insert the emergency recovery tape(s) when prompted. Wait for the processing of the last tape to complete before going to Step 4.

◆ If you select to mount file systems, the UnixWare file systems are mounted. If you then invoke the emergency shell, you can access all the UnixWare commands on your system.

Note▼ Depending on the amount of damage to your hard disk, this option may not be available.

◆ If you select to unmount file systems, the UnixWare file systems are unmounted.

Note▼ Depending on the amount of damage to your hard disk, this option may not be available.

◆ If you select to reboot your system, the system reboots. If you used the emergency recovery shell to repair your system, remove the second emergency recovery diskette from the disk drive and then select this option to reboot your system.

4. **Remove the emergency recovery diskette.**

5. **Press <Esc> to reboot your system.**

6. **If you created any full or incremental backups of your system after creating the emergency recovery tape(s), restore those backups using the standard backup and restore facilities.**

See the chapter "Backing Up and Restoring Files" in the *Desktop User Handbook* or the chapter "UnixWare Command-Line Tools" in this handbook for more information.

14 *Setting Up DOS and MS Windows for Merge*

This chapter describes how to set up DOS and MS Windows and includes information on

◆ How to install DOS and MS Windows

◆ How to configure DOS and MS Windows

◆ How to install private and public applications for DOS

◆ How to use terminals with Merge and includes keyboard mapping tables

◆ How to troubleshoot Merge problems

Overview

Merge provides capabilities similar to those provided by personal computers running DOS and MS Windows alone. Merge allows you to run DOS and MS Windows (and their applications) simultaneously with UnixWare. With Merge, you benefit from UnixWare's multitasking and other advanced capabilities while running your favorite DOS or MS Windows applications.

Important ▼ MS Windows is not provided with Merge; if you want to use MS Windows, you must purchase it separately. If more than one user uses MS Windows or any DOS or MS Windows applications you install, each user must be licensed.

This chapter describes how to install and set up DOS and MS Windows for Merge. Information on starting and using DOS and MS Windows Merge is contained in the *Desktop User Handbook*.

Installing Another DOS Version

UnixWare comes with a subset of Novell DOS™ installed. This version does not include commands that do not apply to the Merge environment, such as *UNDELETE.EXE*. Also, documentation for Novell DOS is not provided.

Note ▼ This release includes a subset of Novell DOS 6.0. The *dosinstall* utility can be used to install a full copy of DR-DOS 6.0, MS-DOS 5.0, MS-DOS 6.0, MS-DOS 6.21, or reload the DR-DOS 6.0 subset. This version does not support Novell DOS 7.0.

To install another version of DOS, Merge requires that the diskettes used be the official manufactured DOS diskettes or they may not be installed properly. User- created versions of DOS diskettes may not have all the required files or they may not be in the proper order. Merge requires that the DOS diskettes be bootable.

Note ▼ As sold by Microsoft, the Microsoft MS-DOS 5.0 Upgrade Package was not bootable; the Microsoft MS-DOS 6.0 Upgrade Package was bootable. If your DOS diskettes are not bootable, you must create a bootable set as described in the upgrade product.

To install another DOS from floppy diskettes, do the following:

Procedure ▼ 1. **Double-click on Applications at the UnixWare Desktop.**

2. **Double-click on Terminal in the Applications folder.**

3. **Type *su* and the root password.**

4. **Type *dosinstall*.**

5. **Follow the prompts on the screen to remove the current version of DOS and install the new version.**

Configuring DOS

You can reconfigure your DOS environment or the environment of any particular DOS executable on your desktop from the "DOS Options" window.

Using the DOS Options Window

You can change the DOS environment from the "DOS Options" window related to the DOS icon or any icon representing a DOS application on the desktop. To invoke the "DOS Options" window, do one of the following:

Procedure
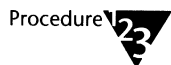
1. **Right click on the DOS icon in the "Applications" window or the icon that represents the DOS application and select *Options*.**

   The "DOS Options" window appears.

2. **Set the desired options:**

   Video. Click on VGA, CGA, MDA, or Hercules, depending on the video display mode you want the DOS session to run under.

   Note Hercules® video mode is supported by DOS Merge when running in an X window, but requires a physical Hercules video card in order to run DOS Zoomed to full screen.

   Drives. Click on a drive letter you want to assign. Additional DOS partitions can be assigned to Merge drive letters E: through I:. DOS drive letters are shown as *dosX*, where *X* is the name of the DOS drive under DOS on your DOS partition. For example, *dosC* and *dosD* are DOS drives C: and D: under DOS on your DOS partition.

   COM Ports. Click on COM1 or COM2, depending on the COM port you are using with the current DOS session.

   Note You can only use a COM port with DOS if the port is not already in use —including a UNIX system user—and only if you have permission to use the port. Do not apply a COM port for all DOS sessions because a second DOS session will not be able to attach the COM port and will fail to start.

   Merge uses UnixWare devices */dev/tty00* and */dev/tty01* for DOS COM1 and COM2 ports. To make them accessible to DOS, they must have read/write permissions for all users. If the permissions are not available, consult with the system adminstrator.

   Note If you apply a COM port for all DOS sessions, a second DOS session will not be able to attach the COM port and will fail to start.

   Memory. Click on the type of memory with which you want to start your DOS. Standard memory is the same as Extended memory. If your DOS applications require Expanded memory, click on EMS which is LIM EMS 4.0 compatible. Select the amount of memory to use for each type.

If you are going to start MS Windows manually after starting a DOS session, you must start your DOS session with Standard (Extended) memory selected.

We suggest that you select 4 MB of Standard memory. However, you should use the Win icon to start and configure the MS Windows environment.

If you select more memory than you currently have, your DOS session may not come up. In this case, close several open windows or select less memory to bring up the session. For information on adding swap space, see the chapter "Monitoring and Tuning Your System" earlier in this handbook.

LPT Ports. By default, all printing to parallel ports LPT1, LPT2, and LPT3 automatically goes to the UNIX spooler named *doslp*.

Suggestion

You can press the Help button for more information on these ports.

3. **If you want the settings to be permanent, click on the Apply button.**

If you want the settings to be used for this session only, click on the Start button.

Viewing Configured DOS Devices

You can view the current settings you made in the "DOS Options" window by pressing <Ctrl>+<Esc> and then <Ctrl>+<i> from any DOS text application or from the DOS command line.

Note

You cannot view the "DOS Options" window while MS Windows or a DOS graphics session is displayed on your screen. If you do this by mistake, press the <Spacebar> to continue.

For more information on customizing and configuring your DOS and MS Windows sessions, see "Configuring Your DOS and MS Windows Environment Under UnixWare" later in this chapter.

Using Extended and Expanded Memory

By default, DOS on UnixWare has 640KB of conventional RAM—most DOS applications are designed to use this amount of memory. You can, however, add up to 15MB of Extended or 8MB of Expanded memory to run applications designed for this type of memory.

Using Extended Memory

Extended memory is used by a limited number of applications. MS Windows, however, is one of the applications that requires Extended memory. If you are going to start MS Windows after starting a DOS session, we suggest that you start your DOS session with 4MB of Extended memory.

When a DOS session starts, 1MB of Standard memory is assigned. We suggest that you do not select more Standard memory when starting a DOS session unless your applications require it.

Note If you try to start MS Windows with only 1MB of Standard memory, an error message will appear stating that you cannot start MS Windows.

Using Expanded Memory

Some applications, such as WordPerfect®, are designed to use the LIM EMS. To run such applications, select an appropriate amount of EMS memory.

Increasing Memory

MS Windows will not start from a 1MB DOS session. To increase memory, do the following:

Procedure

1. **Double-click on Applications at the UnixWare Desktop.**

2. **Press and hold the right mouse button on the DOS icon.**

    A menu appears.

3. **Click on *Options*.**

    The "DOS Options" window appears.

4. **Select the desired amount of memory (at least 4MB).**

5. **Click on Apply.**

Using Display Adapters

By default, DOS on UnixWare starts in VGA mode (640x480) with 16 colors, even if you have a VGA card that has extended video modes. You can, however, configure all or specific DOS sessions to run in either CGA, MDA, or Hercules

full-screen modes (Hercules full-screen mode requires a Hercules display adapter).

Note ▼ VGA graphics can only be viewed when Merge is in Zoom (full-screen) mode.

Using the Mouse

You can use your mouse with DOS without any special configuration or driver. DOS recognizes the mouse as a two-button Microsoft bus mouse.

Note ▼ You must *focus* your desktop mouse to use it in a "DOS" window. See Focus described in the *Desktop User Handbook*.

Setting the Search PATH

The system-wide default PATH for DOS on your UnixWare system is defined in the *D:\AUTOEXEC.BAT* file and includes *J:\DOS* and *J:\MERGE.* The *J:\DOS* directory contains the standard DOS commands provided with your UnixWare system, and the directory *J:\MERGE* contains the DOS and MS Windows executables.

You should modify your personal startup file, *C:\AUTOEXEC.BAT*, instead of the system startup file, *D:\AUTOEXEC.BAT.* Any entries in your personal *AUTOEXEC.BAT* file are run in addition to the entries in the system-wide *AUTOEXEC.BAT* file. For example, if you add *C:\WINDOWS* to your path in your local *AUTOEXEC.BAT* file, it would become part of your path along with the path specified in the *D:\AUTOEXEC.BAT* file whenever you start a DOS session. Your *C:\AUTOEXEC.BAT* file is concatenated to the system-wide *D:\AUTOEXEC.BAT* file so that entries in both are applied to your environment. Modifying *C:\AUTOEXEC.BAT* does not affect other users on your system; modifying *D:\AUTOEXEC.BAT* does affect all users.

Use a DOS text editor to change the search path in your *AUTOEXEC.BAT* file

Installing DOS Applications

In general, you can install most DOS applications by following the manufacturer's instructions for installing on a hard disk. Simple DOS applications or commands—those that have a single *.EXE* or *.COM* file and do not require their own subdirectories—can be copied directly into your *home* directory or into the directory *J:\SHARE* rather than requiring an installation procedure.

Following are procedures for installing private DOS applications (that are to be used by you only and that will reside in a subdirectory below your *home* directory) and public DOS applications (that are accessible by multiple users and that will reside in a public subdirectory).

Installing Private Applications

To install a DOS application for your own use, log in to UnixWare, start DOS, and follow the manufacturer's installation procedures.

Most applications require you to specify the following at installation:

◆ The drive and directory where the application is to be installed.

Type the desired pathname on your C: drive. For example, if you are installing WordPerfect, you could specify *C:\WPERF* as the program directory.

◆ The type of display you have on your system.

Most applications automatically detect the type of display you have. If not, specify your display adapter as CGA, Hercules, or VGA.

◆ The printer port the application is to use.

Specify LPT1, LPT2, or LPT3 as your printer port. Specify the type of printer you have.

◆ The type of mouse you have on your system.

Always specify a Microsoft bus mouse as your mouse type regardless of your actual mouse. To a DOS program, your mouse is always seen as a two-button Microsoft bus mouse. Type No if the application acknowledges whether it should install its own mouse driver.

◆ Permission to modify the *AUTOEXEC.BAT* and *CONFIG.SYS* files.

Type Yes if the application wants to modify your personal *C:\AUTOEXEC.BAT* and *C:\CONFIG.SYS* files. You may also want to check the application documentation for a description of the modifications and make the necessary changes to your personal *AUTOEXEC.BAT* and *CONFIG.SYS* files.

◆ Permission to configure the application for a specific processor.

◆ Type **8086** if the application wants to configure itself to run on a specific processor.

Installing Public Applications

Public DOS applications should be installed in a directory or drive so they are accessible to all users. However, you should give only one user (such as a system administrator) the responsibility and permissions to install these applications.
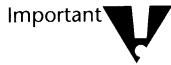
Important ▼ When installing public applications, observe the licensing requirements of the application's manufacturer.

Install public DOS applications in subdirectories below the directory *J:\SHARE*. By default, only the root user has permissions to install applications in this directory and to edit the system startup files *D:\AUTOEXEC.BAT* and *D:\CONFIG.SYS*.

To assign these tasks to the system owner, do the following:
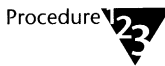
Procedure ▼
1. **Double-click on Applications at the UnixWare Desktop.**

2. **Double-click on Terminal in the Applications folder.**

   A "Terminal" windows appears.

3. **Type *su* and the password to become root.**

4. **Change user permissions by typing the following, replacing** *username* **with the name of the system owner:**

   ```
   chown  username /usr/merge/dosroot  /autoexec.bat
        /config.sys
   ```

5. **Close the Terminal window.**

To allow another user to install DOS applications, log in as the current user and repeat Steps 1 through 5.

To install a public DOS application, follow the procedures in "Installing Private Applications" described previously, with these exceptions:

◆ Log in as the system owner and start DOS.

◆ At the DOS prompt, move to the *J:\SHARE* directory by typing
cd c:\usr\ldbin.

◆ Use the manufacturer's installation instructions and specify that the
application be installed in a subdirectory under *J:\SHARE*.

◆ Do not allow the application to modify the system-wide
D:\AUTOEXEC.BAT and *D:\CONFIG.SYS* files. Consult the application
documentation for the description of the modifications and make the
necessary changes yourself.

◆ Reverse the ownership changes you made earlier by typing

```
chown bin  /usr/merge/dosroot  /autoexec.bat
    /config.sys
```

Installing Applications on a DOS Partition

Some copy-protected DOS applications cannot be installed on the shared file
system. If you have a DOS partition on your hard disk, you can install these
applications on the DOS partition using the methods described next. If you do
not have a DOS partition on your hard disk, see the *Installation Handbook* for
information on setting up a DOS partition.

Installing Copy-Protected Applications on a DOS Partition at the Desktop

To install a copy-protected application on a DOS partition, be sure you are
logged in to UnixWare as the system owner, and do the following:

Procedure 23
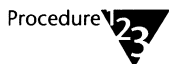
1. **Double-click on the DOS icon in the Applications folder.**

2. **At the DOS prompt, type the drive letter you assigned to the DOS
partition and where you want the application installed.**

3. **Move to the subdirectory where you want to install the application.**

4. **Install the application according to the manufacturer's instructions.**

Installing Copy-Protected Applications on your DOS Partition from DOS

Some copy-protected DOS applications cannot be installed using the
UnixWare Desktop. To install these applications, you need to run DOS from the

DOS partition by either booting from a bootable DOS floppy diskette or by using the **fdisk** command to boot directly from your DOS hard disk partition.

Note▼ To install copy-protected applications under DOS on your DOS partition, do the following after shutting down your UnixWare system:

Use a bootable DOS floppy diskette to boot DOS on your system. You can create bootable DOS floppy diskettes on UnixWare by starting a "DOS" window and using this DOS command: **format a: /s /u**

Or you can use **fdisk** from a "Terminal" window (located in your Applications folder) to make the DOS partition the active partition. Then shut down your system and reboot. DOS will boot instead of UnixWare. See the chapter "UnixWare Command-Line Tools" for information on how to use **fdisk**.

To boot UnixWare again, run **fdisk** within DOS and make the UNIX partition the active partition. Reboot to start UnixWare again.

Some DOS applications must be installed and run under the same drive letter. The applications make a record of the drive letter on which they are installed and fail if you try to run them from any other drive. When you run under DOS on your DOS partition, DOS usually identifies the DOS partition as drive C:. When you run under DOS on UnixWare, the same partition is referenced as drive E:, which causes the application to fail.

To avoid this, install the application on drive E: so that the application recognizes drive E:.

To install an application on drive E: after booting DOS on your DOS partition, do the following:

Procedure▼ **1. At the DOS prompt, type**

```
SUBST  E:  C:\
```

2. Install the application on drive E:.

Whenever you run this application from DOS on UnixWare, the drive is automatically referenced as drive E:.

Installing Protected Mode Applications Under DOS on your DOS Partition

Protected mode applications cannot be installed or run using the UnixWare Desktop.

To install and run these applications, do the following:

1. **Shut down UnixWare using the procedures described in "Shutting down or Rebooting UnixWare" in the *Desktop User Handbook*.**

2. **From a "Terminal" window, become root, use the fdisk command to switch partitions, and make the DOS partition active.**

3. **In the DOS partition boot DOS on your system.**

4. **Install the application on the DOS partition using the manufacturer's installation instructions.**

5. **Run the application using DOS on your DOS partition.**

Note

Only run applications under DOS on your DOS partition if you have a single-user system.

Making New DOS Images

A DOS image is a file that reflects the configuration of your current DOS session. You should make a new DOS image if you changed your hardware, your video board, or added or removed floppy diskette drives. In addition, you should make a new image file if you change the LASTDRIVE or add device drivers to the special *config.sys* file used to create the image file.

To change the *lastdrive* or add device drivers, you can either edit the master configuration file, */usr/merge/image/config.mki*, or edit the *config.sys* file located in */usr/merge/image/std/vga* (there are also *mono* and *cga* directories located under */usr/merge/image/std*, each of which contains a *config.sys* file). These *config.sys* files already include a *lastdrive* entry. After editing these files, remake the DOS image files.

To make a new DOS image, do the following:

1. **Double-click on Applications in the UnixWare Desktop.**

2. **Double-click on Terminal in the Applications folder.**

3. **Type *su* and the password to become root.**

4. **Type *mkimg*.**

Installing MS Windows

UnixWare does not come with MS Windows installed. Read this entire section carefully before installing MS Windows on UnixWare. If you want to use the **win** command from a DOS prompt, see "Running MS Windows from a DOS Prompt" later in this chapter.

The procedure in this section describes how to install MS Windows so either you personally or all users on your system can use MS Windows. If you have installed Server Merge, skip to the section "Installing MS Windows in a Network or Shared Environment" to install MS Windows so it can be shared with remote users.

To install MS Windows, do the following:

Procedure

1. **In the Applications folder, double-click on the MS Windows Win_Setup icon.**

    This icon opens a "DOS" window specifically configured for installing MS Windows.

Note

The MS Windows Win_Setup icon can also be used to start a DOS session when you want to run MS Windows' SETUP from the DOS command line. If MS Windows is already running, double-clicking on the MS Windows Setup icon will not open a DOS window.

2. **Insert the MS Windows Disk 1 diskette.**

3. **Type *A:* (or *B:* if you're using drive B:) at the DOS prompt and press <Enter>.**

4. **Type *SETUP* and press <Enter>.**

5. **If a message appears about *SUBST.EXE* running, type *C* to continue.**

    The screen now indicates that your hard disk is being checked for previous versions of MS Windows. This may take several minutes, depending on the size of your hard disk.

6. **When prompted, choose Express Setup.**

7. **A window appears indicating *C:\WINDOWS* as the drive and directory for the installation. Press <Enter> to accept this directory.**

8. **Continue with the installation by following MS Windows' installation instructions.**

When MS Windows shows your hardware configuration, note the following:

◆ Make sure that the selected keyboard is the following: Enhanced 101 or 102 Key U.S. and Non-U.S.

◆ Make sure you configure your Merge mouse driver. For further information, refer to "Selecting the Mouse" later in this section.

◆ If you are using NetWare and IPX, make sure that Novell NetWare is selected as the network. Select the shell version appropriate to your version of NetWare. See your NetWare documentation for details.

Note ▼ You will be prompted to switch to Zoom (full screen) mode when MS Windows is ready to enter its graphics mode. Follow the instructions on the screen to switch to Zoom mode.

◆ You may allow MS Windows to update your *AUTOEXEC.BAT* or *CONFIG.SYS* files.

The "Printers" window is displayed. To configure your printer, do the following:
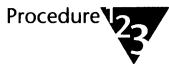
Procedure ▼ 1. **From the List of Printers column, click on the desired printer type.**

2. **Click on *Install*.**

3. **In the Installed Printers box, select your printer.**

4. **Click on Connect.**

5. **In the Ports box, select LPT1.DOS (do not select LPT1).**

6. **Click on OK.**

7. **Click on Continue.**

8. **Answer any other questions that appear.**

9. **When the installation is complete, remove any remaining diskettes from your drives.**

You now are in Zoom (full-screen) mode with a DOS prompt.

10. **Exit Zoom mode by pressing** <Scroll Lock>.

    The "UnixWare Desktop" window is displayed along with a DOS window.

11. **If you do not already have an *AUTOEXEC.BAT* file in your *home* directory, you must create and edit one in this step. Create one by opening a new file called *autoexec.bat* with your editor and include the statement *PATH C:\WINDOWS*.**

Note ▼▼
    If you are editing an existing *AUTOEXEC.BAT* file, make a backup copy before editing it. If necessary, you can restore the file from your backup.

MS Windows is now installed and ready to run. See the *Desktop User Handbook* for more information on starting MS Windows.

Installing MS Windows in a Network or Shared Environment

To install MS Windows so that several users can access it, you must perform either a network or a shared installation. In both cases, use the **/A** option to SETUP. Refer to the documentation supplied with your copy of MS Windows for additional information.

For a network installation, you install MS Windows on a NetWare file server by using O: as the installation drive. From O: you can log in to the server you want to use for MS Windows.

A shared installation means that MS Windows is installed on a directory accessible by all users on the same system. The network is not used for installing MS Windows. For a shared installation use *J:\SHARE* as the drive and directory to install MS Windows.

Be sure to use the **/A** option to **SETUP** when installing on a shared directory. Before installing MS Windows in *J:\SHARE*, you must change the UnixWare permissions for the directory, as explained in the next section of this chapter.

After MS Windows is installed either on the NetWare file server or in a shared directory, users should perform a personal installation. Each user runs **SETUP** with the **/N** option and specifies *C:\WINDOWS* as the drive and directory within which to install. This creates personal copies of several configuration files for MS Windows in your home directory. The majority of MS Windows' files are accessed from the file server or the shared directory. In general, follow the steps for installing a personal copy of MS Windows.

Installing MS Windows in a Shared Directory

To install MS Windows in a shared directory, you must log in as root, change the UnixWare permissions, install MS Windows using **SETUP /A**, then change the permissions back to their original values to avoid a breach in security on your system. For additional help with this procedure, see your system administrator.

To perform these steps in */usr/merge/dosroot/share*, do the following:

Procedure

1. **Double-click on Applications at the UnixWare Desktop.**

2. **Double-click on Terminal in the Applications folder.**

3. **Type *su* and the password to become root.**

4. **Type *cd /usr/merge/dosroot* and press <Enter>.**

5. **Type *chmod 777 share* and press <Enter>.**

6. **Press <Ctrl>+<d> to return to your regular prompt.**

This procedure assigns read-write-execute permissions for the */usr/merge/dosroot/share* directory for all users.

Warning

Changing permissions on *share* to **777** creates a potential security problem. After installing MS Windows, set the permissions back to their original values by repeating the previous procedure, but substitute *chmod 755 share* for **chmod 777 share** in Step 5.

Completing a Network or Shared Environment Installation

After installing MS Windows on a network or in a shared directory, and after each user has copied the necessary MS Windows files to their local directory using **SETUP /N**, do the following:

Procedure

1. **For each user using the shared copy of MS Windows, edit the *PATH* statement in their *AUTOEXEC.BAT* file to include both the shared MS Windows directory and the local MS Windows directory.**

   See the *Desktop User Handbook* for information on editing the *AUTOEXEC.BAT* file.

2. **If other users run MS Windows on the UnixWare Desktop, copy the MS Windows/X display drivers to the shared MS Windows directory.**

Merge supplies the **winxcopy** command that copies the correct files for you. For example, to copy the MS Windows/X drivers to *J:\SHARE\WINDOWS*, type the following at the DOS prompt:

winxcopy   J:\SHARE\WINDOWS

Be sure you have write permissions for the shared directory.

3. **When a networked or shared environment is used for MS Windows, the MS Windows applications must be installed in the networked or shared directory.**

Running MS Windows from a DOS Prompt

This version of UnixWare allows you to run MS Windows in Standard mode only. From a DOS prompt, you must type **win /s** to open MS Windows in Standard mode.

Suggestion — You can create a DOS batch file called *WIN.BAT* that starts *C:\WIN /S* automatically.

Configuring MS Windows to Run on the Desktop

After installing MS Windows, you can use Windows Setup to select the display driver, keyboard, mouse, and network. You can also set the desired display resolution by editing a UnixWare file. This section explains how to make these changes.

Installing MS Windows Applications

To ensure that the application installs correctly, install the application in your private directory by specifying C: as the installation drive. Using the C: drive installs the application in your UnixWare *home* directory.

When you install a communications program (for use with a modem, for example), you must configure DOS correctly for the port to which your modem is connected. To configure the port, right-click on the MS Windows icon in the Applications folder. Set the COM port you want to use as described in the section "Configuring DOS" earlier in this chapter.

MS Windows under Merge supports MS Windows applications designed for Standard (80286) mode. DOS applications requiring 80286, 80386, or 80486 processors or that require DPMI/VCPI protected modes are not supported.

Selecting the Mouse

For the mouse to operate properly, you must select DOS Merge Mouse as the mouse driver.

To check your mouse driver selection, do the following:

Procedure

1. **From the MS Windows "Main" window, double-click on the Windows Setup icon. If the DOS Merge Mouse is selected, you may skip these procedures.**

2. **Click on the *Options* menu, then select *Change System Settings*.**

   The "Change System Settings" window is displayed.

3. **Click on the third text box (Mouse) to view the available mouse drivers.**

4. **If the DOS Merge MS Windows/X setting is listed (you may have to use the scrollbar), click on that choice and skip to Step 8.**

   If the DOS Merge MS Windows/X setting is not listed, click on Other Mouse at the bottom of the list.

5. **In the text box that appears, A:\ is highlighted. Change this to the following:**

   `J:\MERGE\WINDOWS`

6. **Click OK.**

7. **Select one of the display drivers and click OK.**

8. **When you are finished, click OK.**

9. **The next window may ask you if you want the currently installed driver. Click on Current if it does.**

10. **The "Exit Window Setup" window is displayed. If you want to continue using MS Windows this way, click on Continue. To use the new mouse immediately, click on Restart MS Windows.**

Selecting the Display Driver

When MS Windows is first installed, it runs in Zoom (full-screen) mode. To run MS Windows on the UnixWare Desktop, you must install a DOS Merge MS Windows/X display driver. Once installed, you can switch between running MS Windows full screen and on the desktop by selecting VGA or DOS Merge MS Windows/X in Win_Setup. MS Windows must be restarted for the new display driver to take effect.

To install the DOS Merge MS Windows/X display driver, do the following:

Procedure

1. **From the MS Windows "Main" window, double-click on the Windows Setup icon. If a DOS Merge MS Windows/X driver is selected, you may skip these procedures.**

2. **Click on the *Options* menu, then select *Change System Settings*.**

   The "Change System Settings" window is displayed.

3. **Click on the first text box (Display) to view the available display drivers.**

4. **If the DOS Merge MS Windows/X setting is listed (you may want to use the scrollbar), click on that choice and skip to Step 8.**

   If the DOS Merge MS Windows/X setting is not listed, click on Other Display (Requires disk from OEM)..." at the bottom of the list.

5. **In the text box that appears, A:\ is highlighted. Change this to the following:**

   `J:\MERGE\WINDOWS`

6. **Click on OK.**

7. **Select one of the display drivers and click on OK.**

   Note

   If you are using UnixWare at high resolution (1024x768), you may select DOS Merge MS Windows/X [Large Fonts]. This will give you larger text on your screen. When selecting the DOS Merge MS Windows/X drivers, you may be prompted to

insert your MS Windows 3.1 installation floppies. Have them handy if you select these drivers.

8. **When you are finished, click on OK.**

9. **The next window may ask you if you want the currently installed driver. Click on Current if it does.**

10. **The "Exit Windows Setup" is displayed. If you want to continue using MS Windows this way, click on Continue. To restart MS Windows, click on Restart MS Windows. Press <Scroll Lock> to return to the desktop.**

Note Do not install a display driver that comes with your graphics card or select a display driver other than VGA, DOS Merge MS Windows/X or DOS Merge MS Windows/X [Large Fonts]. Doing so may cause MS Windows to be inoperable. If MS Windows doesn't operate because the incorrect display driver is selected, start a DOS session with the Win_Setup icon (in the Applications folder) and type **SETUP** from the directory in which MS Windows is installed, such as *C:\WINDOWS*. Change the display driver to VGA, DOS Merge MS Windows/X, or DOS Merge MS Windows/X [Large Fonts]. Exit DOS and start MS Windows.

Selecting the Keyboard

For the keyboard to operate properly, you must make a keyboard selection (Enhanced 101 or 102 Key U.S. and Non-U.S.).

To select a keyboard, do the following:

Procedure

1. **From the MS Windows "Main" window, double-click on the Windows Setup icon.**

2. **Click on the *Options* menu, then select *Change System Settings*.**

3. **Click on the second text box (Keyboard) to view the list of available keyboard options.**

4. **Select the following: Enhanced 101 or 102 Key U.S., and Non-U.S.**

5. **Click OK.**

6. **Click on *Options* in the menu bar.**

7. **Click Exit.**

Selecting the Network

To select the correct network driver, do the following:
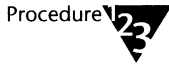
Procedure

1. **From the MS Windows "Main" window, double-click on the Windows Setup icon.**

2. **Click on the *Options* menu, then select *Change System Settings*.**

3. **Click on the fourth text box (Network) to view the network options.**

4. **Select the following: Novell NetWare (shell version ....). Select the option that matches your shell version.**

   See your NetWare documentation for the shell version supplied with NetWare software.

5. **Click on OK.**

6. **Click on *Options* in the menu bar.**

7. **Click on Exit.**

Configuring Your DOS and MS Windows Environment Under UnixWare

For advanced users, you can use the **mrgconfig** command from a UnixWare prompt in a "Terminal" window to modify and configure the environments in which your DOS and MS Windows sessions run. This environment is kept in the subdirectory, *.merge*, in your UnixWare *home* directory. The files *dos.cfd* and *win.cfw* contain the complete settings for DOS and MS Windows sessions.

Some of the most common commands are listed in the next table.

Command	dos \<or\> win	set \<or\> list	Option	Setting	Description
mrgconfig	dos \<or\> win	set	autozoom	=true \<or\> =false	Specifies whether or not the DOS Merge session zooms automatically. The default is false.

Command	dos <or> win	set <or> list	Option	Setting	Description
mrgconfig	dos <or> win	list	autozoom		Displays the current autozoom setting.
mrgconfig	dos	set	dosfont	=auto <or> =small <or> =medium	Specifies the font size to be used for DOS sessions. "Automatic" chooses an appropriate font size based on the resolution of your desktop display. "Small" selects the first 6x13 DOS font; "Medium" selects the 8x14 DOS font. The default is auto.
mrgconfig	dos	list	dosfont		Displays the current dosfont setting.
mrgconfig	dos <or> win	set	installcolormap	=true <or> =false	Setting the colormap option to true sets the colors for your desktop, including your DOS windows, to the 16 standard text colors. You may need to do this if the text in your DOS window is hard to see or if the colors seem strange. This setting is also required to provide MS Windows with full 256-color capabilities. The default is false.
mrgconfig	dos <or> win	list	installcolormap		Displays the current colormap setting.
mrgconfig	win	set	windowssizeauto	=true <or> =false	Specifies that DOS Merge should automatically compute the window size when a MS Windows session starts. The default is true.

Command	dos <or> win	set <or> list	Option	Setting	Description
mrgconfig	win	list	windowssizeauto		Displays the current windowssizeauto setting.
mrgconfig	win	set	windowswidth	=640	Specifies the width of the MS Windows window in pixels. This option only works when windowssizeauto is set to false.
mrgconfig	win	list	windowswidth		Displays the current windowswidth setting.
mrgconfig	win	set	windowsheight	=480	Specifies the height of the MS Windows window in pixels. This option only works when windowsizeauto is set to false.
mrgconfig	win	list	windowsheight		Displays the current windowsheight setting.
mrgconfig	dos <or> win	set	lpt1 <or> lpt2 <or> lpt3	=doslp,15	Specifies the DOS printer ports for DOS Merge sessions. The first setting is the UNIX print queue name (default is doslp) followed by the timeout value in seconds. The default is doslp,15 for DOS and doslp,45 for MS Windows.
mrgconfig	dos <or> win	list	lpt1 <or> lpt2 <or> lpt3		Displays the current printer port settings for DOS or MS Windows.

Accessing MS Windows Remotely

Merge allows you to access MS Windows and DOS applications remotely. To use a Personal Edition or Application Server to remotely access MS Windows from a host Application Server, do the following on the Application Server:

Procedure

1. **Double-click on Admin Tools at the UnixWare Desktop.**

2. **Double-click on App Sharing in the Admin Tools folder.**

3. **Double-click on Applications in the "UnixWare Desktop" window.**

4. **Drag-and-drop the MS Windows icon from the Applications folder to the "App Sharing" window.**

5. **Click on the MS Windows entry to highlight it.**

6. **Click on the Change Type button to change the application type to X Application.**

7. **Click on the Edit button.**

   A "Text Editor" window is displayed.

8. **Use the scrollbar to move to the end of the file. Change the line:**

```
"X_Application")  "/home/login/Applications/Win";;
```

   to

```
"X_Application")  "/home/login/Applications/Win"
  "+x";;
```

   by typing **"+x"** before the double semi-colons. Include the quotation marks as shown. The word *login* will be replaced by your login ID.

9. **Click on *File* at the top of the Text Editor window.**

10. **Click on Save.**

11. **Click on *File* again.**

12. **Click on Exit.**

   Setup on the host system is complete.

Running MS Windows on a Remote System

To run MS Windows on the remote system, do the following:

Procedure

1. **Double-click on Applications at the UnixWare Desktop.**

2. **Double-click on Remote Apps in the Applications folder.**

3. **Under Servers with Applications, use the scrollbar to locate the name of the Application Server previously set up to share MS Windows.**

4. **Click on the server's name. The "Authentication" window may be displayed. Enter your login and password and click on Authenticate.**

5. **The applications available from the Application Server are displayed under Remote Applications. Click on MS Windows.**

6. **Click on the Make Icon button.**

7. **Click on Cancel.**

    In the Applications folder, a new icon is displayed. The icon shows the name of the server and the application name (in this case, MS Windows). You can now double-click on this icon to run MS Windows.

Note

The user's account on the server must have the MS Windows directory in its DOS path. This can be done either by having a local *AUTOEXEC.BAT* file on the server with the appropriate PATH line, or by having the server's system *AUTOEXEC.BAT* file contain the proper PATH line.

Using Terminals with Merge

Merge supports X terminals, PC scancode terminals, and serial terminals that display ASCII characters. This section describes how to use these terminals with Merge and explains their limitations.

Using X Terminals

Once an X terminal is configured for your network and UnixWare system, you use it the same way you use your UnixWare Desktop. Start by logging in. When your system acknowledges that you want to run the desktop, type Yes.

Using PC Scancode Terminals

PC scancode terminals emulate the keyboard and 25-line monochrome display of a standard personal computer. With PC scancode terminals, you can run any DOS program that does not display bit-mapped graphics (that is, character-mode applications only). MS Windows is not supported with PC scancode terminals.

To start a DOS session on a PC scancode terminal, do the following:

Procedure ▼

1. **Log in to your UnixWare system from the PC scancode terminal.**

2. **Make sure your TERM variable setting is correct.**

3. **At the prompt, type**

   ```
   dos
   ```

Using Serial ASCII Terminals

As with PC scancode terminals, ASCII terminals can only run DOS programs that do not display bit-mapped graphics. In addition, they have the following limitations:

◆ ASCII terminals can only display 24 of the 25 lines that DOS normally displays on a personal computer. However, the Merge function Shift Screen allows you to view either the top or bottom 24 lines. For information on key mappings, refer to the following table.

◆ Most ASCII terminals cannot display the full DOS PC character set. Merge maps characters that cannot be displayed to similar ASCII characters.

Note ▼ Some ASCII terminals can display the entire IBM PC character set. When used with the correct *terminfo* entry, these terminals display the correct characters under Merge.

◆ Most ASCII terminal keyboards are missing typical DOS keys, such as <Alt>, <Page Up>, and <Page Down>. Merge simulates these keys with

combinations of standard ASCII keys (see the table "ASCII Terminal Keyboard Mapping" for more information).

To start a DOS session on an ASCII terminal, do the following:

Procedure
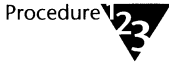
1. **Log in to your UnixWare system from the ASCII terminal.**

2. **Make sure your TERM variable setting is correct.**

3. **At the prompt, type**

   ```
   dos
   ```

ASCII Terminal Keyboard Mapping

The following table maps the keys usually present on an ASCII terminal to keys frequently used by DOS. To simulate the key in the first column, press the keys in the second column. Keystrokes may be used in combination as well. For example, to simulate <Shift>+<F1>, press <Esc>+<z> , then <Esc>+<1>.

From Merge, when you simulate a <Ctrl>, <Alt>, or <Shift> key, the key is seen as held down until you simulate a non-Ctrl, -Alt, or -Shift key. However, if the key sequence you are entering ends with a <Ctrl>, <Alt>, or <Shift>, you must press <Esc>+<Space> to end the sequence.

PC Key to Simulate	ASCII Escape Sequence	PC Key to Simulate	ASCII Escape Sequence
The 12 Function Keys		The Numeric Keypad	
F1	Esc 1	4/←	Esc f
F2	Esc 2	6/→	Esc g
F3	Esc 3	8/↑	Esc t
F4	Esc 4	2/↓	Esc v
F5	Esc 5	7/Home	Esc h
F6	Esc 6	9/PgUp	Esc p
F7	Esc 7	3/PgDn	Esc q
F8	Esc 8	0/Ins	Esc i
F9	Esc 9	./Del	Esc d
F10	Esc 0	1/End	Esc e
F11	Esc ;	5	Esc .
F12	Esc :	NumLock	Esc n
		/	Esc &
		*	Esc *
		-	Esc -
		+	Esc +
		Enter	Esc ^
Shift, Control, & Alt Keys		Other Special Keys	
Left Shift	Esc z	PrtSc/SysReq	Esc r
Right Shift	Esc Z	ScrollLock	Esc s
Left Ctrl	Esc c	Pause/Break	Esc l
Right Ctrl	Esc C	CapsLock	Esc k
Left Alt	Esc a	SysReq	Esc =
Right Alt	Esc A	Esc	Esc Esc
		102nd key on international keyboards	Esc <
10 Cursor Keypad Keys		Special Function Escape Sequence	
Ins	Esc I	All shifts released	Esc Space
Home	Esc H		
PgUp	Esc P		
Delete	Esc D		
End	Esc E		
PgDn	Esc Q		
↑	Esc T		
←	Esc F		
↓	Esc V		
→	Esc G		

Desktop DOS Window and Terminal Control Codes

From either your desktop "DOS" window, PC scancode, or ASCII terminal, you can initiate certain control codes that perform functions for your terminal, such as ending your DOS session or giving DOS device information. The following table describes the function's control codes for each type of terminal. The functions are described after the table.

Table 14-1.
Function Control Codes

Function	ASCII Terminal Control Keys	PC Scancode Terminal Control Keys	Desktop DOS Window Control Keys
Kill DOS	<Esc>+ <Ctrl>+<k>	<Ctrl>+<Esc> <Ctrl>+<k>	<Ctrl>+<Esc> <Ctrl>+<k>
DOS Device Info	<Esc>+ Ctrl>+<i>	<Ctrl>+<Esc> <Ctrl>+<i>	<Ctrl>+<Esc> <Ctrl>+<i>
Fork Shell	<Esc>+ <Ctrl>+<f>	<Ctrl>+<Esc> <Ctrl>+<f>	N/A
Shift Screen	<Esc>+<Ctrl>+<u>	<Ctrl>+<Esc> <Ctrl>+<u>	N/A
Redraw Screen	<Esc>+ Ctrl>+<r>	<Ctrl>+<Esc> <Ctrl>+<r>	N/A

Note ▼ On some ASCII terminals, the key sequence <Ctrl>+<Esc> produces the same results as pressing <Esc>. Therefore, you can use the same <Ctrl>+<Esc> sequence on these terminals for control codes as you would on the console or PC scancode terminal.

Kill DOS. If a DOS process becomes hung (freezes), this function will kill your DOS session.

DOS Device Info. Use this function to display information about your DOS session.

Fork Shell. This function starts a new UNIX system shell. Exit the shell by pressing <Ctrl>+<d> or typing **exit**. This function is not available from the console.

Shift Screen. On a 24-line display, this function shifts the view from displaying the lower 24 lines to displaying the upper 24 lines and back. This function has no effect on 25-line displays or PC scancode displays.

Redraw Screen. Use this function to redraw the display in case it becomes overwritten or corrupted. This function has no effect on the console.

Key Sequence Conflicts

When many layers of software interact, there can be unexpected results. Sometimes the same sequence of key presses initiates one action in program A and another action in program B. When both programs are in memory at once, the key sequence may be intercepted by an underlying layer of software before it reaches the application for which it is intended.

Your computer may sometimes be running the UnixWare Desktop, Merge, MS Windows, and one or more specific DOS or MS Windows applications all at once. An occasional key sequence conflict is inevitable. Here are some key sequence conflicts and instructions on how to resolve them:

♦ **<Ctrl>+<Alt>+<Del>**. When you are running MS Windows on the desktop (with the DOS Merge MS Windows/X display driver), the <Ctrl>+<Alt>+<Del> key sequence might cause UnixWare to reboot. Avoid using this key sequence while running MS Windows on the desktop.

♦ **<Ctrl>+<Esc>**. The MS Windows Task Manager is usually summoned by pressing <Ctrl>+<Esc>. Merge uses <Ctrl>+<Esc> as the opening sequence for several control functions, most notably the Kill DOS sequence, <Ctrl>+<Esc> <Ctrl>+<k>.

Merge monitors all key activity to perform a task. Most key presses are passed along promptly to the running application; however, when Merge receives a <Ctrl>+<Esc> sequence, it takes the sequence as the opening sequence for one of its own control codes and waits for the next key action to complete that code.

As a result, to summon the MS Windows Task Manager, press <Ctrl>+<Esc> twice. The first is intercepted; the second is passed to MS Windows.

♦ **<Print Screen>**. The DOS Print Screen key also produces unexpected results with several DOS programs. Under Novell DOS 6.0, any use of the <Print Screen> key (alone or in combination with <Ctrl> or <Shift>) may produce undesireable behavior and should not be used. It will work properly with DOS.

Using Merge with Other Applications

Following is a list of notes and recommendations when using Merge with other applications:

◆ To use Word 6.0® for MS Windows and other MS Windows applications, you must put the SHARE command in your *AUTOEXEC.BAT* file. For example,

```
J:\DOS\SHARE.EXE /L:500 /F:5000
```

◆ CorelDRAW™ will not install unless you manually create the file *C:\LOGFILE.TXT*. As the root user, enter the following (from a "Terminal" window or shell prompt):

```
touch /logfile.txt
chmod 666 /logfile.txt
```

◆ If you try to start dBASE® from a shared file system, you may get the following message:

```
Abort, Retry, Ignore
```

dBASE is trying to do low-level I/O. If available, run it from a DOS partition drive, such as *E:*.

Merge Tips and Troubleshooting

◆ Do not use file compression programs such as Stacker with Merge.

◆ Redirecting DOS command output with DR DOS 6.0 may not produce proper output. For example, when you run **COPY /H > myfile**, the contents of **myfile** will be incorrect.

◆ When running Merge as root, you will not have any root privileges. DOS does not differentiate root from any other user, and all permissions remain enforced.

◆ Avoid using the driver *ANSI.SYS* in your *CONFIG.SYS* file. By default, Merge improves system response by suspending DOS applications that poll the keyboard while waiting for keyboard input. Using *ANSI.SYS* prevents Merge from suspending DOS and your computer will be less responsive, especially if you run multiple DOS sessions.

◆ Use Icon Setup (located in the Admin Tools folder) to integrate DOS and MS Windows applications with the desktop. Icon Setup allows you to configure the desktop to automatically start DOS or MS Windows whenever you double-click on a DOS or MS Windows application icon. For more information on using Icon Setup, see the chapter "Installing and Sharing Applications" earlier in this handbook.

◆ To speed up opening a DOS window, type **PS=*servername***, where *servername* is the NetWare server to which you prefer to connect, to the line *J:\SHARE\NOVELL\NETX* in your system *AUTOEXEC.BAT* file located in the root directory.

◆ Merge does not handle symbolically linked files correctly. If you have *file1* linked to *file2*, you can delete *file2*, and then *file1*. If you reverse the order and try to delete *file1* first, *file2* will appear to be deleted, but will show up if you enter the **dir** command.

◆ Some DOS backup systems do not work well on files in the shared DOS/UnixWare file system. This applies especially to those that make heavy use of Direct Memory Access (DMA). Most DOS tape backup systems are in this category. Using these applications on any portion of the UnixWare file system can hang your DOS session.

As a general rule, use DOS backup programs only with your actual DOS partition and diskettes. Use the UnixWare backup programs for the UnixWare file systems.

◆ When running DOS or MS Windows in full-screen mode and your session appears to hang, you may be accessing a NetWare server file system through the NetWare Unix Client File System (NUCFS). If this happens, press the <Scroll Lock> key on your keyboard and switch back to your UnixWare Desktop. You should find the Auto-Authenticator has popped up asking you to log in to the server you accessed. After you log in, press the <Scroll Lock> key again and ZOOM back to your DOS or MS Windows session.

◆ If you receive the message:

```
Your DOS Merge MS Windows/X display driver
(vw.drv) does not match the current release.
```

you must replace the driver: From a DOS prompt, type **WINXCOPY C:\WINDOWS\SYSTEM**. If your MS Windows *SYSTEM* directory is located in a different area, specify its location.

◆ If you have just installed Merge and are rebooting for the first time, you may receive a message stating that DOS is not installed the first time you try to run it. Wait a few seconds and try it again. UnixWare probably has not finished rebuilding the Merge images, which it does in the background.

◆ Merge supports IPX/SPX; however, SPX has some limitations. NVR does not work. You can send messages from a Merge DOS session but you cannot receive messages.

◆ Symbolically linked files are not handled correctly by Merge. When you delete a file linked to another, one of the files may not be deleted.

◆ Fractal Design Painter requires 256-color support. Using the MS Windows X driver, UnixWare cannot be configured to MS Windows 256 colors using standard video boards and drivers. A #9GXE with 2MB of VRAM is known to allow Fractal Design Painter to work.

A Troubleshooting

This appendix lists basic UnixWare problems in alphabetical order and describes how to correct them.

The information in this appendix is intended for an experienced UNIX system user and may require work at the command line. When you go directly to the command line, many of the protections built into UnixWare are not maintained.

To access the command line, double-click on Applications and Terminal in the UnixWare Desktop.

Application Problem

This section describes what to do when the following problem occurs if you try to run applictions in UnixWare.

Application Will Not Start Up

Problem. An application such as DOS or MS Windows will not start up or the desktop is slow to come up.

Solution. This may be due to lack of swap space. For information on how to increase your swap space, see "Understanding Swap Space" in the chapter "Monitoring and Tuning Your System."

Backup and Restore Problem

This section describes what to do when the following problem occurs if you try to restore UnixWare 1.1 files onto UnixWare 2.0.

Cannot Restore UnixWare 1.1 Files onto UnixWare 2.0 When Upgrading

Problem. Restoring the */home* directory for a user onto a UnixWare 2.0 system may cause a failure.

Solution. After upgrading to UnixWare 2.0, a complete backup should be done including user accounts. Restore only selected user files from UnixWare 1.1 if you want them placed into UnixWare 2.0.

If only UnixWare 1.1 backups are available for recovery, to restore an account from the UnixWare 1.1 backup, do the following:

Procedure
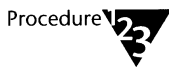
1. **Create an account in UnixWare 2.0 either using User Setup from the desktop or *dtadduser* from the command line in a "Terminal" window.**

2. **Remove all desktop files created in Step 1.**

Warning

Do not remove the user through User Setup on the desktop or *dtdeluser* from the command line as this will delete some important administrative information. Make sure the *.UpgradeVer2.0* file has been removed from the user's home directory.

To perform this recovery from a desktop account, do the following:

2a. **Open the backup/restore application *before* the desktop files are removed; otherwise, you will not be able to open the backup and restore application later.**

2b. **Once the backup/restore application is up, the files can be recovered from UnixWare 1.1 backups.**

3. **Restore the UnixWare 1.1 desktop files from the backup medium.**

The next time the user logs in, the desktop will be automatically upgraded to the UnixWare 2.0 desktop.

Basic UnixWare System Problems

This section describes what to do when the following problems occur in the UnixWare system.

System Fails During Installation

Problem. Your system fails during installation.

Solution. See the chapter "Setting Up and Configuring Hardware" in this handbook. In addition, see the appendix "Troubleshooting" in the *Installation Handbook* for more information.

System Will Not Start Up

Problem. Your system is installed properly but will not boot.

Solution. Check these items:

◆ Is there a floppy diskette in the drive? If there is, the system is trying to boot from the floppy instead of from the hard disk. Remove the floppy diskette and restart your system by pressing <Ctrl>+<Alt>+<Delete>.

◆ Did any cables come loose? Check that power cables and the monitor cable are still connected.

◆ Did you just add new hardware? Refer to the *Installation Handbook* for a checklist of potential hardware problems.

System Runs Out of Space

Problem. The system is unable to save a file because it is out of disk space.

Solution. There are several tasks you can do to recover:

◆ Delete files you no longer need. Be sure to empty the Wastebasket. (See the *Desktop User Handbook* for information on how to empty your wastebasket.)

◆ If you no longer need an application package on your system, remove it following the procedures described in the chapter "Installing and Sharing Applications" in this handbook.

◆ Some applications create backup files in your current folder or *home* folder. Delete these files and folders if you do not need them.

◆ Read and delete mail for *lp*, *root*, and *uucp*.

◆ Open a "Terminal" window, log in as root, and delete log files in the following directories:

  /var/uucp/.Admin

  /var/uucp/.Log

◆ Remove any core files by typing `core.*` in a "Terminal" window.

Changing the Mouse

Problem. If you have a mouse other than the type identified when you installed UnixWare, or if you change the location of your mouse connection or get a new mouse, you have to reconfigure it.

Solution. To reconfigure your mouse, do the following:

Procedure
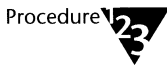
1. **Open a "Terminal" window.**

2. **Type** *su* **to become root.**

3. **Type the root password and press** <Enter>.

4. **Type**

   `/usr/bin/mouseadmin`

   A mouse selection menu appears.

5. **Select one of the following options from the menu:**

   B. To add a bus mouse. You are asked to enter the interrupt for the mouse.

   P. To add a PS/2 mouse.

S. To add a serial mouse. You are asked the name of the display, the terminal, the device to which the mouse is connected and if the mouse is Mouse Systems Corporation (MSC) compatible.

U. To update the mouse configuration.

Removing the Mouse

Problem. The *mouseadmin* program will not allow you to remove your mouse.

Solution. At init state 2 and above, the mouse device is open and in use so *mouseadmin* cannot delete the entry.

To solve this problem, do the following:

Procedure

1. **Open a Terminal window.**

2. **Type *su* to become root.**

3. **Type**

   ```
   init 1
   ```

   This places you in single-user mode and kills the *mousemgr* daemon so that *mouseadmin* will allow you to remove the mouse.

4. **Log out, log in again, and type**

   ```
   init 3
   ```

   to enter multiuser mode.

5. **To add the mouse back in, type**

   ```
   mouseadmin
   ```

   to enter the utility, remove the mouse, exit the utility, and install the mouse again (see "Changing the Mouse" in this appendix for more information).

Note

An MSC-compatible mouse is a 3-button serial mouse with or without a switch to change the modes. For more information, see the documentation shipped with your mouse.

Commands

This section describes what to do when the following problem occurs when using commands.

Want to Search for a File in the File System

Problem. The user wants to search for a local file using the **find** command.

Solution. You can perform a find using the UnixWare Desktop. See the *Desktop User Handbook* for information.

To use the **find** command from a "Terminal" window, do the following:

If you want to search for a local file in a file system using the **find** command from the root directory, specify the **-xdev** option to restrict your search to the nfs mount system in the root file system.

Type

```
find  .  -xdev argument list
```

where *argument list* is the list of options to use.

For example, to find the file *temp*, type

```
find  .  -xdev -print | grep temp
```

The **-xdev** option must be used; otherwise, UnixWare will search for and try to find files for every file system on both local and remote networks (for example, NetWare or other UnixWare systems).

The **-local** option of the **find** command will not resolve this problem.

To search the whole file system, you must log in as root.

Desktop Problems

This section describes what to do when the following problems occur at the desktop.

Changing Your Login ID

Problem. You may perform this task if the wrong login ID is created when UnixWare is installed, if the login is missing for some reason and you cannot log in, or if you want to change the login ID.

Solution. To change your login ID, do the following:

Procedure

1. **Create a new system owner. See "System Owner Problem" later in this appendix.**

2. **Open a Terminal window.**

3. **Type *su* to become root.**

4. **Create a new user by typing**

   `useradd` *username* `-m -d /home/`*username*

5. **Assign the new user a password by typing**

   `passwd` *username*

6. **Add the new user as a desktop user by typing**

   `/usr/X/adm/dtadduser` *login-id*

7. **You can also assign the new user as the system owner by typing**

   `/usr/X/adm/make-owner` *login-id*

Note

You can also change your user permissions at the UnixWare Desktop. See the chapter "Configuring Your User Environment" in this handbook.

8. **Delete the old owner from the desktop (see "Using User Setup" in the chapter "Configuring Your User Environment" of this handbook).**
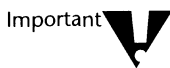
Screen Scrambled at Graphical Login

Problem. After you install UnixWare, the screen appears scrambled.

Solution. You may have the wrong type of video resolution.

The best way to change your video resolution is at the desktop. See the chapter "Configuring Your User Environment" for information.

Procedure ▼
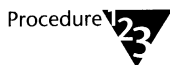
1. **Open a Terminal window.**

2. **Press <Alt> + <SysRq> + <h> and log in as the root user.**

3. **Type**

   ```
   /usr/X/adm/setvgamode
   ```

   and select the proper video configuration.

4. **Type**

   ```
   /usr/X/bin/enable_glogin
   ```

5. **Reboot by typing**

   ```
   init 6
   ```

   When the system comes back up, the login screen should appear normal.

Recovering a Desktop Icon

Problem. An icon is accidentally dragged and dropped into the wastebasket.

Solution. If you accidentally drag an icon such as Disks-etc from the desktop into the Wastebasket, the icon will disappear from the desktop and you may think that the icon and its contents have been deleted.

There are four ways to retrieve your desktop icon:

1. **Try to use the App Installer icon to bring it back. See the chapter "Installing and Sharing Applications" for information on Application Installer.**

2. **Create a non-desktop user, then a desktop user. See "Starting Up a Non-Desktop User on the Desktop" in this appendix.**

3. **Double-click on the Wastebasket icon to see if it exists. If it does, double-click on Disks-etc to open the folder and drag the media icon (for example, Disk_A) back into Disks-etc.**

4. **If you empty your wastebasket and the icon does not appear, open a "Terminal" window and change to your *home* directory by typing**

   /home/_username_**/Disks-etc**

   where _username_ is the name of the system owner.

   You must relink the icon (Disk_A) to Disks-etc. To do this, type

   ln -s /dev/dsk/_devicename_
   /home/_username_**/Disks_etc**

   where _devicename_ is the name of the media type that represents the missing icon. For example, Disk_A is *f0t*.

   For information on floppy diskette device names, see **fd**(7) in the *Command Reference*.

Starting Up a Non-Desktop User on the Desktop

Problem. A new user does not have access to the UnixWare Desktop.

Solution. The best way to get the desktop running is to add a new user to your desktop, as described in the chapter "Configuring Your User Environment" in this handbook. To bring up the desktop for a specific user, type

/usr/X/bin/desktop

or

desktop

in the console window. The desktop will then appear.

Logging Error Messages When the Desktop Will Not Appear

Problem. UnixWare is started, but your desktop does not appear.

Solution. Check these files for error messages:

If you invoked the desktop, check the *.oliniterr* file.

If you are logged in using the graphical login (xdm), check the */dev/X/Xdm-errors* file.

E-Mail Problem

This section describes what to do when the following problem occurs in mail.

Checking the Mailer

Problem. Need to determine what the mailer is doing.

Solution. If you uncomment the last two lines in */etc/mail/mailsurr*, you will turn on the mailer's activity.

To turn on this process, do the following:

Procedure

1. **Open a Terminal window.**

2. **Type *su* to become root.**

3. **Type**

   ```
   createSurr -l on
   ```

   to create a new *mailsurr* file which allows the mail messages to be sent to */var/mail/:log* which you can check for possible problems in the mail program.

Important
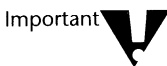
This file may require a lot of disk space. You should monitor it closely.

4. **When your diagnosis is complete, type**

   ```
   createSurr -l off
   ```

   to stop the mail message from being copied into */var/mail/:log*.

Font Problem

This section describes what to do when your font is the wrong size for your screen.

Help Window Too Small

Problem. This problem occurs in the Operations, Administration, and Maintenance package (OA&M). When sysadm is invoked from the desktop in a "Terminal" window, the `-fn fixed` string is used from */usr/X/lib/classdb/dtadmin* which fixes the font size.

Solution. To use the default "Terminal" window font, you must delete a line in the */usr/X/lib/classdb/dtadmin* file.

To remove this line, do the following:

Procedure

1. **Double-click on Applications in the UnixWare desktop.**

2. **Double-click on Terminal in the Applications folder.**

   A "Terminal" window appears.

3. **Change to the */usr/X/lib/classdb* directory.**

   `cd /usr/X/lib/classdb`

4. **Use vi or another text editor to open the *dtadmin* file.**

5. **Delete the line that reads `-fn fixed` (it should be close to or on line 214).**

6. **Save your file.**

Font Server Problem

This section describes what to do when the following problem occurs with fonts.

Font Server Is Not Running on the Desktop

Problem. The font server automatically starts up when UnixWare is rebooted. If the font server process is terminated, the user cannot restart it. Therefore, some fonts are unusable.

Solution. The font server process is started when the graphical login process, xdm, is started. The graphical login process connects the font server to the X server by adding the font server address to the X server's font path.

To solve this problem, do the following:

Procedure
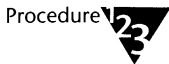
1. **Log in as root or type *su* to become root.**

2. **Change to the */usr/X/bin/fs* file by typing**

   ```
   cd /usr/X/bin/fs
   ```

3. **Change the ownership from bin to root by typing**

   ```
   chown root fs
   ```

4. **Change the permissions from r-xr-xr-x to rwxr-xr-x by typing**

   ```
   chmod 755 fs
   ```

Keyboard Problems

This section describes what to do when the following problems occur on the keyboard.

Function Keys Do Not Work

Problem. When running an application from ASCII or a "Terminal" window, the <F10> key will not work.

Solution. In such cases, press <Ctrl>+<F>+<0> instead of <F10>. If none of your function keys work, press and hold <Ctrl>, then press <F> and release both keys, then press *<function key number>*; for example, if you want to use the <F9> key, press <Ctrl>+<F>+<9>.

Remapping Your Keyboard

Problem. The user wants to remap the keyboard.

Solution. You can remap your keyboard by editing the */usr/lib/keyboard/keys* file. This file contains default mappings for the keyboard keys in UnixWare by rows and columns.

Important ▼ We suggest that you remap your keys using the desktop. See the *Desktop User Handbook* for more information. The procedures in this section require use of the command line. To remap your keyboard, you must be root. Also, ensure that you know what keys to edit, as this task could cause undesirable effects.

To remap keys such as <Ctrl> and <CAPS-LOCK>, for example, do the following:

Procedure ▼

1. **Open a Terminal window.**

2. **Type *su* to become root.**

3. **Type**

   cd /usr/lib/keyboard

4. **Using a text editor such as *vi*, open the file *keys*.**

5. **Search for the word *cntrl*.**

6. **Replace the word *cntrl* at the beginning of the file with *cap lock*.**

7. **Save the file.**

8. **Create a file in */etc/init.d* called *keyboard*.**

9. **Add the following line:**

   ```
   /usr/bin/mapkey /usr/lib/keyboard/keys <\
     /dev/console
   ```

10. **Save the file.**

11. **Type**

    ```
    cd /etc/rc2.d
    ```

12. **Type**

```
ln /etc/init.d/keyboard S50keys
```

to create a symbolic link between these two files.

13. **Reboot your system.**

Keyboard Freezes on a COMPAQ

Problem. If you are using a COMPAQ computer, the first time you start up your system after installation and log in through the graphical login, your keyboard may freeze if the <Num Lock> key is on.

Solution. To correct the problem, either unplug and plug the keyboard back in or reboot the computer.

Network Problems

This section describes what to do when the following problems occur with the network.

File Sharing Problem

Problem. Tried to use a special character in Icon Name.

Solution. When attempting to advertise a share-item using the File Sharing icon (described in the *Desktop User Handbook*), avoid using special characters, such as parentheses, in the Icon Name you type to identify the share-item. Use conventional alphabetic and numeric characters instead.

Starting and Stopping NFS

Problem. Incomplete processing.

Solution. After selecting either Start NFS or Stop NFS in the "File Sharing: Status" window, wait until processing is completed before you click on the Update Status button. When the mouse pointer changes from a clock back to a pointer, processing is completed.

Cannot Access Other Systems with TCP/IP

Problem. If you install TCP/IP and are unable to access any other systems, the TCP/IP interface to the networking board may be incorrect.

Solution. See the chapter "Setting Up and Configuring TCP/IP" in this handbook for information on using the **configure -i** command to correct network interface problems.

Wrong Frame Type is Detected on SPX

Problem. If the **nwdiscover** command is used to detect the network on which your system resides in SPX, it may locate the wrong frame type.

Solution. The order that the **nwdiscover** command detects frame types is: ETHERNET_802.2, ETHERNET_II, ETHERNET_802.3, and ETHERNET_SNAP. For example, it may have detected ETHERNET_802.2 as your frame type when your actual frame type is ETHERNET_802.3.

To make sure your system is using the correct frame type, do the following:

Procedure

1. **Double-click on Applications in the UnixWare Desktop.**

2. **Double-click on Terminal in the Applications folder.**

   A "Terminal" window appears.

3. **If you are on a UnixWare 2.0 system, edit the */etc/netware/nwconfig* file. (If you are on a UnixWare 1.1 system, go to Step 4.) Locate the following line, for example:**

   ```
   lan_1_frame_type = "ETHERNET_II"
   ```

   and change it to

   ```
   lan_1_frame_type = "ETHERNET_802.3"
   ```

   this means you want to change the existing frame type, ETHERNET_II to ETHERNET_802.3.

4. **If you are on a UnixWare 1.1 system, edit the */etc/rc2.d/S27nuc* file. Locate the following line, for example:**

   ```
   /usr/sbin/npsd -v >> $LOG 2>&1
   ```

and change it to

```
/usr/sbin/npsd -v -f ETHERNET_802.3 >> $LOG2>&1
```

this means you want to change your existing frame type to
ETHERNET_802.3.

5. **Save your file and reboot your system.**

Online Documentation Problem

This section describes what to do when the following problem occurs with
online documentation.

Cannot Print a Manual Page Using the *man* Command

Problem. When a user searches for and tries to print a command, function call,
file, etc., to the screen using the **man** command (for example, typing **man find**
at the command line), nothing happens.

Solution. You may not have installed the *Dyna*Text Online Document Browser
and UnixWare documentation set. To be able to access the man pages online,
the browser must be installed and either the *PEdocs* (for the Personal Edition)
or *ASdocs* (for the Application Server) package. This installs the reference
manuals. See the "Setting Up the Document Browser" appendix in this
handbook for information on how to install and set up the browser and
documentation.

Packaging Problems

This section describes what to do when the following problems occur with
packaging.

Package Will Not Install

Problem. A package will not install. On systems that are low on space
(particularly in the */var/tmp* and */tmp memfs* file system), attempts to install a
package using the **pkgadd** command or the UnixWare Desktop may fail
without an intuitive error message.

Solutions. Try one of these solutions if you cannot install your package.

1. Free up some space by discarding or backing up unused files or remove unneeded software for installation to succeed.

2. If this does not solve the problem, it is possible that UnixWare cannot read the installation media or write to your disk. This may be due to improper SCSI termination or faulty unsupported hardware.

3. If your system has cache, try disabling the cache during installation.

4. Make sure */var/tmp* is cleaned out before performing **pkgadd**.

5. The */tmp* and */var/tmp* files could share one limit on file system size. To do this, symbolically link */var/tmp* to */tmp/.var*. Type **mount -t /tmp** to create this directory since a memfs file system always starts out empty. You must pay close attention to performance and disk space allocation if you make this change.

Package Cannot Be Removed

Problem. A package cannot be removed. On systems that are low on space (particularly in the */var* file system), attempts to remove a package using the **pkgrm** command or the UnixWare Desktop may fail without an intuitive error message.

Solution. Free up some space by discarding or backing up unused files. Typically, 1 MB of free space in the root filesystem and */var* file system is enough.

pkgadd Fails on EISA Computer Using Adaptec 1740-Series

Problem. The **pkgadd** command fails on an EISA computer using an Adaptec 1740-Series SCSI host adapter.

Solution. This is a known problem. A firmware update is available from Adaptec which corrects this problem for the AHA 1740A and 1742A controllers.

There is no firmware update available yet for the Adaptec AHA 1740 controller. To work around problems with this controller, run the EISA Configuration Utility that comes with your machine to disable disconnects in

the SCSI setup. Additionally, changing the cartridge tape bufsize in */etc/device.tab* from 65536 to 512 prevents the system from hanging during **pkgadd**.

"ctape1 is Not Functional" Message Appears When Using pkgadd

Problem. `ctape1 is not functional` message appears on your system when you are installing a package using the **pkgadd** command.

Solution. If you run **pkgadd -d ctape1** and it fails with a message, `ctape1 is not functional`, type **pkgadd -d ctape2** (even if you only have one tape drive). If the pkgadd program still fails, check your hardware. Is the tape drive on? Is the controller board seated and jumpered properly?

Printing Problems

This section describes what to do when the following problems occur.

Default Printer Is Not Recognized at the Command Line

Problem. When a user's default printer is defined using the desktop, the printer is not recognized from the command line if you are using **lpstat -d** or **lp -d**.

Solution. Type **lpadmin -d** *dest* to set the system default printer. (The **lp** commands do not acknowledge individual default printers.)

Cannot Print to a PostScript Printer at the Command Line

Problem. The user is trying to print a PostScript file using the **lp** command.

Solution. If you are printing PostScript files from the command line with the **lp** command, you must use the *-Tpostscript* option to tell the printer that the file is a PostScript file. For example, by typing

lp -dprinter1 -Tpostscript file1

the file called *file1* is processed on the printer named *printer1*, and interprets it as a PostScript file.

If you are printing a PostScript file and instead of printing the file properly, the system produces a large amount of Postscript code, it is probably one of two problems:

1. Make sure you have identified the file as PostScript in the "Request Properties" window (see the previous note for how to do this on the command line).

2. Try changing whether or not the banner page is requested. Add **-onobanner** (to turn it off) or **-obanner** (to turn it on) if you are using the **lp** command. Click on the appropriate Print Banner Page By Default option in the "Printer Setup" window when you are printing from the desktop.

See the *System Administration* guide for more information on the **lp** command.

System Name Problem

This section describes what to do when the following problem occurs.

Changing Your System Name

Problem. The user wants to change the UnixWare system name.

Solution. After your system is installed, you can change the system name using the command line.

Important ▼ This task should be performed by a network administrator. Do not perform this task unless it is absolutely necessary. It is not recommended to change your system name unless, for example, you experience system name conflicts on your network.

To change your system name, do the following:

Procedure ▼

1. **Open a Terminal window.**

2. **Type** *su* **to become root.**

3. **Type**

   ```
   setuname -n name
   ```

   where *name* is the new system name.

This, however, does not change all occurrences of the system name in UnixWare.

To change all files, do the following:
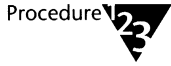
1. **Use a text editor such as *vi* to change the old system name to the new system name in the following files:**

   ◆ */etc/inet/hosts* (only exists if you have installed TCP/IP)

   ◆ */etc/inet/inetd.conf* (only exists if you have installed TCP/IP)

   ◆ */etc/net/ticlts/hosts*

   ◆ */etc/net/ticots/hosts*

   ◆ */etc/net/ticotsord/hosts*

Important
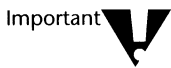
Ensure that you change the names carefully, as damage to these and other files could occur.

2. **Reboot your system. Other files that contain the system name are automatically updated.**

Note

Remote systems that store your system name must also be corrected.

On each remote system, your system name may need to be updated in the following files:

◆ *$HOME/.rhosts* (all *home* directories with *rhosts* files on all remote systems, including root)

◆ */etc/hosts.equiv*

◆ */etc/inet/hosts*

◆ */etc/uucp/Systems*

System Owner Problem

This section describes what to do when the following problem occurs.

Granting System Owner Privileges

Problem. Permissions were lost when the owner name was modified at the command line.

Solution. When UnixWare is installed, the owner is given permission to administer the system from the desktop. If the owner name is modified from the command line after installation, permissions may be lost.

To change your system owner or reinstate system owner permissions:

Procedure

1. **Open a Terminal window.**

2. **Type *su* to become root.**

3. **Type**

   ```
   /usr/X/adm/make-owner login-id
   ```

Note

You can establish several owners if desired, but all owners will have owner permissions on the desktop.

System Status Problem

This section describes what to do when the following problem occurs in some instances if you change the system time.

Home Directory has Become Full of System Messages

Problem. The *.oliniterr* file in the *home* directory is filled with system error messages.

Solution. If the system clock in the "System Status: Properties" window has been changed, if your desktop application is time-sensitive, and if you have not logged out of the desktop and logged back in after making changes equal to or greater than 30 minutes, the system displays the message `You have`

changed the system time. and may generate numerous warning
messages and store them in your *home* directory.

In addition, the message `Warning: Select failed; error code
22` may appear numerous times in a log file if the time is greater than 3.5 years.
Consequently, this may use up an enormous amount of disk space.

The message is stored in */dev/X/xdm-errors* if the desktop session was brought
down from the Login window. The message will be in *$HOME/.oliniterr* if the
desktop session was brought down from a user's *home* directory at the desktop.
Or the message will be shown in the console if the desktop manager was
brought down from the command line.

If you change the time from the command line as root in a "Terminal" window,
the same messages will be stored but no warning will appear on the screen
because the time change was not made in System Status on the desktop.

If this happens, you can manually change the *.Xdefaults* file in your *home*
directory so that the system default is overridden.

To change your *.Xdefaults* file, do the following:
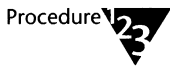
Procedure

1. **Double-click on Applications in the UnixWare desktop.**

2. **Double-click on Terminal in the Applications folder.**

3. **Change to your *home* directory and open the *.Xdefaults* file.**

   You can change the `dateChgThreshold` resource. For example if you
   add any of the following resources, the system default will be overridden:

   dashboard.dateChgThreshold: 1
   dashboard.dateChgThreshold: 2
   System_Status.dateChgThreshold: 3
   System_Status.dateChgThreshold: 4
   *dateChgThreshold: 5

   Each unit of measure represents one minute.

Terminal Emulation Problems

This section describes what to do when the following problems occur.

Screen-Based Applications Do Not Work Correctly in xterm Using rlogin

Problem. Some screen-oriented programs or curses-based applications (such as *vi* or *pg*) do not work correctly when a user executes an **rlogin**, in either direction, between an xterm window on a UnixWare system and a system running a non-UnixWare version of UNIX.

The problem occurs because UnixWare uses a slightly different *terminfo* entry for xterm than the MIT terminfo entry for xterm used in many non-UnixWare UNIX systems.

Some symptoms of this problem are:

◆ Applications can scroll off the screen

◆ Random characters appear on the screen

Solution. To print the correct characters to the screen, do the following:

Procedure

1. **Open a "Terminal" window.**

2. **Type *rlogin* to log into the destination system.**

3. **Create the following directory on the destination system by typing**

   ```
   mkdir $HOME/terminfo/x
   ```

4. **Copy */usr/share/lib/terminfo/x/xterm* from your local system to the directory *$HOME/terminfo/x* on the destination system. You can use *rcp* to to do this by typing**

   ```
   rcp /usr/share/lib/terminfo/x/xterm dest
      sysname!$HOME/terminfo/x
   ```

5. **Set and export the following environment variable on the destination system by typing**

   ```
   TERMINFO=$HOME/terminfo
   ```

```
export TERMINFO
```

Shutting Down the Desktop

Problem. The desktop does not function properly.

Solution. To shut down and restart your desktop if it becomes nonfunctional, press <Alt>+<SysReq>+<n>. Or, if desired, do the following:

Procedure ▼

1. **Press <Alt>+<SysReq>+<H> to start a new virtual terminal.**

2. **At the terminal, type**

   ```
   ps -e | grep X
   ```

3. **Halt the process by specifying the Process Identification (PID) number for X by typing**

   ```
   kill -9 pidnumber
   ```

4. **Restart the desktop.**

Video Display Problem

This section describes what to do when the following problem occurs.

Video Display Appears Garbled and Cannot Log In to the Desktop

Problem. Used Display Setup to configure video and still cannot get a clean display.

Solution. If your desktop becomes unusable, do the following:

Procedure ▼

1. **Double-click on Applications in the UnixWare Desktop.**

2. **Double-click on Terminal in the Applications folder.**

   A "Terminal" window appears.

3. **Type**

   ```
   /usr/X/lib/display/setvideomode
   ```

4. **You can also copy a file into the following file to restore standard VGA mode by typing**

   ```
   cp /usr/X/default/Xwinconfig.ini
      /usr/X/defaults/Xwinconfig
   ```

Window Manager Problem

This section describes what to do when the following problem occurs.

Cannot Run the Window Manager

Problem. The window manager will not run because the system states that the window manager is already running.

Solution. To run a window manager, you must kill the existing one and restart it again. Do the following:

Procedure

1. **Double-click on Applications in the UnixWare Desktop.**

2. **Double-click on Terminal in the Applications folder.**

   A "Terminal" window appears.

3. **Type**

   ```
   ps -u username
   ```

   where *username* is the name of the user logged in.

4. **Kill all processes that belong to *olwm* by typing**

   ```
   kill process ID olwm
   ```

   where *process ID* is the number listed under the *PID* column.
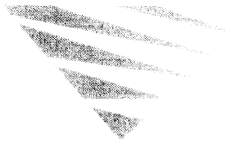
B   *Setting Up the Document Browser*

This appendix explains how the browser works, how to customize the browser configuration file, how to set up remote access, how to access the browser from CD-ROM, and how to set up a printer to print from the browser.

All of the documents on using and administering UnixWare are available online if you install and read them using the browser. If you want to use the online documents, you must install the *Dyna*Text online documentation browser separately from the UnixWare installation. Because the online documentation consumes a lot of disk space, it is best to install the documents on an accessible UnixWare system with extra disk space (such as a server). Then other systems (clients) can share the documents without actually installing the complete set of documents on each system.

Online Documentation System Components

The UnixWare online documentation system has three components:

◆ The *Dyna*Text online documentation browser and supporting files

◆ Collections of online documents

◆ The *.ebtrc* configuration file

If you want to customize your online documentation environment, you need to understand the purpose and location of each of these components.

When you install the *Dyna*Text package, you install the online documentation browser and its supporting files. By default, these files are installed in */usr/doc*, but you may select another directory at installation time if desired. Most of the supporting files are in */usr/doc/data* and */usr/doc/X*. You can run the browser on your local system, or you can access it from a remote system as described later in this chapter.

Collections of documents are installed when you install any of the online documentation packages including *ASdocs*, *PEdocs*, and *SDKdocs*. By default, these files are installed in */usr/doc/Libraries*, but you can select another directory at installation time if desired. Whether you are running the browser on your local system or on a remote system, you can access documents from your local system, from one or more remote systems, or from CD-ROM.

The Configuration File

The *.ebtrc* configuration file is used by the browser. This file points the browser to the files it needs, including the documentation files. When you install the browser and documents, the *.ebtrc* file is created and stored in the */etc/opt/dynatext* directory.

Configuration File Contents

A sample *.ebtrc* file is shown next:

X_DIR	*/usr/doc/data/Xuw*
DATA_DIR	*/usr/doc/data*
PUBLIC_DIR	*/usr/doc/tmp/ebtpub*
PRIVATE_DIR	*~/tmp/ebtpriv*
DTEXT_AUTH	*/usr/doc/data/security/fullrun.aut*
# Book collections are listed as follows:	
#COLLECTION	collection-path=Description for Library Window
# For example (remove the # character to use):	
#COLLECTION	*/usr/doc/Libraries/C/pe*=Basic Use & Admin (UnixWare PE guides)
COLLECTION	*/usr/doc/Libraries/C/pe*=Basic Use & Admin (UnixWare PE guides)
COLLECTION	*/usr/doc/Libraries/C/as*=Use & Admin (UnixWare PE & AS guides)

COLLECTION	*/usr/doc/Libraries/C/sdk*=Programming (UnixWare SDK guides)
COLLECTION	*/usr/doc/Libraries/C/refman*=Reference (UnixWare SDK man pages)

In all cases, except for *PRIVATE_DIR, /usr/doc* is the pathname where the *dynatext* package was installed.

Note ▼ If you installed the browser in a different directory, that directory will appear instead of */usr/doc*.

The lines have the following meanings:

◆ *X_DIR*. The directory containing other X-related data files for the look-and-feel of a browser window.

◆ *DATA_DIR*. The directory containing data files used by the browser

◆ *PUBLIC_DIR*. The directory containing public annotations

◆ *PRIVATE_DIR*. The directory containing private annotations

◆ *DTEXT_AUTH*. The type of authorization to use for the browser. This will always be set to */usr/doc/data/fullrun.aut*.

◆ *COLLECTION*. Lists a collection of documents installed (or available remotely) on the system. Several COLLECTION lines can exist and are listed as: `pathname=collection alias.`

The lefthand side of the equals sign represents the `pathname` to the document collection, while the righthand side of the equals sign, known as the collection alias, contains the text that appears in the list of collections in the "*Dyna*Text Library" window.

A few additional details about how the browser uses the *.ebtrc* file may help you solve problems that may occur if your environment is different from the default environment.

◆ The browser displays the collection aliases of the COLLECTION lines in the Library window in the order in which they appear in the *.ebtrc* file.

◆ The browser will display only the first of several collections with the identical alias, even if the collections with the alias have different pathnames.

◆ If a book contains a cross-reference or hyperlink to a book in a different collection, the browser finds the cross-referenced collection by searching for its name as the last element in a collection directory in the *.ebtrc* file.

◆ If a *.ebtrc* file lists the same collection more than once but with different pathnames, the browser will only search for cross-references in the first occurrence. For example, if your *.ebtrc* file contained the following COLLECTION lines:

```
COLLECTION /usr/doc/Libraries/C/as=Use & Admin
(UnixWare PE & AS guides)
COLLECTION /usr/doc/Libraries/C/refman=Reference
(UnixWare AS man pages)
COLLECTION /installr/usr/doc/Libraries/C/as=Use &
Admin (UnixWare PE & AS guides on CD-ROM)
COLLECTION/installr/usr/doc/Libraries/C
/refman=Reference (UnixWare AS man pages on
CD-ROM)
```

and if you installed some of your documents on disk, but others are available only on CD-ROM, this configuration would occur. If while reading a reference manual in the *refman* collection, you click on a cross-reference to a guide in the *as* (Application Server) collection, the browser will search for that guide in */usr/doc/Libraries/C/as*. It will not search for that guide in */installr/usr/doc/Libraries/C/as*, which is on CD-ROM.

If the guide is only on the CD-ROM, the browser will return a message `Can't find target book` *name*. If this becomes a problem, you can move the CD-ROM collections to be listed first in the *.ebtrc* file. However, if the CD-ROM is not mounted, the browser will not find cross-references to books outside the current collection.

Customizing the Browser Configuration File

While the system *.ebtrc* file in */etc/opt/dynatext* will contain what most users need, users can customize the *.ebtrc* file. The browser searches for the *.ebtrc* file in several locations in a particular order and uses the first *.ebtrc* file that it finds. The locations in their search order are:

1. *$EBTRC*. This is a variable pointing to an *.ebtrc* file of any name.

2. *./.ebtrc*. This is an *.ebtrc* file in the current directory.

3. *$HOME/.ebtrc*. This is an *.ebtrc* file in the user's *$HOME* directory.

4. */etc/opt/dynatext/.ebtrc*. This is the directory where the system *.ebtrc* file is stored when the browser is installed.

The browser first checks if the *$EBTRC* variable is defined, and if it is, the browser uses its value as the *.ebtrc* file. If *$EBTRC* is not defined, the browser checks the current directory for a file named *.ebtrc* and uses that file if it exists. If not, the browser then checks for *$HOME/.ebtrc* or */etc/opt/dynatext/.ebtrc*; if it does not find any of these, the browser will fail with an error message.

You can create a custom *.ebtrc* file and place the file in any of the locations searched before */etc/opt/dynatext/.ebtrc*.

Setting Up the Browser and Documentation for Remote Access

You can set up the browser and documentation for remote access in one of two ways: by using File Sharing (which uses NFS) or by using Remote Application Sharing (which uses NetWare).

See the section, "Sharing Files and Folders Remotely" in the chapter, "Installing and Sharing Applications" earlier in this handbook for more information on how to share files.

Accessing the Browser and Documentation Remotely with File Sharing

You can set up client systems to use both a remote browser and remote documentation or to use a local browser and remote documentation. In either case, use remote access with File Sharing and do the following on the server system.

Note ▼ The procedure to follow on the client system varies depending on whether the client will use a remote or local browser. These tasks must be done only once on each system.

Setting Up the Browser and Documentation on a Server

To set up remote access to the browser and documentation on the server system, do the following:

Procedure ▼

1. **Install the *dynatext* package and the desired online documentation packages you need.**

   The online documentation packages are *ASdocs*, *PEdocs*, and *SDKdocs*.

2. **Use the File Sharing icon in Networking to share the directory in which you installed the packages.**

   2a. **Double-click on Admin Tools in the UnixWare Desktop.**

   2b. **Double-click on Networking in the Admin Tools folder.**

   2c. **Double-click on File Sharing.**

   2d. **Click on *View* in the menu bar and select *Local*.**

   2e. **Click on *Share-Item* in the menu bar and select *New*.**

   The "Add New Share-Item - Local" window appears.

   2f. **Type */usr/doc* in the Folder/File to Share option.**

   2g. **Type an icon name in the "Icon Name" window; for example, *doc*.**

   2h. **If you want to allow remote clients to write public annotations on the documents, select Read and Write on the Advertise As line.**

   2i. **Select any other options you need.**

   2j. **Click on Add to save your changes.**

   The */usr/doc* directory is available for clients to access.

Setting Up Remote Access to the Browser and Documentation on the Client

To set up remote access to both the browser and the documentation from a client system with File Sharing, do the following:

Procedure
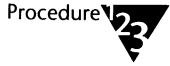
1. **Install the *dynatext* package and choose the icon-only option.**

2. **Rename the */usr/doc* directory by typing**

   ```
   mv /usr/doc /usr/0doc
   ```

   This will enable you to place */usr/doc* on the server.

3. **Mount the directory advertised from the server. (See the *mount* command in the *Command Reference*.) You can also use File Sharing on the desktop to make that directory accessible by doing the following:**

   3a. **Double-click on Networking under Admin Tools.**

   3b. **Double-click on File Sharing.**

   3c. **Click on *View* in the menu bar and select *Remote*.**

   3d. **Click on *Share-Item* in the menu bar and select *New*.**

   The "Add New Share-Item - Remote" window appears.

   3e. **Type the name of the system on which the browser and documents are installed in the "Remote System Name" window.**

   3f. **Press <Enter>.**

   The list of available Share-Items appears.

   3g. **Select the Share-Item containing the browser and documents from the list of available Share-Items.**

   Select Connect Share-Item as read/write if you want to write public annotations.

   3h. **Type */usr/doc* in the Local Folder to Connect it to option.**

   3i. **Click on Add to save your changes.**

   The */usr/doc* directory is now mounted.

4. Update the */etc/opt/dynatext/.ebtrc* file to include the remote collections by typing

```
cd /etc/opt/dynatext
cp .ebtrc 0.ebtrc
cp /usr/doc/inst.ebtrc .ebtrc
```

5. **Log out and log in again, and you will be able to use the icon.**

Setting Up Remote Access to the Documentation on the Client

To set up local access to the browser with remote access to the documentation only from a client system with File Sharing, do the following:

Procedure 23

1. **Install the *dynatext* package and the choose the full browser option.**

2. **Mount the directory advertised from the server on a directory other than */usr/doc*. (See the *mount* command in the *Command Reference*.) You can also use File Sharing on the desktop to make that directory accessible by doing the following:**

   2a. **Double-click on Admin Tools in the UnixWare Desktop.**

   2b. **Double-click on Networking in the Admin Tools folder.**

   2c. **Double-click on File Sharing.**

   2d. **Click on *View* in the menu bar and select *Remote*.**

   2e. **Click on *Share-Item* in the menu bar and select *New*.**

   The "Add New Share-Item" window appears.

   2f. **Type the name of the system on which the browser and books are installed in the Remote System Name option, followed by <Enter>.**

   The "Available Share-Items" window appears.

   2g. **Select the Share-Item containing the browser and books from the list of available Share-Items.**

   2h. **Choose the directory (other than */usr/docs*) at the Local Folder to Connect it to option, for example */fs/remote-systemname/doc* and type that directory in the Local Folder to Connect it to box.**

2i. **Select Connect Share-Item as Read and Write if you wanto be able to make public annotations.**

2j. **Click on Add.**

The directory is now mounted.

3. Link the remote directory containing the online documentation to */usr/doc/Libraries* **by typing:**

Note ▼ In the following command, replace /fs/*remote systemname*/doc with the directory you created at the Local Folder to Connect it to box.

```
cd /usr/doc
ln -s /fs/remote systemname/doc/Libraries
  Libraries
```

4. Update the */etc/opt/dynatext/.ebtrc* **file to include the remote collections by typing**

Note ▼ In the following command, replace /fs/*remote systemname*/doc with the directory you created at the Local Folder to Connect it to box.

```
cd /etc/opt/dynatext
cp .ebtrc 0.ebtrc
cat /fs/remote systemname/doc/inst.ebtrc
  .ebtrc > N.ebtrc
cp N.ebtrc .ebtrc
```

This may result in an *.ebtrc* file containing two lines for X_DIR, DATA_DIR, and so on. This is fine if the entries are identical. If the entries differ, make sure the pathnames for your local system appear first.

5. If you want to access annotations on the remote system, edit the *.ebtrc* **file and change the first PUBLIC_DIR entry to the following:**

Note ▼ In the following command, replace /fs/*remote systemname*/doc with the directory you created at the Local Folder to Connect it to box.

```
PUBLIC_DIR /fs/remote systemname/doc/tmp/ebtpub
```

Accessing the Browser Remotely with Remote Applications

To set up remote access with Remote Applications, perform the following task on the server system and another on each of the client systems which will access the browser remotely.

Note ▼▼▼ The procedure on the server system must be done only once.

Setting Up the Browser for Remote Access

This task must be done each time the browser is run from the client.

To set up remote access with Remote Applications, do the following:

Procedure ▼▼▼
1. **Double-click on App Sharing in the Admin Tools folder.**

2. **Double-click on Applications.**

3. **Drag-and-drop the Online Docs icon from the Applications folder to the "App Sharing" window.**

4. **Click on the Change Type button to change the application type from a Text Application to an X Application.**

5. **Click on Cancel to close the window.**

6. **Give each user a login if they will be using the browser remotely from this system.**

Running the Browser Remotely

This task allows you to use the browser from a remote server.

To run the browser remotely from the server with Remote Applications, do the following:

Note ▼▼▼ These steps need to be followed by each user every time the browser is run.

Procedure **23**

1. **Double-click on Applications in the UnixWare Desktop.**

2. **Double-click on Remote Apps in the Applications folder.**

3. **Click on the name of the server containing the Online Docs application.**

   An "Authentication" window appears.

4. **Type your login name.**

   4a. **Press <Tab>.**

   4b. **Enter the password for the remote system.**

   4c. **Click on Authenticate.**

5. **Click on Online Docs.**

6. **Click on Open to run the browser on the server.**

7. **Click on Make Icon if you want to create an icon that will run the browser.**

   If you make an icon, you will be able to click on that icon instead of clicking on Remote Apps. However, you will still need to log in to the remote system.

Accessing Documents from CD-ROM

If your system has a CD-ROM drive and you received UnixWare on CD-ROM, you can choose to access documentation from the CD-ROM rather than (or in addition to) installing the documents on disk.

The UnixWare product CD-ROMs contain the following documentation:

UnixWare Product	Documentss Included
Personal Edition	All Personal Edition documents
Application Server	All Application Server documents (a superset of the Personal Edition documents)
Software Development Kit	All Application Server documents and all Software Development Kit documents

When you install any of the online documentation packages (*PEdocs, ASdocs,* or *SDKdocs*), you will be asked whether you want to access the documents from CD-ROM. If you respond **Yes**, then the */etc/opt/dynatext/.ebtrc* file will be updated to include the CD-ROM document collections. The following line will be added to the file:

```
COLLECTION /installr/usr/doc/Libraries/C
/as=Use & Admin (PE & AS guides on CD-ROM)
```

However, to access the documents from CD-ROM, you must mount the CD-ROM by doing the following:

Procedure
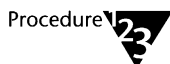
1. **Insert the UnixWare CD-ROM in the CD-ROM drive on your system.**

2. **Double-click on Applications in the UnixWare Desktop.**

3. **Double-click on Terminal in the Applications folder.**

   A "Terminal" window appears.

4. **Log in as root or type *su* to become root.**

5. **Type**

   ```
   mount -F cdfs -r /dev/cdrom/cCbBtTlL /installr
   ```

   where *C* is the number of the SCSI controller boards to which the CD is connected; *B* is the bus number (usually 0, but can be 0-7); *T* is the target ID (the ID associated with the drive on the bus it uses); and *L* is the SCSI logical unit number (usually 0).

When you next run the browser, select the CD-ROM collection to access the documents from CD-ROM.

Setting Up to Print from the Browser

The browser library main window allows you to select a printer if you want to print a document from the browser. First, however, you must add your printer to a file using the command line.

Adding a Printer

By default, UnixWare provides several printer types when you use Printer Setup (see Chapter 4 "Setting Up and Configuring Printers" earlier in this handbook). The printer you set up as your default in Printer Setup will be the same printer used for the browser unless you specify otherwise.

To view the list of printers, see the chapter on the *Dyna*Text browser in *Desktop User Handbook*. If you do not find the desired printer, you can add one at the command line. But if you add a printer using the following file, your changes will not be reflected in Printer Setup and will not be added to the list of available printers in the Printer Setup list.

Note ▼ This procedure requires knowledge of UNIX commands and options, specifically the **lp** command. See the *System Administration* or the **lp** man page in the *Command Reference*.

To manually add a printer to the *Dyna*Text printers list, do the following:

Procedure ▼ 1. **Double-click on Applications in the UnixWare desktop.**

2. **Double-click on Terminal in the Applications folder.**

   A "Terminal" window appears.

3. **Change to the */usr/doc/data/ps* directory by typing**

   ```
   cd /usr/doc/data/ps
   ```

Note ▼ You may have a different path than */usr/doc* if you installed *Dyna*Text in a different directory.

4. **Using *vi* or another text editor, open the *config.dat* file.**

5. **To add a new printer for use with *Dyna*Text, type**

   ```
   printer_name page_width page_length print_command
   ```

where *printer_name* is the name of your printer, *page_width* and *page_height* are your page dimensions, and *print_command* is the **lp** command you use plus options.

For example, you could type

default 612 792 lp -d$LPDEST -$LPOPS -Tpost

Note ▼ Some printers, such as printers accessible through NetWare, may print pages in reverse order. In this case, add the **-y reverse** option to the **lp** command.

The following example lists the contents of a *config.dat* file before a printer is added:

```
#spooler_name page_width page_height print_command
##############################################
default 612 792 lp -Tpost
#kodak 612 792 lp -dkodak -Tpost -$LPOPTS
#dp1 612 792 lp -ddp1 -Tpost -$LPOPTS
#netpr 612 792 -dnetpr -Tpost -yreverse -$LPOPTS
#A4 597 845 lp
#font specifications
font times iso8859-1,times,timesb,timesi
Times-Roman,Times-Bold,Times-Italic
font helvetica iso8869-1 helv,helvb,helvo
Helvetica, Helvetica-Bold, Helvetica-Oblique
font courier iso8859-1 cour,courb,couro
Courier,Courier-Bold,Courier-Oblique
font symbol symbol symbol symbol symbol
Symbol,Symbol,Symbol,Symbol
```

Note ▼ The lines that begin with # are comments. The only printer in this file is default.

Selecting a Printer

For information on how to select a printer to print the documentation from *Dyna*Text, see the *Desktop User Handbook*.

Glossary

absolute pathname

Pathnames can be *absolute* or *relative* pathnames. An absolute pathname is the file's full pathname starting at root ("/"). A relative pathname specifies a file's position relative to the current pathname; it never begins with root ("/"). An example of an absolute pathname is */home/chris/memos/copier*, where */home/chris/memos* represents the folder that contains the file *copier*. An example of a relative pathname for that same file is *memos/copier*, where the current directory is */home/chris* and *memos* is the folder containing the file copier.

account

A valid user login name and password on a UnixWare system or a NetWare server. UnixWare accounts are either user, group, or reserved accounts.

active icon

A minimized application window. Active Icons are normally located along the bottom edge of the desktop.

adapter

A hardware card or board that allows one hardware component to communicate with another.

address

A number, label, or name that shows the location of information in the computer's memory.

advertise

To advertise is to allow users on other systems to access files and folders on your system.

application set

A group of application packages.

ASCII format

A file that is in standard text format.

automatic call unit (ACU)

A device that is capable of placing outgoing calls on a telephone line. In UnixWare, the ACU designation in the */etc/uucp/Systems* file indicates that a remote system can be reached by telephone over any ACU connected to your system.

binary format

A file that is in a form that can only be interpreted by a particular system or application.

bitmapped font

A font (a typeface at a particular point size) in the form of an array of bits or pixels than can be displayed relatively quickly on a computer display. Bitmapped fonts are generated for a specific resolution, such as 72 dots per inch (typical of most displays). Also known as a screen font.

block

A contiguous group of bytes on a disk that you can access with a single address.

browser

See the *Dyna*Text Online Documentation Browser in your handbooks.

broadcast address

An Internet Protocol (IP) address used to send a message to all the systems on a given network (that belong to the same class).

button

An area in a window, with a label, that is used to request an action within that window. There are several types of buttons. If a button has ellipses (three dots) following the label, the button brings up a window. If the button has an arrow following it, it brings up a menu. If the button has nothing following it, it performs the indicated action.

chat script

A series of requests and responses that establish a connection between UnixWare and a modem. Chat scripts for different types of modems are contained in the */etc/uucp/Dialers* file.

click

> To quickly press and release the left mouse button. You *click* on something to select it or set input focus. You can change the speed at which you must press and release the mouse button by following the procedure described in "Changing Mouse Preferences" in the *Desktop User Handbook*.
> *See also* right-click.

click and hold

> To press the left mouse button and keep it depressed.

client

> The computer requesting a service from a server system on a network.

command interpreter

> The UnixWare software that lets you enter commands, then interprets and responds to those commands. The UnixWare command interpreter is also referred to as the shell.

COM ports

> The name used to designate serial ports (COM1, COM2, etc.) on an IBM-compatible personal computer.

command mode

> When you are using the *vi* text editor, command mode is the mode in which you move around in your text file or request to enter text input mode. Press the <Esc> key to enter command mode.

connect

> When many computers are networked together, you can connect to share-items that are made available from remote systems. When you connect to a remote share-item, you can use it in the same way you use other files and folders on your system.

control information

> The part of a packet that contains information on the packet's destination, error checking, and other information used by the protocol that will handle the packet.

controller

> A hardware device that is directly attached to your system's I/O bus.

cpio

> A UNIX system command for copying archive files in to and out of the system.

<Ctrl>+<Alt>+click

To copy selected text to a current location. (This is for a two-button mouse only).

<Ctrl>+click

To select/deselect an icon or an item from a list.

<Ctrl>+drag

To make a copy.

default

Something that is already selected for you, either by an installation procedure or by you in a previous step. For example, a default printer is the printer that jobs go to if you do not specify a printer at the time you are printing a file. You would select a default printer using Printer Setup.

desktop

The graphical user interface provided with UnixWare. Using the desktop, you can operate UnixWare by manipulating windows, icons, and text with a mouse and keyboard.

desktop user

A user account that is designated to use the UnixWare Desktop interface. When a desktop user logs in to UnixWare, the desktop interface starts up.

Device Configuration Utility (DCU)

A UnixWare software program that allows you to review and change hardware configuration, including assigning device drivers to hardware controllers and changing device driver parameters such as the interrupt vector.

device driver

A software interface between the UnixWare system and a hardware device. Device drivers are represented by files in the UnixWare file system, usually contained in the */dev* directory.

Discretionary Access Control (DAC)

The ability to restrict data access based on the user identity and/or the group to which the user belongs.

directory

Another name for a UnixWare folder.

DMA Channel

Direct Memory Access Channel, a designated channel for transmitting data.

/Domain Name Service (DNS)

A service available with TCP/IP that lets a group of systems (defined as a domain) share the system names and addresses list for many systems. DNS saves the overhead of having every system maintain its own list of systems.

double-click

To quickly press and release the left mouse button twice. *See also* right-click.

drag

To press the left mouse button on an icon or on text while you move the mouse pointer to a new location.

drag-and-drop

To press the left mouse button on an icon and hold it down while you move the mouse pointer to a new location. You release the mouse button when the object is at the desired location.

dumb terminal

A display terminal that has no processing power. All processing is done by the computer to which it is connected. You cannot run the UnixWare Desktop from a dumb terminal, though you can login and work with UnixWare from the command line.

dynamically loadable drivers

Special device drivers that can be loaded into UnixWare before UnixWare completes the boot procedure.

DynaText Online Documentation Browser

A UnixWare application used for graphically displaying information on how to use the UnixWare system.

enveloping

In data communications, the process whereby control information is added around data passed from higher-level protocols to lower level protocols. This action is compared to putting an envelope around a letter. When the letter (data) arrives at its destination (peer protocol on a remote system), the envelope is removed, exposing a new envelope that is passed on (to the higher level protocol).

file

A collection of related information, such as an application, a memo, or a drawing created with a computer graphics program. A UnixWare file appears as an icon on your desktop.

file system

A collection of files and folders along with the structure that holds them together.

folder

A container that may contain files and other folders. You use folders to organize files and folders by grouping them under one name. For example, a folder called *reports* may contain several files such as *report1*, *report2*, and so on.

You may be familiar with the term directory—a folder is a directory. A UnixWare folder appears as a folder icon on your desktop.

font

Traditionally, in the terminology of the typesetting profession, a font is a typeface at a single point size. However, in the computer business, the term font has come to mean any of the following: typeface family, typeface, or font. An example of a font, in the traditional sense of the term, is Helvetica Italic 18 point.

fsck (File System Check)

A tool that checks for file system correctness and repairs damaged data on a disk.

ftp (File Transfer Protocol)

A TCP/IP protocol used to log in to another system across the network, list directories, and copy files between systems at high speeds.

function calls

Features contained in a programming library that let you perform specific programming features. For example, a networking programming library might have specific function calls for requesting connections, negotiating protocol features, and sending data to remote systems.

group

A set of users on your system that is assigned a common name, such as *doc* for all the users in the documentation department. A group is assigned a common set of permissions to certain files and folders. For example, the owner of a file might be able to read, write, and execute a file, while the group members might only be able to read and execute the file.

group ID (gid)

The integer associated with UNIX permissions in files and directories.

handshaking

The information that is passed between two systems or devices to allow the two sides to establish a connection.

HBA (Host Bus Adapter) diskette

A diskette containing device drivers for host bus adapters.

highlight

To press the left mouse button (on text, usually) and hold it down while you move the mouse pointer to the new location. When text is highlighted, it is ready to be copied, moved, or deleted.

home directory

Where your personal files are stored. Your "UnixWare Desktop" window provides access to your *home* directory.

icon

A graphical image that represents various elements on the desktop, such as files, folders, printers, and other computers.

icon classes

Describe how files, directories, and other items that appear in a folder window behave when you use the mouse or keyboard to manipulate them.

inode

The location where information for a file is stored (one inode per file). A file system is made up of inodes.

Internet

An international network made up of more than one thousand networks. When your system is connected to the Internet, it is given a special address through which others on the Internet can contact you. Internet is the name used to describe the worldwide TCP/IP-based network.

Internet Protocol (IP) address

The high-level addresses used by Internet Setup. Every IP address is a 32-bit number that is usually broken down into four pieces called octets, with 8 bits per octet.

internetwork

Two or more networks connected by an internal or external router.

Interrupt Vector (IRQ)

A signal to stop execution of a process. Distinct hardware components must have unique interrupts.

I/O address range

A portion of shared memory reserved for communication between the computer operating system and a hardware peripheral.

IPX (Internetwork Packet eXchange protocol)

A Novell implementation of the Xerox Networking System (XNS) communications protocol that transports data, or packets, between network devices (workstations, servers, routers, and so on).

IPX/SPX (Internetwork Packet eXchange/Sequenced Packet eXchange)

A set of protocols used to communicate across NetWare networks.

keyboard shortcuts

A shortcut to using the mouse. While UnixWare is designed to be used with a mouse, you can use the keyboard to perform many functions.

link

Another name (alias) for a file or folder, which enables you to access the same file or folder from more than one location. Since only one copy of the file exists, any changes you make to the original file are relected in both the links and the original file.

login

The name you use to identify yourself to your computer. For example, you might use your initials for your login. Then at the login prompt, you would enter your initials and then your password. The system checks its files and if your password matched the one on file for your initials, it allows you onto the system.

login_ID

The name used to represent a user's login account. A security procedure that limits access to authorized users. With UnixWare, you create a login ID and password (also called an account) for yourself when you install UnixWare. To access a NetWare server, you must have a login ID (also called a *username*) and password (an account) for that server. *See also* *username*.

main window

The base application window from which a pop-up window originates.

megabyte

One million bytes. Used to describe the amount of information that can be contained on a hard disk or in RAM.

memory address range

A portion of RAM reserved for communication between the computer operating system and a hardware peripheral.

menu

Menus are accessed from the menu bar of a window. You display menus by clicking on an item in the menu bar or by typing the keyboard shortcut indicated by an underscore in the menu option name.

menu bar

Appears below the menu title. The words in the menu bar represent menus that display menu options when you click on them. Menu names and options change to accommodate different applications or utilities.

menu option

Appears in a menu when you select an item from the menu bar of a window. Select a menu option by clicking on it or by typing the keyboard shortcut indicated by an underscore in the menu option name.

Merge

The UnixWare software package that allows you to run DOS and MS Windows applications within UnixWare.

message level service

A service provided by the SPXII protocol to ensure reliable transmission of data to session-level protocols.

metacharacter

A set of characters that have special meaning to the UNIX system shell. They include the asterisk (*), question mark (?), and square brackets ([ ]). Metacharacters are used in patterns to match filenames. For example, "t*" (t followed by an asterisk) matches all files beginning with the letter t.

mount

A term used to describe the action of connecting a file system to your UnixWare file system tree so it is accessible to users on the system. File systems can reside on the local hard disk, a floppy disk, or on a remote system (if you are using File Sharing or NFS).

multiprocessor

A system with more than one central processing unit.

netmask

Determines which part of your network address is used as a network ID and which part is used as the system, or host, ID. For example, say your network address is 123.456.789.101 and your network is a Class B network. By default, on a Class B network, the first two parts of the address, 123.456, identify the network where your system resides, and the last two parts, 789.101, identify your specific system within that network. By changing the netmask, you can change which part of the IP address identifies the network and which identifies the system.

NFS (Network File System)

A distributed file system that allows data to be shared by network users. Network users can share data regardless of operating system or workstation type.

NetWare rights

Attributes associated with a file or folder on a NetWare server. When files and folders on a NetWare system are used from a UnixWare system, NetWare rights (supervisor, read, write, create, erase, modify, file scan, and access control) are mapped into UNIX system permissions (read, write, and execute).

NetWare mode

A file system installed in NetWare mode on a NetWare server will only support DOS semantics when you access it from UnixWare. For example, *chown* and *chmod* commands cannot be used to change all file permissions and you cannot use file names that are longer than the standard 8.3 characters.

NIS server

A system that is configured to centrally manage a wide range of information for a network.

non-desktop user

A UnixWare user account that is not designated to use the desktop graphical user interface. When a non-desktop user logs in to UnixWare, that user sees a command-line prompt, rather than a desktop interface.

nondestructive installation

An installation where the operating system is replaced but user files remain untouched. There are two types of nondestructive installations: overlay (where the same release of the UnixWare operating system is installed) and upgrade (where a new release of the UnixWare operating system replaces an earlier release).

online browser

See the *Dyna*Text Online Browser.

option

A button that typically enables or disables a control in a window.

overlay installation

A nondestructive installation where one release of the UnixWare operating system replaces another version of the same release. This type of installation is useful when you want to keep user data while replacing potentially corrupted operating system or application software.

package

A unit of application software. In addition to the application itself, a package may also contain related files, such as configuration files, device files, or data files.

packet

A logical group of data. Sometimes called data packet.

packet structure

The characteristics that define a packet. The structure defines the size of each area of the packet and what each of those pieces of information is for.

parallel port

A physical connector on the computer that can be used to establish links to parallel devices, such as a printer.

parallel printer

Any printer directly connected to a parallel port (for example, LPT1 or LPT2) on your computer.

parity

A bit added to character bits to make the total number of bits odd or even. The system uses parity bits for error checking. UNIX systems use a 7-bit even parity.

partition

A portion of the hard disk that is physically separated from other areas of the hard disk. Different operating systems must be on different partitions.

path

A file's path, also called a pathname, indicates where the file is located on your computer system. The path consists of a series of folder names separated by slashes (/). For example, */home/chris/bin/smaker* indicates that the file *smaker* is located in the *bin* directory, which is located in the *chris* directory, which is located in the *home* directory, which is located off of root ("/"), the beginning of the file structure).

When a path begins with a slash, it called an absolute path, because it begins at the beginning of the file structure. If a path is given without a slash at the beginning, such as *bin/smaker*, it is called a relative path, because the path is relative to another folder. The path *bin/smaker* only makes sense if you are located in the folder chris.

pathname

See path.

peer-to-peer communication

Occurs between similarly capable network devices.

peripheral

A hardware device that is connected to a hardware controller, rather than being directly connected to a computer's I/O port. For example, a SCSI controller connects directly to the I/O bus, while a SCSI tape drive is a peripheral because it connects to the SCSI controller.

permissions

Attributes associated with files and folders (directories) that describe who can use the item, as well as how it can be used (read, write, or execute).

pipe

The shell special character (|) that is used to direct output from one command to the input of another.

point size

Point size is a measurement used for fonts. There are about 72 points to the inch.

processor

The main processing unit of the computer that controls the processing routines, performs the arithmetic functions, and maintains accessible memory.

protocol

A formal description of message formats and the rules two or more machines must follow to exchange those messages.

pseudo device

A device file (located in the */dev* directory) that does not represent a physical hardware device. For example, pseudo terminal devices can represent several "Terminal" windows though they may appear on the same physical terminal.

pseudo terminal

The software implementation of a terminal, used as an active agent in communicating between processes and users. For example, a remote login server uses pseudo-terminals for remote login sessions.

queue

The list of jobs waiting to be printed. When new print requests are sent to a printer, they are added to the end of the queue.

random access memory (RAM)

The computer's working storage area. All processing of data and running programs are stored in RAM.

remote printer

Any printer connected to a remote system.

resource

When used with the X windowing system, a resource represents a particular attribute that defines how a part of your X session looks or acts. For the Network File System (NFS), a resource represents a remote file or directory that can be connected to your file system.

right-click

Refers to clicking the right mouse button. For example, you *right-click* on a icon or a window to display a popup menu. See also *click*.

rlogin

A remote login command used to start a session on a remote computer.

root

The root login is the traditional UNIX system login for all system administration tasks. Also, root can refer to the root directory (/), which is the *home* directory of the root user, by default.

router

A device used to connect two or more similar or dissimilar networks and provide routing services based on end-to-end connections.

SCSI (Small Computer System Interface)

A peripheral interface that allows you to connect other devices to your computer while only taking up one slot in your machine.

select

Another word for *click on*. You *click on* or *select* a window, a menu option or item, an icon, an option button, or a name from a list. To select an item from the screen with the mouse, move the cursor over the item and press and release the left mouse button one time without moving the mouse. Also called a single click. Another word for *click on*.

serial printer

Any printer connected to a serial port (for example, COM1 or COM2) on your computer.

serial port

A physical connector on the computer that can be used to establish an asynchronous link to serial devices, such as a modem, mouse, or printer.

server

The system in a client-server network that provides services to other computers.

share-item

Either a file or folder that is advertised (that is, made available to other computers). Through a network, other computers connect to the share-item. The share-item then appears as if it is really part of the computer that is connecting to it. Using a share-item in this way is an efficient way of sharing files and folders among everyone on a network.

shell

The UnixWare command-line interpreter. The Korn shell (*ksh*), Bourne shell (*sh*), Windowing Korn shell (*wksh*) and C shell (*csh*) are among the most popular shells used with UnixWare.

<shift>+<ctrl>+drag

To make a link.

single click

Same as *select*, that is, to select an item from the screen with the mouse, position the cursor over the item and press and release the left mouse button one time without moving the mouse.

slice

A portion of a partition on your hard disk that contains a separate file system.

smarter host

A feature of UNIX electronic mail that lets you route messages through a central system and/or log messages.

socket

A two-byte address supplied for every type of service provided by a network.

sort

A shell command used to rearrange data and send it to the display or to a file.

SPX

Sequenced Packet eXchange. A protocol that enhances the IPX protocol by providing reliable delivery.

style

The aspect of typefaces from a single typeface family that distinguishes them from each other. Style variations include such elements as weight (Bold, Demi), slant (Italic), and width (Constant, ExtraWide).

surface analysis

A hard disk test to check for defects in each disk block. Performing a surface analysis is important to ensure that the disk does not have defects in areas where critical UnixWare data will be placed.

swap space

If internal active and inactive processes fill up the memory, UnixWare automatically swaps some inactive processes out of system memory and onto a special section of the hard disk to allow for more memory space. The area swapped to is known as swap space.

system administrator

The person responsible for administering and managing a machine, network, and/or users.

system owner

The user account that administers the system from the desktop. For example, a system owner can back up/restore files, change network configurations, and add users. More than one user can be designated as a system owner.

TCP/IP (Transmission Control Protocol/Internet Protocol)

A set of protocols used to communicate between networks. TCP/IP is the basic set of protocols used to communicate to systems on the Internet.

terminfo

A database in UnixWare that contains definitions of different terminal and printer types you can use with UnixWare.

text file

Also known as an ASCII file. A file that contains only the printable characters from the ASCII character set. These characters include the alphabet, numbers, and normal punctuation marks. Control characters are not usually included in text files.

text input mode

When you are using the *vi* text editor, text input mode is the mode in which you add text to the file.

threads

A small task in a computer program. Threads allow a programmer to break large tasks into smaller ones which can be processed concurrently. This is designed to increase the program execution speed.

tool bar

Appears below menu bars in windows. Graphical buttons in the tool bar give you quick access to frequently used functions. When you move the mouse pointer over a graphical button, the name of the task it represents appears in the footer (area below the window) of the window. Tool bars provide an alternative to using menus for performing certain tasks.

tunable parameters

A set of values that determine how resources are allocated in the UnixWare kernel. For example, tunables limit how many processes can run concurrently, the maximum file size allowed on the system, and memory is allocated.

umask

A variable, expressed in octals, that is associated with a user's login ID. This variable sets file and directory permissions for newly created files and directories.

ulimit

A value in UnixWare that limits the maximum file size that can be created on the system.

UNIX mode

By installing a file system on a NetWare server in UNIX mode, the file system will support the semantics of a normal UNIX file system when you access it from UnixWare. For example, you can use **chown** and **chmod** to change file permissions and you can use file names that are case-sensitive and longer than the standard 8.3 characters.

UNIX-to-UNIX copy (UUCP)

The group of networking commands and protocols used to transfer files, do remote execution, and login to remote systems. This is the original UNIX system networking package and is used primarily today for serial communications (modem and direct connections).

username

Information you supply as part of the login procedure. *See* login ID.

user ID (uid)

An integer value, usually associated with a login name. The user ID of a process becomes the owner of files created by the process.

upgrade installation

A nondestructive installation where one release of the UnixWare operating system replaces an earlier release. Upgrade installations preserve user data.

window

A rectangular viewing area of various shapes that contains icons, text, or menus. Windows can be manipulated and moved.

window menu

The menu that allows you to manipulate the window itself (not the icons in the window). The window menu button is always in the upper left corner of a window.

X Windowing System

The graphical user interface developed at MIT that is used as the foundation for the UnixWare Desktop.

Trademarks

Novell, Inc. has made every effort to supply trademark information about company names, products, and services mentioned in this manual. The following list of trademarks was derived from various sources.

Novell Trademarks

Host Presenter is a trademark of Novell, Inc.

IPX/SPX is a trademark of Novell, Inc.

MAC is a trademark of Novell, Inc.

N-Design is a registered trademark of Novell, Inc.

NE2000 is a trademark of Novell, Inc.

NetWare is a registered trademark of Novell, Inc.

NetWare Client is a trademark of Novell, Inc.

NetWare Core Protocol is a trademark of Novell, Inc.

NetWare Global MHS is a trademark of Novell, Inc.

NetWare Logotype is a trademark of Novell, Inc.

NetWare MHS is a trademark of Novell, Inc.

NetWare Print Server is a trademark of Novell, Inc.

NLM is a trademark of Novell, Inc.

Novell is a registered trademark of Novell, Inc.

Novell DOS is a trademark of Novell, Inc.

Novell Virtual Terminal is a trademark of Novell, Inc.

Packet Burst is a trademark of Novell, Inc.

SMS is a trademark of Novell, Inc.

SPX is a trademark of Novell, Inc.

UnixWare is a registered trademark of Novell, Inc.

UnixWare Application Server is a trademark of Novell, Inc.

UnixWare Personal Edition is a trademark of Novell, Inc.

Windowing Korn Shell is a trademark of Novell, Inc.

WordPerfect is a registered trademark of Novell, Inc.

Third-Party Trademarks

Apple is a registered trademark of Apple Computer, Inc.

AT&T is a registered trademark of AT&T.

COMPAQ is a registered trademark of COMPAQ Computer Corporation.

DynaText is a registered trademark of Electronic Book Technologies, Inc.

EPSON is a registered trademark of Seiko Epson Corporation.

Hayes is a registered trademark of Hayes Microcomputer Products, Inc.

Hercules is a registered trademark of Hercules Computer Technology.

HP is a registered trademark of Hewlett-Packard Company.

i386 is a trademark of Intel Corporation.

i486 is a trademark of Intel Corporation.

Intel is a registered trademark of Intel Corporation.

Mach is a registered trademark of Carnegie-Mellon University.

Macintosh is a registered trademark of Apple Computer, Inc.

Merge is a trademark of Locus Computing Corporation.

Micro Channel is a registered trademark of International Business Machines Corporation.

Microsoft is a registered trademark of Microsoft Corporation.

MIME is a trademark of Micro-Term.

Motif is a trademark of the Open Software Foundation, Inc.

MS-DOS is a registered trademark of Microsoft Corporation.

Network File System is a registered trademark of Sun Microsystems, Inc.

Network Information Service is a registered trademark of SunSoft, Inc.

NFS is a registered trademark of Sun Microsystems, Inc.

NIS is a registered trademark of SunSoft, Inc.

Open Desktop is a registered trademark of The Santa Cruz Operation, Inc.

OS/2 is a registered trademark of International Business Machines Corporation.

Pentium is a trademark of Intel Corporation.

PostScript is a trademark of Adobe Systems, Inc. which may be registered in certain jurisdictions.

Proprinter is a registered trademark of International Business Machines Corporation.

PS/2 is a registered trademark of International Business Machines Corporation.

Q Vision is a trademark of COMPAQ Computer Corporation.

SCO is a registered trademark of The Santa Cruz Operation, Inc.

SNMP is a trademark of Wellfleet Communications, Inc.

Stacker is a registered trademark of Stac Electronics.

Sun is a registered trademark of Sun Microsystems, Inc.

Telebit is a registered trademark of Telebit Corporation.

UNIX is a registered trademark in the United States and other countries, licensed exclusively through X/Open Company, Ltd.

X Window System is a trademark of Massachusetts Institute of Technology.

XENIX is a registered trademark of Microsoft Corporation.

Xerox is a registered trademark of Xerox Corporation.

XNS is a trademark of Xerox Corporation.

Index

Double-click, defined 377

Drag, defined 377

Drag-and-drop, defined 377

Drivers
    viewing/updating software 132

Dumb terminal, defined 377

Dynamically laudable drivers, defined 377

DynaText
    defined 377

Dynatext. *See* Online document browser

E

Emergency recovery
    creating diskettes for 292
    creating tape for 294
    overview of 291

Enveloping, defined 377

Expanded memory
    required for DOS applications 305

Extended memory
    configuring DOS with 305
    required for MS Windows 305

F

File
    defined 378

File naming conventions
    DOS 250
    overview of 249
    UnixWare 250
    without NUC.NLM installed 250

File sharing
    configuring at command line
        view available local resources 216
    configuring at the command line
        make resources unavailable 215
        mount remote resources 212
        overview of 211
        share resources 214
        unmount remote resources 213

        view remote system resources 215
    configuring with File Sharing window
        accessing remote share-items 207
        creating local share-items 205
        opening window 202
        permissions needed 202
        relationship to NFS 201
        removing local share-items 210
        removing remote share-items 211
        requirements for 202
        starting NFS 203
        viewing share-items 204

File size, changing maximum with ulimit 287

File system
    defined 378

File systems
    NUCFS 235
    overview of 13
    structure of 13

Filenames
    differences between DOS and UnixWare 249
    mapping between NetWare and UnixWare
        with NUC.NLM installed 251
        without NUC.NLM installed 250

Files
    archiving with cpio or tar 22
    backing up 22
    changing maximum allowed size of 287
    compressing 21
    copying between directories 20
    copying from CD-ROM 24
    deleting 21
    editing .mwmrc 56
    editing .olinitrc 56
    editing .Xdefaults 55
    editing with text editor 27
    editing with vi 28
    linking 21
    listing in directory 20
    moving 20
    naming restrictions for DOS 250
    naming restrictions for UnixWare 250
    printing with lp 26
    searching for 25

SAP 232
SPXII 231
overview of 221
IPX, defined 380
IPX/SPX, defined 380

K

Kernel
described 11
rebuilding 123
Keyboard shortcuts
defined 380
Korn shell 18

L

Linking files
hard link 21
symbolic link 21
Links
defined 380
Log data
saving 275
stopping 275
viewing saved data 275
Login
defined 380
Login ID
defined 381

M

Mail
configuring gateway for MHS 145
configuring MHS Gateway on NetWare 146
configuring MHS Gateway on UnixWare 147
customizing with Mail Setup 138
files and directories used by
/bin/mail 138
/etc/mail/mailsurr 138

/etc/mail/namefiles 138
/usr/lib/mail/mailsurr.proto 138
/var/mail 138
overview of 137
permissions to configure 139
setting up basic variables 140
setting up extended variables 140
setting variables for MHS Gateway 147
using MHS Setup 144
Mail Setup. *See* Mail
Main window, defined 381
Medium-Access Protocols (MAC) 221
Megabyte, defined 381
Memory address range, defined 381
Menu bar
defined 381
described 381
menu bar 60
Menu option, defined 381
Menus
defined 381
using in menu bar 381
Merge
defined 381
Merge. *See* DOS Merge
Message Handling Service. *See* MHS Setup and MHS
Gateway
Message level service, defined 381
Message Monitor
accessing 283
clearing messages from 284
overview of 283
saving messages to file 284
setting alert option 285
Messages, monitoring system
clearing messages 284
overview 283
saving messages to file 284
setting alert option 285
using Message Monitor for 283
Metacharacter, defined 382
MHS Gateway
configuring 145
configuring on NetWare 146

User Comments

We want to hear your comments and suggestions about this manual. Please send them to the following address:

Novell, Inc.
Technical Publications Group
180 Park Avenue
Florham Park, NJ 07932
U.S.A.

UnixWare 2
System Owner Handbook
Part #100-002418-002
December 1994

For technical support issues, contact your local dealer.

Your name and title: _____

Company: _____

Address: _____

_____

_____

Phone number: _____ Fax: _____

I use this manual as ❑ an overview ❑ a tutorial ❑ a reference ❑ a guide ❑ _____

	Excellent	Good	Fair	Poor
Completeness	❑	❑	❑	❑
Readability (style)	❑	❑	❑	❑
Organization/Format	❑	❑	❑	❑
Accuracy	❑	❑	❑	❑
Examples	❑	❑	❑	❑
Illustrations	❑	❑	❑	❑
Usefulness	❑	❑	❑	❑

Please explain any of your ratings: _____

_____

_____

_____

In what ways can this manual be improved? _____

_____

_____

_____

You may photocopy this comment page as needed so that others can also send in comments.