

System Guide



Microsoft
WINDOWS NTTM

System Guide

Microsoft® Windows NT™

Beta March 1993

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Welcome

Welcome to Microsoft® Windows NT™, the next-generation operating system that opens up the power of 32-bit computing in a graphical user environment.

Windows NT is designed to meet the demands of power users, developers, and MIS for powerful hardware and applications, without sacrificing the ease of use and application availability of Windows. Windows NT is another member of the family of Windows operating systems. It includes powerful built-in networking capabilities in addition to the same workgroup services provided in Windows for Workgroups. Windows NT is easy to install, configure, and manage.

You can run powerful new 32-bit applications created for Windows NT, which is also compatible with existing environments. So you can run applications created for other versions of Microsoft Windows™, MS-DOS®, and character-based MS OS/2® 1.x as well as POSIX-compliant applications.

The *Windows NT System Guide* is for new and experienced users of Windows NT. This manual describes the features in Windows NT and presents step-by-step procedures for using the applications and tools provided in your product package.

This introduction provides the following information:

- A description of Windows NT, including its benefits and a comparison to Microsoft Windows for MS-DOS
- The Windows NT system requirements
- A summary of the resources available for learning and using Windows NT
- A list of the conventions used in the Windows NT document set

What Is Windows NT?

The Microsoft Windows NT operating system is the portable, secure 32-bit, preemptive multitasking member of the Microsoft Windows operating system family. Windows NT combines the ease of use and productivity of the Windows graphical interface with the powerful capabilities of a next-generation operating system that takes maximum advantage of the advanced hardware of the 1990s.

Key Features of Windows NT

Complex business applications place high demands on computing technology. Windows NT is designed to support these applications with:

- Efficient high-end computing, with full 32-bit operations, preemptive multitasking, and memory protection.
- Portability, running on advanced PC hardware based on x86 microprocessors or reduced instruction set computer (RISC) architecture such as the MIPS® R4000™.
- Scalability, supporting a diverse range of hardware platforms for stand-alone systems, workstations, and network servers. Windows NT also supports symmetric multiprocessing to take full advantage of computers with multiple processors.
- Security, providing an advanced, reliably secure environment designed to meet the requirements of U.S. Department of Defense C2-level standards.
- Networking and workgroup support, with built-in file-sharing and print-sharing capabilities for workgroup computing, and an open network system interface that includes built-in support for NetBEUI, TCP/IP, and other transports. Windows NT is compatible with existing networks such as Banyan® VINES® and Novell® NetWare®.
- 32-bit versions of Microsoft Mail and Microsoft Schedule+ for sending messages, managing calendars, and scheduling meetings.

With Windows NT, you can run a host of applications on both x86 and RISC machines, including the following:

- New, powerful Win32™-based applications (32-bit Windows)
- Programs created for the MS-DOS and Microsoft Windows for MS-DOS operating systems
- MS OS/2 version 1.x character-based programs
- POSIX-compliant programs

Windows NT Compared to Windows for MS-DOS

If you are familiar with versions of the Microsoft Windows operating system that run with MS-DOS, you will quickly understand how to use Windows NT.

Windows NT shares these same features:

- Mouse and keyboard techniques for working with windows, menus, and icons
- Desktop tools such as Program Manager, File Manager, and Print Manager
- Accessories, games, and other components, with an extended set in Windows NT
- The complete object linking and embedding (OLE) capabilities supported by applications created for versions of Windows for MS-DOS

Windows NT, however, is a complete operating system with powerful additions to support file and system security, networking capabilities, and high-end, 32-bit computing. Windows NT is designed to take full advantage of the advanced computing capabilities of x86 and RISC processors to provide a platform for advanced line-of-business computing solutions and for applications requiring sophisticated system software.

You will find these additional features in Windows NT:

- Advanced built-in network support, including complete security features.
- Applications in the new Administrative Tools group for managing user accounts, controlling network services, auditing system events, managing and backing up disks, and more.
- Tools in File Manager, Control Panel, and Print Manager for security, hardware configuration, and network management.
- A new file system—the Windows NT file system (NTFS)—that provides security and automatic error-correction capabilities. NTFS allows file and directory names of any length.
- A command prompt where you can start programs and batch files, or issue all Windows NT commands and most commands for MS-DOS, MS OS/2, and POSIX.

System Requirements

The following table describes the system requirements for Windows NT.

Category	Requirement
Hardware	32-bit x86-based (such as Intel® 80386/25 or higher) microprocessor, or supported RISC-based microprocessor such as the MIPS R4000 and DEC® Alpha
	VGA, or higher resolution, video display adapter
	One or more hard disks, with 80 MB minimum free hard disk space on the partition that will contain the Windows NT system files
	For x86-based computers, a high-density floppy disk drive
	For RISC-based computers, a SCSI® CD-ROM drive
Memory	8 MB RAM required
Optional components	Mouse or other pointing device
	One or more SCSI CD-ROM drives (required for RISC-based computers)
	One or more network adapter cards, if you want to use Windows NT with a network

Finding Information About Windows NT

The *Windows NT System Guide* presents information for both new and experienced users who are installing and using Windows NT. Read this book for a description of the applications and tools provided in your Windows NT package. This manual presents procedures for completing common tasks, such as organizing the desktop, managing files and directories, printing, using applications, administering the network, and more.

Your product package also includes a set of Release Notes. Be sure to read these notes, and also look for any README text files that are copied to the \WINNT directory when you install Windows NT. These files contain up-to-date information about specific hardware, printers, and networks.

The following sections describe other sources of information for learning and using Windows NT.

Additional Information

Three other key sources of information included in the Windows NT package will help you plan for and use Windows NT:

Road Map for Windows NT

Gives you a graphical overview of where to find the tools and information you need to learn and use Windows NT.

Online demonstration

Covers the basics of Windows NT. View it at the conclusion of Windows NT Setup, or at any time by choosing the Introducing Windows NT icon in the Main program group.

Online Help

Always available when you press F1 while working in Windows NT. Or at the command prompt, type **help** or **net help** and then press ENTER.

Detailed information on Windows NT architecture and design is available in a Microsoft Press book, *Inside NT*. *Inside NT* may be obtained wherever books and software are sold. To order the book directly, call 1-800-MSPRESS.

To explore additional sources of information about Windows NT, see the appendix called “Microsoft Support Services.” It covers the following:

- Contacting Microsoft Product Support Services
- Calling Interactive Voice Support
- Using the Microsoft forums on CompuServe
- Getting product training and consultation services

Conventions

The following conventional terms, text formats, and symbols are used throughout the printed and online documentation for Microsoft Windows NT.

Convention	Meaning
Bold	Indicates the actual commands, words, or characters that you type in a dialog box or at the command prompt.
<i>Italic</i>	Indicates a placeholder for information or parameters that you must provide. For example, if the procedure asks you to type <i>filename</i> , you must type the actual name of a file. Italic also indicates new terms and the titles of other books in the Microsoft Windows NT package.
ALL UPPERCASE	Indicates a directory, filename, or acronym. You can use lowercase letters when you type directory or filenames in a dialog box or at the command prompt, unless otherwise indicated for a specific application or utility.
monospace	Represents examples of screen text or entries that you might type at the command line or in initialization files.
►	Indicates a procedure with sequential steps.
•	Indicates a procedure with only one step.
■	Indicates a list of related information, not procedural steps.
\WINNT	Refers to the Windows NT system tree. All references to files in the Windows NT operating system assume that you installed Windows NT in this directory.
Security	Indicates the group membership required for the account used to log on to Windows NT in order to complete the task described.
RISC	Indicates a special note for RISC-based computers.

Guidelines for mouse and keyboard actions are described in Chapter 2, “Windows NT Basics.”

Introducing Windows NT

After you install Windows NT, you can begin working right away. Windows NT takes care of most configuration tasks automatically, including preserving settings for other operating systems such as MS-DOS if you maintain dual-boot capabilities. You can run your applications and manage files immediately, without editing special configuration or initialization files.

This chapter presents the basic information you need to get started with Windows NT and explains what you can do with the Windows NT operating system.

If you are new to using a graphical user interface such as Microsoft Windows or if you want a quick review, see Chapter 2, “Windows NT Basics,” for a summary of the basic procedures you need to know.

Starting and Quitting Windows NT

As an operating system Windows NT affects every aspect of your work on the computer, from when you first turn it on, through all your actions to start applications, save files, and communicate with other users over the network.

This section describes how to start Windows NT and log on to your computer, and also describes how to use online Help and the Windows NT introductory demonstration.

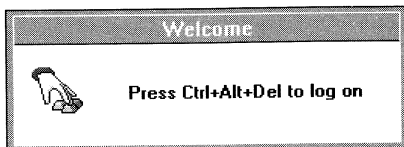
Starting Windows NT

Because Windows NT is a secure system, you must identify yourself, or “log on,” and enter a password each time you start Windows NT.

► To start Windows NT

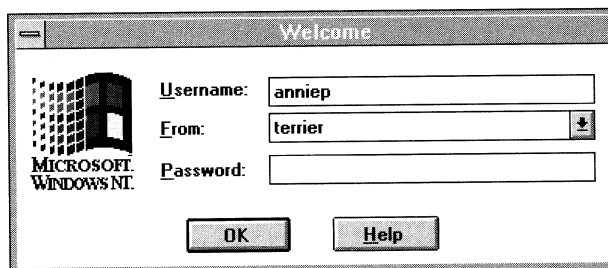
1. Turn on your computer.

2. Press an arrow key at the boot loader prompt to choose Windows NT from the list of operating systems on your computer, and then press ENTER.
3. When the logon message appears, press CTRL+ALT+DEL to log on.



Important The CTRL+ALT+DEL sequence ensures the security of your system. Even if you see a message already displayed that asks you to enter your password, always press CTRL+ALT+DEL before you type your password.

4. In the Welcome dialog box, type your username and password, and also select either your local computer name or the name of a Windows NT Advanced Server domain, and then choose the OK button.



Your username, user account, and password are unique identifiers defined while running Setup. If you do not know the correct entries for logging on a computer, ask your network administrator.

- The entry in the Username box is the name you entered while running Setup to identify your user account, or it is the username assigned by the network administrator. Each time you log on, Windows NT proposes the username for whoever last logged on at this computer.
- The entry in the From box is either your local computer name or the name of the Windows NT Advanced Server domain to which your computer belongs.
- The entry in the Password box is the one you defined while running Setup or that the network administrator defined for you. Leave this box blank if there is no password defined for your user account.

As soon as you log on, you can run applications, share files with other users on the network, connect to a printer, and control who has access to your computer and its files, as summarized in "What to Do After Setup" later in this chapter.

Using Windows NT Help

Online Help in Windows NT is a convenient, quick way to look up information about a task you are performing or a feature or dialog box you would like to know more about.

Windows NT Help includes the following:

- A description of each command available from the Command Prompt
- Information about Microsoft Product Support Services
- Full-text search capability that enables you to find Help information quickly
- An explanation of how to use full text search

Starting and Quitting the Online Demonstration

The online demonstration installed with Windows NT introduces the built-in networking security and workgroup features of Windows NT. The topics include the following:

- Logging on to Windows NT
- Connecting to other computers and sharing files on a network
- Creating user accounts and setting file permissions
- Connecting to a printer
- Using ClipBook to share information over the network
- Communicating with other users

► **To run the “Introducing Windows NT” online demonstration**

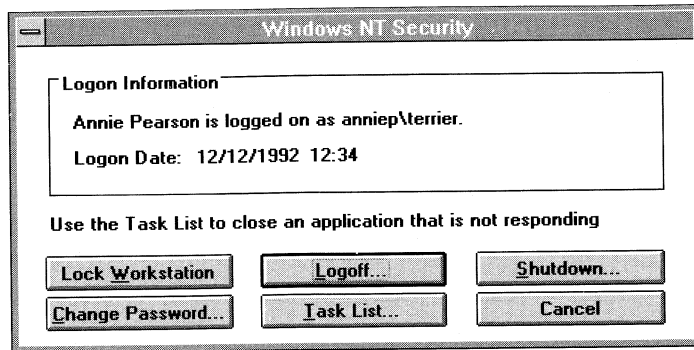
1. Choose the Introducing Windows NT icon in the Main group.
2. To quit, press the ESC key once if you are viewing the main menu, or press ESC twice if you are viewing a topic.

Quitting Windows NT

When you are working in Windows NT, you can press CTRL+ALT+DEL to change your password, to lock or secure the computer, or to log off so that you can restart your computer or log on using another user account.

► **To log off the current session**

- From the File menu in Program Manager, choose Logoff, or press ALT+F4.
–Or–
- Press CTRL+ALT+DEL, and then choose the Logoff button in the Windows NT Security dialog box.



► **To turn off your computer**

- From the File menu in Program Manager, choose Shutdown.
- Or–
- Press CTRL+ALT+DEL, and then choose the Shutdown button in the Windows NT Security dialog box.

Caution Never use the computer's power switch to quit Windows NT, or you may lose data. Always use Shutdown to quit, so Windows NT can save changes in all working files and properly close applications and services.

What to Do After Setup

















The Windows NT operating system affects every aspect of your work on the computer, from when you first turn on the computer, through all your actions to start applications, save files, and communicate with other users over the network.

Although Windows NT takes care of most configuration tasks automatically, you might want to modify your working environment or add elements to your system. This section suggests activities for using and modifying your system after installing Windows NT.

Using Windows NT Applications

Program Manager is the application that runs each time you start Windows NT. You can use Program Manager to organize and start applications and tools. The first time you start Windows NT, Program Manager shows the Main group window open on the desktop, plus icons for several built-in program groups. For more information, see Chapter 3, "Program Manager."

The following table lists the applications provided with Windows NT.

Application	Used to
Main group:	
 File Manager	Manage files and directories, share files on the network, and connect to shared directories on other computers. See Chapter 4.
 Control Panel	Customize the fonts, color, and desktop, and to configure hardware devices and the network. See Chapter 5.
 Print Manager	Connect to, configure, and share printers, and control printing of documents. See Chapter 6.
 Mail	Send and receive electronic mail. See Chapter 7.
 Schedule+	Maintain a personal calendar and schedule meetings automatically. See Chapter 8.
 Command Prompt	Start programs or run batch files for MS-DOS, MS OS/2 version 1.x, and POSIX. See Chapter 9.
 PIF Editor	Create or change program information files for running MS-DOS-based applications. See Chapter 9.
 ClipBook Viewer	Store clippings from data files and share that information over the network. See Chapter 10.
 Windows NT Setup	Install device drivers and Windows NT components. See Chapter 12.
 Introducing Windows NT	View an online demonstration of the networking, security, and workgroup features of Windows NT.
 Windows NT Help	Get information on the online Help features of Windows NT.
 User Manager	Create user accounts and groups, and define policies for users and groups. See Chapter 13.
 Backup	Back up and restore files on a tape drive for NTFS, FAT, or HPFS file systems. See Chapter 14.
 Event Viewer	View and manage event logs for system, security, and application events. See Chapter 15.
 Disk Administrator	View and manage hard disk partitions and other disk resources. See Chapter 16.
 Performance Monitor	Measure CPU use and other data on system performance. See Chapter 17.

Setting Up Startup Applications

You can specify which applications will start automatically whenever you log on. These changes will only be saved for your user account. If another user logs on to your computer, or if you log on to another user account, the startup applications defined for that user account will appear.

► **To define startup applications**

- In Program Manager, open the Startup group and add a program item for each application that you want to start each time you log on, following the procedures in “Creating a Program Item” in Chapter 3, “Program Manager.”

Setting Up Your Personal Working Environment

You will probably want to configure the appearance and content of your basic workspace, the desktop.

Note If your computer is a member of a Windows NT Advanced Server domain, the network administrator might have created a user profile for you. Ask your network administrator if a user profile controls your personal working environment. Changes you make to your workspace may not be retained the next time you log on if a user profile controls your workspace.

► **To configure how your workspace looks and sounds**

1. In Control Panel, double-click the Color, Desktop, and Sound icons to define how your desktop looks and sounds, following the procedures in Chapter 5, “Control Panel.”
2. In the Command Prompt window, choose commands from the Control menu to configure fonts, screen size, position, and color, following the procedures in Chapter 9, “Command Prompt.”

► **To set up custom program groups for running applications**

- In Program Manager, create program groups and add program-item icons, following the procedures in “What Are Groups and Program Items?” in Chapter 3, “Program Manager.”

► **To change your password**

1. Log on to Windows NT in the usual way, and then press CTRL+ALT+DEL.
2. In the Windows NT Security dialog box, choose the Change Password button.
3. In the Change Password dialog box, type your old password, a new password, and a confirmation in the appropriate boxes, and then choose the OK button.

Configuring the Network

Windows NT provides network services so that users can connect computers to share files, printers, and other resources. The following tools in Windows NT help you configure and monitor the network.

Security To install, configure, or remove any network component and to join a workgroup or domain, you must be logged on as a member of the Administrators group.

Use	To
Network in Control Panel	Install and configure software to support the network, and to join workgroups or domains.
Event Viewer	View the system, security, and application events on a computer to monitor how the computer is being used.
File Manager	Share files and directories on the network, and connect to shared directories.
Print Manager	Share printers on the network, and connect to shared printers.
Server in Control Panel	View connected users, shared resources, and open resources; manage directory replication and designate recipients of administrative alerts.
Services in Control Panel	Start and stop network services.
User Manager	Manage user accounts, group members, and security policies.

Joining a Workgroup or Domain

Note You do not need to complete this procedure if your computer joined the correct workgroup or domain during Setup.

In Windows NT, a *workgroup* is a collection of computers that appear under the same workgroup name on the network. This grouping makes it easy to find directories or printers shared by people you work with.

Besides providing the same network browsing capabilities as a workgroup, a Windows NT Advanced Server *domain* is a collection of computers that can recognize the same user accounts. Membership in a domain is assigned by the domain administrator in a Windows NT Advanced Server network.

► To join a workgroup or a Windows NT Advanced Server domain

1. At the computer which will join the workgroup or domain, log on as a member of the Administrators group. For example, you might be able to log on under the username “Administrator” and use this account to make changes.

2. In the Network option of Control Panel, choose the Change button beside the Workgroup or Domain name at the top of the dialog box, and then follow the procedure as described in “Configuring the Network” in Chapter 5, “Control Panel.”

Browsing Other Computers and Resources on the Network

In Microsoft Windows-based networking you can browse domains, workgroups, and computers to look for shared directories and printers.

► To browse for shared directories on the network

1. In File Manager, choose Connect Network Drive from the Disk menu, or choose the Connect Drive button on the toolbar.
2. The networks, domains and workgroups, computers, and shared directories are organized in a tree structure. From the Shared Directories box, choose an item to expand the list: Choose a network name to display available domains and workgroups, a domain or workgroup name to display available computers, or a computer name to display its shared directories.

► To browse for shared printers on the network

1. In Print Manager, choose Connect to Printer from the Printer menu, or choose the Connect to Printer button on the toolbar.
2. From the Select Printer box, choose an item to expand the list: Choose a network name to display available domains and workgroups, a domain or workgroup name to display available computers, or a computer name to display its shared printers.
3. To connect to a printer, double-click on a printer name.

Managing Files and Disks

A key function of any operating system is to provide a file system for storing and managing your application and data files. The tools for file management in Windows NT include the following.

Use	To
Windows NT Setup	Specify a file system for Windows NT during setup.
File Manager	Create and delete directories, manage files stored in directories, and define file attributes.
Server in Control Panel	View and remotely manage other computers.
Convert utility	Change a FAT or HPFS file system to NTFS for a disk partition after Setup. Run CONVERT.EXE from the command prompt.

Managing Files

When you format a hard disk, you prepare it to store files using a particular file system. Most operating systems require a specific file system to store files on a hard disk. Windows NT automatically supports the following three file systems:

- The Windows NT File System (NTFS) is a new advanced file system that supports file recovery, extremely large storage media, and long filenames. NTFS is required if you want maximum data security for your installation, and is recommended if Windows NT is the only operating system on your computer.
- The File Allocation Table (FAT) is the file system used by the MS-DOS operating system, limited to eight-character filenames with three-character extensions. FAT does not provide security. FAT is required for the system partition if you also use MS-DOS on your computer.
- The High Performance File System (HPFS) is the file system used with the OS/2 operating system version 1.2 or later, which supports long filenames. HPFS does not provide security.

If you choose to install Windows NT on a disk partition formatted for FAT or HPFS, Windows NT automatically observes all the file-naming conventions of those file systems. For more information, see “Working with Files and Directories” in Chapter 4, “File Manager”; see also the online Command Reference and your documentation for Microsoft MS-DOS or Microsoft OS/2.

If you choose to use NTFS with Windows NT, these new file-naming conventions apply:

- File and directory names can each be up to 256 characters, including extensions; and a name can have multiple extensions separated by periods.
- Names can contain any uppercase or lowercase characters except the following:
? \ * " < > | / :
- If you mix uppercase and lowercase characters in a filename, Windows NT preserves the case when it displays the name. However, Windows NT does not regard case when distinguishing filenames you enter in dialog boxes or at the command prompt.
- You can search for filenames or perform other multiple-file operations in Windows NT using wildcards, where an asterisk (*) stands for a whole word or group of characters, and a question mark (?) represents a single character.

When you create a file with a long name under NTFS, Windows NT also automatically creates a filename that is compatible with MS-DOS, so that computers running MS-DOS or applications that don't support long filenames can still identify the file.

Setting Up to Print

Windows NT provides several advantages in printing:

- If you use Windows NT printers on the network, separate printer drivers do not have to be installed on each workstation, because the printer driver is stored on a single computer.
- You can browse for available printers on the network.
- You do not have to redirect a port for the printer—you just connect to a printer using Print Manager.
- You can manage your print job from your local computer.

You can choose Print Manager in the Main program group of Program Manager to install and configure printers.

► **To connect to, install, or configure a network printer**

- If the network printer is on a Windows NT network, follow the procedures in “Connecting to a Network Printer” in Chapter 6, “Print Manager.”
Or, if printer is on another kind of network, follow the procedures in “Installing a Printer” in Chapter 6.

Configuring Your System

What happens when you start your computer depends on various elements:

- The defaults you define for the boot loader and any user environment variables you define for applications
- The services you configure to start automatically
- The applications you specify in the StartUp group in Program Manager
- The contents of your logon script
- Any user profile that might be assigned by the administrator for a Windows NT Advanced Server domain

This section describes how to get started with defining each of these elements.

Security You can change some system settings only if you are logged on as a member of the Administrators group or if you belong to another group that can configure the computer. If you cannot run any application for changing system settings, ask your network administrator for assistance. For more information, see “Managing the Security Policies” in Chapter 13, “User Manager.”

In Microsoft Windows NT, you define all elements of your system configuration using graphical tools such as Control Panel and Windows NT Setup. Windows NT automatically stores values that define the working environment for Windows NT, plus the information for running applications or for using alternate operating systems.

The Control Panel is probably the main tool you will use to change your system configuration. For example, you can choose the Fonts option to install or remove screen fonts, including TrueType fonts. Also, some configuration values change automatically when you install new software or when you define your workspace in an application such as Microsoft Excel.

The following key tools can be used to configure system hardware and software.

Use	To
Windows NT Setup	Install drivers for the video display, mouse, and keyboard for the computer. Install or remove supporting components for Windows NT.
Control Panel	Define desktop appearance and configure hardware and software for the computer and for the network.
PIF Editor	Change the memory settings required for running MS-DOS-based applications.
Print Manager	Install and configure printers to be used with your computer.
System in Control Panel	Define environment variables and preferences for alternate operating systems.

Defining the Boot Loader and Other Operating System Variables

You can specify the default operating system that your system proposes at startup, define user environment variables, and add or configure virtual-memory paging files to optimize performance in Windows NT.

- **To configure boot loader, user environment variables, or virtual memory**
 - In the System option of Control Panel, specify the settings you want, following the procedures in “Defining Options for the Operating System” in Chapter 5, “Control Panel.”

The *boot loader* defines the information needed for system startup, such as the location for the operating system’s files. Windows NT automatically creates the correct configuration and checks this information whenever you start your system. How this configuration information is stored depends on your system’s microprocessor:

- For an x86-based computer, Windows NT saves your startup preferences in the BOOT.INI file in the root directory on your main hard drive. Configuration files such as AUTOEXEC.BAT and CONFIG.SYS are used only to specify memory and other parameters for MS-DOS-based applications that you might run under Windows NT.
- For a RISC-based computer, your startup preferences and all other system configuration information are stored in non-volatile RAM.

You don't have to keep another operating system such as MS-DOS on your computer to run applications created for that operating system. For information about running applications created for other operating systems, see Chapter 11, "Other Application Environments."

Setting Up Startup Network Services

Windows NT starts several network services automatically, so that the capabilities of the Windows NT network are automatically available as soon as you want to work with the system. For example, the Computer Browser, Event Log, Workstation, and Net Logon services start each time you log on. You might also want to start other services automatically at system startup, depending on your system needs.

- **To start network services automatically when you log on**
 - In the Services option of Control Panel, set up services that you want to start automatically, following the procedures in "Managing Services" in Chapter 5, "Control Panel."

Setting Up User Accounts and Groups

If your computer is not a member of a Windows NT Advanced Server domain, you must create local user accounts and specify user groups. You might want to create user accounts and groups for everyone who will use your computer.

A user account consists of all the information that Windows NT uses to allow someone to use a computer, including the username, a description, a password, and the groups to which that user belongs.

A group is an account that contains other accounts, which are called "members." Groups provide an easy way to grant common capabilities to several users, because all rights and permissions assigned to a group are provided to its members.

► **To set up user accounts and groups for a single computer**

1. In the Administrative Tools group in Program Manager, double-click the User Manager icon.
2. Create the user accounts you want, following the procedures in “Managing User Accounts” in Chapter 13, “User Manager.”
3. Create the groups you want, following the procedures in “Managing Groups” in Chapter 13, “User Manager.”

Applications and Commands for User Accounts and Shared Resources

Task	Configuration application
Set up user accounts	User Manager
Set up local groups	User Manager
Set up shared resources	File Manager, Print Manager

Managing Security

The security provided through Windows NT when you use NTFS, combined with regular use of the Backup utility, can eliminate almost all possibility of data loss. Security in Windows NT consists of two basic elements: preventing data loss resulting from unauthorized access or preventing data loss resulting from file damage.

Security For most actions related to security, you must log on as a member of the Administrators group.

Controlling Unauthorized Access

To control unauthorized access, Windows NT includes tools for limiting initial access to the system itself, to specific files and directories, and to resources such as printers. Windows NT also includes tools for monitoring security events.

The tools for controlling access to the system include the following.

Use	To
CTRL+ALT+DEL	Change your password.
File Manager	Share resources and establish permissions to protect specific files and directories.
Network in Control Panel	Define limits for sharing a computer's resources with other users on the network.
User Manager	Create user accounts for identification and authentication when the user logs on, and authorize the specific actions a user can perform on the system.

You can also change your password by pressing CTRL+ALT+DEL and then choose the Change Password button in the Windows NT Security dialog box.

The tools for auditing security transactions in Windows NT include the following.

Use	To
Event Viewer	Define the size and management of the security event log.
File Manager	Define the files, directories, and users to be audited.
Print Manager	Define printers to be audited
User Manager	Define the kinds of events to be audited.

Preventing File Damage and Data Loss

When you use NTFS, Windows NT logs all file transactions, replaces bad sectors automatically, and stores copies of all vital information. Therefore, Windows NT can preserve disk integrity and ensure complete, rapid recovery after power failure or other system failures.

No matter which file system you use, Windows NT also automatically preserves a working boot configuration to ensure that you can always start Windows NT, in spite of any changes to the system configuration that may occur during a work session. Windows NT also requires that you create a Repair disk during Setup so that your system can be repaired if boot information or system files are corrupted at startup.

Setting Up Security Policies

You can define three basic security policies for your computer:

- The Account policy controls how passwords are used by user accounts.
- The Audit policy controls what types of events are recorded in the Security log (which you can view in Event Viewer).
- The User Rights policy controls the rights assigned to groups and user accounts for your computer. We do not recommend that you change these default settings.

► To manage security policies for your computer

- From the Policy menu in User Manager, choose Account or Auditing, and then follow the procedures in “Managing the Security Policies” in Chapter 13, “User Manager.”

Windows NT Basics

This chapter reviews the basics for working in Windows NT. These features and the related procedures in the graphical user interface of Windows NT are identical to those in versions of Windows for MS-DOS. If you are familiar with Windows, you can skip this chapter. You can practice any of the basic procedures described here without fear of harming your system.

This chapter emphasizes using the mouse to complete tasks. For information about using the keyboard to work with windows and dialog boxes, see “Using the Keyboard” later in this chapter. The following topics are included in the chapter:

- Selecting items for action
- Managing windows
- Choosing commands
- Using the Control menu and Task List
- Using Help
- Using dialog boxes and responding to system messages
- Copying and pasting information between applications
- Using keyboard shortcuts

Selecting Items for Action

In Windows NT, you can accomplish most tasks by selecting an item such as an icon, window, or other element, and then choosing a command. You can use a mouse or other pointing device such as a pen to select items and carry out actions in Microsoft Windows NT. For example, you select an item by pointing to it with the mouse and clicking.

The procedures in this manual and in Help assume that you configured the left button as the primary mouse button. Any procedure that uses the secondary button will refer to it as the right mouse button.






The following terms are used to describe mouse actions.

Mouse term	Meaning
Point	Move the mouse until the tip of the mouse pointer rests on what you want to choose on the screen.
Click	Press and release the mouse button without moving the mouse. Clicking an item selects it. For many actions, you can select multiple items by holding down SHIFT while clicking.
Double-click	Click the mouse button twice in rapid succession.
Drag	Hold down the mouse button while you move the mouse. For some actions, you can extend a selection by pressing SHIFT while dragging. For other actions, you can move a copy of a selection to another location by pressing CTRL while dragging.

Guidelines for Selecting Items and Using the Mouse

To use Windows NT efficiently, use the mouse to select items and initiate commands. The following list presents basic guidelines for using the mouse:

- When you select an icon, dialog box option, or other item, the selection is highlighted. For example, selected text or the label on a selected icon appears in reverse color.
- To cancel a selection, click another item.
- Double-clicking usually initiates the same action as selecting the item and then choosing a command. For example, double-clicking an icon in Program Manager is the same as selecting the icon and then choosing the Open command from the File menu.
- When you move the mouse, the mouse pointer shows your location on the screen and often changes shape when the mouse crosses different areas on the screen. The following table shows some examples.

This pointer	Appears
	Where you can click to select items.
	Where you can drag the window border to size a window.
	Where you can draw or paint.
	Where you can enter text in a window or dialog box.
	When you start an application and can continue working while Windows NT completes a background task.

Managing Windows

All Windows NT operations take place on the desktop, the area of the screen where elements such as windows, icons, and dialog boxes appear. When you first start Windows NT, the Program Manager application window appears on the desktop, showing the Main group window and group icons for the other applications installed with Windows NT.

You can move windows and icons around on the desktop. When you click a window to begin working, the title bar changes color to show that it's the active window, and the window automatically becomes the topmost window.

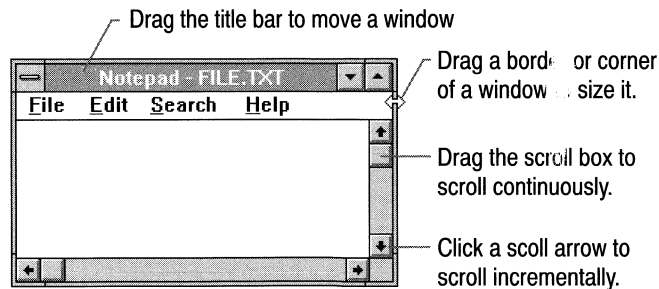
You can switch to other windows on the desktop by clicking the window you want, or by pressing ALT+TAB to cycle through the running applications. You can also use the Task List to switch windows, as described in “Using the Control Menu and Task List” later in this chapter.

Starting Applications in Program Manager





Program Manager is a Windows NT application that you use to start applications and also to organize applications and working files in logical groups. Applications and files are represented in Program Manager as program-item icons, and organized in groups that appear as windows or icons within the Program Manager window. You start an application by choosing its icon. For more information, see Chapter 3, “Program Manager.”

Moving and Sizing Windows

You can move or size most windows in Windows NT, or scroll the contents of the window with the basic mouse actions shown in the following illustration.

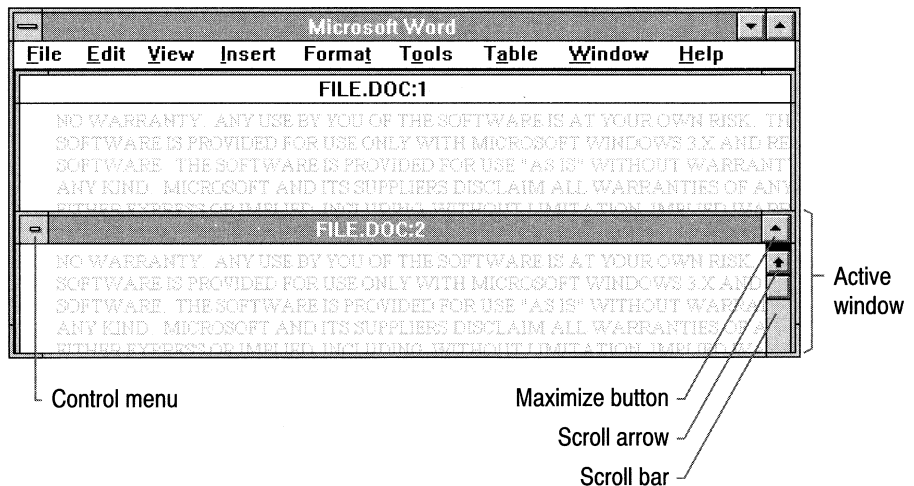


The following list shows how to use the buttons in the window frame to manage the size and position of the window.

Choose	To
	Display the Control menu (this is the same as pressing ALT+SPACEBAR).
	Reduce the application to an icon (this is the same as choosing Minimize from the Control menu).
	Enlarge the application window to full screen (this is the same as choosing Maximize from the Control menu).
	Return the application window to its previous size (this is the same as choosing Restore from the Control menu).

Using Document Windows

Some Windows-based applications also present document windows so that you can view more than one document simultaneously. You can size, scroll, and arrange document windows, but you cannot move them outside the application window.



Choosing Commands in Windows NT

When you work with applications in Windows NT, you choose commands to complete actions. The applications and tools included with Windows NT provide several ways to choose commands. You can:

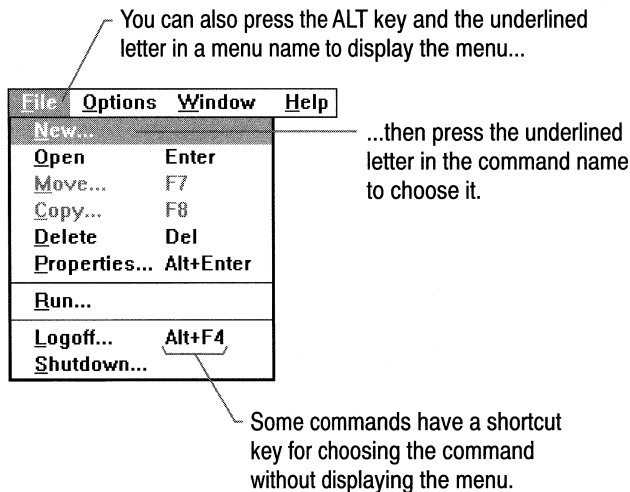
- Use the mouse or keyboard to choose commands from the menu bar.
- Choose buttons on toolbars (where available).
- Use the drag-and-drop features in Program Manager or File Manager to move, copy, and print files, or to start applications.

This section describes how to choose commands from the menu bar in all Windows-based applications. For information about using drag-and-drop in Windows NT, see “Working with Files and Directories” in Chapter 4, “File Manager.” For information about using a toolbar, see the documentation for your application.

In all Windows-based applications, commands are grouped on menus, with the menu names displayed in the menu bar across the top of the application window. Each application has different menus, but most applications include at least a File menu, Edit menu, and Help menu.

► **To choose a menu command**

1. To display the menu, point to the menu name in the menu bar and hold the mouse button down.
2. Drag to select the command you want, and then release the mouse button.



Guidelines for Working with Menus in Windows NT

The following list presents some basic guidelines for menus:

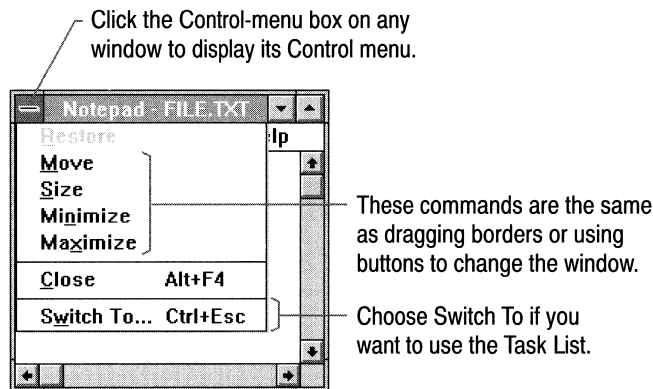
- When the menu is displayed, you can also press an arrow key to highlight a command name and then press ENTER to choose the command.
- When you choose a command that ends in an ellipsis (...), the application displays a dialog box that asks you to supply more information.
- If a command turns a feature on and off, a check mark (✓) appears by the command name when the feature is on.

- When you choose a command that ends with an arrow (►), the menu cascades to display more command names.
- If a command name is dimmed, it indicates that the command does not apply to the current situation or that you need to make a selection or complete another action before choosing the command.

Using the Control Menu and Task List

All windows have a Control menu. You can use it to switch to another running application; close the window or quit the application; change the size and position of a window, or minimize or maximize it.

Most dialog boxes and messages also have a Control menu, usually with commands for moving or closing the dialog box.



► To use a window's Control menu

1. Click the Control-menu box in a window, or click an application icon on the desktop. Or press ALT+SPACEBAR to display the Control menu for an application window or for a dialog box. Press ALT+HYPHEN (-) to display the Control menu for a document window.
2. Choose a command for the action you want.

The commands available on the Control menu vary for different applications, but most Control menus include at least the Move and Close commands.

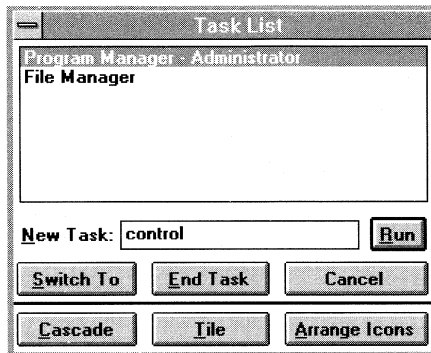
The Control Menu for each application window includes the Switch To command, which displays the Task List. You can use the Task List to switch to other currently running applications, or to manage windows and icons on the desktop.

Although it is usually easiest to switch to another window by clicking that window, your current application may fill the screen, or some of the windows may not be visible. With Task List, you can switch windows quickly without having to search for the window you want.

► **To use the Task List**

1. From the Control Menu, choose Switch To; or press CTRL+ESC.
2. In the task list, select the name of the application you want to work with.

To switch to a task not on the list, in the New Task box, type the executable name for the task you want. Choose the Run button.



3. Choose one of the following buttons for the action you want.

Choose	To
Switch To	Switch to the application selected in the list.
End Task	Quit the selected application.
Cancel	Close the Task List. You can also press ESC or double-click the Control-menu box to quit.
Cascade	Display windows in layers, showing the title of each window.
Tile	Resize all windows and arrange them side by side.
Arrange Icons	Rearrange application icons on the desktop.

► **To switch applications without using the Task List**

- Press ALT+TAB.

Continue pressing ALT+TAB until the window you want is displayed.

If you do not want to use ALT+TAB for switching between windows, you can turn off this capability by choosing the Desktop icon in Control Panel and then selecting the Fast ALT+TAB Switching check box in the Desktop dialog box.

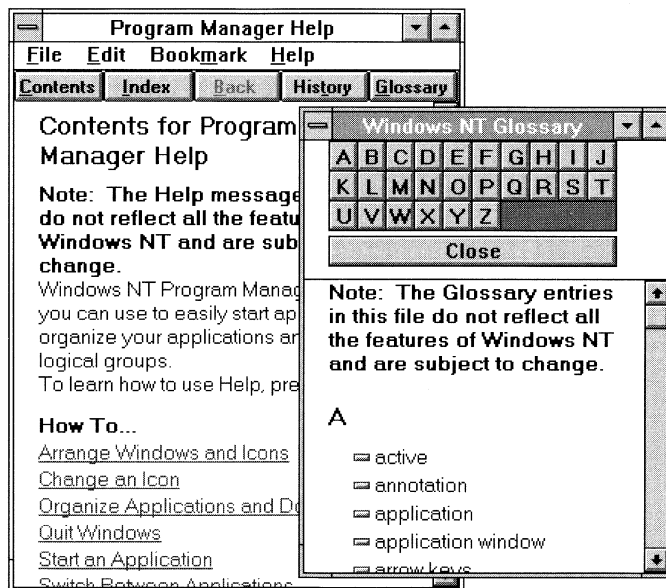
Using Help

Windows NT provides Help so that you can get useful information quickly while you are working. Help contains a description of each command and dialog box, and explains procedures for most tasks.

► To get Help

- Press F1 wherever you are working.

The following illustration shows the Help Contents window for Program Manager. The Help Contents lists the major topics for the current application. From this window you can move to more specific information, in this example, the Windows NT Glossary.



► To search for a Help topic

1. In the Help window, choose the Search button.
2. In the Search dialog box, type the first letter of the word or phrase you're looking for, or select a word or phrase from the list of keywords.

When you type a letter, the selection in the list shifts to the first keyword that begins with that letter. If several keywords begin with the same letter, you can type additional letters to move the selection to the keyword you want.

3. Choose the Show Topics button to display a list of topics, and then select a topic from the list.
4. Choose the Go To button to view the selected topics.

The following table summarizes the actions you can take while using Help.

To	Do this
Get help in a Windows-based application	Press F1 for context-sensitive Help, or chose a command from the Help menu.
Get help in a dialog box or message box	Press F1, or choose the Help button in the dialog box.
Get help on using Help	From the Help menu, choose How To Use Help.
See a list of Help topics	Choose the Contents button.
Get help on a specific topic	Choose the Search button and select a topic to view.
Go back to a previous topic	Choose the Back button, or choose the History button and double-click any listed topic.
Jump to another Help topic	Click the underlined jump term, or choose a “hot” button in the Contents topics.
Display a definition	Click the term with the dotted underline, and then click anywhere on the screen to close the definition.
Continue working with Help displayed	From the Help menu in the Help window, choose Always On Top.
Minimize Help to an icon	Choose the Minimize button in the Help window.
View another Help file	From the File menu in Help, choose Open and select another .HLP filename.
Exit Help	Double-click the Control-menu box.

You can also set bookmarks for frequently used Help topics, and annotate any Help topic. These and other Help features are explained in Help.

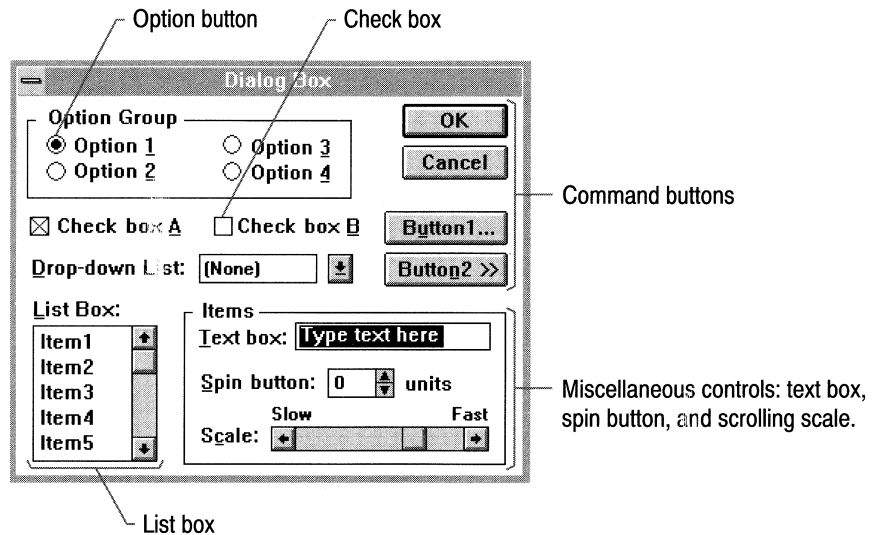
Help is also available at the command prompt for all Windows NT commands. The following table shows the syntax for Help at the command prompt.

Syntax	Information provided
help	Available native system commands.
<i>command</i> /?	Description, syntax, parameters, and switches for native system commands, plus help for MS-DOS subsystem commands not listed when you type help .
help <i>command</i>	Description, syntax, parameters, and switches for native system commands.
net help	Available network commands.
net <i>command</i> /?	Syntax only for network commands.
net <i>command</i> / help	Syntax and description for network commands.
net help <i>command</i>	Syntax and description for network commands.
net help <i>command</i> / options	Parameters and switches for network commands.

You can also use the online Command Reference, which displays additional details, examples, and conceptual information for the system or network command you typed. To start the Command Reference, double-click the Help icon in the Main program group.

Using Dialog Boxes

Windows NT displays a dialog box to ask for information and to provide information you need to proceed. When you choose a command that displays a dialog box, that dialog box may include areas where you type numbers or text. You may also see various options to change or view settings related to the command.



► To use a dialog box

1. Select options or type text to specify the information you want in a dialog box.
Click an option to select it, or press ALT plus the underlined letter in the option name. If any item in a dialog box is dimmed, it is unavailable because it requires a selection or some previous action.

To see a description of the options, press F1 or choose the Help button in the dialog box.

2. To move the dialog box in the window, drag its title bar.
3. When you finish with the dialog box, choose the appropriate command button to carry out the command.

Usually, clicking the OK button carries out the command. Sometimes the button that carries out the command has a label such as Open or Find Next.

► **To close a dialog box without completing the command**

- In the dialog box, choose the Cancel button, or double-click the Control-menu box.

Guidelines for Buttons and Miscellaneous Items

The following list presents some basic guidelines for using buttons and other items in dialog boxes.

Option buttons and check boxes:

- Click a round option button to select it and to turn off any other option in the group. You can select only one option button in a group.
- Click a check box to turn that option on or off. You can select as many check boxes as you want.
- When an option button or check box is selected, it's filled—a selected option button contains a dot and a selected check box contains an "X".

Command buttons:

- If you choose a button with an ellipsis (...), another dialog box appears.
- If you choose a button with double arrows (>>), the dialog box expands.

List boxes:

- Click an item in any kind of list to select it, or scroll to see more items.
- In a drop-down list box, click the arrow to display a list of options to select.
- In some lists, you can select multiple items. In such a list, click a selection a second time to turn it off.

Miscellaneous items:

- Type, edit, and paste text in any text box. If a text box contains text when you move to it, all the text is selected and any text you type replaces it. Press DEL or BACKSPACE to edit the text.
- Scroll a spin button or type in the box to select a number.
- Drag a scroll box to select a range in a scale.

Responding to Messages

Windows NT displays messages or warnings if you should know about possible consequences of a command action, or if Windows NT requires more information or cannot complete a command for any reason.

Most messages explain the problem and what you should do to continue working. Often, the Help button also appears so that you can get more information.

► **To dismiss a message**

- Choose the OK button.

If the message contains two or more command buttons, choose the OK button to proceed, or choose the Cancel button to cancel the action and dismiss the message.

Cutting and Copying Information

When you cut or copy information from an application, it is placed onto the Clipboard, which is a temporary storage area in your computer's memory. You can then paste that information from the Clipboard into other documents or applications. You can also use the Clipboard to transfer information between Windows-based applications and some MS-DOS-based applications.

In some Windows-based applications, you can also paste information from the Clipboard to create a linked or embedded object. For more information, see Chapter 10, "Object Linking and Embedding."

You can use the ClipBook Viewer to view and save the contents of the Clipboard. For more information, choose the ClipBook Viewer icon in Program Manager, and then press F1 to get help.

Transferring Information Between Windows-Based Applications

You can use the Cut, Copy, and Paste commands in most Windows-based applications to copy or move information within a document, between documents, or between Windows-based applications.

► **To copy or move information with the Clipboard**

1. In your document, select the information you want to copy or move.
2. To copy the information, choose Copy from the Edit menu. To move the information, choose Cut from the Edit menu.

► **To paste information from the Clipboard**

1. If necessary, switch to the document or application that will receive the information from the Clipboard.
2. Place the insertion point where you want the information to appear.
3. From the Edit menu, choose Paste.

Transferring Information Between MS-DOS–Based Applications

When you are running an MS-DOS–based application under Windows NT, you can copy selected information or the entire screen onto the Clipboard. You can paste only text into an MS-DOS–based application, not a graphic or screen capture.

► **To copy information from an MS-DOS–based application**

1. To open the application's Control menu, click the Control-menu box or press ALT+SPACEBAR.
2. From the Control menu, choose Edit.
3. From the cascading Edit menu, choose Mark.
4. In the document, select the information you want to copy.
5. From the application's Control menu, choose Edit, and then from the cascading Edit menu, choose Copy.

In the command prompt window, the text is copied automatically.

► **To paste text into an MS-DOS–based application**

1. Copy the information onto the Clipboard.
2. Switch to the application into which you want to paste the information.
3. Place the insertion point where you want the information to appear.
4. From the application's Control menu, choose Edit, and then from the cascading Edit menu, choose Paste.

Copying Screen Images

For both Windows-based applications and MS-DOS–based applications, you can copy an entire screen onto the Clipboard. For Windows-based applications, you can copy an image of the active window onto the Clipboard. You can place this image in any file that can save or display bitmap images.

► **To copy the entire screen onto the Clipboard as text**

- Press PRINT SCREEN.

To copy a screen image for a non-Windows-based application, the application must be running in text mode, not graphics mode.

► **To copy an image of the active window onto the Clipboard**

- Press ALT+PRINT SCREEN.

Using the Keyboard

Microsoft Windows NT and Windows-based applications provide a set of common keyboard shortcuts that you can use to carry out commands and select options in dialog boxes. You can use these *shortcut keys* to bypass the menus.

The key names in the Windows NT documentation appear in small capital letters. For example, the Shift key appears as SHIFT, and the Control key appears as CTRL. The following conventions are used to describe keyboard actions in Windows NT.

Convention	Meaning
KEY1+KEY2	A plus sign (+) between key names means that you must press the keys at the same time. For example, “Press ALT+F4” means you press and hold down ALT while you press F4.
KEY1,KEY2	A comma (,) between key names means that the keys must be pressed sequentially. For example, “Press ALT, HYPHEN (-)” means you press and release ALT, and then press the hyphen.
Keypad	The numeric keys to the right of the standard alphanumeric keys. Press NUM LOCK to toggle between numbers or arrow keys.
Arrow keys	The keys labeled UP, DOWN, LEFT, RIGHT, HOME, END, PAGE UP, and PAGE DOWN on the extended keyboard or on the keypad; used to move or scroll in a document, window, or list.

Each shortcut key may also work with the SHIFT, CTRL, and ALT keys for different actions. The following list shows the general uses for shortcut keys, either individually or in combination with other keys.

Key	Used to
ENTER	Confirm or carry out an action.
ESC	Cancel an action.
F1, F2, F3, ...	Provide shortcuts for commands. If your keyboard has only 10 function keys, press ALT+F1 for F11, ALT+F2 for F12, and so on.
INS, DEL, BACKSPACE	Edit—insert, delete, or clear an item.
TAB; arrow keys	Move the cursor, select an item, or scroll in a window or list.
ALT+ <i>key</i>	Choose commands or dialog box options, or perform other actions related to application windows.
SHIFT+ <i>key</i>	Extend the selection.
CTRL+ <i>key</i>	Choose a command, apply an action in a dialog box, or perform an alternate action on a selected object.

Using the Keyboard for Common Actions

You can use standard keyboard procedures for many of the common tasks throughout Windows NT. The following procedures summarize how to start an application in Program Manager and open a file in an application.

► To start an application in Program Manager

1. Press CTRL+TAB to select the group you want to open, and then press ENTER to open that group window.
2. Press an arrow key to select the program-item icon for the application you want, and then press ENTER to start the application.

Or press SHIFT+ENTER to start the application as an icon.

► To open a file in an application

1. Press ALT to select the menu bar.
2. To choose Open from the File menu, press F,O (the direct-access keys, which are indicated by the underlined letters in the menu bar and in the menus).

Or press the RIGHT ARROW and DOWN ARROW keys to select and open the menu. Press the DOWN ARROW key to select Open, and then press ENTER to choose it.

3. In the Open dialog box, press TAB to move between the list of files, directories, and drives, and then press an arrow key to select the filename or directory you want.
4. To choose the OK button, press ENTER.

To cancel your selection and close the dialog box, press ESC.

This same series of keyboard actions works everywhere in Windows NT for choosing menu items and for selecting options in dialog boxes.

Keyboard Shortcut Reference

The following tables summarize common keyboard shortcuts in Windows NT. Keys that must be pressed sequentially are separated by a comma; keys that must be pressed at the same time are separated by a plus sign.

Keyboard Shortcuts for Using Program Manager and File Manager

Basic Windows NT Keyboard Shortcuts

To	Press
Help:	
Open or switch to the Help window	F1
Open or switch to context-sensitive Help	SHIFT+F1
Move to and view the next jump term or definition	TAB, ENTER

Using Program Manager and File Manager:

Open the selected icon	ENTER
Move a selected group or item	F7
Copy a selected item	F8
Clear a selected group or item	DEL
Edit properties of a selected group or item ¹	ALT+ENTER
Cascade the windows on the desktop	SHIFT+F5
Tile the windows on the desktop	SHIFT+F4

Using File Manager:

Expand the directory tree one level in File Manager	+ (keypad)
Expand a directory branch in File Manager	* (keypad)
Expand all branches in File Manager	CTRL+* (keypad)
Collapse a directory branch in File Manager	- (keypad)
Refresh the display	F5

Scrolling in a Window or a Dialog Box:

Scroll up or down one line, or left or right one item	Arrow keys
Scroll up one window	PAGE UP
Scroll down one window	PAGE DOWN
Scroll left one window	CTRL+PAGE UP
Scroll right one window	CTRL+PAGE DOWN

Basic Windows NT Keyboard Shortcuts *(continued)*

To	Press
Moving and Selecting in a Window or a Dialog Box:	
Move to an item in a dialog box and select it	TAB or arrow keys
Move left, right, up, or down in a window or dialog box	Arrow keys
Move to the beginning of a line	HOME
Move to the end of a line	END
Move up or down one window	PAGE UP or PAGE DOWN
Move left one window	CTRL+PAGE UP
Move right one window	CTRL+PAGE DOWN
Extend the selection left, right, up, or down	SHIFT+arrow keys
Extend the selection to the beginning of the line	SHIFT+HOME
Extend the selection to the end of the line	SHIFT+END
Extend the selection up one window	SHIFT+PAGE UP
Extend the selection down one window	SHIFT+PAGE DOWN
Extend the selection left one window	CTRL+SHIFT+PAGE UP
Extend the selection right one window	CTRL+SHIFT+PAGE DOWN
Editing in Dialog boxes or Applications:	
Undo the last action	CTRL+Z or ALT+BACKSPACE
Delete the selection	SHIFT+DEL
Clear the selection	DEL
Copy the selection	CTRL+INS
Paste the selection	SHIFT+INS
Clear the preceding character	BACKSPACE
Working with a Window:	
Select the menu bar	ALT or F10
Carry out a command or action	ENTER
Cancel a command or action	ESC
Toggling full-screen and window display for non-Windows-based applications ²	ALT+ENTER
Select an application's Control menu	ALT+SPACEBAR
Select the Control menu in a document window	ALT,HYPHEN (-)
Display the Task List	CTRL+ESC
Move to the next application	ALT+TAB
Quit the current application	ALT+F4

Basic Windows NT Keyboard Shortcuts *(continued)*

To	Press
Working with Multiple Document Windows:	
Move a document window	CTRL+F7, arrow keys
Size a document window	CTRL+F8, arrow keys
Maximize a document window	CTRL+F10
Minimize a document window	CTRL+F9
Restore a document window	CTRL+F5
Close a document window	CTRL+F4
Move to the next document window	CTRL+F6
Switch to the previous document window	CTRL+SHIFT+F6
Move to the next pane	F6
Move to the previous pane	SHIFT+F6

¹ This shortcut also toggles between full-screen and window display for the command prompt and non-Windows-based applications

² This shortcut also allows you to edit properties of a selected group or item in Program Manager and File Manager.

Program Manager

Use Program Manager to organize your applications and files in groups and to easily start applications.

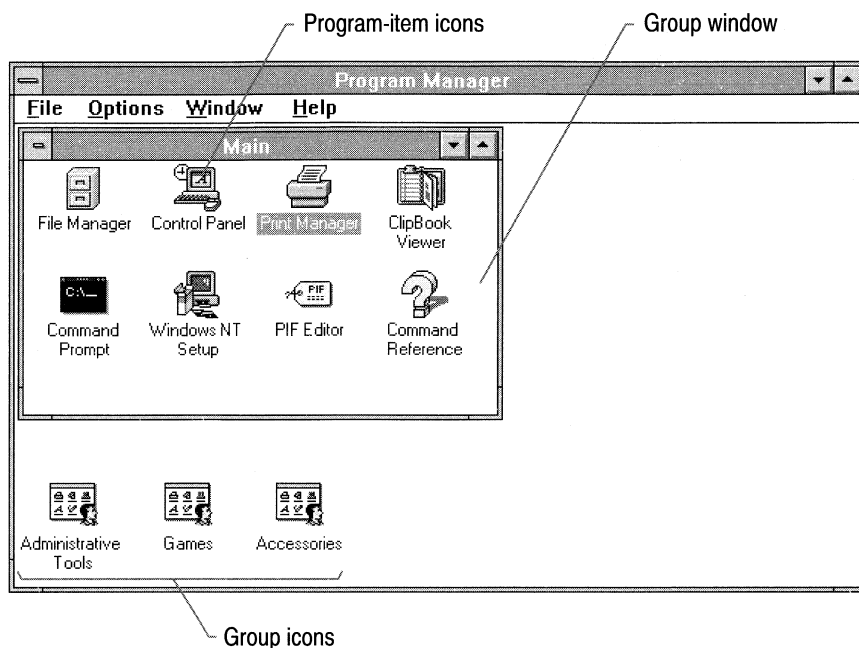
This chapter explains how to use Program Manager, including the following topics:

- Quitting Windows NT
- Working with group windows and icons
- Creating and deleting groups
- Creating, copying, moving, and deleting program items
- Changing program item icons
- Starting applications from Program Manager
- Starting applications automatically when you log on to Windows NT

Overview

Use Program Manager to start applications and to organize applications and files on the Windows NT desktop. Program Manager starts when you log on to Windows NT. The name of the computer or domain that you specified when you logged on and your username appear in the title bar of the Program Manager window. When you want to leave Windows NT, use Program Manager to log off or shut down your computer.

The first time you log on to Windows NT, Program Manager opens on your desktop with the Main group window open inside the Program Manager window.



Program Manager lets you organize your applications so that you can easily find and run them. To get working quickly, you can have an application open a document automatically when it starts. Or you can start applications automatically when you log on to Windows NT. Use groups and program items to organize your applications. Groups can be displayed as windows or icons.

Program-item icons appear inside a group window and represent the applications, accessories, and documents you can start from Program Manager. Double-clicking a program-item icon starts the application that the icon represents. Program-item icons can be moved between groups but not outside of them.

A *group window* is separate window inside the Program Manager window that contains program-item icons. Each group window has its own control menu in the upper left corner, but no menu bar. You can control group windows using commands from the Program Manager menu bar. Group windows cannot be moved outside the Program Manager window.

A *group icon* is a minimized group window. Group icons appear along the lower edge of the Program Manager window. Each is labeled to indicate what sort of program items are in the group. Like group windows, group icons cannot be moved outside the Program Manager window.

Quitting Windows NT Using Program Manager

Program Manager runs as long as you are running Windows NT. To end your Windows NT session when you want to leave your computer running, return to Program Manager and log off. When you want to turn off your computer, return to Program Manager and use the Shutdown option.

► To log off from Windows NT

1. From the File menu, choose Logoff. Or double-click the Control-menu box.
2. Choose the OK button to confirm that you want to log off.

The system closes any running applications and displays the Welcome dialog box. Before closing an application, the system prompts you to save any unsaved work. Running services are not stopped.

► To shut down your computer

1. From the File menu, choose Shutdown.
2. Choose the OK button to confirm that you want to shut down your computer.

The system closes running applications and services, and informs you when you can safely switch off your computer.

If you want to restart your computer immediately rather than switch it off, select the Restart When Shutdown Is Complete check box. Windows NT automatically restarts after closing applications and services.

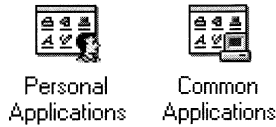
Caution Never use the computer's power switch to quit Windows NT. Always choose the Shutdown command to quit, so Windows NT can save changes in all working files and properly close applications and services.

What Are Groups and Program Items?

A group contains program items. You can display a group as either an icon or a window. When a group window is open, you can work with its program items—icons that represent applications. When you choose a program item, the application it represents starts. If you have specified a document in the program item, the application opens the document for you when it starts.

Groups provide a convenient way to organize your applications, and program items provide an easy way to start your applications. Because you can associate a file with an application when you create a program item, you can create groups that organize files belonging to a project and let you easily switch from one part of the project to the next.

Windows NT provides personal groups and common groups. Personal groups are stored as part of each user's logon information. Each time a particular user logs on, that user's personal groups appear. Common groups appear for all users who log on to the computer. Personal and common groups have different icons:



When you installed Windows NT, the system created groups and program items for applications.

Group	Description
Main group	Contains the Windows NT system applications including File Manager, Control Panel, and Print Manager. The Read Me item contains information you should know before you start working with Windows NT.
Applications group	Contains applications found on your hard disk.
Administrative Tools group	Contains applications for system management including User Manager, Disk Administrator, and Backup.
Accessories group	Includes applications for word processing, drawing, and communications, plus several other applications such as a clock and a calculator.
Games group	Offers games you can use to practice Windows skills.
Startup group	Contains applications that start when you log on to Windows NT. You can add any applications you want to this group; it is empty until you add applications to it.

Opening Group Windows and Reducing Them to Icons

To start an application from a group, first open the group window that contains the program-item icon for that application. Once you have started the application, you can reduce the group window to an icon to free room on your desktop. For more information on starting applications, see “Starting an Application from a Group” later in this chapter.

► To open a group window

- Double-click the group icon. Or select the group's name from the list at the bottom of the Window menu. Or press CTRL+F6 or CTRL+TAB until the group icon you want is selected, and then press ENTER.

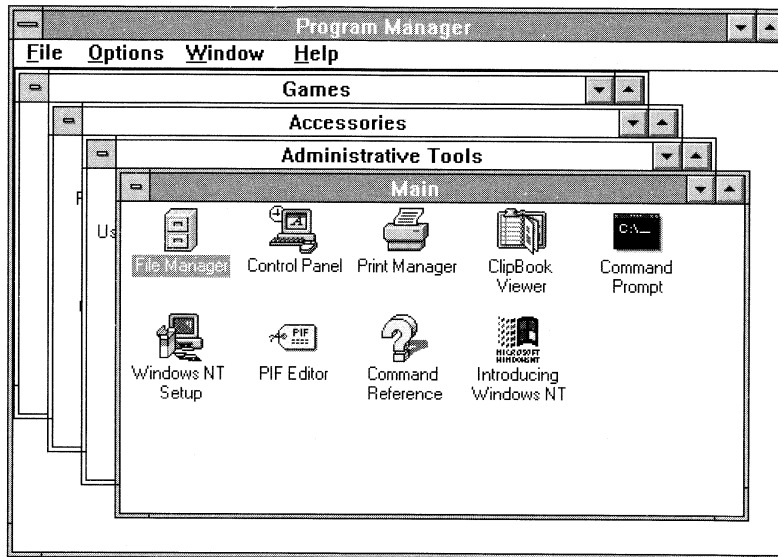
► **To reduce a group window to an icon**

- Click the Minimize button, or double-click the Control-menu box for the group.

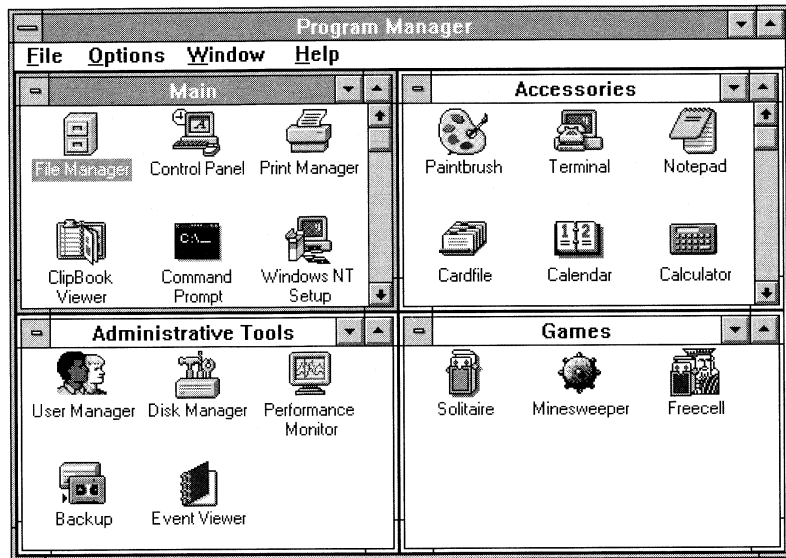
Arranging Group Windows

When several group windows are open, some windows will hide others. Use the Cascade and Tile commands from the Window menu to arrange all the open windows so that some part of each window is visible.

The Cascade command resizes and layers the open group windows within the Program Manager workspace so that each title bar is visible.



The Tile command divides the Program Manager workspace into smaller windows of similar sizes for each group window you have open.



If you open another group window after you use the Cascade or Tile command, it covers the arranged windows. To arrange it with the other windows, choose the Cascade or Tile command again.

- ▶ **To arrange all the open group windows**
 - From the Window menu, choose Cascade or Tile.

Arranging Group and Program-Item Icons

You can arrange icons one at a time, or have Program Manager organize them all at once. When Program Manager arranges group icons, it aligns them along the lower edge of the Program Manager window. When arranging program-item icons, Program Manager distributes them within their group window.

- ▶ **To arrange icons one at a time**
 - Drag each icon to a new location.
- ▶ **To arrange group icons**
 1. Select any group icon.
 2. From the Window menu, choose Arrange Icons to align the group icons along the lower edge of the Program Manager window.
- ▶ **To arrange program-item icons**
 1. Open the group window that contains the program-item icons you want to rearrange.

2. From the Window menu, choose Arrange Icons to distribute the program-item icons evenly within the selected group window.

Windows NT can automatically arrange program-item icons whenever you change the window size, or add, delete, or move program items. You can adjust the spacing between icons by choosing the Desktop icon from Control Panel, and then typing a number in the Icon Spacing box.

► **To automatically arrange icons**

- From the Options menu, choose Auto Arrange.

A check mark beside the command means it is in effect.

Saving Program Manager Settings

Once you have set the appearance of your group windows and icons, you can save it. Then each time you log on to Windows NT, they will appear as you set them up. As an alternative, you can choose to save the appearance of group windows and icons as they are when you log off of Windows NT. When you next log on to Windows NT, they will appear as they were when you logged off.

► **To save the current settings**

- From the Options menu, choose Save Settings Now.

So that different settings are not saved when you log off from Windows NT, make sure that the Save Settings On Exit command is not checked.

► **To save settings when you log off from Windows NT**

- From the Options menu, choose Save Settings On Exit.

A check mark appears next to the command. You can turn this feature off by choosing the command again.

Creating Groups

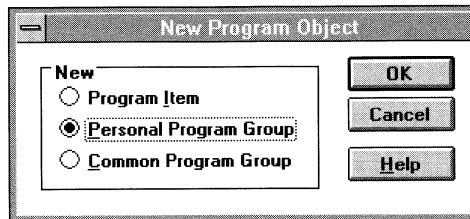
You can create personal and common program groups using Program Manager. Generally, you will only need to create personal groups. When you log on, the groups you have created are ready for you. When another user logs on to the computer, that user does not see your program groups. You can add any number of groups to Program Manager to organize your applications and documents in a way that makes sense to you. After creating a group, you can add program items to it. For more information, see “Creating Program Items” later in this chapter.

Create a common program group only when you want all users of the computer to have access to the program items in the group. If, for example, you have installed an application that you want to make available to all users of the computer, you can place it in a common program group.

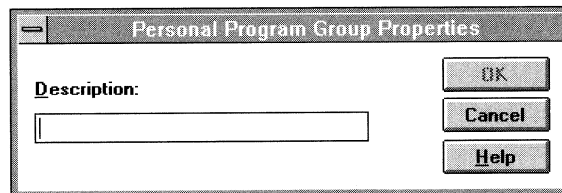
Security To create a common group, you must be logged on as a member of the Administrators or Power Users group. Users who are not members of one of these groups can copy program items from a common group to their personal groups; however, they cannot delete or move program items from common groups.

► **To create a new group**

1. From the File menu, choose New.



2. In the New Program Object dialog box, select Personal Program Group or Common Program Group, and then choose the OK button.



3. In the Description box, type a description for the group you want to create and choose the OK button.

This description will appear in the title bar of the group window and below the group icon.

Creating Program Items

To create a program item, define the properties for the item. You can create a program item using Program Manager, File Manager, or Windows NT Setup. If you use File Manager or Windows NT Setup to create a program item, Windows NT will define the item's properties for you. Each method of creating program items has advantages:

- Use Program Manager when you want to specify the program item's properties such as the application's working directory or which document the application will open when it starts. Also use Program Manager when you want to change a program item's properties.
- When you are using a mouse, File Manager provides the most direct way to create a program item and place it in the group you choose.
- Windows NT Setup is fastest when you need to create many program items at one time. For more information on this method, see Chapter 12, "System Maintenance with Windows NT Setup."

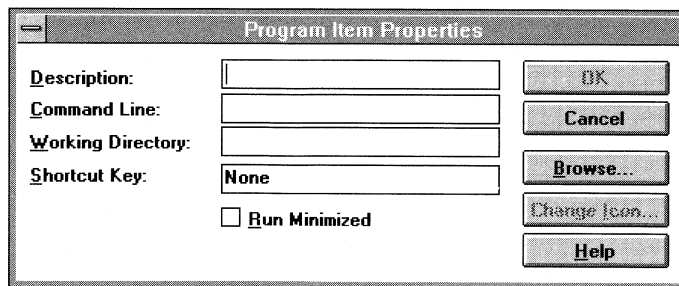
Creating or Changing a Program Item Using Program Manager

You can use Program Manager to create a program item for an application or for an application and a document. The following steps guide you through the basics of creating a program item. If you want, you can also specify a working directory, a shortcut key, and that the program start running minimized.

Security To create or change a program item in a common program group, you must be logged on as a member of the Administrators or Power Users group.

► To create a program item using Program Manager

1. Open the group to which you want to add the item.
2. From the File menu, choose New to display the New Program Object dialog box. Then select the Program Item option and choose the OK button. Or press and hold down ALT while double-clicking in a blank area of the group window.



3. In the Description box, type a description that identifies the application.

This optional description becomes the label that appears under the icon in the group window. If you leave this box blank, Program Manager labels the icon for you. However, a description of your own can be very useful, especially if you set up multiple program items for the same application.

4. In the Command Line box, type the name of the program file, including its path and extension.

For example, to add Microsoft Excel, located in a directory named C:\EXCEL, you would type:

c:\excel\excel.exe

If you don't know the name of the program file, choose the Browse button to display a list of files and directories. Select the appropriate filename from the list. You can use the directory listing to change to a different directory, if necessary. Choosing the OK button places the selected filename in the Command Line box.

If you want the application to open a document when it starts, after the program name type a space and then the document's filename. Include the path required to locate the document. Be sure to separate the program name from the document name with a space.

For example, to specify a spreadsheet named 92BUDGET.XLS, located in the C:\ADMIN\FY92 directory, as the document to be opened when you start Microsoft Excel, you would type:

c:\excel\excel.exe c:\admin\fy92\92budget.xls

If the document is in the same directory as the application, you can omit the path. For example, to specify a spreadsheet named EXPENSE.XLS, located in the C:\EXCEL directory, you would type:

c:\excel\excel.exe expense.xls.

5. Choose the OK button.

The dialog box closes and the new program item appears in the group.

You can also specify a working directory, a shortcut key, and whether the application starts as an icon in the Program Item Properties dialog box.

► **To specify a working directory**

- In the Working Directory box, type the name of the directory.

When you start the application, the directory you specify as the working directory will become the current directory. It will be the default directory in the application's Open and Save As dialog boxes when you open and save files.

► **To specify an application shortcut key**

- Type the key combination in the Shortcut Key box.

A shortcut key allows you to switch quickly to the application when it is running. Valid shortcut-key sequences are CTRL+ALT+*character*, CTRL+SHIFT+*character*, SHIFT+ALT+*character*, and CTRL+SHIFT+ALT+*character*. *Character* can be any letter, number, or special character. When you type a character in the Shortcut Key box, Program Manager adds CTRL+ALT in front of it. To specify a different control-key sequence, you must type the sequence.

You can reserve shortcut keys for an MS-DOS application by using Program Manager or PIF Editor. Shortcut-key settings made in Program Manager override settings made in PIF Editor.

► **To run an application as an icon when it starts**

- Select the Run Minimized check box.

When this box is selected, the application is reduced to an icon when it starts. When you want applications you have added to the Startup group to run minimized when you start Windows NT, use this option.

Once you have created a program item, you can change its properties.

► **To change a program item**

1. Select the program item and choose Properties from the File menu.
2. Change any of the options in the Program Item Properties dialog box and choose the OK button.

Creating a Program Item Using File Manager

You can also use File Manager to create program-item icons in Program Manager groups. You can move applications and associated documents from File Manager directories to Program Manager group windows or group icons.

Security

To create a program item in a common program group, you must be logged on as a member of the Administrators or Power Users group.

The following steps require a mouse and have no keyboard equivalent.

► **To create a program item using File Manager**

1. Arrange your desktop so that you can see both File Manager and the group where you want to place the new program item.

The destination group can be either a window or an icon.

2. Open the File Manager window, and if necessary position and resize it.

If no other application windows are open, you can use the Tile button in the Task List to arrange the File Manager and Program Manager windows.

3. Locate and select the program or document file in File Manager that you want to add. You can select multiple items and add them all to a group at the same time.
4. Drag the file from File Manager to Program Manager, and place it in the group window or on the group icon.

As you drag the file, the mouse pointer turns into a replica of a file icon. If you have more than one file or document selected, you see a multiple-file icon.

Once you have created the program item, you can customize its properties by selecting the icon and choosing Properties from the File menu. For more information on program-item properties, see “Creating or Changing a Program Item Using Program Manager” earlier in this chapter.

Deleting Groups and Program Items

When you no longer need a group or program item, you can delete it. When you delete a group, Program Manager deletes the program items it contains. Deleting program items has no effect on the corresponding application and document files. They are not removed from your hard disk.

Security To delete a common program group or program items in a common group, you must be logged on as a member of the Administrators or Power Users group.

► **To delete a group**

1. If the group contains program items, reduce it to an icon. If the group window is empty, you can delete it without reducing it to an icon.
2. Select the group icon or empty group window.
3. From the File menu, choose Delete. Or press DEL.
4. A dialog box prompts you to confirm the deletion. Choose the Yes button to remove the group.

► **To delete a program item from a group**

1. Open the group window that contains the item you want to delete.
2. Select the program-item icon.
3. From the File menu, choose Delete. Or press DEL.
4. A dialog box prompts you to confirm the deletion. Choose the Yes button to remove the program item.

Changing the Description of a Group

You can change the description of any group. The description is the label for the group icon and appears in the title bar of the group window.

Security To change the description of a common group, you must be logged on as a member of the Administrators or Power Users group.

► **To change the description of a group**

1. Make sure the group whose description you want to change is reduced to an icon.
2. Select the group icon.
3. From the File menu, choose Properties. Or press and hold down ALT while double-clicking the program-group icon.
4. In the Program Group Properties dialog box, type a new description, and then choose the OK button.

Copying a Program Item to Another Group

The easiest way to copy a program item from one group to another is to use the mouse to drag the program-item icon onto the other group icon or into the other group window. If you don't have a mouse, you can use the Copy command on the File menu.

Security You can always copy a program item from a common group to one of your personal groups. However, you must be logged on as a member of the Administrators or Power Users group to copy a program item from a personal group to a common group.

► **To copy a program item to another group**

1. If you're not concerned with where the new program-item icon is placed in the group window, open the group window containing the program-item icon you want to copy and leave the destination group reduced to an icon.

If you want to place the new program-item icon in a particular location in a group window, open the group windows for both the source and the destination.

2. Press and hold down CTRL while you drag the program-item icon from its current location to the destination group's icon or window.

The mouse pointer becomes a replica of the program-item icon you are copying.

3. When the copied icon is on top of the destination group's icon or inside the destination group's window, release the mouse button and the CTRL key.

You can create a duplicate program item within a group. Press CTRL while dragging the icon to another place in the window.

► **To copy a program item to another group using the Copy command**

1. Open the group window that contains the program item you want to copy.
2. Select the program-item icon.
3. From the File menu, choose Copy.
4. In the To Group box, select the name of the group you want to copy the program item to.
5. Choose the OK button.

Moving a Program Item to Another Group

Moving a program item is easiest if you have a mouse. You can simply drag the program-item icon onto the other group icon or into a group window. If you don't have a mouse, you can use the Move command on the File menu.

Security To move a program item from a common group, you must be logged on as a member of the Administrators or Power Users group.

► **To move a program item to another group**

1. Open the group window that contains the program item you want to move.
2. Drag the program-item icon to the destination group's icon or window.
The mouse pointer becomes a replica of the program-item icon you are moving.
3. When the program-item icon is on top of the destination group's icon or inside the destination group's window, release the mouse button.

► **To move a program item to another group using the Move command**

1. Open the group window that contains the program item you want to move.
2. Select the program-item icon.
3. From the File menu, choose Move.
4. In the To Group box, select the name of the group you want to move the program item to.
5. Choose the OK button.

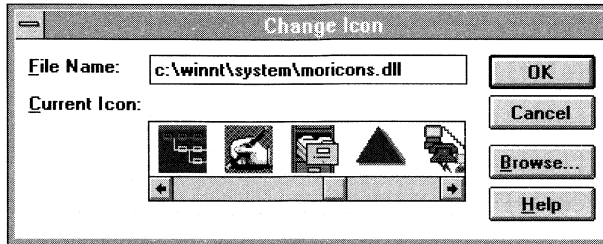
Changing an Icon

When you add a program item to a group, Program Manager selects an icon for that item. You can change the icon displayed in the group window.

Security To change an icon in a common group, you must be logged on as a member of the Administrators or Power Users group.

► **To change an icon**

1. Select the program item whose icon you want to change.
2. From the File menu, choose Properties.
3. In the Program Item Properties dialog box, choose the Change Icon button.



4. Use one of the following methods to select a new icon:
 - If more than one icon is available, select a different icon in Current Icon box.
 - If no additional icons are available, Windows NT displays the icons available with PROGMAN.EXE. Select an icon in the Current Icon box.
 - In the File Name box, type the path to either PROGMAN.EXE or MORICONS.DLL, for example **c:\winnt\system32\moricons.dll**, and choose the OK button. Then select an icon in the Current Icon box.
5. Choose the OK button.

Starting an Application from a Group

If an application is represented by a program-item icon in a group, the easiest way to start the application is to choose the program-item icon from the group window. If you included a document with the program item, it appears in the application workspace. For more information, see “Creating or Changing a Program Item Using Program Manager” earlier in this chapter.

► **To start an application from a group**

1. Open the group window that contains the program-item icon for the application.
2. Double-click the icon.

When you start an application, Program Manager changes the current directory to the directory you specified in the Working Directory box when you added the program item to the group. If you are using an MS-DOS application, you can specify a working directory in either Program Manager or PIF Editor. Settings made in Program Manager override PIF Editor settings.

Use the following steps to run an application as an icon when you start the application.

► **To run an application as an icon**

1. Open the group window that contains the program-item for the application.
2. Press and hold down SHIFT while double-clicking the icon.

You can have Windows reduce Program Manager to an icon whenever you start an application. This is useful because the icon remains visible on the lower edge of the desktop when most applications are running, making it easy to find when you want to switch to Program Manager.

► **To reduce Program Manager to an icon whenever you run an application**

- From the Options menu, choose Minimize On Use.

A check mark appears beside the command when it is in effect. To cancel the command, choose it again.

Starting an Application When You Start Windows NT

When you install Windows NT using the Setup program, Windows NT creates a Startup group. When you add a program item for an application to the Startup group, the application starts each time you log on to Windows NT.

For example, if you want to start File Manager whenever you log on to Windows NT, move the File Manager icon from the Main group to the Startup group. Program items in the Startup group start in the order their icons appear in the window starting with the top row, and moving left to right.

You can also have Windows NT automatically reduce an application to an icon when it starts. To do this, select the Run Minimized box in the Program Item Properties dialog box for the application's program item.

Returning to Program Manager from an Application

When you are working with an application or document and you want to start a different application, you can do so by returning to Program Manager.

► **To return to Program Manager from an application**

- Click the Program Manager window or double-click the Program Manager icon. Or press ALT+TAB repeatedly until the message box shows the Program Manager title and icon. Or press ALT+ESC repeatedly to move through open application windows and application icons until you reach Program Manager.

File Manager

File Manager allows you to organize and work with directories and files.

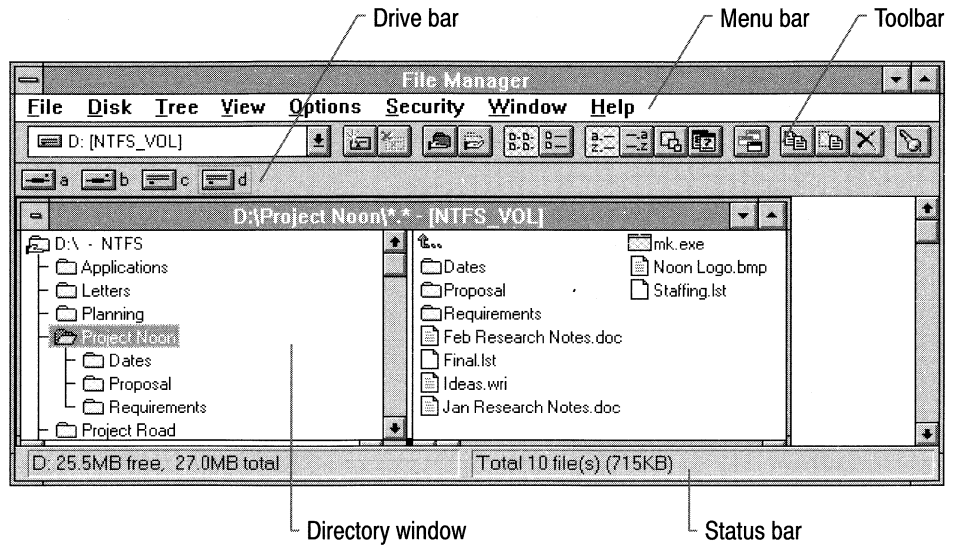
This chapter explains how to use File Manager and includes the following topics:

- Using directory windows to display directories and files
- Navigating drives and directories
- Working with directories and files
- Sharing directories and files
- Securing directories and files
- Maintaining disks

Overview

File Manager displays the organization of the directories and files on your disk drives and on network disk drives. Use File Manager to create and remove directories; move, copy, and delete files; connect to directories shared on the network; share directories; secure files and directories; and perform other disk, directory, and file management tasks.

When you first start File Manager, the File Manager window appears. It contains a menu bar, toolbar, drivebar, status bar, and a directory window that shows the contents of the current drive.



Toolbar

Provides quick access to commands through buttons and allows you to change drives by selecting from a list.

Drivebar

Allows you to change drives by selecting one of the drive icons. Different icons represent the floppy and hard drives on your computer, network drives to which you've connected, and CD-ROM drives.

Status bar

Shows you how much free space remains and total space exists on the current drive. It also shows you how many files are in the current directory and how much space they take up.

The toolbar, drivebar, and status bar are displayed by default. You can remove them from the screen by choosing the Toolbar, Drivebar, and Status Bar commands from the Options menu.

Starting and Quitting File Manager

By default, when you start File Manager, its window appears as it was when you last quit File Manager. Settings you make using the Options menu are always saved when you quit. The positions of directory windows and icons and the settings on the View menu are saved as long as the Save Settings on Exit command is in effect when you quit.

► **To start File Manager**



- Choose the File Manager icon in the Main Group. Or select the File Manager icon and press ENTER.

► **To quit File Manager**

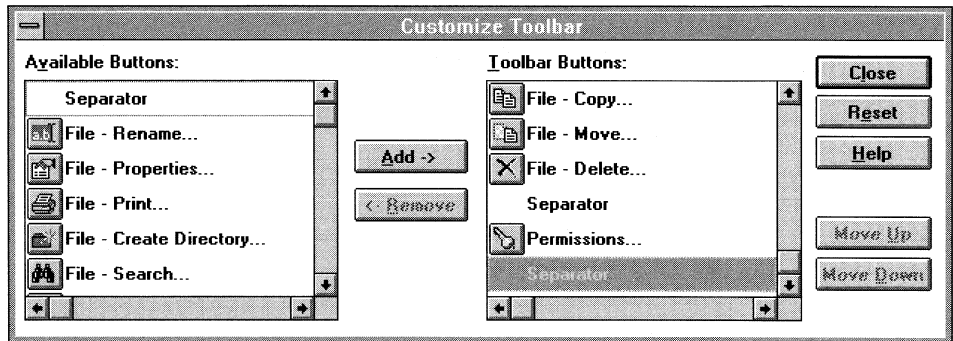
- Choose the Control-menu box. Or, from the File menu, choose Exit.

Customizing the Toolbar

You can add, remove, and rearrange the buttons on the toolbar. Every command available on File Manager menus has an equivalent button.

► **To add a button to the toolbar**

1. From the Options menu, choose Customize Toolbar. Or double-click the background of the toolbar.



2. In the Available Buttons box, select the button that you want to add. Select Separator to add a space between buttons.
3. Choose the Add button.

► **To move a toolbar button**

- Press and hold down SHIFT while dragging the button to a new location on the toolbar.

–Or–

1. From the Options menu, choose Customize Toolbar. Or double-click the background of the toolbar.
2. In the Toolbar Buttons box, select the button or Separator you want to move.
To move the selection to the left on the toolbar, choose the Move Up button.
To move the selection to the right on the toolbar, choose the Move Down button.

3. Choose the Close button.

► **To remove a toolbar button**

- Press and hold down SHIFT while dragging the button off the toolbar.

—Or—

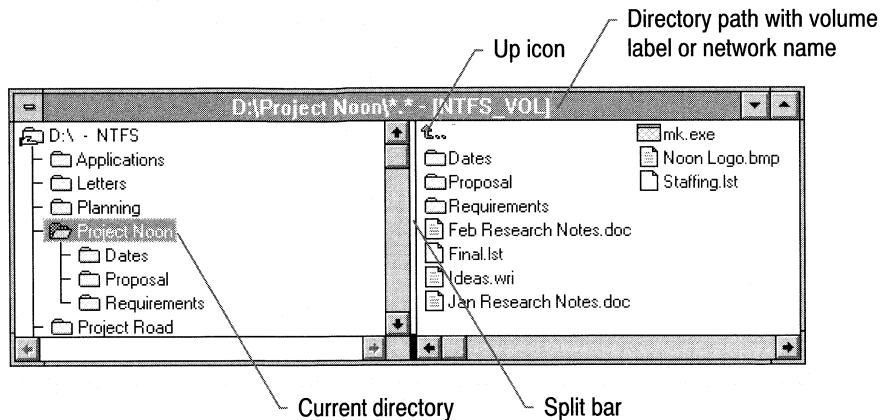
1. From the Options menu, choose Customize Toolbar. Or double-click the background of the toolbar.
2. In the Toolbar Buttons box, select the button or Separator you want to remove, and then choose the Remove button.
3. Choose the Close button.

► **To restore the default toolbar buttons**

1. From the Options menu, choose Customize Toolbar. Or double-click the background of the toolbar.
2. Choose the Reset button.
3. Choose the Close button.

Working with Directory Windows

Each directory window is divided into two panes: the left pane displays the directory tree, and the right pane lists the contents of the current directory. The *directory tree* shows the structure of the directories on a disk. The directory structure begins at the upper left with the *root directory*, the first directory on a disk. The root directory is created when you format a disk. It is represented by a backslash (\). For example, C:\ is the root directory for drive C. Other directories branch below the root directory. The contents list in the right pane of the directory window shows the names of files and directories within the current directory. Directories within a directory are known as *subdirectories*. The panes are separated by a split bar that allows you to adjust their widths.



The following table describes the elements in a directory window.

Element	Description
Directory path	The name and location of the current directory is displayed in the title bar of the directory window.
Volume label	The name that identifies your disk is displayed in brackets ([]) to the right of the directory path. This information appears only if you have assigned a label to your disk.
Network name	If you have selected a shared directory, its name is displayed instead of the volume label.
File system name	The name of the file system used on the selected drive is displayed next to the root directory.
Directory icons	Icons representing directories and shared directories appear in both panes. In the directory tree, directory icons are connected by a vertical line to the directory level above them. In the contents list, directory icons represent directories in the current directory.
Current directory	The directory you are currently using is represented by an icon that looks like an open directory folder in the directory tree. File Manager commands affect the current directory or files within it.
File icons	Icons next to filenames indicate file type. There are icons to represent program files, document files, and other types of files. For more information, see “Working with Files and Directories” later in this chapter.
Up icon	Double-clicking the arrow at the top of the contents pane takes you up one level in the directory tree.

Opening and Closing Directory Windows

You can open additional directory windows that display the contents of the same drive or a different drive. Opening multiple directory windows makes it easy to move and copy files.

If you have two or more windows displaying the same drive and directory information, a number appears in the title bar of each window, indicating that there is more than one window displaying that directory.

A new directory window inherits its display options from the previous one. For example, if you are working with a directory window that shows only the directory tree, and you open a new directory window, the new window displays only the directory tree.

► To open a new directory window

To open a window	Do this
That displays information for the selected drive	Double-click the drive icon. Or press TAB to select the drivebar and use the arrow keys to select a drive icon. Then choose Open from the File menu, or press ENTER.
That displays the same information as the previous active window	From the Window menu, choose New Window. Or from the toolbar, click the New Window button.
That displays only the contents pane for the selected directory	In the directory tree, press and hold down SHIFT while double-clicking the directory icon. Or in the directory tree, select the directory icon, and then press SHIFT+ENTER.

When you finish working with a directory window, you can close it to clear space on your screen. If you have only one directory window open, you cannot close it.

► To close the active directory window

- Double-click the Control-menu box, located in the upper-left corner of the directory window. Or, from the Control menu, choose Close.

File Manager updates open directory windows automatically. For example, when you save a new file from an application, File Manager displays the new file name immediately. Sometimes File Manager cannot complete an update when, for example, you are using network directories or you have changed floppy disks. You can update the active directory window manually when this occurs.

► To update a directory window

- Click the drive icon for the current drive, or choose Refresh from the Window menu.

Selecting and Arranging Directory Windows and Icons

Before you can work with the files and directories in a directory window, you must select the window. Selecting the window makes it active: the title bar changes color or intensity and the window moves in front of any other open windows.

► **To select an open directory window**

- Click anywhere in the window. Or choose a window name from the list at the bottom of the Window menu. Or press CTRL+F6 or CTRL+TAB until the window you want is selected.

If the window you want to select is hidden by another window, you can use the Cascade or Tile commands on the Window menu to rearrange the open directory windows so that all of them are visible.

► **To arrange open directory windows**

To	Do this from the Window menu
Overlap windows so that each window's title remains visible	Choose Cascade
Resize and arrange windows without overlap so that each window is wider than it is long	Choose Tile Horizontally
Resize and arrange windows without overlap so that each window is longer than it is wide	Choose Tile Vertically

When you minimize a directory window, it becomes an icon. You can move icons individually by dragging them with a mouse, or File Manager can arrange them evenly all at once. For information about changing the spacing between icons arranged by File Manager, see “Changing the Desktop” in Chapter 5, “Control Panel.”

► **To arrange icons**

- From the Window menu, choose Arrange Icons.

Displaying the Directory Tree or Contents

When you first start File Manager, the directory window displays both the directory tree for the current drive and the contents of the current directory. By using commands on the View menu, you can choose to display only the directory tree or only the contents of the current directory. When both panes of a directory window are displayed, they are separated by a split bar that you can move to change the widths of the panes.

► To display the directory tree or directory contents

To display	Do this from the View menu
Only the directory tree for the current drive	Choose Tree Only
Only the contents of the current directory	Choose Directory Only
The tree and contents for the current directory	Choose Tree And Directory

► To move the split bar

1. Point to the split bar.

The pointer turns into a double bar with two arrows.

2. Drag the bar to a new position.

—Or—

1. From the View menu, choose Split to display a vertical bar.
2. Use the arrow keys to move the selection bar to where you want to place the split bar, and then press ENTER.

If you decide you do not want to move the split bar, press ESC to cancel the command.

Changing the Font in File Manager

You can change the font that File Manager uses to display the names of files and directories. When you change the font, it changes in all directory windows.

► To change the font

1. From the Options menu, choose Font.
2. In the Font box, select the font you want to use.

When you select a font, a style, or a size, the text in the Sample box changes to reflect your choice.

3. In the Font Style box, select a style option (for example, bold or italic).
4. In the Size box, select a point size: the larger the point size, the larger the character appears on your screen.

5. By default, file and directory names appear in lowercase letters on FAT drives. On drives formatted to use the Windows NT files system (NTFS), names appear as they were typed in uppercase and lowercase.

To display names on FAT drives in uppercase, clear the Display Lowercase For FAT Drives check box.

To display names on all drives in lowercase, select the Display Lowercase For All Drives check box.

6. Choose the OK button.

Navigating Drives and Directories

You can use File Manager to change to different local and network drives and to navigate through the directory structure.

Changing Disk Drives

A directory window shows the directory structure of the current drive. On the drive bar, the icon for the current drive is surrounded by a rectangle. On the toolbar, the current drive is shown in the list box.

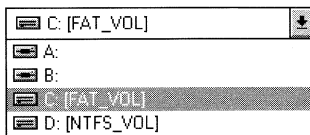
When you change to a different drive, the names of the files and directories on that drive are displayed in the directory window. When File Manager searches the drive to display its contents, you can press ESC to stop the search. If you stop the search, only a partial directory tree is displayed, as indicated by the status bar at the bottom of the File Manager window.

► To select another drive in a directory window

- Click the drive bar icon representing the drive you want to use.



Or choose the drive from the toolbar drive list.



Or press and hold down CTRL while typing the letter of the drive you want to select.

—Or—

1. Press TAB or F6 to move to the drive bar.

To move back to the directory tree or contents area without changing drives, press TAB or F6 again.

2. Use the arrow keys to select the drive icon you want, and then press the SPACEBAR.

► **To change drives by using the Select Drive command**

1. From the Disk menu, choose Select Drive. Or double-click the background of the drive bar to display the Select Drive dialog box.
2. Select the drive you want to change to.
3. Choose the OK button.

Changing Directories

You can change directories using either the directory or the contents list.

In the directory tree, the current directory is marked by the *selection cursor*, a dotted rectangle around the highlighted icon and text. You can select only one directory at a time in the directory tree. To change to a different directory, move the selection cursor.



In the contents list, you can move up or down one level in the directory structure. You can go up one level by choosing the Up icon, and you can change to a subdirectory by choosing its icon in the list.

► **To change to another directory in the directory tree**

- Click the directory name you want to change to. Or use the following keys to change to a different directory.

Press	To change to
UP ARROW or DOWN ARROW	A directory above or below the current directory.
HOME or BACKSLASH (\)	The root directory.
END	The last directory in the list.
RIGHT ARROW	The first subdirectory of the current directory, if one is displayed in the directory tree.
LEFT ARROW or BACKSPACE	The next directory level up from the current directory.
PAGE UP	The directory one screen up from the current directory.
PAGE DOWN	The directory one screen down from the current directory.
CTRL+UP ARROW	The previous directory at the same level.
CTRL+DOWN ARROW	The next directory at the same level.
A character key	The next directory whose name begins with that letter or number.

► **To change directories by using the contents list**

To	Do this	Icon
Move down a level	Choose the directory icon next to the subdirectory's name.	
Move up a level	Choose the Up icon, or press the BACKSPACE key.	

Expanding and Collapsing the Directory Tree

When you first start File Manager, only the first level of directories are displayed in the directory tree.

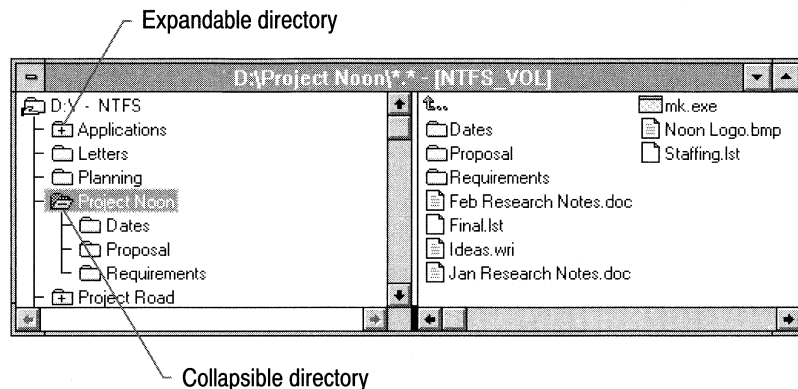
When you *expand* a directory, the directory tree displays the names of the subdirectories in that directory. Like the structure of a tree, subdirectories branch from directories. You can expand an entire directory branch, a single level of the branch, or all branches in the tree. You can also *collapse* a directory so that its branch of subdirectories is not listed in the directory tree.

► **To expand or collapse a directory**

To	Do this in the directory tree
Expand one level of a directory	Choose the icon or name of the directory you want to expand, or select the directory, and then choose Expand One Level from the Tree menu.
Expand an entire branch	Select the directory, and then choose Expand Branch from the Tree menu.
Expand all branches in the directory tree	From the Tree menu, choose Expand All.
Collapse a directory	Choose the icon or name of the directory you want to collapse, or select the directory, and then choose Collapse Branch from the Tree menu.

Showing Which Directories Expand

If you want to know which directories have subdirectories, you can use the Indicate Expandable Branches command on the Tree menu. When you use this command, a plus sign (+) marks each directory that has subdirectories. The plus sign means you can expand the directory to display its subdirectories in the directory tree. After you expand a directory, the plus sign changes to a minus sign (-), indicating that the directory is expanded and can be collapsed. If you choose the Indicate Expandable Branches command, File Manager may take longer to create the directory tree.



► To mark expandable directories in the directory tree

- From the Tree menu, choose Indicate Expandable Branches.
A check mark appears next to the command in the Tree menu.
To turn off this feature, choose Indicate Expandable Branches again.

Connecting to and Disconnecting from a Network Drive

You can use File Manager to connect to and disconnect from network drives. When you connect to a network drive, you can specify whether or not to reconnect to the drive each time you log on to Windows NT.

When you connect to a network drive, File Manager opens a new window in which to display the directory information. You can switch this feature off from the Options menu by choosing the Open New Window On Connect command.

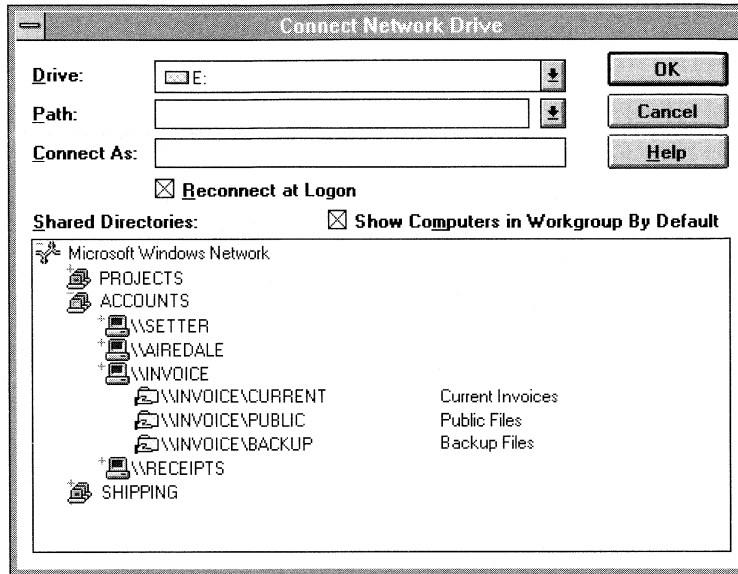
Computers in your computer's domain or workgroup are displayed automatically in the Shared Directories box. You can switch this off by clearing the Show Computers In Domain/Workgroup By Default check box.

Security If you are logged on as a member of the Administrators or Backup Operators groups, or you have been granted permission, you can connect to a computer's root shares, for example \\SALESERVER\C\$.

► **To connect to a network drive**



1. Choose Connect Network Drive from the Disk menu, or choose the Connect Drive button on the toolbar.



2. File Manager displays the first free drive letter in the drive box. You can accept the displayed drive letter for the connection, or choose another.
3. Select or type a network path in the Path box. A network path consists of a computer name followed by the name of a shared directory, for example, \\SHIPPING\\PUBLIC.
 - If you have connected to the directory before, select the path from the list displayed in the Path box. The Path box displays the previous 10 paths.
 - You can use the Shared Directories box to select a network path. In Microsoft Windows-based networking you can browse domains, workgroups, and computers to look for shared directories. Other networks may contain different options.

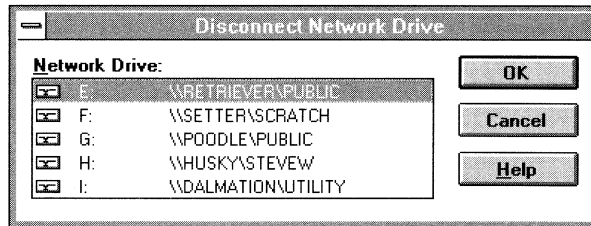
The networks, domains and workgroups, computers, and shared directories are organized in a tree structure. Choose an item to expand the list: Choose a network name to display available domains and workgroups, a domain or workgroup name to display available computers, a computer name to display its shared directories. When you select a shared directory, File Manager fills in the Path box with the name you selected.

- If you know the name of a computer, but need to see the names of its shared directories, you can type the computer name in the Path box and choose the OK button. Preface the computer name with two backslashes (\\). Windows NT adds the name of the computer's first shared directory to the Path box and displays all of the computer's shared directories in the Shared Directories box. To connect to different directory, select it in the Shared Directories box.
 - You can type the name of a computer and shared directory in the Path box. Preface the computer name with two backslashes (\\) and separate the computer name from the shared directory's name with a single backslash (\), for example \\SHIPPING\\SALESQ1.
4. In the Connect As box, type a valid username. You do not need to use the same name you used to log on to Windows NT. For example, you may want to connect to a shared directory using a name that allows greater access to files in the directory.
 5. If you do not want to connect to the shared directory each time you log on, clear the Reconnect At Logon box.
 6. Choose the OK button.

► **To disconnect from a network drive**



1. Choose Disconnect Network Drive from the Disk menu, or choose the Disconnect Drive button on the toolbar.









2. In the Disconnect Network Drive dialog box, select one or more network drives and choose the OK button.

Working with Directory Information

You can control how File Manager displays directory information by using commands on the View menu.

The changes you make by using commands on the View menu affect the active directory window and any new windows you open from that window. Other open windows are not affected.

In the contents list, File Manager displays icons next to names so that you can quickly identify directories and files. The following table describes the icons.

Icon	Represents
	Directories. These are listed first, in alphabetical order.
	Shared directories. These are directories you can connect to on the network, or you are sharing on your computer.
	Program files and batch files. Their default filename extensions are .EXE, .CMD, .COM, .PIF, and .BAT. These files start applications.
	Document files. These files are associated with applications. When you open one of these files, the associated application starts automatically. For more information, see “Associating Files with an Application” later in this chapter.
	System or hidden files. These files have system or hidden attributes. For more information, see “Setting File Attributes” later in this chapter.
	All other files.

Displaying Information on Files

When you first start File Manager, only the names of directories and files are shown. In addition to names, you can also display size, last modification date and time, and attributes of files in the contents list. On drives formatted to use the Windows NT file system (NTFS), you can display the MS-DOS-style names that Windows NT creates to accompany long filenames.

► To display only names of files and directories



- From the View menu, choose Name, or choose the Name button on the toolbar.

► To display complete information about each file

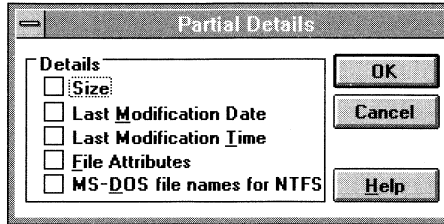


- From the View menu, choose All File Details, or choose the All File Details button on the toolbar.

The file size, last modification date and time, and file attributes are displayed next to each filename and directory name in the active directory window. If the directory is on a drive formatted to use the Windows NT file system (NTFS), the short, MS-DOS filename is shown as well as the long filename.

► **To display selected information about each file**

1. From the View menu, choose Partial Details.



2. Select the check boxes of options you want to display, and clear the check boxes of options you don't want to display.

The table that follows describes each option.

3. Choose the OK button.





You can select the following options in the Partial Details dialog box.

Select	To
Size	Display the size in bytes of each file.
Last Modification Date	Display the date each file was last modified, according to the system clock.
Last Modification Time	Display the time of day each file was last modified, according to the system clock.
File Attributes	Indicate whether files are hidden, system, archive, or read-only. For more information, see “Setting File Attributes” later in this chapter.
MS-DOS filenames for NTFS	Display short, MS-DOS-style names for long filenames on drives formatted to use NTFS.

Sorting the Contents of a Directory

When you first start File Manager, it lists directory contents alphabetically, with directories first, followed by filenames. You can sort the files and directories by name, type, size, or the date the file was last modified. Sorting files and directories affects the contents list only.

► **To sort the contents of a directory**

To sort contents by	Use this command	Use this toolbar button
Alphabet: Directories are sorted first, then files.	Sort By Name	
Type: Directories and then files are sorted alphabetically by filename extension.	Sort By Type	
Size: The largest file is listed first.	Sort By Size	
Date: Directories and then files are sorted with the most recent first.	Sort By Date	

Limiting the Files to Display

When you first start File Manager, the contents list displays the names of all the files and directories in the current directory, except hidden and system files. (For information about hidden and system files, see “Setting File Attributes” later in this chapter.) You can specify whether File Manager displays only certain types of files, or groups of files with similar filenames or extensions.

► **To specify which types of files are displayed in a directory window**

1. From the View menu, choose By File Type.
2. In the By File Type dialog box, use the Name box to limit the display to a single filename. Use wildcards to limit the display to files with similar names.
A wildcard substitutes for one or more characters. Use an asterisk (*) to represent a group of characters. Use a question mark (?) to represent a single character. The Name box default, *.* , means all files in the directory are listed. For example, to display only those files with the extension .TXT, you can type *.txt.

3. Under File Type, select the types of files you want to display.

Select	To
Directories	Display the names of directories that are in the current directory.
Programs	Display all filenames that have an .EXE, .COM, .PIF, .CMD, or .BAT extension.
Documents	Display the names of text or graphics files associated with an application. For information about associating files, see “Associating Files with an Application” later in this chapter.
Other Files	Display all filenames not included in the preceding three options.

4. To display hidden and system files, select the Show Hidden/System Files check box.
5. Choose the OK button.

Caution If you choose to display hidden and system files, be careful not to rename or delete them. Your computer may not start or work properly without them.

Working with Files and Directories

Once you select a file or directory, you can use File Manager to copy, move, delete, or rename it. You can also use File Manager to create a new directory. You can start applications from File Manager, and, once a type of file is associated with an application, open a file and start its application at the same time. Use File Manager to set the attributes for files.

Naming a File or Directory

An operating system's file system determines the conventions that apply to file and directory names. When you use Windows NT on drives formatted to use the Windows NT file system (NTFS), you can use long file and directory names. When you create a directory or rename a file and use a long filename, File Manager automatically creates a shorter, MS-DOS-style name. This allows applications that do not support long file names to use the file.

NTFS uses the following naming conventions:

- Names can be up to 256 characters long, including the extension. Separate the extension from the name using a period.
- Names preserve case, but are not case sensitive. When you name a file, your use of uppercase and lowercase letters will be retained. However, Windows NT does not distinguish filenames by their case. For example, Windows NT considers the filenames August Sales and AUGUST SALES to be identical.
- Names can contain any uppercase or lowercase characters except the following:

? " / \ < > * | :

When Windows NT creates a long name, it automatically creates a short, MS-DOS-style name as well. This keeps Windows NT compatible with MS-DOS workstations and applications. For example, a workstation running MS-DOS will use short names to see the shared directories and files on a Windows NT computer. Applications that do not support long file names will be able to work with files by using the short name. However, if you save a file using an application that does not support long filenames, the long filename will be lost and the file will have only a short name.

When you create a long name, Windows NT uses the following rules to create the short name:

- Spaces are removed.
- Periods are removed except for the last period in the filename that is followed by a character. Windows NT interprets this period as marking the start of the filename's extension.
- Characters not allowed in MS-DOS-style names are changed to underscores (_).
- The name, not including its extension, is truncated to 6 characters and a hyphen (-) and a number are appended.
- The name's extension is truncated to 3 characters.

If you are using Windows NT in an environment where long file names are not always supported, you may want to continue using MS-DOS conventions for the first 6 characters of names and use periods only to separate the name from the extension. For example, you could name a file AUGSLS-August 1992 Sales Report.XLS. Then the short name would be AUGSLS-1.XLS.

MS-DOS conventions for naming files are:

- The name of a file or directory can have two parts: a name and an optional extension. The two parts are separated by a period.
- The name can contain up to eight characters, and the extension can contain up to three characters.
- The name must start with either a letter or number. It can contain any uppercase or lowercase characters except the following:
. " / \ [] : ; | = , ? * + < >

If you use these characters in a filename, you may get unexpected results.

- The name cannot contain any spaces.
- The following names are reserved and cannot be used for files or directories:

AUX	COM4	LPT3
COM1	CON	NUL
COM2	LPT1	PRN
COM3	LPT2	

Selecting Files or Directories

Before you can work with a file or a directory, you must select it. When a file or directory is selected, its name and icon are highlighted in the directory window. In the contents list, you can select more than one file or directory at a time in order to perform a task with several files at once. For example, you may want to select several files and move them to another directory. You can select a group of files or directories that appear in consecutive order, or you can select items that are not in sequence.

► **To select files or directories**

To select	Do this
A single file or directory	In the contents list, click the name of the file or directory you want to select. —Or— Press TAB to move the selection cursor to the contents list. Then use the UP ARROW or DOWN ARROW keys to select the file or directory.
Two or more items in sequence	Click the first file or directory you want to select. Then press and hold down SHIFT while you click the last item in the group. —Or— Press TAB to move to the contents list, and then use the arrow keys to select the first item. Then press and hold down SHIFT while selecting the remaining items using the arrow keys.
Two or more items out of sequence	Press and hold down CTRL while you click each item. —Or— Press TAB to move to the contents list, then use the arrow keys to select the first item. Press and release SHIFT+F8, then use the arrow keys to move to each item and press the SPACEBAR to select it. When you finish selecting items, press SHIFT+F8 again.
More than one group of items	Use any method to select the first sequential group of items. Hold down CTRL while you click the first item in the next group, and press and hold down CTRL+SHIFT while you click the last item in the group. —Or— Use the keyboard method with SHIFT+F8 to select the first group, then use the arrow keys to move to the first item in the next group and repeat the process, pressing SHIFT+F8 again when all items are selected.
All files in a directory	Press CTRL+SLASH (/).

When you are selecting files and directories using the keyboard, you can use the following keys.

Press	To select
UP ARROW or DOWN ARROW	A file or directory above or below the current selection.
END	The last file or directory in the list.
HOME	The first file or directory in the list.
PAGE UP	The file or directory at the top of the previous screen.
PAGE DOWN	The file or directory at the bottom of the next screen.
A letter or number	The next file or directory that begins with that letter or number.

► **To select a group of items by using the Select Files command**

1. From the File menu, choose Select Files.
2. In the Files box, type the name of the file you want to select.
Use wildcards to specify a group of files. For example, to select all files with a .TXT extension, type *.txt. Or, to select all files in a directory, leave the default *.* in the Files box.
3. Choose the Select button.
The Cancel button changes to the Close button.
4. Repeat steps 2 and 3 until you have selected all the files you want.
You can choose the Deselect button at any time to cancel a selection. The Deselect button cancels the selected files that you specify in the Files box.
5. Choose the Close button.

► **To cancel a selection of files or directories**

To cancel	Do this
A single selection	Press and hold down CTRL while you click the item. –Or– Press and release SHIFT+F8, use the arrow keys to move to the selection you want to cancel and press the SPACEBAR. Then press SHIFT+F8 again.
All selections	Press CTRL+BACKSLASH (\).

► **To cancel a group of selected files by using the Select Files command**

1. From the File menu, choose Select Files.
2. In the Files box in the Select Files dialog box, type the name of one of the selected files you want to cancel.

You can use wildcards to specify a group of files or all files that are selected in a directory.

3. Choose the Deselect button.
4. Repeat steps 2 and 3 until you finish canceling selections.
5. Choose the Close button.

Creating a Directory

You can create a directory by using the Create Directory command. After you create a directory, you can copy files and directories to it from other locations by using the Move and Copy commands. For more information, see “Moving and Copying Files and Directories” later in this chapter.

► **To create a directory**

1. In the directory tree, select the directory in which you want the new directory to appear.
2. From the File menu, choose Create Directory.
3. In the Name box, type a name for the new directory.

Use the same conventions for naming directories as you do for naming files. For information, see “Naming a File or Directory” earlier in this chapter.

If you decide to create the directory somewhere other than in the current directory, you can type the full path of the new directory.

4. Choose the OK button.

Moving and Copying Files and Directories

You can move and copy files and directories from one location to another by dragging them with the mouse or by using the Copy or Move commands. You can copy and move items between directories and between drives. When you move or copy a directory, all the files and subdirectories in it are moved or copied.

Security On drives formatted to use the Windows NT file system (NTFS), you must have permission to move or copy a file or directory. For more information on file and directory permissions, see “Securing Directories and Files” later in this chapter.

Important When you copy files or directories, security permissions set on them are discarded as is ownership and auditing information. They will inherit a new set of permissions from the directory into which they have been copied or moved. In the case of files, if the new directory does not specify permissions for files, only the file's owner (the person who copied or moved the file) will have permission to use the file. When you copy or move a directory to a disk formatted to use the FAT file system, permissions are discarded and not replaced.

► **To move or copy files or directories by dragging**

1. Make sure the source and destination locations are visible. You can use the Cascade or Tile command on the Window menu to rearrange directory windows. The destination can be a directory icon, directory window, or drive icon. If the destination is a drive icon, the file will be placed in the current directory of that drive.
2. Select the file or directory you want to move or copy. You can select more than one file or directory.

When you drag a selection, Windows NT assumes you want to copy it when the destination is on a different drive and move it when the destination is on the same drive.

To	Do this
Move to a location on the same drive	Drag the selection.
Move to a location on any drive	Press and hold down SHIFT while dragging the selection.
Copy to a location on a different drive	Drag the selection.
Copy to a location on any drive	Press and hold down CTRL while dragging the selection.

3. Release the mouse button. If you are dragging while pressing SHIFT or CTRL, release the mouse button before releasing the key.
4. To complete moving or copying, choose the Yes button in the confirmation message.

You can choose not to receive confirmation messages. For more information, see "Turning Off Confirmation Messages" later in this chapter.

If the destination directory contains a file with the same name, a dialog box prompts you to verify that you want to replace the existing file. Choose the Yes button to replace the existing file, or if you are moving or copying more than one file, choose the Yes To All button. If you choose the Yes To All button, File Manager does not prompt you for each file that is replaced.

► **To move or copy files or directories using commands**



1. Select the file or directory you want to move or copy.

You can select more than one file or directory.

2. To move, from the File menu, choose Move. Or choose the Move button on the toolbar.



To copy, from the File menu, choose Copy. Or choose the Copy button on the toolbar.

The name of the selected file or directory appears in the From box of the Move or Copy dialog box.

You can select a different file or directory by typing its name in the From box. If the file or directory is not in the current directory, include the path.

3. In the To box, type the destination drive or directory.

If you type a drive name without including a path, the file or directory will appear in the current directory of the drive.

If you type a new name, the original file or directory will be renamed when it is moved or copied.

4. Choose the OK button.

If the destination directory contains a file with the same name, a message prompts you to verify that you want to replace the existing file. Choose the Yes button to replace the existing file, or if you are moving or copying more than one file, choose the Yes To All button. If you choose the Yes To All button, File Manager does not prompt you for each file that is replaced.

Copying a File to the Clipboard

You can copy a file onto the Clipboard so that the file can be linked to or embedded in another document. For more information about object linking and embedding, see Chapter 10, “Object Linking and Embedding.”

► **To copy a file to the Clipboard**

1. Select the file you want to copy.
2. From the File menu, choose Copy to Clipboard.

The name of the selected file appears in the Copy to Clipboard box. You can copy a different file by typing its name in the box. If the file is not in the current directory, include its path.

3. Choose the OK button.

Deleting a File or Directory

You can use File Manager to delete files and directories. By selecting multiple files or directories, you can delete them at one time. When you delete a directory, all files and subdirectories in the directory are deleted.

Security On drives formatted to use the Windows NT file system (NTFS), you must have permission to delete a file or directory. For more information on file and directory permissions, see “Securing Directories and Files” later in this chapter.

Caution Once you delete files or directories, they cannot be recovered.

► **To delete a file or directory**



1. Select the file or directory you want to delete.
2. From the File menu, choose Delete, or choose the Delete button on the toolbar. Or press DEL.
3. Choose the OK button to delete the selected file or directory, or type the name of a different file or directory you want to remove. If you type a long name that contains spaces, be sure to enclose the name in quotation marks.

File Manager prompts you to confirm the deletion. (You can choose not to receive confirmation messages. For more information, see “Turning Off Confirmation Messages” later in this chapter.)
4. To delete a single file or directory, choose the Yes button. To delete more than one file or directory and without confirming each deletion, choose the Yes To All button.

Renaming a File or Directory

You can rename any file or directory by choosing the Rename command from the File menu.

Security On drives formatted to use the Windows NT file system (NTFS), you must have permission to rename a file or directory. For more information on file and directory permissions, see “Securing Directories and Files” later in this chapter.

Caution Be careful when you rename files. If you rename a file that your system requires, for example, any file that has an .SYS extension, your system may not start or run correctly.

► **To rename a file or directory**

1. Select the file or directory you want to rename.

2. From the File menu, choose Rename.

The name of the selected file or directory appears in the From box. If you decide to rename a different file, type the name in the From box. To rename a group of files, use wildcards (for example, *.BAK).

3. In the To box, type the new name.

Use a file or directory name that does not already exist in the destination directory. You can specify only one filename in the To box. If you want to rename a group of files, you can only use wildcards (for example, *.TXT).

4. Choose the OK button.

Searching for a File or Directory

When you want to find a file or directory, use the Search command. You can select files and directories in the Search Results window and use File menu commands to print, copy, move, delete, and rename them. You can view file details by using commands on the View menu. However, although you can move or copy files from the Search Results window, you cannot copy or move files into it.

► To search for a file or directory

1. Select the directory that you want to start the search from.
2. From the File menu, choose Search.
3. In the Search For box, type the name of the file or directory. Use wildcards to search for a group of files or directories with similar names or extensions.
For example, to search for all files with the extension .WRI, you would type *.wri in the Search For box.
4. In the Start From box, the current directory is listed. To start the search from a different directory, type the directory name in the Start From box.
5. By default, File Manager searches the directory listed in the Start From box, and all its subdirectories. If you do not want File Manager to search the subdirectories, clear the Search All Subdirectories check box.
6. Choose the OK button.

File Manager searches the directory and subdirectories you specified, displaying its progress in a dialog box. To cancel the search, choose the Cancel button. You can continue working with File Manager while the search continues in the background. To hide the dialog box while the search continues, choose the Hide button. When the search is complete, the Search Results window appears, displaying all the filenames and directories found.

If you modify the drive on which the search was performed and the Search Results window is active (or is made active), a message appears, asking whether you want to update the Search Results window. If you choose the Yes button, the search is performed again on the modified drive.

Associating Files with an Application

A file is associated with an application through the file's filename extension and the application's file type. Once a file is associated with an application, you can choose any file with the same extension in the directory window to start the application and load the file. A file extension can be associated with only one application; however, an application can be associated with several different file extensions.

Many applications are associated with files when you install them. If an application does not automatically set up an association, you can associate files with it by using the Associate command.

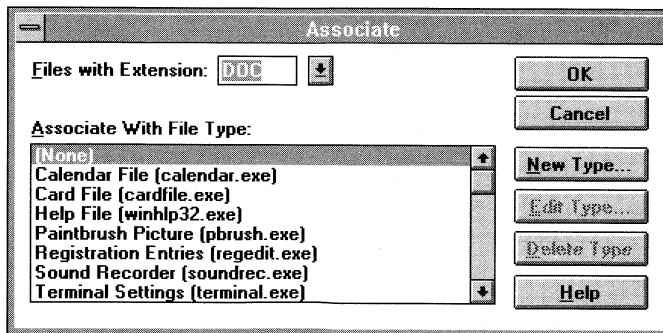
- If the application appears in the list shown in the Associate With File Type box, you can associate a file extension with it using the Associate dialog box.
- If the application does not appear in the list, create a file type for it and associate it using the File Type Editor dialog box.

► To create or change a file association using the Associate dialog box

1. In a directory window, select a file that has the extension you want to associate.

For example, to associate files that have a .DAT extension with an application, select any file that has a .DAT extension.

2. From the File menu, choose Associate.

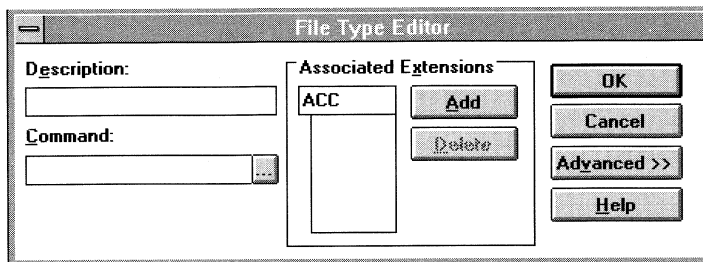


3. The filename extension of the file you selected appears in the Files With Extension box. To associate a different filename extension, or if no file was selected when you chose the Associate command, type the extension in the Files With Extension box.

4. Select the file type and program name in the Associate With File Type box and choose the OK button.

► **To create or change a file association using the File Type Editor dialog box**

1. In a directory window, select a file that has the extension you want to associate.
2. From the File menu, choose Associate.
3. In the Associate dialog box, choose the New Type button.



4. The filename extension of the file you selected appears in the Associated Extensions box. Choose the Add button to add it to the list of associated extensions.
5. Type a description for the type of file in the Description box.
The description identifies the file type and is required.
6. Type the name of the program file in the Command box. By choosing the browse button in the Command box, you can select the program file and its path.
7. Choose the OK button.

► **To remove an association**

1. In a directory window, select a file with the extension that you want to remove.
2. From the File menu, choose Associate.
3. In the Associate dialog box, the extension of the selected file appears in the Files With Extension box. To remove the association for a different filename extension, or if no file was selected when you chose the Associate command, type the extension in the Files With Extension box.
4. In the Associate With box, select None.
5. Choose the OK button.

Changing File Type Information

The Advanced section of the File Type Editor dialog box allows you to edit information that File Manager uses when opening or printing a file either conventionally or using dynamic data exchange (DDE). Because this information is added when you install an application, you should not need to edit it.

Security Some file types are protected. To change a protected file type, you must be logged on as a member of the Administrators or Power Users group.

The options in the Advanced section specify information for the file type shown in the Description box. Information is specific to each application. In commands, the %1 parameter represents the filename of the file currently selected in File Manager. The following table describes the options.

Option	Purpose
Action	Specifies the action to which the information in the Command and DDE areas applies. For example, if Open is selected, the information in the Command and DDE areas specifies what to do when opening a file.
Command	Specifies the command that is run to perform the action. If the application supports DDE, specify the name of the program file here and use the options in the DDE area to specify the DDE commands.
Uses DDE	Specifies that the application uses DDE commands to perform the action.
DDE Message	Specifies the DDE command to use if the application is already running.
DDE Application Not Running	Specifies the DDE command to use if the application is not running.
Application	Specifies the DDE application string used to initiate a DDE conversation with the application specified in the Command box.
Topic	Specifies the DDE topic string used to initiate a DDE conversation with the application specified in the Command box.

Starting an Application from File Manager

You can use File Manager to start your applications. You start an application by opening a program file or document file from a directory window. Program files almost always have a .COM, .EXE, .PIF, .CMD, or .BAT filename extension. Document files are associated with applications and are represented by document-file icons in directory windows. For information about the types of file icons, see “Working with Files and Directories” earlier in this chapter.

When you start an application that runs in a window, the window appears in front of any open File Manager windows. When you start an application that uses the entire screen, the application replaces the File Manager window. If you want to reduce File Manager to an icon each time you start an application, choose the Minimize On Use command from the Options menu.

► **To start an application from a program file or document file**

- In the directory window, choose the filename.
–Or–
 1. Select the filename in the directory window.
 2. From the File menu, choose Open; or press ENTER.

► **To start an application and open a file**

- Drag the icon for the data file onto the icon for the program file.
–Or–
 1. Select the program file for the application you want to use.
 2. From the File menu, choose Run.
 3. The name of the program file appears in the Command Line box. If you did not select a program file, or if you want to run a different application, type the name (and path, if necessary) of the program file in the Command Line box.
Then, in the Command Line box, add the name of the data file after the program filename. Include the path if the data file is not in the same directory as the program file.
 4. If you want the application to start minimized, select the Run Minimized check box.
 5. Choose the OK button.

Printing a File from File Manager

Using File Manager, you can print files that are associated with applications. You can use the Print command, or, if you are using a mouse, you can simply drag the file icon onto the minimized Print Manager icon.

Note Some applications do not support printing through File Manager. If this is the case, or if a file is not associated with an application, you must open the application and print the file from there.

► **To print a file by dragging the file icon**

1. Make sure Print Manager is started and minimized to an icon on the desktop.
2. Drag the document-file icon onto the Print Manager icon.

► **To print a file by using the Print command**

1. In the directory window, select the file you want to print.
2. From the File menu, choose Print.
3. Choose the OK button.

Turning Off Confirmation Messages

If you do not want a confirmation message to appear each time you delete or replace files and directories, you can change the confirmation settings. You can also turn off messages that appear when you perform certain mouse actions, such as moving and copying. If you turn off confirmation messages, File Manager carries out commands as soon as they are issued.

► **To turn off confirmation messages**

1. From the Options menu, choose Confirmation.
2. Clear the check box for each confirmation option you want to cancel, and then choose the OK button.

Clear this option	If you don't want a warning message
File Delete	Before deleting files
Directory Delete	Before deleting directories
File Replace	Before writing over existing files
Mouse Action	Before moving or copying files by dragging
Disk Commands	Before formatting or copying a disk
Modifying System, Hidden, Read Only files	Before deleting, replacing, or moving system, hidden, and read-only files

Caution If you clear the Directory Delete check box, remember that when you delete a directory, all files and subdirectories in that directory are deleted. Also, to avoid accidentally writing over files you want to keep, do not clear the File Replace check box.

Setting File Attributes

File attributes are part of the directory information the operating system maintains for each file. This information helps the operating system identify a file and controls the kinds of tasks you can perform with the file. You can see file attributes in a directory window by choosing the All File Details command on the View menu.

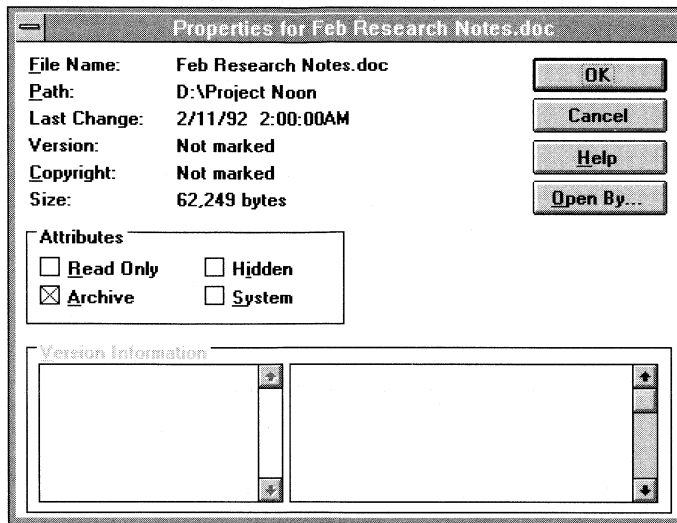
Security On drives formatted to use the Windows NT file system (NTFS), you must have permission to change file attributes. For more information on file and directory permissions, see “Securing Directories and Files” later in this chapter.

The four file attributes are described in the following table.

Abbreviation	Attribute	Description
R	Read-only	Prevents a file from being changed.
A	Archive	Identifies a file that has been modified since it was last backed up. When you use some commands, such as backup and xcopy , the archive attribute is turned off.
H	Hidden	Prevents a file from appearing in a directory listing at the command prompt. Files that have a hidden attribute appear in directory windows only if you select the Show Hidden/System Files check box by using the By File Type command on the View menu.
S	System	Identifies the file as a system file. Files that have a system attribute appear in a directory window only if you select the Show Hidden/System Files check box by using the By File Type command on the View menu.

► **To change file attributes for one or more files**

1. Select the files whose attributes you want to set.
2. From the File menu, choose Properties.



If you are using a network, more options may be available in the Properties dialog box.

3. Select or clear the check boxes for the attribute settings.

When you have selected more than one file, check boxes will appear gray if the attribute for the files is not set alike.

4. Choose the OK button.

Viewing a File's Version Information

File Manager allows you to see version information for files. This is information supplied by the manufacturer of an application including the company name and other comments.

► To view a file's version information

1. Select the file whose information you want to see.
2. From the File menu, choose Properties.
3. In the Version Information box, select the subject in the left box. The information on the subject is displayed in the right box.

Working with Shared Directories and Files

Windows NT allows you to share directories and files over the network. Use File Manager to share and stop sharing directories. File Manager also allows you to monitor and control the use of shared files.

Sharing a Directory

Share a directory when you want to make information located there available to others on the network.

Before you can share a directory, the Server service must be running. You can start the server service using the Services option in Control Panel.

Security To share a directory, you must be logged on as a member of the Administrators or Power Users group.

► To share a directory

1. Select the directory you want to share in either the tree or contents panes of the directory window.

If you are logged on as a member of the Administrators group or if you have permission, you can share a directory on a remote computer. First connect to the computer's shared root directory, for example C\$. Then select the directory you want to share.



2. From the Disk menu, choose Share As, or choose the Share Directory button on the toolbar.

The screenshot shows a 'New Share' dialog box with the following fields and controls:

- Share Name:** A text box containing 'Proposa'.
- Path:** A text box containing 'D:\Project Noon\Proposal'.
- Comment:** An empty text box.
- User Limit:** A section with two radio buttons: 'Unlimited' (selected) and 'Allow' (unselected). Next to 'Allow' is a small spinner box and the word 'Users'.
- Buttons:** 'OK', 'Cancel', 'Permissions...', and 'Help' are located on the right side of the dialog.

3. The Share Name box shows the name users will specify to connect to the shared directory. By default, File Manager uses the name of the directory you selected. If you want to share the directory using a different name, type a new share name in the Share Name box. Share names can be up to 12 characters long.

If the directory you selected is already shared, the Share Name box shows the share names for the directory. You cannot give a shared directory a new share name; however, you can create a new share by choosing the New Share button.

4. The path for the directory you selected appears in the Path box. If you decide you want to share a different directory, you can type a different path.
5. Type a comment in the Comment box.

Users will see the comment when connecting to the directory using the Connect Network Drive dialog box. A comment is optional.

6. Set a limit on the number of users who can connect to the shared directory at one time in the User Limit box.

By default, no limit is set.

7. To set permissions on the shared directory, choose the Permissions button.

For more information on setting permissions, see “Setting Permissions Through Shared Directories” later in this chapter.

8. Choose the OK button.

File Manager shows that the directory is shared by displaying a shared directory icon next to the directory’s name.

Stopping Directory Sharing

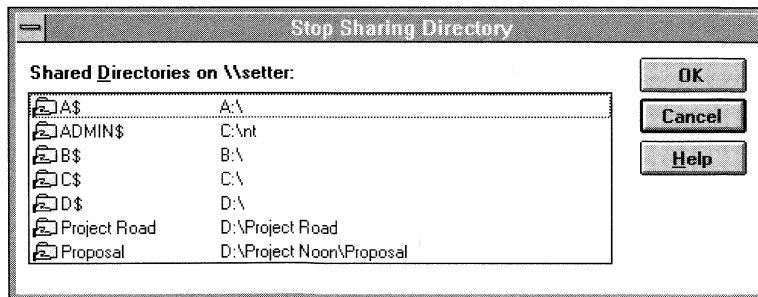
Once you stop sharing a directory, it is no longer available over the network.

Security To stop sharing a directory, you must be logged on as a member of the Administrators or Power Users group.

Caution If you choose to stop sharing a directory while users are connected, those users may lose their data.

► To stop sharing a directory

1. Select the drive containing the directories you want to stop sharing by selecting the drive’s directory window or drivebar button.
2. From the Disk menu, choose Stop Sharing. Or choose the Stop Sharing button on the toolbar.



3. The Stop Sharing dialog box shows the computer name of the selected drive and, in the Shared Directories On box, the shared directories on the drive. For each share name, the directory path on the computer is shown. Select the directories you want to stop sharing. If you selected a shared directory before opening the Stop Sharing Directory dialog box, the shared directories corresponding to that directory are already selected.
4. Choose the OK button.
If any users are connected to a shared directory, File Manager will warn you before sharing is stopped.

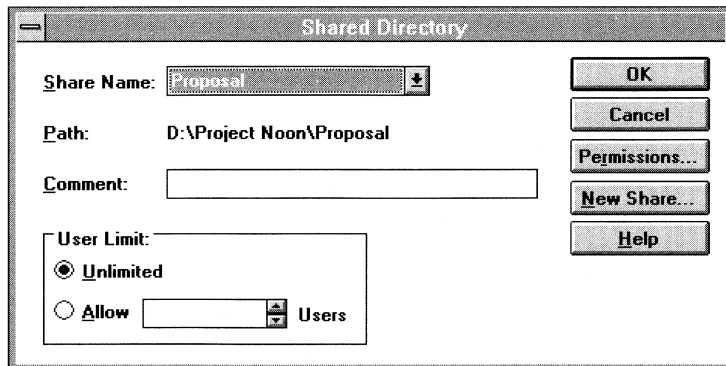
Changing Share Properties

You can change the number of users allowed to connect to a shared directory, a shared directory's comment information, or the shared directory's permissions.

Security To change a shared directory's properties, you must be logged on as a member of the Administrators or Power Users group. Only members of the Administrators group can change share properties on administrative shares.

► To change a shared directory's properties

1. Select the shared directory whose properties you want to change in either the tree or contents panes of the directory window.
2. From the Disk menu, choose Share As. Or choose the Share Directory button on the toolbar.



3. If the directory has been shared more than once, select the name in the Share Name box of the shared directory whose properties you want to change. You can then:
 - Change the number of users allowed to connect to the directory at one time by selecting, under User Limit, the Unlimited option or the Users option. When you select the Users option, you can either type a limit or click the scroll arrows to raise or lower the limit.

- Edit the Comment box to change the description that appears when users see the shared directory listed in the Network Connections dialog box.
 - Choose the Permissions button to change the permissions on the shared directory. For more information on setting permissions, see “Setting Permissions Through Shared Directories” later in this chapter.
4. Choose the OK button.

Viewing or Closing Shared Files

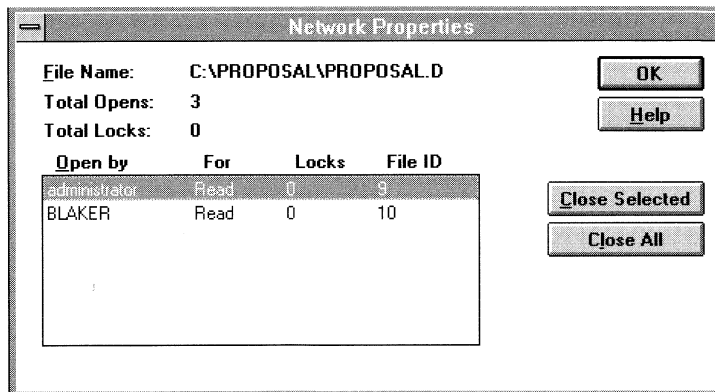
You can view who is using shared files and stop the use of a file. When you are viewing the status of a shared file, File Manager provides the following information.

Item	Shows
Total Opens	The total number of users who are working with the file
Total Locks	The total number of locks on the file
Open By	The name of the user who has the file open
For	The type of access the user has to the file
Locks	The number of locks the user has placed on the file
File ID	The identification number of the file

Security To stop the use of shared files, you must be logged on as a member of the Administrators or Power Users group.

► To view or close a shared file

1. Choose the file in the contents pane of the directory window.
2. From the File menu, choose Properties.
3. Choose the Open By button in the Properties dialog box.



4. To stop use by one or more users, select the user or users and choose the Close Selected button.

To stop use by all users, choose the Close All button.

Caution When you close a file that is in use, changes made to that file will not be saved.

5. Choose the OK button.

Securing Directories and Files

You can control users' access to directories and files on drives formatted to use the Windows NT file system (NTFS). Drives formatted to use FAT and HPFS do not support Windows NT security. You can, however, secure shared directories no matter what file system is in use.

To secure a directory or file, set permissions on it. Each permission you set specifies the access that a group or user can have to the directory or file. For example, when you set Read permission for the group called coworkers on the file MY IDEAS.DOC, the users in that group can display the file's data and attributes, but cannot change the file or delete it. For more information on how to work with groups and users, see Chapter 13, "User Manager."

Windows NT offers a set of standard permissions you can set on directories and files. The standard permissions for directories are No Access, List, Read, Add, Add & Read, Change, and Full Control. The standard permissions for files are No Access, Read, Change, and Full Control.

The standard permissions are groups of individual permissions. When you set a standard permission, the abbreviations for the individual permissions are displayed beside the standard permission. For example, when you set the standard permission Read on a file, the abbreviation RX appears beside it. The individual permissions and their abbreviations are:

Read (R)	Write (W)	Execute (X)
Delete (D)	Change Permissions (P)	Take Ownership (O)

In addition to setting standard permissions, you can set special access permissions. Special access permissions allow you to define a custom set of individual permissions for directories and files.

To effectively work with NTFS security, keep the following in mind:

- Permissions are cumulative except that the No Access permission overrides all other permissions. For example, if the coworkers group has Change permission for a file while the finance group has only Read permission and John is a member of both groups, John will be granted Change permission. However, if you change the finance group's permission for the file to No Access, John will not be able to use the file even though he is a member of a group that has access to it.
- When you create files and subdirectories in a directory, they inherit permissions from the directory. For example, if you add a file to a directory that allows the coworkers group Change permission and the finance group Read permission, those same permissions will apply to the file.
- Changing the permissions on a directory changes the permissions on files that exist in the directory. For example, if you grant the finance group Change permission on a directory, members of that group will be able to change all the files in the directory.
- The user who creates a file or directory is the owner of that file or directory. The owner can always control access to the file or directory by changing the permissions set on it. Users who are members of the Administrators group can always take ownership of a file or directory.
- The easiest way to administer security is by setting permissions for groups, not individual users. Typically, a user will need access to many files. If the user is a member of a group that has access to the files, you can end the user's access by removing the user from the group rather than changing the permissions on each of the files. Note that setting permission for an individual user does not override the access granted to the user through groups to which the user belongs.

Setting Directory Permissions

When you first display a directory's permissions, the Directory Permissions dialog box shows the permissions that the directory inherited from the directory containing it. The Names box shows the groups and users for whom permissions have been set. If you have selected multiple directories, permissions are shown only if they are the same for all of the directories. You can change permissions, add a group or user to the list, or remove a group or user from the list.

Setting permissions on a directory controls what users can do in that directory. When you set directory permissions, you are setting permissions on the directory and all the files that exist in the directory. Existing subdirectories and their files are not changed unless you specify to change them. When you create new files and new subdirectories, they inherit their permissions from the directory.

When you set a standard permission, two sets of individual permissions are displayed next to it: the permissions set on the directory and the permissions set on files in the directory. For example, when you set Add & Read permission on a directory, you see (RWX), signifying Read, Write, and Execute permissions on the directory, and (RX), signifying Read and Execute permission on files in the directory.

To change permissions on the directory, you must be the owner of the directory, or have been granted permission to do so by the owner.

The following table shows permissions for directories and the actions on directories available to users for each permission.

● Permission allows use

○ Permission does not allow use

	No Access	List	Read	Add	Add & Read	Change	Full Control
Display directory filenames	○	●	●	○	●	●	●
Display the directory's attributes	○	●	●	●	●	●	●
Go to the directory's subdirectories	○	●	●	●	●	●	●
Change the directory's attributes	○	○	○	●	●	●	●
Create subdirectories and add files	○	○	○	●	●	●	●
Display the directory's owner and permissions	○	●	●	●	●	●	●
Delete the directory and subdirectories	○	○	○	○	○	●	●
Change directory permissions	○	○	○	○	○	○	●
Take ownership of the directory	○	○	○	○	○	○	●

The following table shows permissions for directories and the actions on files available to users for each permission.

● Permission allows use

○ Permission does not allow use

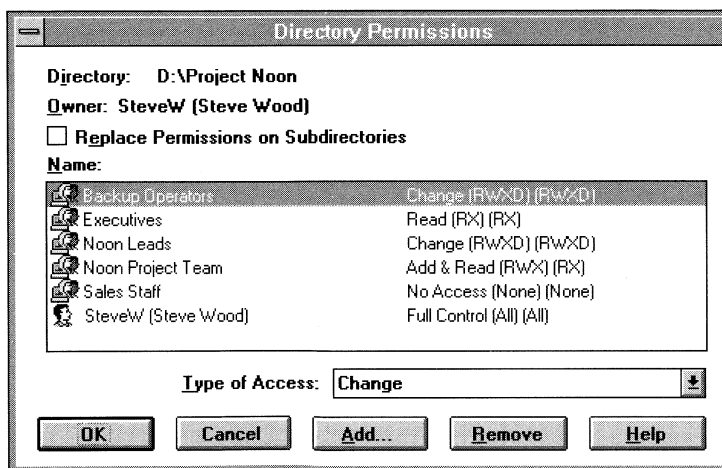
	No Access	List	Read	Add	Add & Read	Change	Full Control
Display the file's owner and permissions	○	○	●	○	●	●	●
Display the file's data	○	○	●	○	●	●	●
Display the file's attributes	○	○	●	○	●	●	●
Run the file if it is a program	○	○	●	○	●	●	●
Change the file's attributes	○	○	○	○	○	●	●
Change data in and append data to the file	○	○	○	○	○	●	●
Delete the file	○	○	○	○	○	●	●
Change the file's permissions	○	○	○	○	○	○	●
Take ownership of the file	○	○	○	○	○	○	●

► To view or change directory permissions

1. Select the directory in the directory window. You can select multiple directories.



2. From the Security menu, choose Permissions. Or choose the Permissions button on the toolbar.



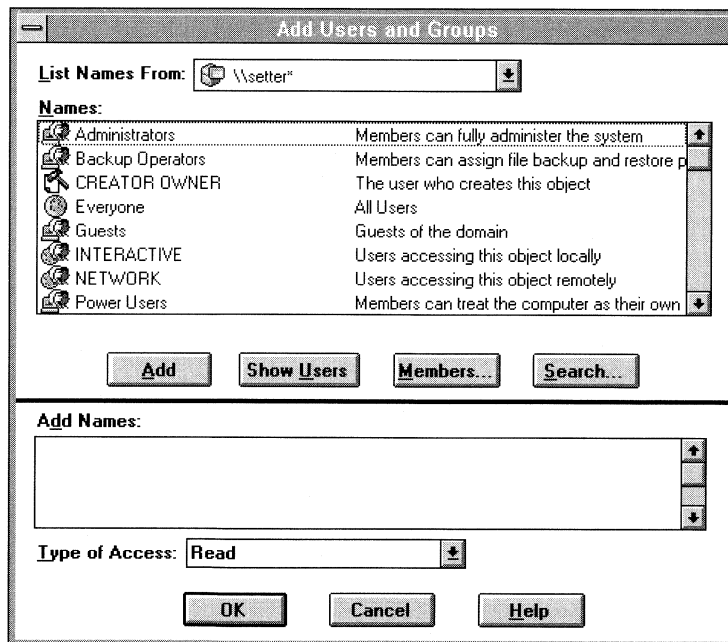
3. By default, the changes you make to directory permissions affect the directory and its files. Changes do not automatically apply to existing subdirectories and their files. You can apply the changed permissions to existing subdirectories and their files by selecting the Replace Permissions On Subdirectories check box.
4. Select the name of a group or user and choose a permission from the Type of Access box.
You can customize directory and file permissions by choosing Special Directory Access... or Special File Access.... For more information on special access permissions, see “Setting Special Access Permissions” later in this chapter.
5. Choose the OK button.

► **To add a group or user to the directory permissions list**

1. In the Directory Permissions dialog box, choose the Add button.

The Add Users and Groups dialog box displays the groups on the computer or in the domain shown by the List Names From box.

You can select another domain by using the List Names From box. Domains appear only if your computer is a member of a domain on a Windows NT Advanced Server network. The domains shown have a trust relationship with the domain containing the directory.



2. You can use options in the Add Users and Groups dialog box to display users, find the users in a group, or find the domain to which a group or user belongs.
 - Choose the Show Users button to display the names of users on the selected computer or domain.
 - To see a group's content, select the group and choose the Members button. Users are listed in a new dialog box. On a Windows NT Advanced Server network, global groups that are members of a local group appear in the list. To see a global group's users, select the group and choose the Members button. To include the group in the Add Users and Groups dialog box, choose the Add button. To include some of the group's users, select them and choose the Add button.
 - To add a group or user, you must know the domain which contains the group's or user's account. On a Windows NT Advanced Server network, choose the Search button to find the domain of a group or user. In the Find Account dialog box, type the name of the group or user in the Find User Or Group box and specify the domains you want to search. Then choose the Search button. To include the groups or users in the Add Users and Groups dialog box, select them in the Search Results box and choose the Add button.
3. To add groups or users to the permissions list, select them in the Names box and choose the Add button, or double-click the name of the group or user.

Or you can type the names of groups and users in the Add Names box. Separate names using a semicolon. If the account of the group or user is not located on the computer or domain shown by the List Names From box, you must specify the location. Type the computer or domain name followed by the group or user name and separate the names using a backslash, for example SHIPPING\ERNESTA. You can type the name without waiting for Windows NT to list groups in the Names box.
4. Select the permission for the groups or users shown in the Add Names box using the Type of Access box.
5. Choose the OK button.

► **To remove directory permissions for a group or user**

1. In the Directory Permissions dialog box, select the name of the group or user.
2. Choose the Remove button.

Setting File Permissions

When you first display a file's permissions, the File Permissions dialog box shows the permissions that the file inherited from the directory containing it. The Names box shows the groups and users for whom permissions have been set on the file. If you have selected multiple files, permissions are shown only if they are the same for all of the files. You can change permissions set for the listed groups and users, add a group or user to the list, or remove a group or user from the list.

To change permissions on the file, you must be the owner of the file, or have been granted permission to do so by the owner. The following table shows permissions for files and the actions available to users for each permission.

- Permission allows use
○ Permission does not allow use

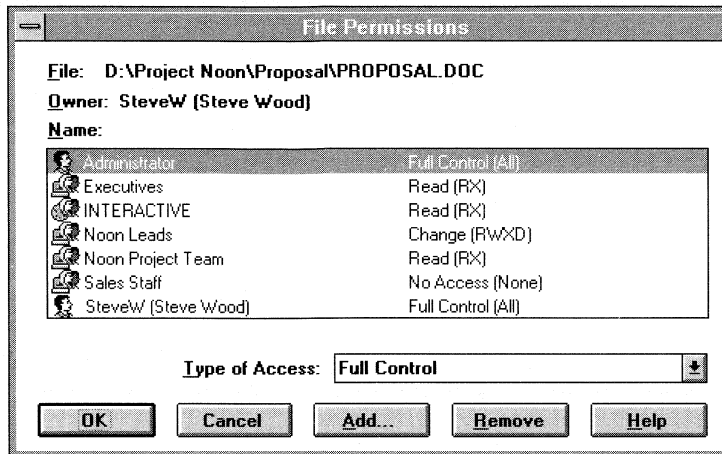
	No Access	Read	Change	Full Control
Display the file's attributes	○	●	●	●
Run the file if it is a program	○	●	●	●
Display the file's owner and permissions	○	●	●	●
Change the file's attributes	○	○	●	●
Change data in and append data to the file	○	○	●	●
Delete the file	○	○	●	●
Change the file's owner and permissions	○	○	○	●

► To change permissions on a file

1. Select one or more files from the contents pane of the directory window.



2. Choose Permissions from the Security menu, or choose the Permissions button on the toolbar.



3. Select the name of the group or user whose permission you want to change.

4. Choose a permission from the Type of Access box.

To customize the permissions set for the group or user, choose Special Access... from the Type of Access box. For more information on special access file permissions, see “Setting Special Access Permissions” later in this chapter.

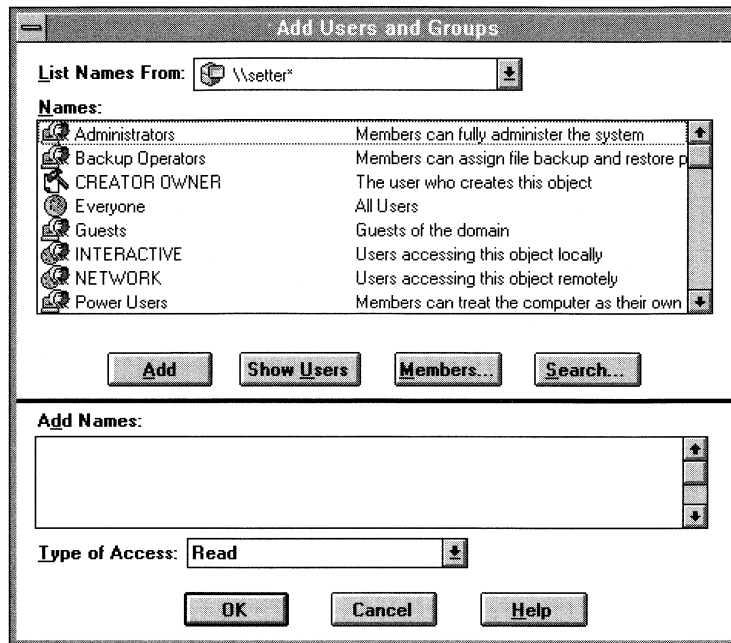
5. Choose the OK button.

► **To add a group or user to the file permissions list**

1. In the File Permissions dialog box, choose the Add button.

The Add Users and Groups dialog box displays the groups on the computer or in the domain shown by the List Names From box.

You can select another domain by using the List Names From box. Domains appear only if your computer is a member of a domain on a Windows NT Advanced Server network. The domains shown have a trust relationship with the domain containing the file.



2. You can use options in the Add Users and Groups dialog box to display users, find the users in a group, or find the domain to which a group or user belongs.
 - Choose the Show Users button to display the names of users on the selected computer or domain.
 - To see a group's content, select the group and choose the Members button. Users are listed in a new dialog box. On a Windows NT Advanced Server network, global groups that are members of a local group appear in the list. To see a global group's users, select the group and choose the Members button. To include the group in the Add Users and Groups dialog box, choose the Add button. To include some of the group's users, select them and choose the Add button.
 - To add a group or user, you must know the domain which contains the group's or user's account. On a Windows NT Advanced Server network, choose the Search button to find the domain of a group or user. In the Find Account dialog box, type the name of the group or user in the Find User Or Group box and specify the domains you want to search. Then choose the Search button. To include the groups or users in the Add Users and Groups dialog box, select them in the Search Results box and choose the Add button.

3. To add groups or users to the permissions list, select them in the Names box and choose the Add button, or double-click the name of the group or user.

Or you can type the names of groups and users in the Add Names box. Separate names using a semicolon. If the account of the group or user is not located on the computer or domain shown by the List Names From box, you must specify the location. Type the computer or domain name followed by the group or user name and separate the names using a backslash, for example SHIPPING\ERNESTA. You can type the name without waiting for Windows NT to list groups in the Names box.

4. In the Type of Access box, select the permission for the groups or users shown in the Add Names box.
5. Choose the OK button.

► **To remove file permissions for a group or user**

1. In the File Permissions dialog box, select the name of the group or user.
2. Choose the Remove button.

Setting Special Access Permissions

In general, the standard directory and file permissions are all you need to secure your directories and files. However, if you need to create a custom set of permissions, you can use special access permissions. You can set special access permissions on directories, on all the files in selected directories, or on selected files.

When you set special access permissions on a directory, the permissions affect the directory only. Current permissions on files in the directory are not affected.

The following table shows special access permissions for directories and the actions available to users for each directory permission.

● Permission allows use

○ Permission does not allow use

	<i>Read</i>	<i>Write</i>	<i>Execute</i>	<i>Delete</i>	<i>Change Permissions</i>	<i>Take Ownership</i>	<i>Full Control</i>
Display filenames in the directory	●	○	○	○	○	○	●
Display the directory's attributes	●	○	●	○	○	○	●
Add files and subdirectories	○	●	○	○	○	○	●
Change the directory's attributes	○	●	○	○	○	○	●
Go to the directory's subdirectories	○	○	●	○	○	○	●
Display directory owner and permissions	●	●	●	○	○	○	●
Delete the directory	○	○	○	●	○	○	●
Change the directory's permissions	○	○	○	○	●	○	●
Take ownership of the directory	○	○	○	○	○	●	●

The following table shows special access permissions for files and the actions available to users for each permission.

● Permission allows use

○ Permission does not allow use

	<i>Read</i>	<i>Write</i>	<i>Execute</i>	<i>Delete</i>	<i>Change Permissions</i>	<i>Take Ownership</i>	<i>Full Control</i>
Display the file's owner and permissions	●	●	●	○	○	○	●
Display the file's data	●	○	○	○	○	○	●
Display the file's attributes	●	○	●	○	○	○	●
Change the file's attributes	○	●	○	○	○	○	●
Change data in and append data to the file	○	●	○	○	○	○	●
Run the file if it is a program	○	○	●	○	○	○	●
Delete the file	○	○	○	●	○	○	●
Change the file's permissions	○	○	○	○	●	○	●
Take ownership of the file	○	○	○	○	○	●	●

► **To set special access permissions**

1. You can set special access permissions on directories, all files in directories, or selected files.

To set permissions on directories, select them in the directory window.

To set permissions on all the files in one or more directories, select the files' directories in the directory window.

To set permissions on selected files, select the files in the contents pane of the directory window.



2. Choose Permissions from the Security menu, or choose the Permissions button on the toolbar.

3. In the Permissions dialog box, select the group or user you want to grant special access.

If no groups or users are shown, indicating that the directories or files you selected have differing permissions, add a group or user before setting special access permissions.

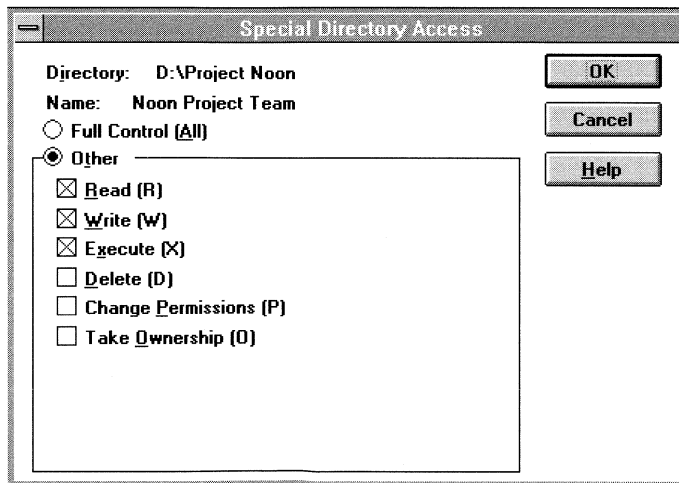
4. Open the appropriate Special Access dialog box.

To set permissions on directories, choose Special Directory Access... from the Type of Access box or double-click the name of the group or user.

To set permissions on all the files in the selected directories, choose Special File Access... from the Type of Access box.

To set permissions on selected files, choose Special File Access... from the Type of Access box or double-click the name of the group or user.

The Special Access dialog box shows which access permissions have been granted based on the current standard or special permissions setting.



3. To set special access permissions, select the check boxes for the access you want to grant.

To grant full control, select Full Control (All).

If you are setting permissions for all files in directories, you can select Access Not Specified. This removes permissions from files in the selected directories and prevents files from inheriting permissions from their directories.

4. Choose the OK button.

Setting Permissions Through Shared Directories

You can set permissions through a shared directory whether the directory is on a drive formatted to use the Windows NT file system (NTFS), FAT, or HPFS.

Security To work with shared directory permissions, you must be logged on as a member of the Administrators or Power Users group.


To secure shared directories effectively, keep the following in mind:

- Permissions set through a shared directory are effective only when the directory is reached over the network.
- Permissions set through a shared directory apply to all files and subdirectories in the shared directory.
- Permissions set through a shared directory that is on an NTFS volume operate in addition to NTFS permissions set on the directory itself. Shared directory permissions specify the maximum access allowed. For example, if a user has Read permission on the shared directory but List permission on the directory itself, the user's access is limited to List.

The following table shows the permissions for files and directories granted through the shared directory and the actions available to users for each permission.

	No Access	Read	Change	Full Control
● Permission allows use				
○ Permission does not allow use				
Display subdirectory names and filenames	○	●	●	●
Display the data and attributes of files	○	●	●	●
Run program files	○	●	●	●
Go to the directory's subdirectories	○	●	●	●
Create subdirectories and add files	○	○	●	●
Change data in and append data to files	○	○	●	●
Change the file's attributes	○	○	●	●
Delete subdirectories and files	○	○	●	●

► **To view or change permissions on a shared directory**

1. Select the shared directory whose permissions you want to change in either the tree or contents panes of the directory window.
2.  From the Disk menu, choose Share As. Or choose the Share Directory button on the toolbar.
3. In the Share Directory dialog box, choose the Permissions button.
4. In the Access Through Share Permissions dialog box, select the name of a group or user and select a permission from the Type of Access box.
5. Choose the OK button.

► **To add a group or user to the shared directory permissions list**

1. In the Access Through Share Permissions dialog box, choose the Add button.
The Add Users and Groups dialog box displays the groups on the computer or in the domain shown by the List Names From box.
You can select another domain by using the List Names From box. Domains appear only if your computer is a member of a domain on a Windows NT Advanced Server network. The domains shown have a trust relationship with the domain containing the directory.
2. Use options in the Add Users and Groups dialog box to display users, find the users in a group, or find the domain to which a group or user belongs.
 - Choose the Show Users button to display the names of users on the selected computer or domain.

- To see a group's content, select the group and choose the Members button. Users are listed in a new dialog box. On a Windows NT Advanced Server network, global groups that are members of a local group appear in the list. To see a global group's users, select the group and choose the Members button. To include the group in the Add Users and Groups dialog box, choose the Add button. To include some of the group's users, select them and choose the Add button.
 - To add a group or user, you must know the domain which contains the group's or user's account. On a Windows NT Advanced Server network, choose the Search button to find the domain of a group or user. In the Find Account dialog box, type the name of the group or user in the Find User Or Group box and specify the domains you want to search. Then choose the Search button. To include the groups or users in the Add Users and Groups dialog box, select them in the Search Results box and choose the Add button.
3. To add groups or users to the permissions list, select them in the Names box and choose the Add button, or double-click the name of the group or user.

Or you can type the names of groups and users in the Add Names box. Separate names using a semicolon. If the account of the group or user is not located on the computer or domain shown by the List Names From box, you must specify the location. Type the computer or domain name followed by the group or user name and separate the names using a backslash, for example SHIPPING\VERNESTA. You can type the name without waiting for Windows NT to list groups in the Names box.
 4. In the Type Of Access box, select the permission for the groups or users shown in the Add Names box.
 5. Choose the OK button.
- **To remove shared directory permissions for a group or user**
1. In the Access Through Share Permissions dialog box, select the name of the group or user.
 2. Choose the Remove button.

Auditing Files and Directories

Auditing files and directories allows you to track their usage. For a particular file or directory, you can specify which groups or users and which actions to audit. You can audit both successful and failed actions. Windows NT stores the information generated from auditing in a file. You can view the information using Event Viewer. For more information on Event Viewer, see Chapter 15, “Event Viewer.”

Important To audit files and directories, you must set the audit policy to audit file and object access. Set the audit policy using User Manager. For more information on audit policy, see Chapter 13, “User Manager.”

Security To audit files and directories, you must be logged on as a member of the Administrators group.

To audit the following activities on a directory, select the events shown.

- Event audits action
- Event does not audit action

	Read	Write	Execute	Delete	Change Permissions	Take Ownership
Displaying filenames	●	○	○	○	○	○
Displaying attributes	●	○	●	○	○	○
Changing attributes	○	●	○	○	○	○
Creating subdirectories and files	○	●	○	○	○	○
Going to the directory’s subdirectories	○	○	●	○	○	○
Displaying owner and permissions	●	●	●	○	○	○
Deleting the directory	○	○	○	●	○	○
Changing directory permissions	○	○	○	○	●	○
Changing directory ownership	○	○	○	○	○	●

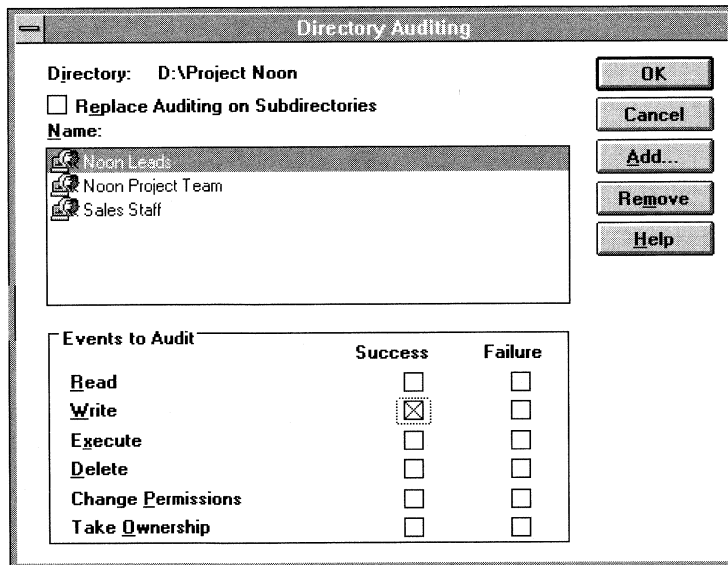
To audit the following activities on a file, select the events shown.

- Event audits action
- Event does not audit action

	Read	Write	Execute	Delete	Change Permissions	Take Ownership
Displaying the file's data	●	○	○	○	○	○
Displaying attributes	●	○	●	○	○	○
Displaying the file's owner and permissions	●	●	●	○	○	○
Changing data	○	●	○	○	○	○
Changing attributes	○	●	○	○	○	○
Running the file	○	○	●	○	○	○
Deleting the file	○	○	○	●	○	○
Changing the file's permissions	○	○	○	○	●	○
Changing the file's ownership	○	○	○	○	○	●

► **To audit a file or directory**

1. In the File Manager window, select the file or directory.
2. From the Security menu, choose Auditing.



3. If you are setting auditing on a directory, select the Replace Auditing On Subdirectories check box when you want to change the auditing on subdirectories and their files. When the check box is clear, your auditing choices affect only the selected directory and its files.
4. Select the name of the group or user.
5. Select the events to audit, and then choose the OK button.

► **To add a group or user to the auditing list**

1. In the Auditing dialog box, choose the Add button.

The Add Users and Groups dialog box displays the groups on the computer or in the domain shown by the List Names From box. You can select another domain by using the List Names From box.
2. Use options in the Add Users and Groups dialog box to display users, find the users in a group, or find the domain to which a group or user belongs.
 - Choose the Show Users button to display the names of users on the selected computer or domain.
 - To see a group's content, select the group and choose the Members button. Users are listed in a new dialog box. On a Windows NT Advanced Server network, global groups that are members of a local group appear in the list. To see a global group's users, select the group and choose the Members button. To include the group in the Add Users and Groups dialog box, choose the Add button. To include some of the group's users, select them and choose the Add button.
 - To add a group or user, you must know the domain which contains the group's or user's account. On a Windows NT Advanced Server network, choose the Search button to find the domain of a group or user. In the Find Account dialog box, type the name of the group or user in the Find User Or Group box and specify the domains you want to search. Then choose the Search button. To include the groups or users in the Add Users and Groups dialog box, select them in the Search Results box and choose the Add button.
3. To add groups or users to the audit list, select them in the Names box and choose the Add button, or double-click the name of the group or user.

Or you can type the names of groups and users in the Add Names box. Separate names using a semicolon. If the account of the group or user is not located on the computer or domain shown by the List Names From box, you must specify the location. Type the computer or domain name followed by the group or user name and separate the names using a backslash, for example SHIPPINGVERNESTA. You can type the name without waiting for Windows NT to list groups in the Names box.
4. Choose the OK button.

► **To remove file or directory auditing for a group or user**

1. In the Auditing dialog box, select the name of the group or user in the list.
2. Choose the Remove button.

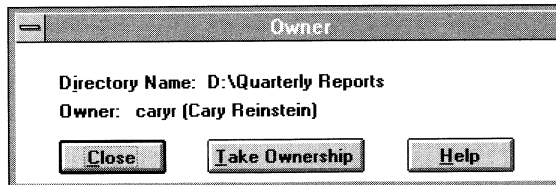
Taking Ownership of Files or Directories

When you create a file or directory, you become the owner of it. By granting permissions, the owner controls how the file or directory is used. The owner can grant permission to another user to take ownership of a file or directory. Otherwise, you must be logged on as a member of the Administrators group to take ownership.

Although an administrator can take ownership, an administrator cannot transfer ownership to others. This preserves security. For example, only an administrator who takes ownership and changes permissions can gain access to a file on which you have set No Access permission. By checking the ownership of the file, you would see the ownership change and know who had violated the permission you set on the file. To make sure that your files are secure, you should check their ownership regularly.

► **To take ownership of a file or directory**

1. Select the file or directory in the File Manager window. You can select more than one file or directory at a time.
2. From the Security menu, choose Owner.



3. Choose the Take Ownership button.

If you have selected one or more directories, File Manager asks whether you want to take ownership of all files and subdirectories in the trees of the selected directories. Choose Yes if you want to do so.

Maintaining Disks

Use commands on the Disk menu to format, copy, and label floppy disks.

Formatting a Floppy Disk

Formatting prepares a floppy disk so that information can be stored on it and retrieved from it. Windows NT uses the MS-DOS FAT file system when formatting a disk. When you format a disk, File Manager removes all the information from it, writes new directory information to it, and checks for unusable portions called bad sectors.

► **To format a floppy disk**

1. Insert a disk into a drive.
2. From the Disk menu, choose Format Floppy.
3. In the Disk In box, make sure that the drive shown is the one containing the floppy you want to format. If necessary, select the correct drive.
4. In the Capacity box, select the size of the disk you want to format.
5. To give the disk a volume label, type a name in the Label box under Options.
6. To quickly reformat a disk that has been formatted previously, select the Quick Format check box. A quick format deletes directory information in the file allocation table and root directory. The disk is not checked for bad sectors.
7. Choose the OK button.
8. A message prompts you to confirm that you want to format the disk. Formatting deletes all information on a disk, so make sure the disk is the one you want to format. Then choose the Yes button.

File Manager displays its progress in a dialog box as formatting proceeds. You can work with File Manager while formatting continues in the background. To cancel formatting, choose the Cancel button. To hide the dialog box while formatting continues, choose the Hide button.

After your disk is formatted, a message prompts you to indicate whether you want to format another disk.

Caution You cannot recover information on a disk that has been formatted.

Copying a Floppy Disk

You can make a copy of a floppy disk by using the Copy Disk command on the Disk menu. When you copy a floppy disk, both disks must have the same storage capacity. For example, if the disk you are copying from (the source disk) has a capacity of 720K, the disk you are copying to (the destination disk) must also.

► **To copy an entire disk**

1. Insert the source disk in the drive you want to copy from. If you have two floppy disk drives of the same size, insert the destination disk in the drive you want to copy to.
2. From the Disk menu, choose Copy Disk.
3. If your computer has two floppy disk drives, select the letter of the source drive and the destination drive in the Copy Disk dialog box. Then choose the OK button.

If your computer has only one floppy disk drive, you are not prompted to select drives.

4. A message prompts you to confirm that you want to copy the disk. There is no way to recover information previously stored on the destination disk, so make sure the disk in the destination drive is one you want to overwrite. Then choose the Yes button.

If you are making a copy using a single floppy disk drive, you are prompted to switch source and destination disks as needed.

A message informs you of the percentage of your disk that has been copied.

File Manager displays its progress in a dialog box as the copy is made. You can work with File Manager while copying continues in the background. To cancel copying, choose the Cancel button. To hide the dialog box while copying continues, choose the Hide button.

Labeling a Disk

You can assign or change a label for a disk by selecting the Label Disk command on the Disk menu.

► **To assign or change a volume label**

1. Click the drive icon for the disk you want to label.
2. From the Disk menu, choose Label Disk.
3. In the Label box, type the label for the disk.

The label can contain up to 11 characters.

4. Choose the OK button.

Control Panel

You can use Control Panel to customize various features of Windows NT.

This chapter describes the options available in Control Panel, which include the following:

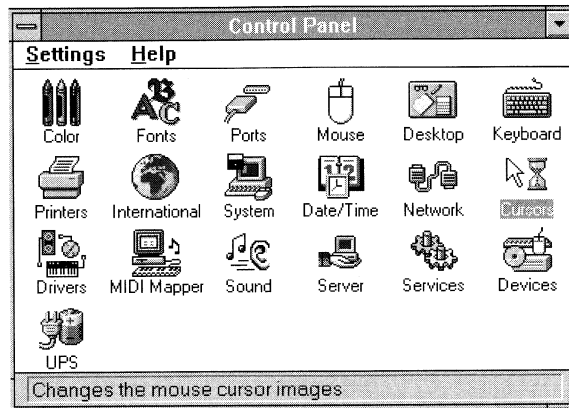
- Changing the desktop
- Setting serial port communications options
- Working with fonts
- Working with date, time, and international settings
- Customizing the keyboard, cursor, and mouse
- Working with printers
- Working with device drivers
- Defining options for the operating system and the uninterruptible power supply
- Configuring the network
- Managing server properties and services

Overview







Control Panel provides many options for customizing Windows NT so that it works and looks the way you want. The icons in Control Panel represent options, including network and sound capabilities, for configuring a computer. For each icon, there is a corresponding command on the Settings menu. Your Control Panel window may look different, depending on the devices you have installed, such as an extra pointing device.














Most changes made in Control Panel (except adding and removing fonts) will affect only the user who is currently logged on to the computer.

Security Some options in Control Panel require you to be logged on as a member of a specific group. If you are not a member of the necessary group, a message appears.



The following table describes Control Panel options.

Choose	To
 Color	Set the color of the various elements of the desktop.
 Cursors	Change the appearance of the cursor.
 Date/Time	Change the system date, time, and time zone.
 Desktop	Specify the pattern, screen saver, alignment grid, icon spacing, and cursor blink rate.
 Devices	Start, stop, and configure the startup type for device drivers.
 Drivers	Install and configure drivers for optional devices such as sound boards and synthesizers.

Choose	To
 Fonts	Add or remove screen, vector, and TrueType fonts. (Some printer fonts are installed automatically when you install a printer. Other printer fonts must be installed using a font installation program provided by the font manufacturer.)
 International	Specify international settings such as the country and language, number and currency formats, and date and time formats without changing the language of the product itself.
 Keyboard	Adjust the keyboard delay and repeat rate.
 MIDI Mapper	Select, change, or create MIDI setups, patch maps, or key maps for playing a synthesizer connected to your computer.
 Mouse	Customize elements such as speed and button function for your pointing device.
 Network	Install and configure network adapter cards and other network software, and join a workgroup or a domain.
 Ports	Set parameters for serial communications ports.
 Printers	Open Print Manager to work with local and network printers.
 Server	For the local computer, view and manage connected users, directory shares, open resources, directory replication, and recipients of administrative alerts.
 Services	Start, stop, pause, or continue the services available on the computer and configure startup options.
 Sound	Assign sounds to system and application events, and turn on or off the warning beep and system sounds.
 System	Specify the default operating system for startup, change user environment variables, and define paging file size.
 UPS	Configure the uninterruptible power supply to ensure safe shutdown during a power failure.

For additional information about any option in Control Panel, see the online Help.

Changing the Desktop

You can use the Desktop option to customize the appearance of your desktop (which is where elements such as windows, icons, and dialog boxes appear). You can specify a pattern or wallpaper for the desktop, adjust icon spacing, wrap icon titles, or set an invisible grid to easily align windows and icons. Use the Color option to select the colors used for displaying desktop elements.

Customizing Desktop Colors

The colors assigned to the different parts of the desktop are saved in *color schemes*. Several predefined color schemes are provided. A solid color in Windows NT is directly supported by your display adapter. VGA adapters support 16 solid colors, and 256-color adapters support 20 solid colors. Both types of displays support hundreds of dithered colors, which are produced by patterns of colored dots to simulate a color or pattern. Depending on the screen resolution, dithered colors can look almost exactly like solid colors.

Changing an Existing Color Scheme

You can change individual colors assigned to a color scheme. If you find that you use only one or two color schemes, you can shorten the list of selections by deleting schemes. The only color scheme that cannot be deleted is Windows Default, the scheme you see the first time you start Windows NT.

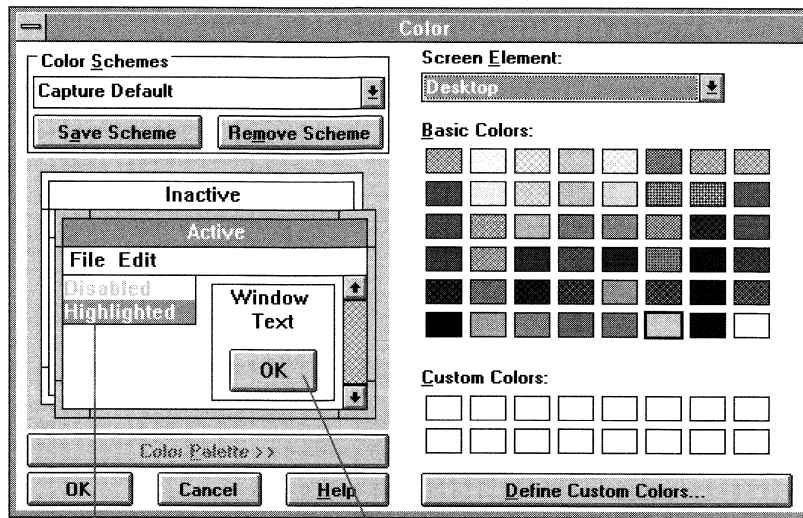
Important Deleting a color scheme on a particular computer will remove that scheme for every user on that computer.

► **To change the colors of a color scheme**



1. In the Control Panel window, double-click the Color icon.
2. In the Color Schemes box of the Color dialog box, select the color scheme you want to change.
3. Choose the Color Palette button.

The Color dialog box expands to include a list of screen elements, a palette of basic colors, and a palette titled Custom Colors.



Clicking "Highlighted" alternately selects the Highlight and Highlighted Text elements.

Clicking the OK button alternately selects the Button Face, Button Shadow, and Button Text elements.

4. Click the part of the sample screen where you want to change the color. Or in the Screen Element box, select the element from the list.

You can see which element is selected in the Screen Element list.

5. In the Basic Colors palette, select the color you want.

The color is displayed in the sample screen.

6. Change the color of any other screen elements until you are satisfied with the color scheme.

Control Panel uses the solid color closest to the selected dithered color for the following screen elements:

Window Frame	Window Text	Window Background
Menu Bar	Menu Text	Active and Inactive Title Bar Text
Button Face	Button Text	Disabled Text
Highlight	Highlighted Text	

7. To save the new color selections, choose the Save Scheme button, and then type a name for the scheme.

If you don't save the scheme, Windows NT still uses the new color selections until you change them again, even if you quit and restart Windows. However, when you make another change or choose an existing scheme, the color selections are lost.

8. Choose the OK button.

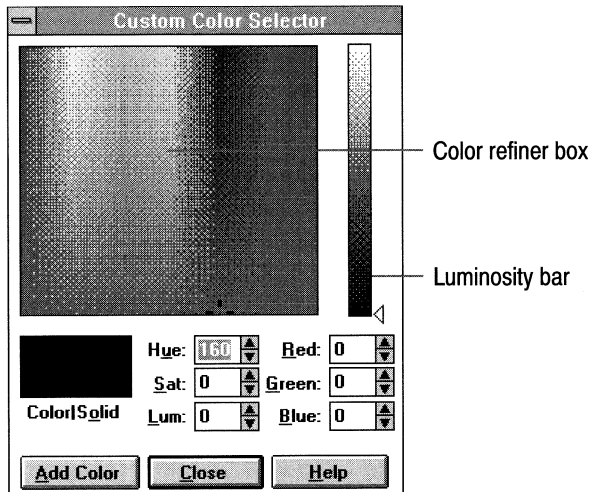
Defining Custom Colors

The Basic Colors palette contains 48 colors. You can define and use up to 16 additional custom colors in a color refiner box by specifying the hue, saturation, luminosity, and relative amounts of red, green, and blue.

Hue is the position of the color along the color spectrum. *Saturation* is the purity of the hue, moving from gray to the pure color. *Luminosity* is the brightness of the color on a scale from black to white.

► To define a custom color

1. In the Color dialog box, choose the Color Palette button, and then choose the Define Custom Colors button.



2. Move the color refiner cursor to the area of the color refiner box that shows the color you want. Then drag the arrow next to the luminosity bar to adjust the luminosity.

The new color is displayed on the left side of the Color/Solid box. The right side of the box displays the solid color closest to your choice. To select the solid color, choose the right side of the box, or press ALT+O.

3. When you are satisfied with the color, select a box in the Custom Colors palette for the new color. You can select an empty box or one that contains a color you want to change.

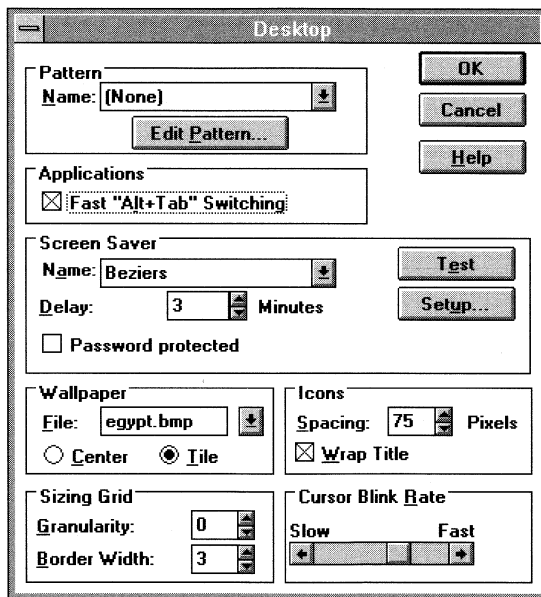
If you do not select a box for the new color, it is placed in the first available empty box or in the upper-left position in the Custom Colors palette. Subsequent custom colors fill the boxes in sequence from upper left to lower right unless you choose a specific box for the new color.

4. Choose the Add Color button to add the new color to the Custom Colors palette.
5. Define any other custom colors you want to add to the palette, and then choose the Close button to return to the Color dialog box. Or to return to the Color dialog box without closing the Custom Color Selector dialog box, drag the Custom Color Selector dialog box to a new position.

You can now choose the custom colors the same way you would choose colors from the Basic Colors palette.

Configuring Desktop Appearance

You can use the Desktop icon in Control Panel to configure the appearance of your desktop.



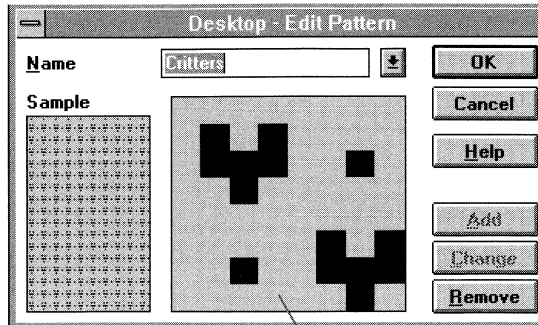
Changing or Creating a Pattern

You can change a predefined desktop pattern, create a new pattern, or remove a pattern.

► **To change an existing pattern**



1. In the Control Panel window, double-click the Desktop icon.
2. Choose the Edit Pattern button.



Click areas in the cell where you want to reverse the color.

3. In the Name list, select a pattern.
A sample of the current pattern appears in the Sample box. The cell shows an enlarged version so you can make changes to the pattern.
4. In the cell, click locations where you want to reverse the colors in the pattern.
5. When the Sample box shows the pattern you want, choose the Change button.
6. Choose the OK button to return to the Desktop dialog box.

► **To create a pattern**

1. In the Name box of the Edit Pattern dialog box, type a name for the new pattern.
2. Click locations in the cell where you want to reverse the colors in the pattern.
3. When the cell shows the pattern you want, choose the Add button.
4. Choose the OK button to return to the Desktop dialog box.

The pattern you define is repeated as many times as necessary to completely fill the background. The colors of the pattern are determined by the Desktop and Window Text colors you choose.

If you find that you use only one or two patterns, you can select patterns you no longer use and choose the Remove button in the Edit Pattern dialog box.

Displaying Custom Wallpaper

You can display a .BMP bitmap graphic on your desktop instead of a solid color or pattern. Paint programs that produce .BMP files, such as Windows Paintbrush, can be used to create a bitmap or to modify a scanned image. After you create the bitmap, save the .BMP file in the \WINNT directory (or specify the full path when choosing the bitmap as wallpaper).

Note Windows uses more memory when displaying wallpaper than when displaying a solid color or a pattern on the desktop. If you run out of memory when running an application, you can change to a color or pattern to free some memory.

► To choose a bitmap to display as wallpaper



1. In the Control Panel window, double-click the Desktop icon.
2. In the File box under Wallpaper, select a bitmap from the list.

If you saved the bitmap in a directory other than the Windows NT directory, type the full path and bitmap filename.

3. Select Center or Tile.

The Center option positions the bitmap in the center of the desktop. The Tile option repeats the bitmap as many times as necessary to cover the desktop.

If you select both a pattern and custom wallpaper in the Desktop dialog box, the wallpaper lies over the pattern. If you select the Center option for the wallpaper and the bitmap doesn't cover the entire desktop, you'll see the pattern around the edges of the bitmap. If the original bitmap is too large to fit on the screen or takes up too much memory, Windows NT does not display it.

If you want to remove a wallpaper from the list, delete the bitmap file from the \WINNT directory.

Preventing Icon Titles from Overlapping

Sometimes an icon's title is so wide that it overlaps an adjacent icon. You can use the Desktop icon to control the display of icon titles.

Windows NT calculates the standard spacing for application, document, and program-item icons based on the size of the widest icon. Usually this spacing is adequate. However, sometimes the description for an icon exceeds the icon's width, causing it to overlap adjacent icons.

Icon spacing is measured in pixels, the smallest unit of measurement on the screen. Increments of 10 pixels result in noticeable increases in spacing between icons.

► **To increase icon spacing and wrap an icon title**

1. Under Icons in the Desktop dialog box, click the up or down arrow in the Spacing box to increase or decrease the spacing between icons, or type a number.
2. Select the Wrap Title check box if you want the title to wrap.

Changing Window Border Width

Many windows can be resized by using the mouse to drag the window border to a new size. If a window can be resized, you can make it easier to “grab” the window border by increasing the border width.

► **To change the border width of windows**

- Under the Sizing Grid in the Desktop dialog box, click the up or down arrow in the Border Width box to increase or decrease the border width. Or type a number from 1 to 50, with 1 being the narrowest border.

Changing the Sizing Grid of Windows

The position and alignment of application windows and icons on your desktop are determined by an invisible grid. When Windows NT is set up, the sizing grid is turned off so that icons and windows remain where you place them on the desktop. When the sizing grid is turned on, application windows and minimized icons align with the nearest invisible gridline.

The grid changes in multiples of 8 pixels. A value of 1 creates a grid with 8 pixels between gridlines, a value of 2 creates a grid with 16 pixels between gridlines, and so forth. A value of 0 cancels the grid.

This option only affects application windows and the application icons that appear at the bottom of your screen. The sizing grid has no effect on document windows and icons.

► **To set the grid spacing**

- Under the Sizing Grid in the Desktop dialog box, click the up or down arrow in the Granularity box to increase or decrease the size of the grid, or type a number from 0 to 49.

Switching Between Applications

Windows NT allows you to run multiple applications at one time. However, when doing this, it is sometimes difficult to locate a specific application window. You can use fast application switching to switch between your applications.

► To use fast application switching



1. In the Control Panel window, choose the Desktop icon.
2. In the Desktop dialog box, select the Fast Alt+Tab Switching check box, and then choose the OK button.

If Fast Task Switch is selected, you can quickly cycle through the names of the applications running at that time. If Fast Task Switch is not selected, pressing ALT+TAB still works, but only the title bar of each window is highlighted.

3. Press ALT+TAB to cycle through the running applications. When you see the name of the application you want, release the keys.

If, while moving through the applications by pressing ALT+TAB, you want to return to your original application, press ALT+TAB+ESC.

Working with Screen Savers

Screen savers are used to reduce wear on your display and to provide security for your system. A screen saver is a moving pattern or bitmap that appears after you have not used your computer for a specified time.

When Windows NT is set up, a default screen saver is selected. However, several other screen savers are available. Move the mouse or press any key to turn off the screen saver.

You can use the Windows NT screen savers or the IdleWild screen savers included in the Microsoft Entertainment Pack for Windows. To use the IdleWild screen savers, the IWLIB.DLL file and the screen saver files (those with the extension .IW) must be in the same directory. Place these files in your \WINNT directory.

When you use a screen saver provided by Windows NT, you can ensure that unauthorized users do not have access to your work by using password protection with a screen saver. If someone tries to use your computer once the password-protected screen saver is displayed, a Lock Workstation dialog box appears. To unlock the computer, the same password used to log on to the computer must be entered.

- **To select a screen saver and turn password protection on and off**
 1. Under Screen Saver in the Desktop dialog box, select a screen saver in the Names box.
 2. In the Delay box, click the up or down arrow to increase or decrease the number of minutes before the screen saver is activated, or type a number between 1 and 99.
 3. If you want to protect your display with a password, select the Password Protect check box.
 4. To configure your screen saver, choose the Setup button, and then complete the setup dialog box that appears.
 5. To see how your screen saver looks, choose the Test button, and then move the mouse or press a key on the keyboard to stop the screen saver.

Setting Serial Port Communications Options

You can specify the communications settings for each serial port your system uses by using the Ports option. Windows NT can support up to 256 serial ports. Serial ports (named COM1 through COM256) are used to connect to serial pointing devices, printers, and other serial devices. Most computers include at least two serial ports: COM1 and COM2. Some devices, such as serial-port adapters, modems, and fax cards, use COM3 through COM256. The settings you specify determine how information is transferred between your computer and the serial device.

The communications settings you can specify include standard settings such as those for baud rate, parity, and flow control, and more advanced settings such as those that specify the base port address and interrupt request (IRQ) line that Windows NT uses to send information to a serial port. If you plan on using only COM1 and COM2, you may only need to change the standard settings. If you use COM3 through COM256, you may need to change the advanced settings.

Most communications applications that you use to exchange information between computers, such as Windows Terminal, require that you specify standard port settings within the application. These settings, such as baud rate, parity, and data bits, override the settings you specify by using the Ports option in Control Panel.

- **To specify standard communications settings**



1. In the Control Panel window, choose the Ports icon.
2. In the Ports dialog box, select the name of the port for which you want to specify communications settings.
3. Choose the Settings button.
4. In the Settings dialog box, display the options for each setting by clicking the scroll arrow to the right of each box.

5. Set the options to match the device connected to the port.

For information about the correct settings, see the documentation supplied with the device.

6. When you finish specifying the settings, choose the OK button to return to the Ports dialog box, and then choose the Close button.

For additional help on setting Advanced Options, see the online Help in the Ports dialog box.

Working with Fonts

A font, or typeface, is a collection of letters, numerals, symbols, and punctuation marks that have common characteristics. Fonts come in different sizes and styles. Font sizes are the height of a character measured in points—a point is approximately 1/72 of an inch. Font styles include characteristics such as bold and italic. Because of the differences in display resolution between the screen and the printer, what appears on screen and what appears in the printed document may be different.

If you use TrueType fonts in your documents, Windows NT and all Windows applications display the fonts on the screen exactly as they appear when printed; there is no need to install matching screen fonts. In addition, by using TrueType fonts, your documents become more portable because they look the same printed on different printers, as long as you use the same application and print at the same resolution. If you print at a different resolution or are printing a document from an older application, line and page breaks might change.

Adding Screen Fonts and TrueType Fonts

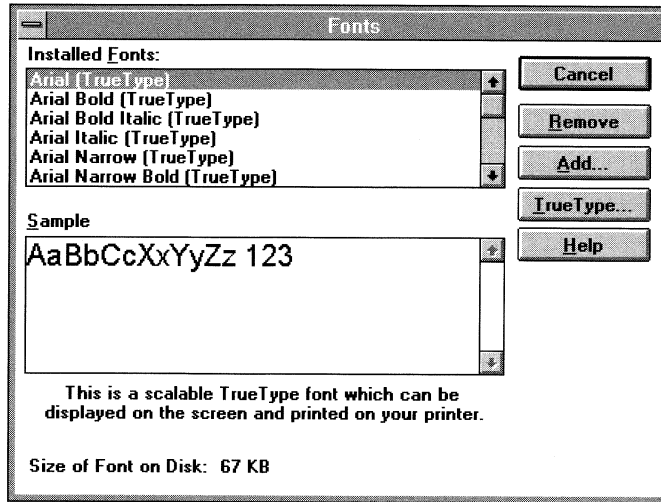
When you install a printer driver, screen fonts that match the printer fonts are usually installed. If you are using cartridge or soft fonts, your font manufacturer usually supplies an installation program for installing screen fonts; or the installation program that installs the cartridge or soft fonts may install the screen fonts automatically.

If no installation program is provided for installing screen fonts, you can use the Fonts option to install them. You can also use the Fonts option to install any additional TrueType fonts that you purchase.

► To add a font



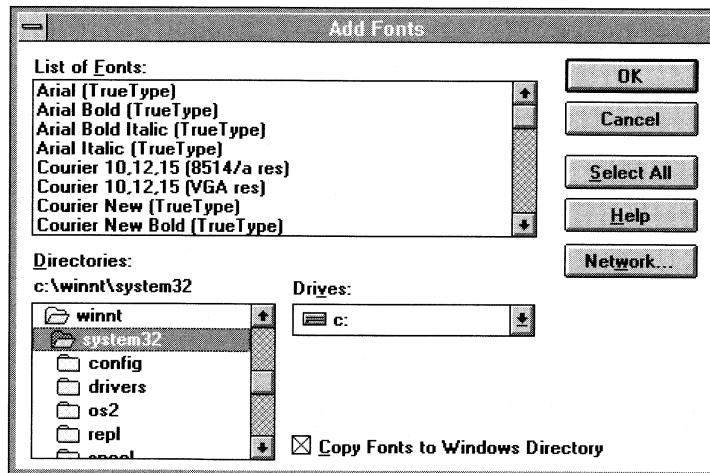
1. In the Control Panel window, choose the Fonts icon.



The Fonts dialog box lists all the installed fonts and the font type (for example, TrueType) displayed in parentheses.

The Sample box displays the selected font in all available sizes unless the font is a vector font or a TrueType font. Vector fonts can be scaled to any height, so the only size displayed is the size used to design the font. TrueType fonts can also be scaled to any height and are displayed in about 24-point size.

2. In the Fonts dialog box, choose the Add button.



3. In the Directories and Drives boxes of the Add Fonts dialog box, select the drive and directory that contains the fonts you want to add.

4. In the List Of Fonts box, select the fonts you want to add. Click the fonts while pressing CTRL to select a nonconsecutive list of fonts in the box.
To add every font in the list, choose the Select All button.
5. If you have limited disk space, you can clear the Copy Fonts To Windows NT Directory check box. You can then use the fonts directly from the directory in which they are located, without copying them to your \WINNT\SYSTEM32 directory.
6. Choose the OK button to add the selected fonts, and then choose the Close button.

Removing a Font

The fonts installed in Windows NT occupy memory. If you don't use all the fonts you have installed, you can remove them from your system and free memory for use by your applications.

Important The MS Sans Serif font set is used by most Windows NT dialog boxes. Do not remove this font; if you do, the text in the dialog boxes will be difficult to read. Deleting a font on a particular computer removes that font for every user who logs on that computer.

► To remove a font

1. In the Installed Fonts list of the Fonts dialog box, select the fonts you want to remove. Click the fonts while pressing CTRL to select a nonconsecutive list of fonts in the box.
2. Choose the Remove button.
3. If you want to delete the font files from your disk as well as remove the fonts from memory, select the Delete Font File From Disk check box.

Caution It is recommended that you not delete fonts from the disk if you chose not to copy the fonts to your \WINNT\SYSTEM32 directory. If you delete the fonts from your hard disk, you must supply the original Windows NT installation disks if you decide to add these fonts later.

4. In the message that appears, choose the Yes button, or, if you are removing several fonts at the same time, choose the Yes To All button.
5. In the Fonts dialog box, choose the Close button.

Working with Date, Time, and International Settings

The system date and time are used in some Windows applications and in various places in Windows NT such as File Manager and Event Viewer. Before setting the date and time on your system, you must be sure to set the correct time zone. The way date and time are displayed can be specified through the International option.

Configuring Date and Time

The system date and time are reflected in Clock and Calendar (two Windows NT applications in the Accessories group), as well as in the information kept by File Manager for each file you save on your disk.

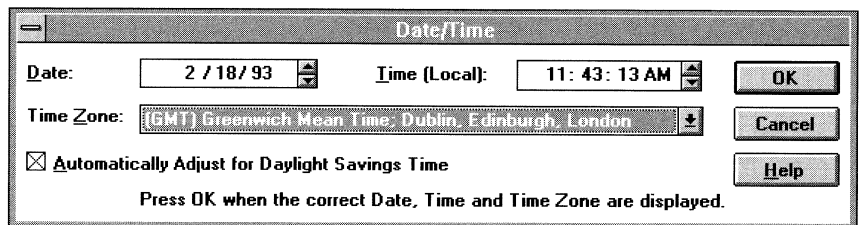
Setting the System Date and Time

You need to set the date and time on your system after installing Windows NT.

► **To set the date and time**



1. In the Control Panel window, choose the Date/Time icon.



2. In the Time Zone box, select the time zone for your area.
If your area uses daylight saving time, select the check box to automatically adjust the time.
3. In the Date box, select the part of the date (day, month, or year) you want to change, and then type the new value, or click the up or down arrow.
4. In the Time box, select the part of the time (hour, minute, second, suffix) you want to change, and then type the new value, or click the up or down arrow.
5. Choose the OK button.

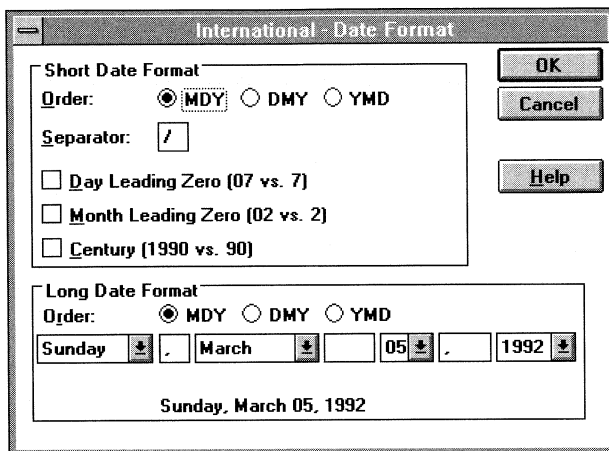
Changing the Date and Time Display

You can change the way the date is displayed in applications that have a date function. For example, you can vary the order of the month, day, and year, or change the punctuation used to separate parts of the date.

► To change the date format



1. In the Control Panel window, choose the International icon.
2. Under Date Format in the International dialog box, choose the Change button.



3. In the International - Date Format dialog box, set the options you want for both the Short Date Format and Long Date Format.

The Short Date Format displays the date as three numbers representing the month, day, and year. You can specify the order and number of digits for each part of the date. For example, selecting Century displays the year as a four-digit number.

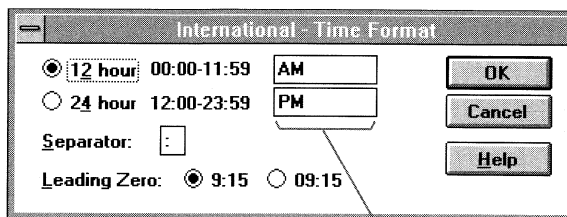
The Long Date Format displays the date as a combination of words and numbers (for example, Monday, October 19, 1992) or a variation you specify.

4. Choose the OK button to return to the International dialog box.

You can also specify how the time is displayed in applications. For example, you can display the time in a 12-hour or 24-hour format, change the punctuation between the hour, minute, and second, or add suffixes to the time, such as A.M. for morning or PST for Pacific Standard Time.

► **To change the time format**

1. Under Time Format in the International dialog box, choose the Change button.



Suffixes can only be added to the 12-hour format, they are not visible in the 24-hour format.

2. Set the options you want, and then choose the OK button to return to the International dialog box.

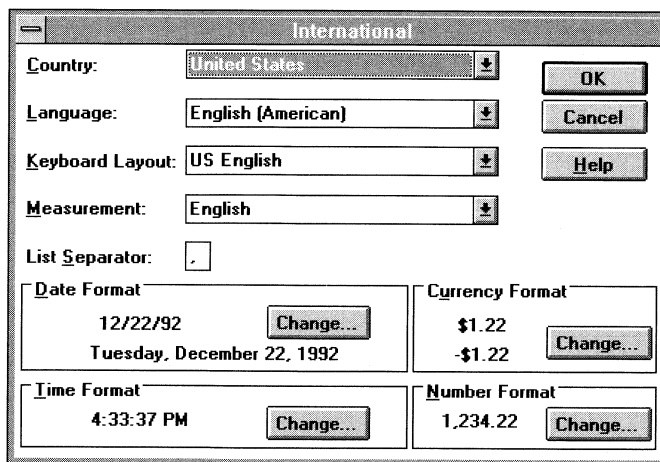
Working with Other International Settings

With the International option, you can specify basic international settings such as the country, language, and system of measurement you want to use. When you select a country, Windows NT automatically adjusts other formats to reflect those used by the selected country. You can also customize these settings.

► **To select international settings**



1. In the Control Panel window, double-click the International icon.



2. In the International dialog box, specify the settings for Country, Language, Keyboard Layout, Measurement, and List Separator.

A description of each option follows this procedure.

3. Choose the appropriate Change button to customize settings for Date and Time Format as specified in the preceding section.
4. Choose the Change button under Currency Format.

In the International - Currency Format dialog box, you can control the way currency is represented. For example, you can place the currency symbol in different locations relative to the amount, specify how negative currency values are represented, or change the currency symbol for your country.

5. Set the options you want, and then choose the OK button to return to the International dialog box.
6. Choose the Change button under Number Format.

In the International - Number Format dialog box, you can control the way numbers are displayed. For example, you can choose the punctuation separating thousands and punctuation separating the fractional part of a decimal number, or change the decimal display of numbers.

7. Set the options you want, and then choose the OK button to return to the International dialog box.

Use this option	To
Country	Specify the country with the standard settings you want to use. When you select a country, Windows NT automatically adjusts the settings for the date, time, number, and currency formats, as well as the Paper Size option in the Print Setup dialog box, to match the standard formats used by that country.
Language	Specify the language you want to work in. The language you select affects the way applications sort information and provides ANSI code page, OEM code page, and OEM font information. For example, if the language you are working in includes extended characters, setting this option to that language ensures that your applications will correctly sort words or phrases that include these characters.
Keyboard Layout	Specify the keyboard layout of your computer. Keyboard layouts vary to accommodate the special characters and symbols used in different languages. Windows NT uses this setting to interpret the keys you press.
Measurement	Select the metric or English system of measurement.
List Separator	Specify a symbol to separate elements in a list. In English, the list separator is typically a comma and is used to separate words or numbers that appear in a series.

Customizing the Keyboard, Cursor, and Mouse

You may have personal preferences about how your cursor, keyboard, mouse, or other pointing device works. For example, you may want the mouse pointer to move rapidly, the keyboard to repeat rapidly when you hold down a key, or the cursor to blink more slowly. You can use Control Panel to customize several options.

Choose	To
Keyboard	Adjust the keyboard speed.
Desktop	Adjust the cursor blink rate.
Cursors	Change the cursor appearance.
Mouse	Adjust the speed of the pointer, set the double-click speed, swap the functions of the left and right mouse buttons, and set any options specific to the mouse you are using.

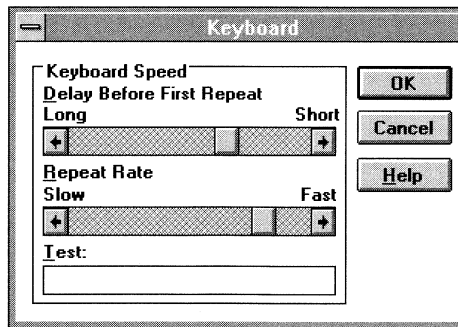
Adjusting the Keyboard Delay and Repeat Rate

You can adjust how long your computer waits after you hold down a key before it repeats that key, and then how fast the key repeats when you hold it down.

► To change the keyboard delay and repeat rate



1. In the Control Panel window, choose the Keyboard icon.



2. Under Delay Before First Repeat, drag the scroll box toward Long or Short to increase or decrease the delay. Or click the appropriate scroll arrow.
3. Under Repeat Rate, drag the scroll box toward Fast or Slow to increase or decrease the repeat rate. Or click the appropriate scroll arrow.
4. To test the speed, move to the Test box and type or hold down any key on the keyboard. Adjust the box positions until you reach a delay speed and repeat rate you are comfortable with.
5. Choose the OK button.

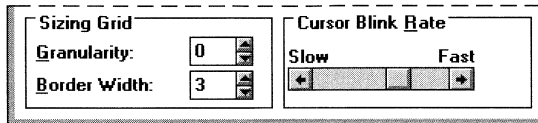
Adjusting the Cursor Blink Rate

You can adjust how fast the cursor blinks.

► To change the cursor blink rate



1. In the Control Panel window, choose the Desktop icon.



2. Under Cursor Blink Rate, drag the scroll box toward Fast or Slow or click the appropriate scroll arrow.
3. Choose the OK button.

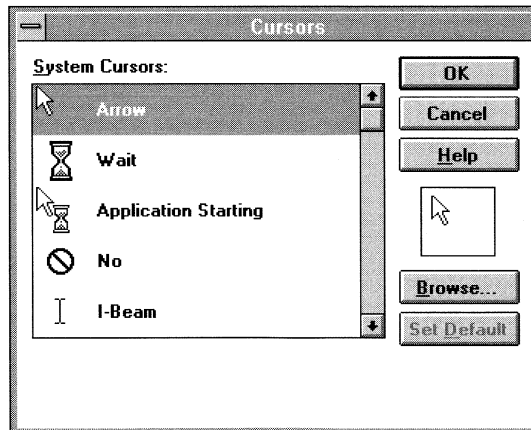
Changing the Cursor Appearance

You can change the look of your cursor with animated or static cursors provided by Windows NT.

► To change your cursor



1. In the Control Panel window, choose the Cursors icon.



2. In the Cursors dialog box, select an action whose cursor you want to change.
3. Choose the Browse button.
4. In the Directories and Drives boxes of the Browse dialog box, select the drive and directory that contains the cursor files you want to view.
5. In the File Name box, select a file.

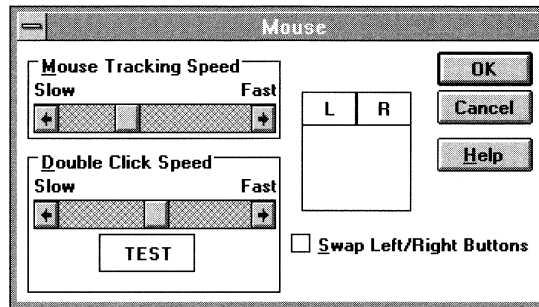
An example of what the cursor looks like appears in the Preview Window.

6. Choose the OK button to return to the Cursors dialog box.
7. Change the cursors for any other actions and then choose the OK button.
8. To reset the selected action to the system default cursor, choose the Set Default button.

Customizing Your Mouse or Other Pointing Device

You can adjust the way Windows NT works with your mouse or other pointing devices. For example, if you are using a mouse, you may be able to switch the functions of the left and right buttons, change the speed of the mouse pointer, or change the double-click rate.

Before customizing settings for your pointing device, you need to install it and its driver, using Windows NT Setup. For information, see Chapter 12, “System Maintenance with Windows NT Setup.”



► To customize your pointing device



1. In the Control Panel window, choose the icon for your pointing device.

A dialog box appears for the device you are using.

2. Set the options you want, and then choose the OK button.

For details about the options and their settings, see the documentation for your pointing device and Help, if available.

Working with Printers



The Printers option in Control Panel opens Print Manager and allows you to work with local and network printers. With Print Manager you can:

- Install local printers
- Set printer properties
- Connect to and share printers on a network
- Remotely administer printers

For more information about Print Manager, see Chapter 6, “Print Manager.”

Working with Device Drivers

When you add a new device to your system, such as a new sound board or video player, you need to install the driver that controls the device. A *device driver* is a program that allows a specific piece of hardware (or device) to communicate with Windows NT. Although the device may be installed in or connected to your computer, Windows NT does not recognize the device until after you install and configure the appropriate driver.

Installing and Configuring Drivers

Most devices come with the appropriate driver. Windows NT also supplies sound drivers for common sound devices, such as sound boards and synthesizers. If you do not have a driver for your device, contact your device dealer or manufacturer about providing one.

Installing a New Driver

Security

To install *kernel drivers* (drivers that access hardware), you must be logged on as a member of the Administrators group. The drivers you install will be available to all users.

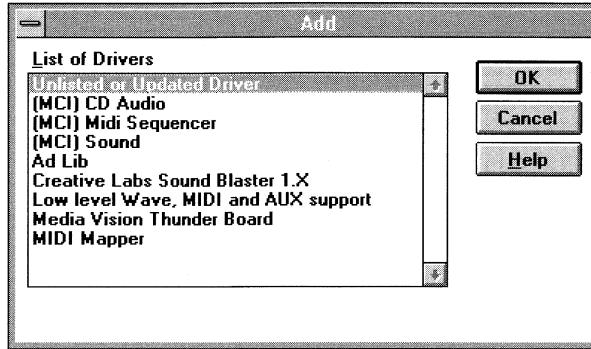
► To install a new driver



1. In the Control Panel window, choose the Drivers icon.

The Drivers dialog box displays a list of the drivers already installed.

2. In the Drivers dialog box, choose the Add button.



3. In the Add dialog box, select the driver you want to install from the list, or select Unlisted or Updated Driver if your driver is not yet known to the system, and then choose the OK button.
4. You will often get a message saying the driver is already present on your system. If you don't have a driver disk or a new driver somewhere else on your system, you should select the Current button.

If a message asks you to insert the disk that contains the driver file, insert the disk containing the driver you want to install into drive A. Or, if the driver is located on your hard disk, type the drive and directory where the driver is located.

If you do not know where the driver file is located, choose the Browse button to locate and select the drive and directory that contain the driver file, but do not type the filename for the driver.

5. If a setup dialog box appears, select the settings required by the driver, such as the port address and interrupts for a sound board.

Important The settings you specify must not conflict with the settings used by other devices installed on your system, such as a mouse or network card. For example, the interrupts used by each device must be unique. You may get a message about a configuration error having occurred if the hardware used by the drivers you are installing or the options you have requested conflict with the hardware or drivers already installed on your system.

To avoid conflicts, see the manuals for your other hardware devices to determine the settings they use. Then see the manual that came with the device you are configuring for information about its settings.

6. When you finish selecting the settings, choose the OK button.
Windows NT installs any additional related drivers automatically. These drivers may also require specific settings. In this case, other setup dialog boxes may appear.

7. Repeat steps 6 and 7 until all related drivers have been configured.

The new driver and any changed driver settings do not take effect until you restart Windows NT. A message asks you if you want to restart Windows NT.

8. To have the new driver take effect immediately, choose the Restart Now button.

Installing a Driver Not Supplied with Windows NT

When you purchase a new device, such as a sound board, the associated driver should be included with the device. If you do not have a driver for your device, contact the device manufacturer or dealer to get one. Follow any instructions the manufacturer provides for installing the driver.

Note Most drivers written for Windows 3.1 cannot be installed. Drivers should be written specifically for Windows NT. If a driver can't be installed, a message indicating the problem will be displayed.

Setting Driver Options

After you have installed a driver, you can change any of its settings. If you want to use more than one set of settings for the same driver, you need to install that driver twice. For instructions on how to install a driver, see "Installing and Configuring Drivers" earlier in this section.

► To adjust driver settings



1. In the Control Panel window, choose the Drivers icon.
2. In the Installed Drivers list in the Drivers dialog box, select the driver you want to configure.
3. Choose the Setup button.

Some drivers do not require specific settings. If you select such a driver, the Setup button is unavailable.

The Setup dialog box appears. The options in this dialog box vary according to the driver you are configuring.

4. Set the options as described in the manual for your device.
5. Choose the OK button.

The changes you make do not take effect until you restart Windows NT. A message asks if you want to restart Windows NT.

6. To have the new settings take effect immediately, choose the Restart Now button.

Removing a Driver

Security

You need to be logged on as a member of the Administrators group to remove some drivers.

If you are no longer using a device, you can remove its driver from the Drivers list. Removing a driver from the Drivers list does not remove the driver file from your hard disk. If you need to use the same device later, you can add its driver again.

Caution The drivers that are automatically installed while running Setup are required by your system (these are the drivers that are displayed when you first open the Drivers dialog box). If you remove one of these drivers, your system may not work properly.

► To remove a driver



1. In the Control Panel window, choose the Drivers icon.
2. From the list of installed drivers in the Drivers dialog box, select the driver you want to remove.
3. Choose the Remove button.
4. When the message asks you to confirm your decision to remove the driver, choose the Yes button.
A message asks if you want to restart Windows NT.
5. To have the removal take effect immediately, choose the Restart Now button.

Using Audio and MIDI Sounds in Windows NT

The Sound icon provides several options for controlling audio sound in Windows NT. To use audio sounds, you need to install a sound card and a sound driver, and then choose the Sound icon to assign different sounds to system and application events.

The Musical Instrument Digital Interface (MIDI) Mapper provides options for setting up and playing MIDI sound in Windows NT. To use MIDI sounds, you need a sound device such as a synthesizer and MIDI device drivers. Windows NT supports two different standards, the General MIDI guidelines and the Microsoft authoring guidelines for MIDI files (for playing MIDI information generated by an application or stored in a MIDI file).

The information in this section is intended only as a general guide. For more specific help, see the documentation for the sound device you install.

Assigning Sounds to Events

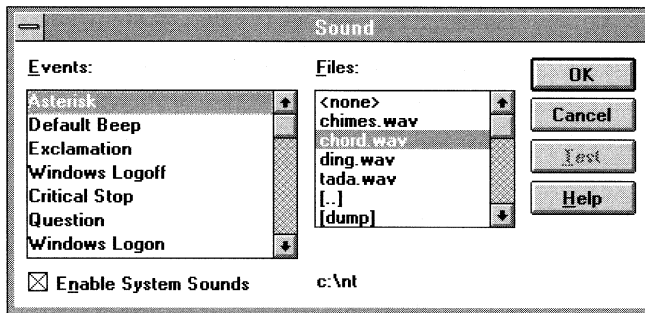
With the Sound option, you can assign sounds to different application and system events. For example, you can select a sound to play whenever you start Windows NT. Other sounds play as specified by the application you are using. For example, some applications play the sound assigned to Default Beep whenever you click the mouse outside of an open dialog box. The sounds you can assign to these events are stored in files with the .WAV filename extension.

To use sound in Windows NT, the sound driver that controls your sound board must be installed and configured for your system. If you do not have a sound board or if the sound driver is not configured properly, you hear a warning beep when an error occurs. Windows NT does not support playing a waveform sound through the PC speaker; therefore, if you do not have sound hardware, the sound dialog boxes will appear dimmed.

► To assign sounds to events



1. In the Control Panel window, choose the Sound icon.



2. From the Events box in the Sound dialog box, select the event that you want to assign a sound to.
If a sound file is already assigned to that event, it is selected in the Files box. Otherwise, “none” is selected.
3. In the Files box, select the sound file you want to use. If the file you want is not listed, select the drive and directory where the file is located by scrolling in the Files dialog box, and then select the file.
If you don’t want to assign a sound to the selected event, select “none.”
4. To hear the sound, choose the Test button or choose the event or filename.
5. Repeat steps 2 through 4 until you have assigned a sound to each event you want.
6. Select the Enable System Sounds check box.
7. Choose the OK button.

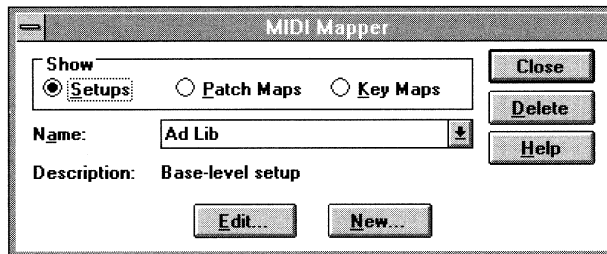
You can turn the warning beep and all other sounds off by clearing the Enable System Sounds check box and assigning “none” to Windows Start and Windows Exit.

Changing MIDI Settings

Caution To use MIDI Mapper, you should have a basic understanding of MIDI concepts and terminology. It is recommended that you not use MIDI Mapper to edit or create MIDI setups unless you are experienced with MIDI and understand the results of the changes you make.



If you are using a sound device such as a synthesizer that has MIDI capabilities, you can specify MIDI settings for the setups, patch maps, and key maps.



For additional help on the MIDI Mapper, see the documentation for the sound device you are installing, or see the online Help in the MIDI Mapper dialog box.

Configuring the Network

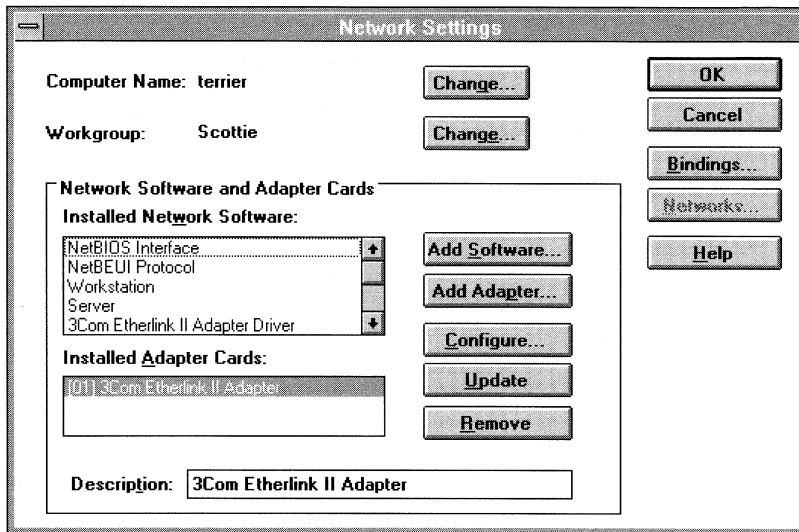
You can use the Network option in Control Panel to make changes in your computer's network configuration. For example, if you add a new adapter card to your computer after installing Windows NT, you need to specify the network device drivers and supporting software that Windows NT needs to work with network adapter cards. You can also use the Network option to join a workgroup or domain, configure network bindings, and set network provider search order.

Security To make changes in the Network Settings dialog box, you must be logged on as a member of the Administrators group for your computer.

► To use the Network option



- Choose the Network icon in Control Panel.



The following table summarizes the buttons in the Network Settings dialog box.

Choose	To
Change (Computer name)	Change the computer name for this computer.
Change (Domain or Workgroup)	Display a dialog box for joining a workgroup or domain. This button is never available if the current computer is a domain controller in a Windows NT Advanced Server network.
Add Software	Display one or more dialog boxes for installing a network software component.

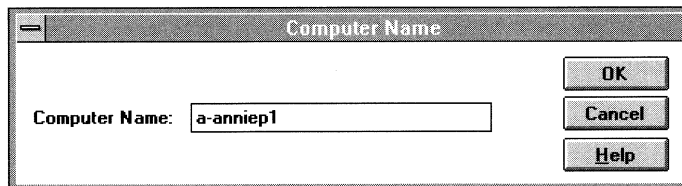
Choose	To
Add Adapter	Display one or more dialog boxes for installing a network adapter card.
Configure	Display one or more dialog boxes for configuring the selected network software component or adapter card.
Update	Display one or more dialog boxes for updating a network software component or adapter card.
Remove	Remove a selected network software component or adapter card.
Bindings	Display a dialog box for adding and removing bindings for network components.
Networks	Display a dialog box for setting network search order if your computer is connected to more than one kind of network provider.

Changing the Computer name

You can change the computer name for the current computer in the Network Settings dialog box.

► To change the computer name

1. In the Network Settings dialog box, choose the Change button next to the computer name.



2. In the Computer Name dialog box, type a unique name for this computer, and then choose the OK button.

Caution If you change the computer name for a computer that participates in a Windows NT Advanced Server domain, that computer name must have an account in the domain. If the computer does not have an account, you will not be able to log on to the domain or access any domain user accounts (including your own account). Check with your network administrator to ensure that you specify a correct computer name and that the computer has an account on the domain.

Installing Network Adapter Cards

To communicate over the network, a computer must have a network adapter card installed. Windows NT uses a *network device driver*, which is software that coordinates communication between the adapter card and the computer's hardware and other software, controlling the physical function of the network adapter cards.

During the initial installation of Windows NT, you have the opportunity to install at least one network card. To add or change network adapter cards to your computer after installation, you must choose the Network icon in Control Panel.

► To install one or more network adapter cards

1. In the Network Settings dialog box, choose the Add Adapter button.
2. In the Add Network Adapter dialog box, select the name of the adapter card that is installed in your computer, and then choose the Continue button.

If you have a disk with software from a vendor, select Other.

3. When Setup asks for a disk, insert the disk in the drive, or type the path of the driver if the file is located on your hard disk or on a network drive. Then choose the OK button.

You may be asked to insert additional disks if more than one disk was provided by the hardware manufacturer. You may also be asked for specific Windows NT installation disks.

4. When you complete all your changes and close the Network Settings dialog box, a message asks if you want to restart your computer for the changes to take effect. To restart your computer immediately, choose the Yes button.

Installing Network Software

Windows NT also uses network software (or protocol) drivers that bind to the adapter card driver. You can also add supporting software for network components in the Network Settings dialog box.

► To install network software

1. In the Network Settings dialog box, choose the Add Software button.
2. In the Add Network Software dialog box, select the software component you want to install, and then choose the Continue button.

If you have a disk with software from a vendor, select Other.

3. When Setup asks for a disk, insert the disk in the drive. Or type the path of the software component if the file is located on your hard disk or on a network drive. Then choose the OK button.

You may be asked for additional disks if more than one disk was provided by the hardware manufacturer. You might also be asked for specific Windows NT installation disks.

4. When you complete all your changes and close the Network Settings dialog box, a message asks if you want to restart your computer for the changes to take effect. To restart your computer immediately, choose the Yes button.

Updating or Removing Network Components

You can either update or remove the configuration information for an installed network software component or adapter card.

► To update a network component

1. In the Network Settings dialog box, select the component you want to update in the Installed Network Software box or the Installed Adapter Cards box.
2. Choose the Update button.
3. Complete the dialog boxes that appear.

You will be asked to insert disks from the manufacturer that contain the updated driver information for the selected component.

When you remove a network component, the information is removed from your system configuration. The related software remains on your hard disk.

► To remove a network component

1. In the Network Settings dialog box, select the component you want to remove in the Installed Network Software box or the Installed Adapter Cards box.
2. Choose the Remove button.
3. Complete the dialog boxes that appear.

The dialog box for removing the component is supplied by the manufacturer. Choose the Help button in the dialog box for more information.

For your changes to take effect, you must restart your computer.

Configuring Network Software and Adapter Cards

Many adapter cards and their supporting software can be configured to achieve the best performance on your system. You can set the appropriate configuration for your network components in the Network Settings dialog box.

The dialog boxes for configuring your adapter and software are supplied by the manufacturer. Most of these dialog boxes contain a Help button to guide you through making choices for optimal settings. For additional information, refer to the documentation for your network adapter card or software.

► **To configure network software or an adapter card**

1. In the Network Settings dialog box, select the name of the item you want to configure in either the Installed Network Software box or Installed Adapter Cards box.

Optionally, in the Description box, type text to describe the component, or keep the description provided by the manufacturer. If you have multiple adapter cards, consider including the slot number of the card in its description.

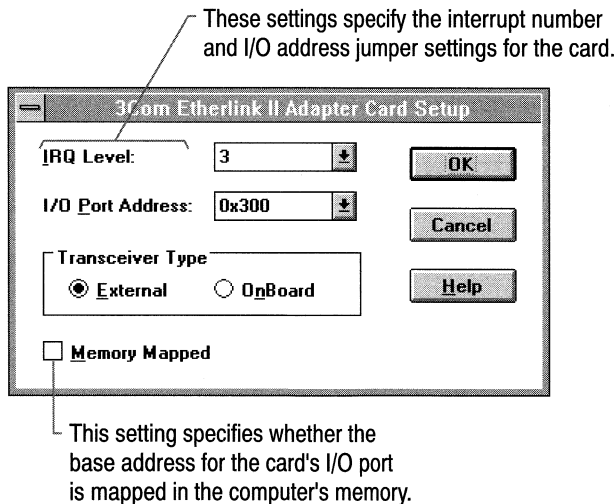
2. Choose the Configure button.

Windows NT displays a dialog box specifically for the selected component, as provided by the component manufacturer.

For information about any items in the dialog box, choose the Help button.

3. Complete options in the dialog box to specify your choices, and then choose the OK button.

For example, the following illustration shows a typical configuration dialog box for a 3Com Etherlink II network adapter card.



In general, Windows NT networking software is self-configuring. However, you might choose to minimize memory use or maximize throughput for optimal software performance. You can also install and configure various network protocol services. To communicate over a network, each computer must be configured with at least one type of protocol driver (sometimes called a protocol).

Choosing and Configuring Protocol Software

Protocol software works between the upper-level network software and the network adapter card. The protocol packages data that is to be sent on the network in a way that the computer on the receiving end can understand. Microsoft provides three protocols for use with Windows NT: NetBEUI, TCP/IP, and Data Link Control.

Protocol software	Description
NetBEUI 3.0 (NetBIOS Extended User Interface)	A small, efficient, and fast protocol tuned for small LANs. It is installed automatically when you install Windows NT.
TCP/IP (Transmission Control Protocol/Internet Protocol)	Provides communication across wide area networks (WANs) and routers.
Data Link Control	Not designed to be a primary protocol for use between PCs. It is useful if your computer needs to access IBM mainframe computers or if you are setting up a printer that attaches directly to the network, instead of to a serial or parallel port on a print server.

NetBEUI is the standard Windows networking protocol and is automatically installed during Windows NT setup. If there are no wide area network (WAN) links in the network, and if there is no need to connect to any devices other than computers running Windows NT or other Windows operating systems, you do not need to add any protocol software. If you need WAN internet capability, add TCP/IP. With both protocols supported, you can benefit from NetBEUI performance when connecting to local computers and you can still connect over WANs to other networks.

To install other protocols included with Windows NT, choose the Add Software button in the Network Settings dialog box. All adapter card drivers that come with Windows NT can use any of the included protocols.

When you install Windows NT on a computer (and when you install additional protocols or network adapter cards), Windows NT automatically assigns LAN adapter (Lana) numbers to protocol/network adapter card bindings. You need to change a LAN adapter number only if you have a NetBIOS application that specifies that it must use a certain LAN adapter number.

► **To set LAN adapter numbers for special applications**

1. In the Network Settings dialog box, select NetBIOS Interface in the Installed Network Software box.
2. Choose the Configure button.

3. In the Network Route box, select the protocol whose LAN adapter number you need to change and then type in a new number in the Lana Number box.
4. Complete options in the dialog box to specify your choices, and then choose the OK button.

Joining a Workgroup or Domain

You can assign the workgroup for the current computer, such as the workgroup created if you were previously using Windows for Workgroups. If the computer will participate in a Windows NT Advanced Server domain, you can use the Network Settings dialog box to join the domain.

In Windows NT, a *workgroup* is a collection of computers that appear, for convenience, under the same workgroup name when you browse network resources. Any computer can join any workgroup.

A *domain* is a collection of computers defined by the administrator of a Windows NT Advanced Server network. A domain provides the same convenience for network browsing and also provides access to the centralized user accounts and group accounts maintained by the domain administrator.

Domain Settings

Computer Name: a-annie1

Member of:

☐ Workgroup:

☒ Domain:

☒ Create Computer Account in Domain (Domain Administrators Only)

Domain Administrator User Name:

Domain Administrator Password:

► To join a workgroup

1. In the Network Settings dialog box, choose the Change button next to the current workgroup or domain name.

The Change button is unavailable if you previously changed the computer name in the current session.

2. In the Domain Settings dialog box, select the Workgroup option, and then type the name of the workgroup you want the computer to join.

The workgroup name must not be the same as the computer name.

3. Choose the OK button.

► **To join a domain**

1. In the Network Settings dialog box, choose the Change button next to the current domain or workgroup name.
The Change button is unavailable if you previously changed the computer name in the current session.
2. In the Domain Settings dialog box, select the Domain option, and then type the name of the domain you want the computer to join.
3. Choose the OK button.

Caution If you change the domain name, you will not be able to log on except using local accounts until you specify a new domain where the computer has an account. If you change the computer name but that computer does not have an account in the domain, you will not be able to log on to the domain or access any domain user accounts (including your own account).

Security If you are logged on as a domain administrator, you can automatically add an account for the current computer when the computer joins the domain.

► **To add a computer to a domain**

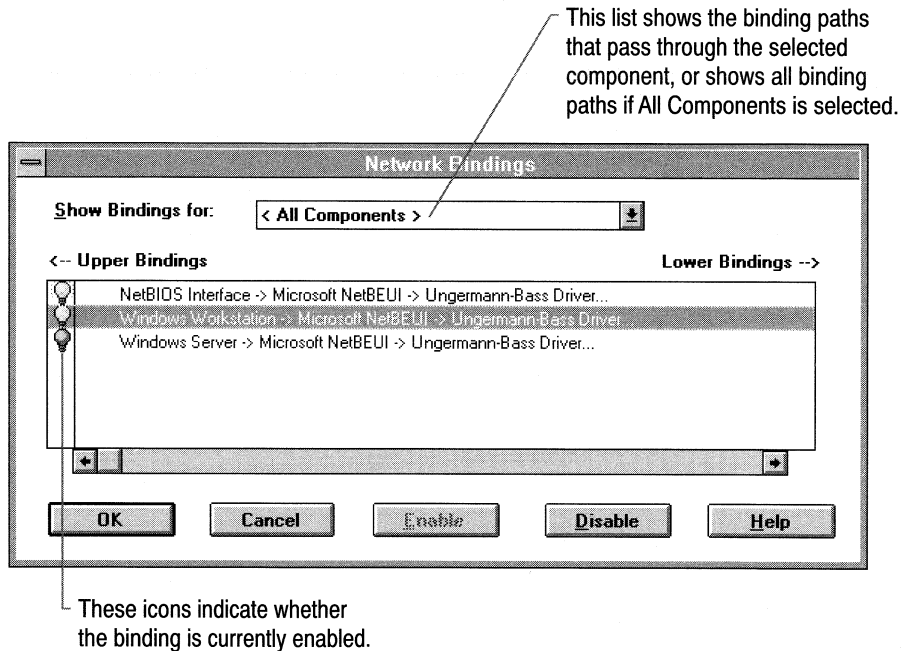
1. In the Domain Settings dialog box, select the Domain option, and then type the name of the domain you want the computer to join.
The computer name, as shown at the top of this dialog box, must be a unique name in the domain.
2. Select the Create Computer Account In Domain check box.
3. In the appropriate boxes, type the username and password for your domain administrator user account.
4. Choose the OK button.

Configuring Network Bindings

The network consists of a series of software layers, where software in each layer performs specific functions for the layers above and below it. All network software layers end at the network adapter card, which moves information between computers. Each network component can be bound to one or more network components above it or below it to make the component's services available to any other component that can benefit from them.

By default, Windows NT maximally binds all network components to ensure that they are fully utilized. If you rarely use a particular adapter card and want to reduce the software loaded into memory, you can simply unbind (disconnect) that network adapter card from all network components.

When you choose the Bindings button in the Network Settings dialog box to add or remove bindings, the Network Bindings dialog box shows the bindings of network components as a series of bound paths, from the upper layer services and protocols to the lowest layer of adapter-card device drivers.



Caution Do not attempt to reconfigure binding settings unless you are an experienced network administrator familiar with the requirements of your network software.

► **To view bindings for network components**

1. In the Network Settings dialog box, choose the Bindings button.
2. In the Show Bindings For box of the Network Bindings dialog box, select one or more components.

Or choose Select All Components to see a list of all bound components.

► **To enable or disable binding paths for selected network components**

1. In the Network Bindings dialog box, select a binding path.
2. To enable the binding path, choose the Enable button.

To disable the binding path, choose the Disable button.

The icon next to the selected binding shows the current state of that binding path.

3. Choose the OK button.

If you have more than one kind of protocol installed, you can set the order in which workstation and NetBIOS software bind to each protocol. You might want to change the binding order for one of the following reasons:

- If the protocol you use most frequently is first in the Binding list, average connection time decreases.
- Some protocols are faster than others for certain network topologies. Putting the faster protocol first in the Bindings list improves performance.

► **To change protocol binding order**

1. In the Network Settings dialog box, choose the Bindings button.
2. In the Show Bindings For box of the Network Bindings dialog box, select All Components.
3. Select the binding path to move up or down and use the protocol order buttons to change the binding order.
4. Choose the OK button.

Configuring the Remote Procedure Call Service

Windows NT Setup automatically installs the files you need for the Remote Procedure Call (RPC) service, a mechanism that enables programmers to easily develop distributed applications. However, to use this functionality, you need to specify the Name Service Interface (NSI) that the RPC service uses to communicate with name service databases. Use the RPC Name Service Provider Configuration dialog box to specify settings for the name service provider. To see this dialog box, choose the Network icon in Control Panel, select RPC Name Service Provider in the Network Software list, and then choose Configure.

To configure the name service provider, you must know what provider you want. If you choose the DCE Cell Directory Service, you must also supply the network address of the provider. The Windows NT Locator is the default name service that is installed with Windows NT.

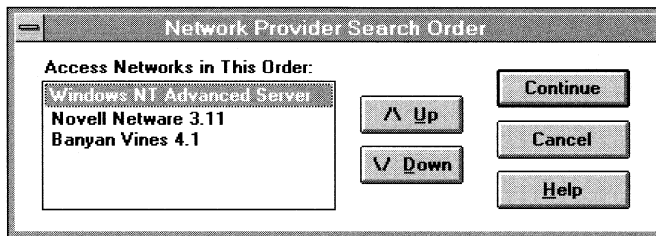
Setting Network Provider Search Order

If you have more than one kind of network installed at your site, you can specify the order in which Windows NT searches the various networks for certain operations.

After you specify the network search order, Windows NT will always search in that order. After Windows NT finds the specified server, directory, file, or other item on one network, it does not continue to search the networks listed lower in the search order.

► **To set network provider search order**

1. In the Network Settings dialog box, choose the Networks button. (This button is dimmed if no other network providers are available.)



2. In the Access Networks In This Order box, select the name of the network whose order you want to change, and then choose the Up or Down button to move that network higher or lower in the search order.
3. Continue selecting network names to define the order until all networks are listed in the order you want for searching, and then choose the OK button.

Defining Options for the Operating System

You can have more than one operating system installed on your computer if you want to use different operating systems at different times. Choose the System option in Control Panel to specify the operating system that the boot loader will use the next time you start your computer. You can also specify the user environment variables and view or change the size of your computer's virtual-memory paging file by using the System option.

► To specify the default operating system for startup



1. In the Control Panel window, double-click the System icon.

The System dialog box shows the settings for the user whose profile is currently active on this computer.

2. In the Startup box, select the default operating system from the list of systems installed on your computer.

This is the operating system that the boot loader will propose to start automatically the next time you start your computer.

3. In the Show List For box, specify the number of seconds the list of choices should be displayed before automatically starting the default operating system.
4. Choose the OK button.

Defining an Alternate Startup Operating System

The method for adding an alternate startup operating system (other than versions of Windows NT) depends on whether your computer is an x86-based or RISC-based system. For systems with either kind of processor, Windows NT Setup detects any operating systems present during the initial installation of Windows NT, so that you can choose to keep or delete the alternate operating systems. After you first install Windows NT, use one of the following methods to add other operating systems:

- For a RISC-based computer, run the appropriate ARC setup program to install the alternate operating system. Windows NT detects the new alternate operating system automatically. All system startup information is stored in non-volatile RAM.
- For an x86-based computer, install the operating system in the usual way, then edit the BOOT.INI file, which Windows NT automatically creates in the root directory of the computer's main hard disk. All system startup information is stored in the BOOT.INI file.

When you edit the BOOT.INI file to define an alternate startup operating system for an x86-based computer, use a non-formatting text editor such as Notepad to add the name and location of the alternate system in the **[operating systems]** section. The descriptive text you specify appears in the Startup box of the System dialog box.

There are no rules for how you refer to each kind of operating system listed in BOOT.INI, except that you must include the path that shows where the source files for the operating system are stored. For example:

```
[operating systems]
  c:\nt="Windows NT 3.1"
  c:\dos="MS-DOS"
```

You cannot necessarily take advantage of the alternate startup option for all operating systems that might be installed on an x86-based computer. Some operating systems such as MS-DOS or OS/2 require certain files to be present in the computer's root directory, and Windows NT can provide the alternate startup option for only one such root-based operating system on a computer. However, you can specify alternate startup options for any number of Windows NT versions or other non-root-based operating systems.

Changing the Environment Variables

Windows NT requires certain information to find programs, to allocate memory space for some programs to run, and to control the behavior of various programs. This information—called the system and user environment variables—can be viewed in the System dialog box. These environment variables are similar to those that can be set in the MS-DOS operating system, such as PATH and TEMP.

The system environment variables are defined by Windows NT, and you cannot add new variables or change the values.

The user environment variables include any environment variables you want to define or variables defined by your applications, such as the path where application files are located.

After you change any user environment variables in the System dialog box and choose the OK button, Windows NT saves the new values in the registry so they are available automatically the next time you start your computer.

If any conflict exists between environment variables, Windows NT resolves the conflict in this way:

- System environment variables are set first.
- Variables defined in AUTOEXEC.BAT are set next.
- User environment variables defined in the System dialog box are set last.

This means, for example, that although you cannot change the values of a system environment variable directly, you can overwrite it by creating a user environment variable with a name that is identical to the name of the system environment variable you want to overwrite.

Note Path settings, unlike other environmental variables, are cumulative. The full path (what you see when you type **path** at the command prompt) is created by appending the path contained in AUTOEXEC.BAT to the paths defined in the System option of the Control Panel.

► To change user environment variables for your computer



1. In the Control Panel window, choose the System icon.

The System dialog box shows the current system environment variables and the environment variables for the user whose profile is currently active on this computer.

2. In the User Environment Variables box, select the variable you want to change.

The name of the selected variable appears in the Variable box, and its current value appears in the Value box.

You can also click the Variables box, and then type a variable name that does not appear in the list. Variables that you add in this way are appended to the list of environment variables for the current user profile.

3. In the Value box, type a new value for the variable.
4. To remove a variable completely, select it in the User Environment Variables box, and then choose the Delete button.
5. When the Variable and Value boxes contain the new information you want to specify, choose the Set button.

Choose the Cancel button at any time to remove all changes made in the System dialog box and restore the previous values.

6. When you have completed all changes you want to make to environment variables, choose the OK button.

Changes to these variables are stored immediately, but the changes won't affect programs that are already running when the changes are made. You must restart your computer to see the effects of the changes while running, for example, the command prompt.

Changing the Virtual-Memory Paging File

Windows NT uses a special file on your hard disk called a virtual-memory *paging file* (or swap file). With virtual memory under Windows NT, some of the program code and other information are kept in RAM while other information is temporarily swapped to virtual memory. When that information is required again, Windows NT pulls it back into RAM and, if necessary, swaps other information to virtual memory. This activity is invisible, although you might notice that your hard disk is working. The resulting benefit is that you can run more programs at one time than your system's RAM would usually allow.

Security If you are logged on as a member of the Administrators group for a computer, you can change the size of the virtual-memory paging file or create additional paging files on other local hard drives.

A virtual-memory paging file is created automatically on your computer when you install Windows NT. Usually, you should leave the paging file at its recommended size for each drive. However, you might want to change the file size if, for example, you frequently work with applications that require a large amount of memory and that could therefore benefit from a larger paging file.

Note The virtual-memory paging file is a file named PAGEFILE.SYS in your system partition. You cannot delete this file while running Windows NT. If you delete this file while running under another operating system, a new paging file is created automatically the next time you start Windows NT.

The recommended size for the virtual-memory paging file, which Windows NT identifies as the size that ensures the best performance, is equivalent to the amount of RAM available on your system plus 12 MB. However, the size of the file also depends on the amount of free space available on your hard disk when the paging file is created. The minimum required size is 2 MB.

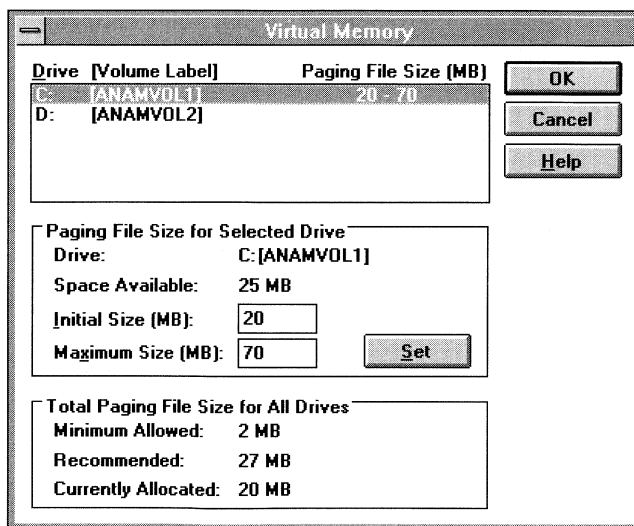
If you have multiple hard disks, you should consider creating a paging file for each local hard drive on your computer. Depending on the capabilities of your system's hard disk controller, the disks can be reading or writing information simultaneously, greatly improving performance. Also, because Windows NT expands the paging file as necessary, multiple paging files make expansion easier, since each file expands a little rather than a single file expanding a lot.

► **To change the size of your system's virtual-memory paging file**

1. In the System dialog box, choose the Virtual Memory button.

Note If you are not logged on as a member of the Administrators group for a computer, the Virtual Memory button is not available, so you cannot change the size of your computer's paging file.

2. In the Drive box of the Virtual Memory dialog box, select the drive for which you want to change the paging file size.



3. In each Paging File Size box, type a number in megabytes to specify the new initial size or maximum size for the paging file, and then choose the Set button.

For example, type **20** to create a 20 MB paging file.

4. Choose the OK button to return to the System dialog box.

You must restart your computer to see the effects of the changes.

Changing Application Response Time

By default, Windows NT gives priority to the application running in the foreground of your display screen. This application receives more processor time relative to other applications running in the background. (A foreground application is the application running in the active window, topmost on your screen.)

- **To change the priority (response time) of a foreground application relative to other running applications**



1. Double-click the System icon in Control Panel.
2. In the System dialog box, choose the Tasking button.
3. In the Tasking dialog box, select one of the following options:
 - Best Foreground Application Response Time (Default)
 - Foreground Application more Responsive Than Background
 - Foreground And Background Applications Equally Responsive

The first two options vary the degree of priority given to the foreground application; the last button gives all applications an equal share of processing time.

Setting Up the Uninterruptible Power Supply (UPS)

An uninterruptible power supply (UPS) is a battery-operated power supply connected to a computer to keep the system running during a power failure. The UPS service for Windows NT detects and warns users of power failures, and manages a safe system shutdown when the backup power supply is about to fail.

Before purchasing a UPS device to use with Windows NT, confirm with the UPS manufacturer that both the device and its serial cable are compatible with Windows NT.

You can use the UPS option in Control Panel to set various options for configuring how UPS works on a computer, such as:

- The serial port where the UPS device is connected.
- Whether the UPS device sends a signal if the regular power supply fails.
- Whether the UPS device sends a warning when battery power is low.
- Whether the UPS service sends a signal telling the UPS device to shut off.
- A command file to execute at shutdown time.
- The expected life and recharge time for the battery.
- The timing for warning messages.

The actual options for configuring the UPS service depend on the specific UPS hardware installed on your system. Incorrect settings can cause undesirable operation of your UPS hardware. For details about possible settings, see the documentation for your UPS device.

► **To set up the UPS service for a computer**



1. In Control Panel, double-click the UPS icon.

UPS

☒ Uninterruptible Power Supply is installed on: COM1: [v] [OK] [Cancel] [Help]

UPS Configuration

☒ Power failure signal ☒ Negative ☐ Positive

☐ Low battery signal at least 2 minutes before shutdown ☒ Negative ☐ Positive

☐ Remote UPS Shutdown ☒ Negative ☐ Positive

☐ Execute Command File

File Name: []

UPS Characteristics

Expected Battery Life: 2 [min]

Battery recharge time per minute of run time: 100 [min]

UPS Service

Time between power failure and initial warning message: 5 [sec]

Delay between warning messages: 120 [sec]

2. In the UPS dialog box, select or clear the Uninterruptible Power Supply Is Installed On check box, and then specify the serial port where the UPS device is connected.

You cannot select a serial port unless the Uninterruptible Power Supply Is Installed On check box is selected.

3. If the UPS device on your system can assert a main power failure indication, select the Power Failure Signal check box.

This setting corresponds to the CTS pin for the UPS serial port connection.

4. If the UPS device on your system can send a warning when battery power is low, select the Low Battery Signal check box.

This setting corresponds to the DCD pin for the UPS serial port connection.

5. If the UPS device can accept a signal from the UPS service telling it to shut off, select the Remote UPS Shutdown check box.

This setting corresponds to the DTR pin for the UPS serial port connection.

6. For each item that is checked in the UPS Configuration group, specify Negative or Positive for the UPS Interface Voltage.

This setting defines how your UPS device expects to communicate with the UPS service. For information about making this choice, see the documentation for your UPS device.

Depending on what items you've checked in the UPS Configuration group, steps 7 through 10 may or may not be necessary.

7. In the Expected Battery Life box, specify the time in minutes that the system can run on battery power. Check the UPS device documentation for the appropriate setting.

The range is 2 to 720 minutes; the default is 2 minutes.

8. In the Battery Recharge Time box, specify the time in minutes that battery must be recharged for every minute of run-time. Check the UPS device documentation for the appropriate setting.

The range for is 1 to 250 minutes; the default is 100 minutes for each minute of battery run-time.

9. In the Time Between Power Failure box, specify the time, in seconds, between when a power failure occurs and when the first message is sent to notify users.

The range is 0 to 120 seconds; the default is 5 seconds.

10. In the Delay Between Warning Messages box, specify the interval, in seconds, between messages sent to notify users of a power failure and to advise them to stop using the computer.

The range is 5 to 300 seconds; the default is 120 seconds.

11. Choose the OK button.

Depending on the changes you make in the UPS dialog box, a message asks if you want to start, stop, or restart the UPS service, depending on whether it is currently running. Choose Yes or No. If you choose Yes, Windows NT configures the UPS service to begin automatically each time your system starts up.

You can also start and stop the UPS service using the Services option in Control Panel once the UPS is configured.

You can also configure the UPS option to execute a command file immediately prior to system shutdown. For example, such a file might run a command to close remote connections. This command file must execute within 30 seconds. Failure to complete execution in 30 seconds jeopardizes the safe shutdown of your Windows NT computer.

► **To set up the UPS service to execute a file prior to system shutdown**

1. In the \WINNT\SYSTEM32 directory, create a command file with one of the following file extensions: .BAT, .CMD, .EXE, or .COM.
2. In the UPS dialog box, type the name of the command file in the File Name box.
3. Select the Execute Command File box.

Using UPS with Other System Services

The UPS service should be used in conjunction with the Windows NT Alerter, Messenger, and Event Log services. This will ensure that events related to the UPS service, such as a power failure or a UPS connection failure, are recorded in the system log of Event Viewer and that designated users are notified of these events over the network.

The Alerter and Messenger services must be started for a computer to generate a UPS or other type of network alert. After setting up the UPS service on your computer, use the Services tool in Control Panel to make sure the Alerter, Messenger, and Event Log services are configured to start automatically. Use the Server option in Control Panel to designate which users and computers will receive alerts. The Messenger service must be started on computers that are to receive UPS alerts and UPS warning messages.

Testing Your UPS Configuration

After configuring UPS options, you or your system administrator should test that your computer is protected from power failure.

► To test UPS configuration

1. Simulate a power failure by disconnecting the power to the UPS device. The computer and peripherals connected to the UPS device should remain operational and a warning message and/or alert should appear on the computer screen.
2. Wait until the UPS battery reaches a low level. At that point system shutdown should occur.
3. Restore power to the UPS device.
4. Check the system log in Event Viewer to ensure that all actions were logged and that there were no errors.

If the UPS service is configured to run a command file, you should test that file execution does not exceed the 30 second time limit.

► To test command file configuration

- Determine a worst case scenario. For example, if your command file starts up a custom application to disconnect logon sessions to a remote computer, test command file execution with a maximum number of logon sessions.

If you have problems running the UPS service, see the system log in Event Viewer for event details related to UPS.

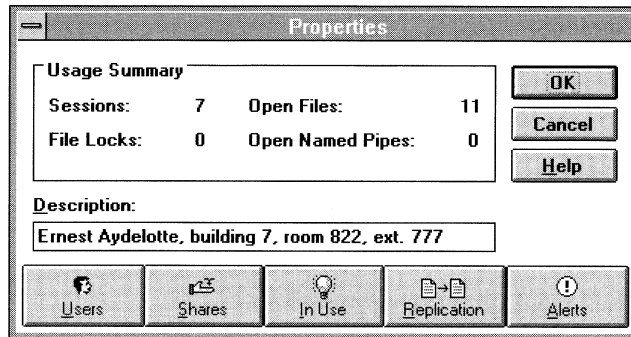
Managing Server Properties

Use the Server option in Control Panel to display a summary of connections and resource use for the computer; to edit the computer description; to view connected users, shared resources, and open resources; and to manage directory replication and the recipients of administrative alerts.

► To manage properties



1. In the Control Panel window, choose the Server icon.



The Properties dialog box displays a usage summary for the computer.

Item	Meaning
Sessions	The number of users remotely connected to the computer
Open Files	The number of shared resources opened on the computer
File Locks	The number of file locks by open resources on the computer
Open Named Pipes	The number of named pipes opened on the computer

2. To change the computer description, type new text in the Description box.
3. To administer a property associated with one of the five buttons at the bottom of the Properties dialog box, choose a button and complete the dialog box that appears. These buttons and their associated dialog boxes are described in procedures following this one.

Choose	To
Users	View all the users connected over the network to the computer and the resources opened by a selected user. One or all of the connected users can be disconnected.
Shares	View the computer's shared resources and the users connected over the network to a selected resource. One or all of the connected users can be disconnected. (To create and manage shares, use File Manager.)
In Use	View the open shared resources on the computer. One resource or all resources can be closed.
Replication	Manage directory replication for the computer.
Alerts	View and manage the list of users and computers that are notified when administrative alerts occur on the computer.

- To exit, choose the OK button.

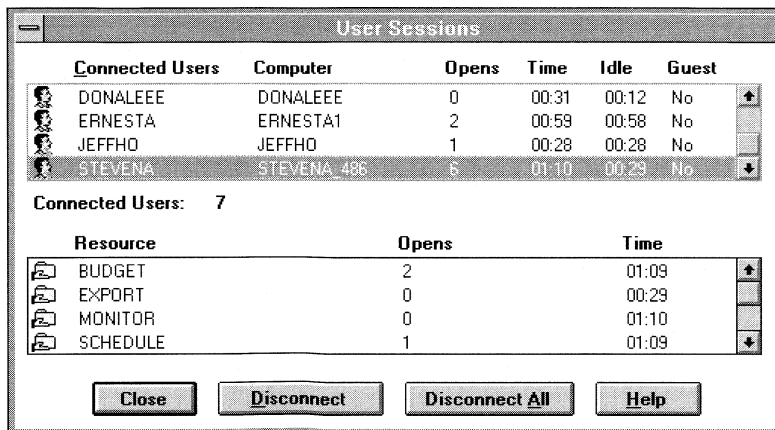
Viewing User Sessions

Use the User Sessions dialog box to view all the users connected over the network to the computer, and the resources opened by a selected user.

One or all of the connected users can be disconnected. There are several reasons to do this. For example, you might be about to stop the Server service on the computer, or you might be about to shut down the computer. To avoid data loss, always warn users before disconnecting them.

► To view users connected over the network to the computer

- In the Control Panel window, choose the Server icon.
- In the Properties dialog box, choose the Users button.



In the User Sessions dialog box, the Connected Users box lists the users remotely connected to the computer.

Item	Meaning
Connected Users	The user name of a connected user
Computer	The computer name of the computer where the user is logged on
Opens	The number of resources opened on the computer by the user
Time	The hours and minutes that have elapsed since this session was established
Idle	The hours and minutes that have elapsed since the user last initiated an action
Guest	Whether this user has guest status on the computer

Below the Connected Users box, the Connected Users summary shows the number of users remotely connected to the computer.

3. To view the resources used by a user, select a user name from the Connected Users box. The Resource box lists the shared resources that user is connected to.

Item	Meaning
Resource	The name of a shared resource the selected user is connected to. This could be a shared directory, named pipe, or printer.
Opens	The number of opens against this resource by this user.
Time	The hours and minutes that have elapsed since this resource was first opened.

4. To disconnect one user from the computer, select the user name from the Connected Users box and then choose the Disconnect button: to disconnect all users from the computer, choose the Disconnect All button.

Warn users before disconnecting them.

5. To exit, in the User Sessions dialog box choose the Close button, and then in the Properties dialog box choose the OK button.

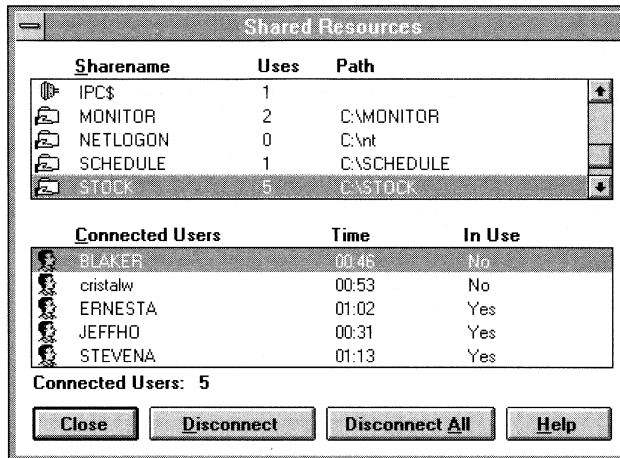
Viewing Shared Resources

Use the Shared Resources dialog box to view the shared resources available on the computer, and the users connected over the network to a selected resource. (To create and manage shares, use File Manager.)

One or all of the connected users can be disconnected. There are several reasons to do this. For example, you may need to allow another user to connect to a shared directory that already has its maximum number of users connected. To avoid data loss, always warn users before disconnecting them.

► **To view shared resources**

1. In the Control Panel window, choose the Server icon.
2. In the Properties dialog box, choose the Shares button.



In the Shared Resources dialog box, the Share Name box lists available resources.

Item	Meaning
Share Name	The name of a shared resource. This could be a shared directory, named pipe, or printer.
Uses	The number of connections to the shared resource.
Path	The path of the shared resource.

3. To view the users connected to a shared resource, select a share name from the Share Name box. The Connected Users box lists the connected users.

Item	Meaning
Connected Users	The user name of a user connected to the selected shared resource
Time	The hours and minutes that have elapsed since the user first connected to this shared resource
In Use	Whether the user currently has a file open from this shared resource

Below the Connected Users box, the Connected Users summary shows the number of users connected to the selected resource.

4. To disconnect one user from all shared resources, select the user name from the Connected Users box and then choose the Disconnect button: to disconnect all users from all shared resources, choose the Disconnect All button.

Warn users before disconnecting them. Each disconnected user is disconnected from all shared resources on the computer—not just the resource selected in the Share Name box.

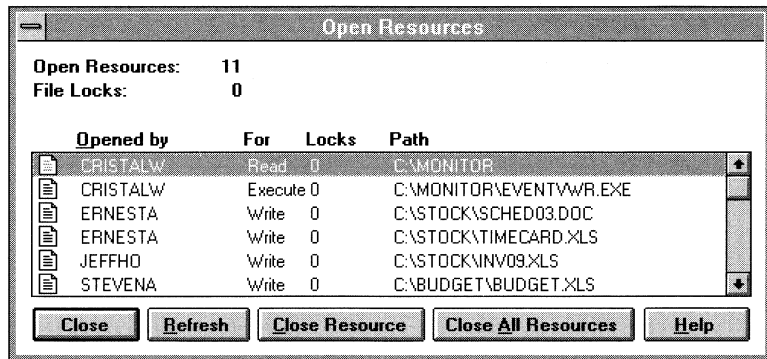
5. To exit, in the Shared Resources dialog box choose the Close button, and then in the Properties dialog box choose the OK button.

Viewing Resources In Use

Use the Open Resources dialog box to view the resources open on the computer. One or all of the resources can be closed. To avoid data loss, always warn connected users before closing resources.

► To view resources in use

1. In the Control Panel window, choose the Server icon.
2. In the Properties dialog box, choose the In Use button.



The Open Resources dialog box shows the resources open on the computer.

Item	Meaning
Open Resources	The total number of open resources on the computer. These could be files, named pipes, or printers.
File Locks	The total number of file locks by open resources.
Opened By	The user name of a user who opened a resource.
For	The permission granted when the resource was opened.
Locks	The number of locks on the resource.
Path	The path of the open resource.

3. To close a single resource, select one resource from the list and then choose the Close Resource button; to close all resources, choose the Close All Resources button.
Warn connected users before closing resources.
4. To update the displayed information, choose the Refresh button.
5. To exit, in the Open Resources dialog box choose the Close button, and then in the Properties dialog box choose the OK button.

Managing Directory Replication

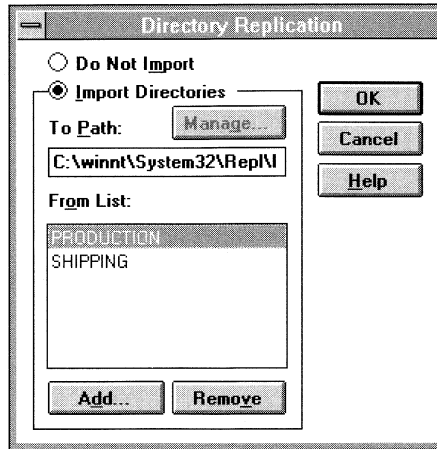
Use the Directory Replication dialog box to manage replication for the computer. Directory replication is the duplication of a master set of directories from a server (called an export server) to specified servers or workstations (called import computers) in the same or other domains. A Windows NT workstation can only be set up as an import computer.

Before replication can occur, a special user account must be created, configured, and assigned to the Replicator service. For information on preparing the Replicator service, and for detailed information explaining directory replication, see the *Microsoft Windows NT Advanced Server System Guide*, which is provided with the Microsoft Windows NT Advanced Server software required for the replication export server.

The procedures that follow describe how to use the Server option in the Control Panel to set up the computer as an import computer. When setting up an import computer you do not need to create the imported subdirectories, because a subdirectory is automatically created the first time it is imported.

► To set up an import computer

1. In the Control Panel window, choose the Server icon.
2. In the Properties dialog box, choose the Replication button.



The Directory Replication dialog box contains the following items relating to import replication.

Item	Description
Do Not Import	Stops importing replicated subdirectories and files.
Import Directories	Allows replicated subdirectories and their files to be imported.
To Path	The directory in which replicated subdirectories and files will be stored. The default is C:\WINNT\SYSTEM32\REPL\IMPORT.
Manage	Displays the Imported Directories dialog box, where the subdirectories to be imported are specified, and where import locks are added or removed.
From List	Subdirectories are replicated to this import computer from the domains and computers listed here. By default, the From List contains a [blank] entry and this computer automatically imports from the local domain.
Add	Displays the Select Computer dialog box. Used to add a computer or domain to the From List.
Remove	Removes a selected computer or domain from the From List.

3. In the Directory Replication dialog box, select Import Directories.
4. To change the directory where imported subdirectories will be stored, type a new path in the To Path box.

Because complex permissions support the default path, C:\WINNT\SYSTEM32\REPL\IMPORT, it is recommended this not be changed.

5. To import subdirectories from a domain or computer, under Import Directories choose the Add button, and then complete the Select Domain dialog box that appears.

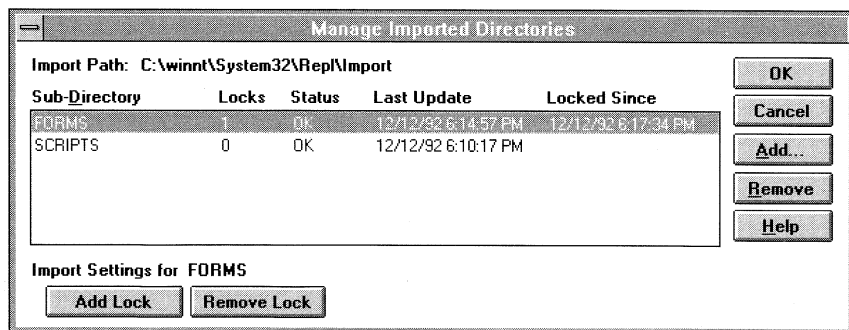
The domain name or computer name is added to the From List.

Note By default, the From List contains a [blank] entry and this computer automatically imports from the local domain. If any entries are added to the From List, the local domain is no longer imported from. If needed, it must be explicitly added to the From List.

6. To stop importing subdirectories from an export server or domain, select the domain or server name in the From List, and then choose the Remove button.
7. To view a list of the subdirectories that have been imported to this computer, or to manage locks on those imported subdirectories, under Import Directories choose the Manage button, and then complete the dialog box that appears. For more information, see the following procedure.
8. To exit, choose the OK buttons in the Directory Replication and Properties dialog boxes.

► **To view a list of, or manage locks for, imported subdirectories**

1. In the Directory Replication dialog box, under Import Directories, choose the Manage button.



The Manage Imported Directories dialog box contains the following items.

Item	Description
Import Path	The directory in which replicated subdirectories and files are stored on this computer.
Sub-Directory	A list of the subdirectories that are imported to this computer. A subdirectory is automatically imported if it is exported by one of the export servers or domains in the From List of the Directory Replication dialog box.

Item	Description
Locks	A lock prevents import to the subdirectory. More than one lock might be applied to a subdirectory. Import to a subdirectory only occurs if this column has a value of 0.
Status	<p>OK indicates that the subdirectory is receiving regular updates from an export server and the imported data is identical to that exported.</p> <p>No Master indicates that the subdirectory is not receiving updates. The export server might not be running, or the export server might have stopped exporting updates.</p> <p>No Sync indicates that the subdirectory has received updates, but the data is not up to date. This could be due to a communications failure, open files on the import or export server, the import server not having access permissions at the export server, or an export server malfunction.</p> <p>[blank] indicates that replication has never occurred for that subdirectory. Replication may not be properly configured for this import computer, for the export server, or both.</p>
Last Update	The date and time the last update was made to a file in this import subdirectory, or in its subtree.
Locked Since	The date and time the oldest lock was placed on this subdirectory.
Import Settings For	Shows the selected subdirectory.
Add Lock	Adds a lock to the selected subdirectory, preventing import.
Remove Lock	Removes a lock from the selected subdirectory. Import only occurs when a subdirectory has 0 locks.
Add	<p>Displays the Add Sub-Directory dialog box, used to add new subdirectories to the list of imported subdirectories.</p> <p>However, this is usually unnecessary. This does not create the actual subdirectory; and when a subdirectory is exported by one of the export servers or domains in the From List of the Directory Replication dialog box, it is automatically imported and is added to this list.</p>
Remove	<p>Removes the selected subdirectory from the list.</p> <p>However, this is usually unnecessary. If that subdirectory is exported by one of the export servers or domains in the From List of the Directory Replication dialog box, it will still be imported and will later reappear in this list.</p>

2. To temporarily stop importing to a subdirectory, select the subdirectory from the list and then choose the Add Lock button.
3. To resume importing to a locked subdirectory, select the subdirectory and then choose the Remove Lock button.

Usually, you should only remove locks that you have applied. Import only resumes when the Locks column shows a value of 0 for the subdirectory.

4. To return to the Directory Replication dialog box, choose the OK button.

Managing Administrative Alerts

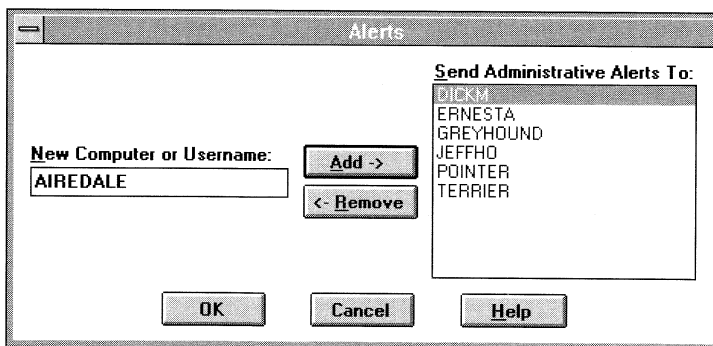
The Alerts dialog box displays and manages the list of users and computers that are notified when administrative alerts occur at this computer.

Alerts relate to server and resource use. They warn about security and access problems, user session problems, server shutdown because of power loss when the UPS service is available, and printer problems. For example, an alert can be generated when disk space becomes low.

For alerts to be sent, the Alerter and Messenger services must be running on the computer originating the alert. For alerts to be received, the Messenger service must be running on the destination computer.

► To manage the recipients of administrative alerts

1. In the Control Panel window, choose the Server icon.
2. In the Properties dialog box, choose the Alerts button.



3. To add a user or computer to the list of alert recipients, type the user name or computer name in the New Computer Or Username box, and then choose the Add button.
4. To remove a user or computer from the list of alert recipients, select the user name or computer name from the Send Administrative Alerts To box, and then choose the Remove button.
5. To exit, in the Alerts dialog box choose the OK button, and then in the Properties dialog box choose the OK button.

Managing Services

Use the Services option in Control Panel to start, stop, pause, or continue each of the services available on the computer, to determine whether a service will start up automatically when the system starts, and to control some other service startup parameters.

The default services provided with the system are shown in the following table.

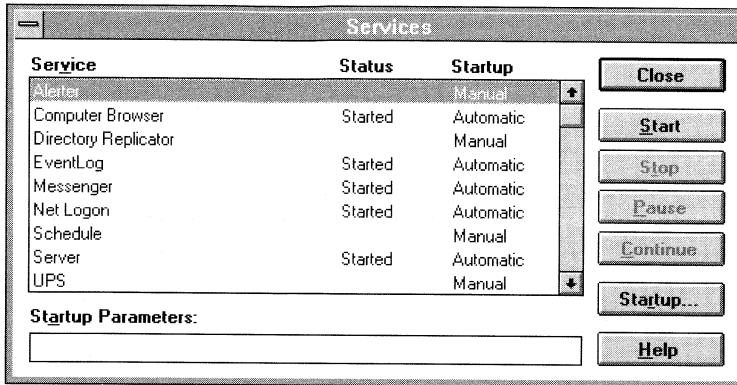
Service	Description
Alerter	Notifies selected users and computers of administrative alerts that occur on this computer. Used by the Server and other services. Requires the Messenger service.
Computer Browser	Maintains an up-to-date list of computers, and provides the list to applications when requested. Provides the computer lists displayed in the Select Computer and Select Domain dialog boxes; and in the main Server Manager window.
Directory Replicator	Replicates directories, and the files in those directories, between computers.
Event Log	Records system, security, and application events in the event logs.
Messenger	Sends and receives messages sent by administrators or by the Alerter service.
Net Logon	Provides authentication of user logon requests.
Schedule	Must be running for the AT command to be used. The AT command can be used to schedule commands and programs to run on a computer at a specified time and date.
Server	Provides RPC (remote procedure call) support, and file, print, and named pipe sharing.
UPS	Manages an uninterruptible power supply connected to this computer.
Workstation	Provides network connections and communications.

Starting and Stopping Services

► To start, stop, pause, or continue a service



1. In the Control Panel window, choose the Services icon.



A blank in the Status column indicates that the service is stopped.

2. In the Services dialog box, select a service.
3. Choose the Start, Stop, Pause, or Continue button.

To pass startup parameters to a service, type the parameters in the Startup Parameters box before choosing the Start button. That entry will be passed to the service when the Start button is chosen. None of the default services supplied with Windows NT accept startup parameters.

4. In the Services dialog box, choose the Close button.

Because stopping the Server service disconnects all remote connected users, use the following procedure to stop that service.

► To stop the Server service

1. Use the Services option in Control Panel to pause the Server service.
This prevents new users from establishing a connection with this computer.
2. Notify all connected users, warning them to disconnect within a specified time period.
3. After expiration of your warning period, use the Services option in Control Panel to stop the Server service.

Configuring Service Startup

Use the Service Startup dialog box to configure when and how a service is started, and to specify the user account the service will use to log on.

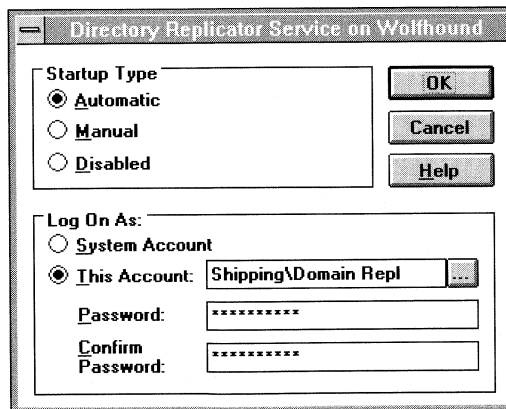
When a user account other than the system account is used to log on a service, that user account must have the Password Never Expires option selected, the User Must Change Password At Next Logon option cleared, and it must belong to a group that is granted the Log On As A Service right. For instructions on configuring a user account and user rights as described here, see Chapter 13, “User Manager.”

If it is the Directory Replicator service that you are assigning the user account to, it must be a domain user account, it must be a member of the domain’s Replicator, Domain Users, and Backup Operators groups, and it must be a member of the Replicator group on all Windows NT workstations configured for import replication. Also, the domain Replicator group and the Replicator groups of all Windows NT workstations configured for import replication must be granted the Log On As A Service right. For instructions on configuring a user account and user rights as described here, see the *Microsoft Windows NT Advanced Server System Guide* provided with the Microsoft Windows NT Advanced Server software required for the replication export server.

Security To configure service startup you must be logged on to a user account that is a member of the Administrators local group.

► **To configure startup for a service**

1. In the Control Panel window, choose the Services icon.
2. In the Services dialog box, select a service.
3. Choose the Startup button.



4. Specify a startup type.

Select	To
Automatic	Start the service every time the system starts. (The Server service will not start automatically unless the computer has at least 12 MB of memory.)
Manual	Allow the service to be started by a user or by a dependent service.
Disabled	Prevent the service from being started.

5. Specify the user account the service will use to log on.

Select	To
System Account	Specify that the service will log on using the system account.
This Account	Specify a user account the service will use to log on.

Caution Most services must log on using the system account. Of the default services provided with Windows NT, only the Directory Replicator and Schedule services can use different accounts.



6. If you select This Account, choose the Browse button and complete the Add User dialog box that appears, and then in both the Password and Confirm Password boxes type the password for the user account you specified in the Add User dialog box.
7. In the Service Startup dialog box, choose the OK button, and then in the Service dialog box, choose the Close button.

If a user account has been assigned to a service as described in steps 5 and 6 of the previous procedure, and if the password for that user account is later changed (for example, while using the User Properties dialog box in User Manager to administer the user account), the password for that user account must also be changed here, in the Service Startup dialog box.

Managing Devices

Use the Devices option in Control Panel to start, stop, and configure the startup type for device drivers.

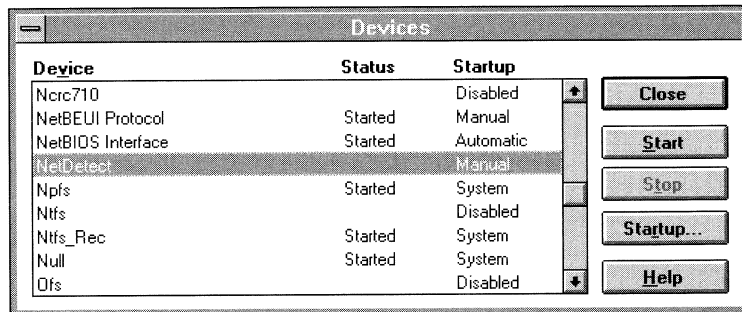
Starting and Stopping Devices

Use the Devices dialog box to start and stop devices.

► To start or stop devices



1. In the Control Panel window, choose the Devices icon.



In the Devices dialog box, if Started is displayed in the Status column for a device, that device driver is loaded. If the Status column is blank, that device driver is not loaded.

The Startup column displays the startup type of each device. The startup types are described in the following procedure under “Configuring Device Startup.”

2. In the Devices dialog box, select a device.
3. Choose the Start or Stop button.

Some devices are essential to system operation and cannot be stopped. When such a device is selected, the Stop button is unavailable.

4. Repeat steps 2 and 3 as necessary.
5. In the Devices dialog box, choose the Close button.

Configuring Device Startup

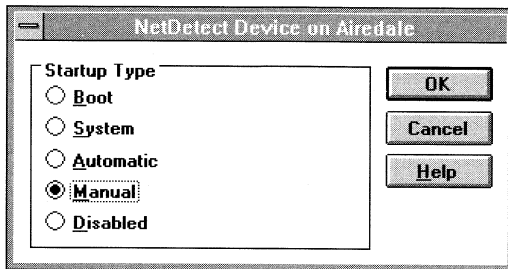
You can determine when a device will start by specifying the startup type.

Security To Configure device startup you must be logged on to a user account that is a member of the Administrators local group.

► To set the startup type of a device



1. In the Control Panel window, choose the Devices icon.
2. In the Devices dialog box, select a device.
3. Choose the Startup button.



4. Select a startup type.

Select	To
Boot	Start the device every time the computer starts. Boot devices start before any other devices. Use for critical devices essential to system operation.
System	Start the device every time the system starts. System devices start after Boot devices. Use for critical devices essential to system operation.
Automatic	Start the device every time the system starts. Automatic devices start after Boot and System devices. Use for devices that are not critical for basic system operation.
Manual	Allow the device to be started by a user or by a dependent device.
Disabled	Prevent the device from being started by a user. However, the device can be started by the system.

Caution Changing the startup type of a Boot or System device can leave the system in an unusable state.

5. Choose the OK button.
6. In the Devices dialog box, choose the Close button.

Print Manager

Use Print Manager to work with local and network printers.

This chapter explains how to control printing and printers, and includes the following topics:

- Installing a printer for use with Windows NT and your applications
- Connecting to a network printer
- Changing a printer's properties, including sharing a printer over the network
- Securing a printer and auditing its use
- Printing documents
- Administering network print servers remotely

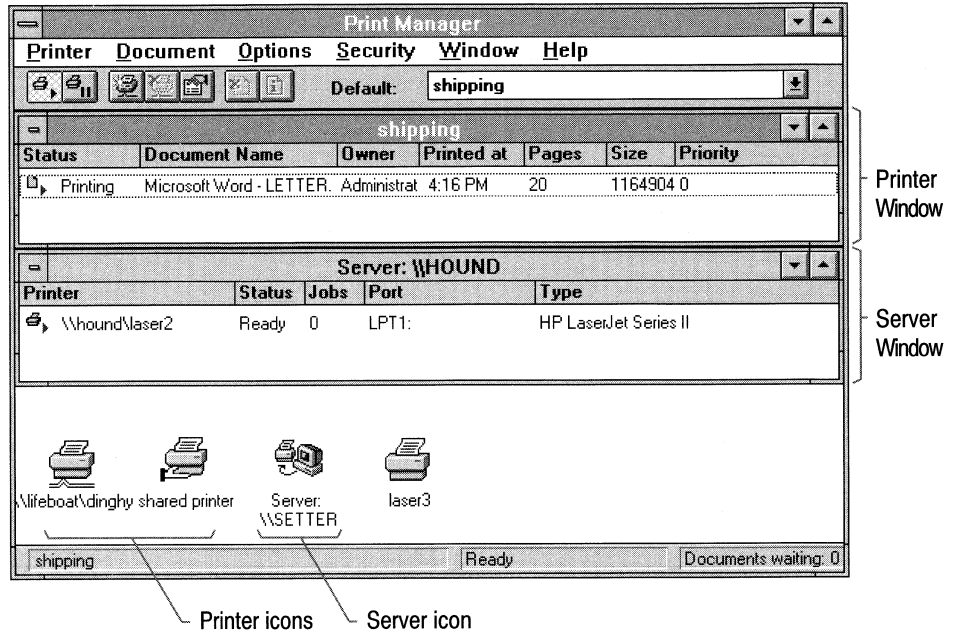
Overview

Use Print Manager to install local printers and to connect to printers on the network so that you can print to them from your applications. Each printer that is available appears in its own window in Print Manager. Printer windows show you the current activity of the printer, including a list of the documents waiting to be printed. If you have several printers available to you on the network, you can use Print Manager to find one that is ready to print and not busy printing other users' documents.

You can use Print Manager to control documents that have been sent to a printer. You can pause and restart printing, arrange the order in which waiting documents will be printed, and remove documents that are waiting to print.

Print Manager allows you to manage both local and remote printers to suit your needs. Use Print Manager to share printers on the network, control access to printers, and set other printer properties such as the hours the printer is available to print.

The Print Manager window contains a menu bar, toolbar, and status bar. Printer windows and icons represent printers you have installed or to which you are connected over the network. Server windows and icons represent servers to which you have connected in order to administer printers remotely.



The *toolbar* provides quick access to commands through buttons.

The *status bar* shows the status of the current job or printer, including how many pages of the job have been printed and how many documents are waiting to be printed.

The *printer window* shows information for one of the printers that you have installed or to which you are connected. For each printer, you can see what documents are waiting to be printed, who owns them, how large they are, and other information.

The *server window* shows information for all printers connected to a Windows NT-based server.

The toolbar and status bar are displayed by default. You can hide them by choosing the Toolbar and Status Bar commands from the Options menu.

Starting and Quitting

By default, when you start Print Manager, its window appears as it was when you last quit Print Manager. The positions of printer and server windows and icons are saved as long as the Save Settings on Exit command is in effect when you quit.

► To start Print Manager



- From the Main Group, choose the Print Manager icon.
–Or–
- In Control Panel, choose the Printers option.

► To quit Print Manager

- From the Printer menu, choose Exit.

Installing a Printer

Use the Print Manager Create Printer option from the Printer menu when:

- You are physically installing a printer on a computer.
- You are physically installing a printer that connects directly to the network.
- You want to define a printer that prints to a file.
- You want to define multiple printers with varying properties for the same physical printer.

You can also create a printer for a network printer controlled by a LAN Manager 2.x server.

Security

To create a printer, you must be logged on as a member of the Administrators or Power Users group.

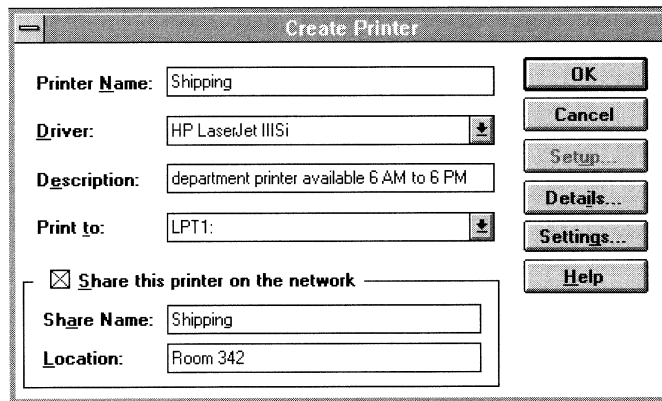
The printers you create using Print Manager represent physical devices, usually physical printers. Because Print Manager printers are representations of physical devices, they can be used flexibly. You can create more than one printer representing the same physical printer, or you can create a printer that prints to a file. For example, if you have a printer in your office, but also share it with others over the network, you might want to create two printers for the physical printer. You can create a printer for yourself that is not shared over the network and a second printer that is shared. Then it's easy to control the use of the shared printer. You can set permissions on it, ensuring that only members of your department can print to it. Or you can set a low priority for it, ensuring that documents you send to the printer will always print before documents sent by those who share it.

Note If you want to print to a printer that is already shared on a network, add it to the printers in Print Manager by connecting to it. For more information, see “Connecting to a Network Printer” later in this chapter.

When you choose Create Printer from the Printer menu, Print Manager displays a Create Printer dialog box where you can define the operation of the printer. To complete a basic printer installation, specify the printer name, driver, and an optional description. Then specify a printing destination. The destination can be a port, a file, a network share name, or a network address. Print Manager will prompt you to select the appropriate printer driver or to install a new one if necessary.

► **To install a printer**

1. From the Printer menu, choose Create Printer.



2. In the Printer Name box, type a name for the printer.

This name appears in the title bar of the printer window. It is the name network users running Windows NT will see when connecting to the printer if you share the printer over the network. The name can be up to 32 characters long.

3. In the Driver box, select the printer's driver.

If your printer does not appear in the list, you can try installing the printer using a compatible driver. For example, if your printer is Hewlett-Packard® PCL® compatible, you may be able to use one of the HP LaserJet® drivers included with Windows NT. Consult your printer's documentation to determine which drivers you can choose.

If your printer manufacturer supplies a Windows NT compatible driver that you want to install, select Other in the Driver box. In the Install Driver dialog box, specify the drive and path where the printer driver is located and choose the OK button. Print Manager adds the new driver to the list.

4. In the Description box, type an optional description.

Network users will see this description when adding the printer to their available printers. Use the description to inform them about the printer. For example, if the printer is available only during certain hours, you could include that information here.

5. In the Print To box, choose a destination for printing output:

- If you are installing a printer that you have physically connected to a computer, choose the appropriate parallel or serial port, for example, LPT1.

If the port you want does not appear in the list, choose Network Printer. In the Print Destinations dialog box, choose Local Port and then choose the OK button. Type the name of the new port in the Port Name dialog box and choose the OK button. Print Manager adds the port to the list of print destinations.

- If you want to print to a file, choose File. When you print, you are prompted for a file name.
- If you want to create a printer for a printer controlled by a LAN Manager 2.x server, choose Network Printer. In the Print Destinations dialog box, choose LAN Manager Print Share and then choose the OK button. You can select the print share in the Browse Network Printer dialog box or type the name of the print share in the Path box. Then choose the OK button.
- If you are installing a Hewlett-Packard printer that connects directly to the network, choose Network Printer. In the Print Destinations dialog box, choose Hewlett-Packard Network Port and then choose the OK button. In the Add A Hewlett-Packard Network Port dialog box, select the network address in the Card Address box and name the port. Then choose the OK button.

Before you can create a printer that uses a Hewlett-Packard network port, the Data Link Control protocol must be installed and running. You can install the protocol using the Networks option in Control Panel.

6. Choose the OK button.
7. If the appropriate printer driver is not already installed, Windows NT prompts you to enter the path of the distribution files where the driver is located. Type the path and choose the OK button. Windows NT prompts you to insert disks as necessary to install the driver.

This completes a basic printer installation. You can specify many other options when installing a printer. For more information, see “Changing a Printer’s Properties” later in this chapter.

Installing a Printer Driver

Use Print Manager when you need to install a new or additional printer driver for your printer.

Because RISC and x86-based computers use different printer drivers, you may want to install printer drivers for both platforms on your print servers if your network contains a mixture of RISC and x86-based computers. For example, when a RISC-based Windows NT computer connects to an x86-based Windows NT print server, the RISC version of the printer's driver must be available to the RISC-based computer. You can install the RISC printer driver on either the local computer or on the x86-based print server. If you install the driver on the server, it will be available to any other RISC-based Windows NT computer on your network.

► To install a new printer driver



1. Select the printer's icon or window.
2. From the Printer menu, choose Properties. Or choose the Properties button on the toolbar.
3. In the Printer Properties dialog box, select Other in the Driver box.
4. In the Install Driver dialog box, specify the drive and path where the printer driver is located and choose the OK button.

Print Manager installs the new driver.

5. In the Printer Properties dialog box, choose the OK button.

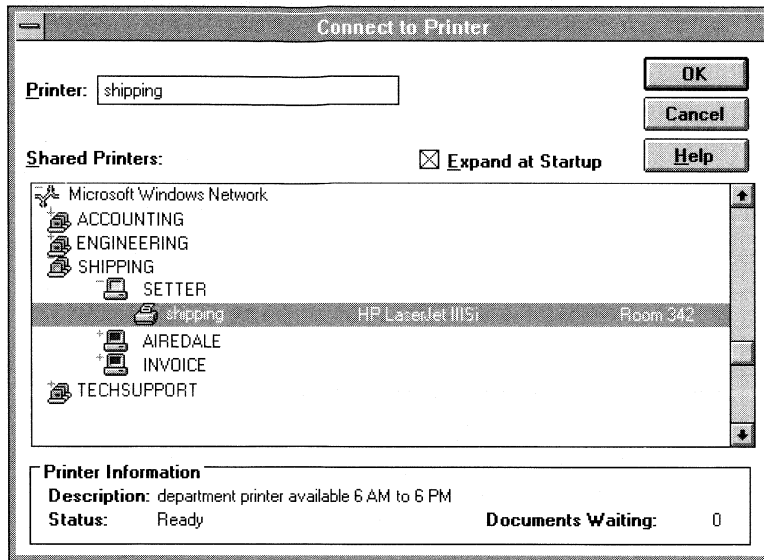
Connecting to a Network Printer

To print to a printer that is shared over the network, connect to it. Connecting to the printer adds the printer to the available printers displayed in the Print Manager window.

► To connect to a network printer



1. From the Printer menu, choose the Connect To Printer command. Or choose the Connect Printer button on the toolbar.



2. In the Connect To Printer dialog box, select a printer.

The Select Printer box shows networks, domains or workgroups, and shared printers organized in a tree structure. Double-click an item to expand the list: Double-click a network name to display domains or workgroups, a domain or workgroup name to display shared printers. Print Manager displays the printer's driver and location next to the printer's name.

When you select a printer, Print Manager fills in the Printer box with the name you selected and displays additional information, including the printer's description, status, and the number of waiting documents, in the Printer Information box.

Or you can type the name of a computer and shared printer in the Printer box. Precede the computer name with two backslashes (\\) and separate the computer name from the shared printer's name with a single backslash (\), for example, **\\printserver\laser**.

3. Choose the OK button.
4. If the printer you selected is shared by a Windows NT computer, you are now ready to print to the printer.

If the printer you selected is shared by computer other than a Windows NT computer, Windows NT prompts you to install a driver. Choose the OK button to continue.
5. In the Select Driver dialog box, select the appropriate driver for the printer in the Driver box.
6. In the Windows NT Setup dialog box, type the directory and path where Windows NT printer drivers are stored, and then choose the Continue button.

Windows NT installs the driver and displays a printer window for the connected printer.

Removing a Printer

You can use Print Manager to remove printers that you have installed and to which you are connected.

► **To remove a printer**



1. Select the printer window or printer icon.
2. From the Printer menu, choose Remove Printer, or choose the Remove Printer button on the toolbar.
3. Print Manager prompts you for confirmation. Choose the Yes button to remove the printer.

Changing a Printer's Properties

You can set printer properties when you create a printer or you can change a printer's properties after you have created it. Properties include:

- Sharing the printer on the network.
- Setting printing options such as the size and format of paper available at the printer and the font cartridges that are installed.
- Setting job defaults such as the default paper size and printing orientation.
- Setting printer details such as the hours the printer is available and the printing priority of documents sent to the printer.

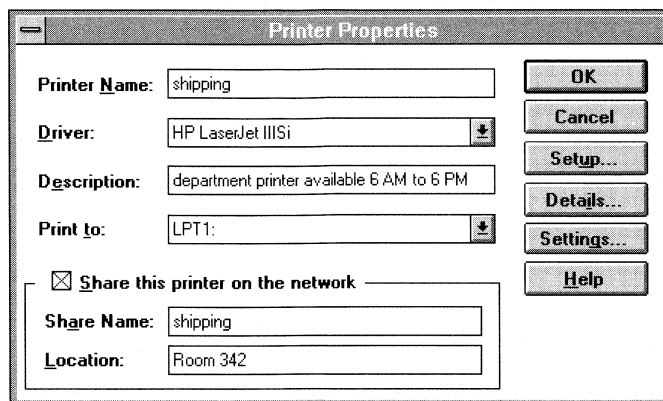
Security

To change printer properties, you must be logged on as a member of the Administrators or Power Users group, or you must have been granted Full Control permission for the printer.

► **To change the properties of an installed printer**



1. Select the printer's icon or window.
2. From the Printer menu, choose Properties. Or choose the Properties button on the toolbar.



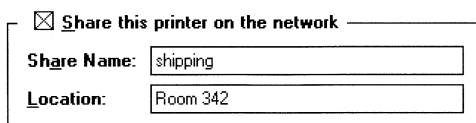
You can now change the printer's properties as discussed in the sections that follow.

Sharing a Printer

Sharing a printer allows others on the network to connect to the printer and to print their documents on it. Before you can share a printer, the Server service must be running. You can start the Server service by using the Services option in Control Panel.

► To share a printer on the network

1. In the Printer Properties dialog box, select the Share This Printer On The Network check box.



2. In the Share Name box, Print Manager creates a share name for the printer. Computers running Windows NT see the printer name when connecting to the printer; however, computers running MS-DOS require a share name that conforms to MS-DOS naming conventions in order to connect.

The share name is based on the printer name. You can edit the share name; however, the share name must follow MS-DOS naming conventions and cannot be longer than 12 characters.

3. In the Location box, type a description of the printer's location to let users know where their documents will be printed. Users see the printer's location in the Connect To Printer dialog box when they add the printer to their list of available printers.

4. Choose the OK button.

Setting Printing Options

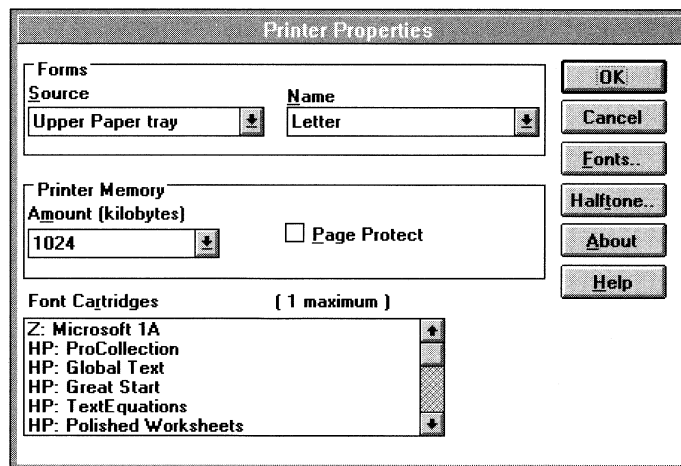
Setup options allow you to configure the printer to take full advantage of its features. The options that are available depend on the printer. The following table lists typical setup options:

Option	Purpose
Forms	Specifies the size and format of paper used in the printer. Printers that support multiple paper trays or sources for paper allow you to match a form with a source.
Memory	Specifies the amount of memory available in the printer.
Font	Specifies the font cartridges installed in the printer. Controls the loading of soft fonts and font substitution.
Color	Adjusts the printing of halftone colors.

► To set or change printing options

1. In the Printer Properties dialog box, choose the Setup button.

A typical Printer Properties dialog box used for setting printing options is shown below. The options available for your printer may be different.



2. Set the options and then choose the OK button.

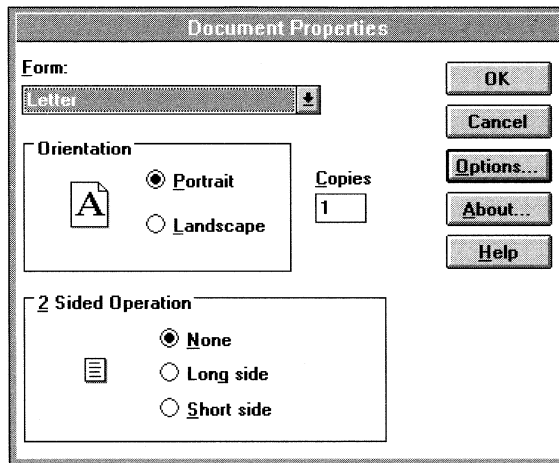
Setting Job Defaults

Job defaults include printing settings such as paper size, page orientation, and number of copies. The features that are available depend on the printer. The settings in Print Manager establish how a document prints by default; however, you can change these settings through your applications when you print. Changes made from an application override the settings made in Print Manager.

► To set or change job defaults

1. In the Printer Properties dialog box, choose the Details button.
2. In the Printer Details dialog box, choose the Job Defaults button.

A typical Document Properties dialog box used for setting job defaults is shown below. The options available for your printer may be different.



3. Set the defaults and then choose the OK button.

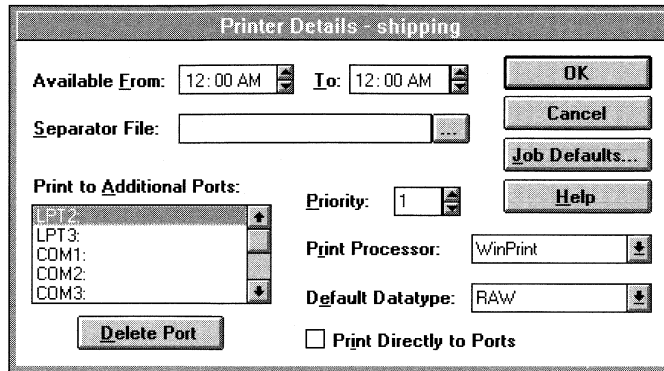
Setting Printer Details

Use the Printer Details dialog box to set the following printer features:

- Set the hours a printer is available
- Print a separator page
- Create a pool of printers
- Set printer priority
- Specify a print processor
- Specify a default datatype
- Print directly to ports

► **To set printer details**

1. In the Printer Properties dialog box, choose the Details button.



2. Set or change printer details and then choose the OK button.

Setting Printing Hours

Setting printing hours sets the period during which the printer will print documents sent to it. Documents can be sent to the printer at any time, but they will only be printed during the hours that you have set. By default, printing hours are not limited.

Setting printing hours allows you to control the flow of work to a printer. For example, you can create two printers in Print Manager for the same physical printer and restrict the printing hours for one printer to nighttime hours. You can send documents to the nighttime printer at any time, but they will print only at night. Use the nighttime printer to print documents that are large or that you don't need immediately. This keeps the physical printer available during the day to print the documents you need right away. Print those documents by directing them to the printer whose hours you have not limited.

► **To set or change printer availability**

- In the Printer Details dialog box, set the period that the printer is available using the Available From and To scroll boxes.

Available From: 12:00 AM To: 12:00 AM

Using Separator Files


You can use separator files for a variety of purposes. Windows NT includes separator files that print a page at the beginning of each document to make it easy to find a document among others at the printer and separator files that can switch a printer between PostScript® and PCL printing. You can create your own separator files and specify their use by Print Manager.

The following table shows the names of separator files supplied with Windows NT, the purpose of each, the type of printer with which each is compatible, and whether or not the file can be edited.

Filename	Purpose	Compatible with	Can be edited
DEFAULT.SEP	Prints a page before each document	PCL	No
PSLANMAN.SEP	Prints a page before each document	PostScript	Yes
PCL.SEP	Switches printer to PCL printing	PCL	Yes
PSCRIPT.SEP	Switches printer to PostScript printing	PostScript	Yes

► To specify a separator page

- In the Printer Details dialog box, type the name of the separator file, including its path, in the Separator File box. To use the Windows NT default separator page, type DEFAULT.SEP in the Separator File box.

Separator File: 

If you want to search for a file, choose the browse button next to the Separator File box. You can then search for the file using the Select Separator Page dialog box.

Setting Printer Priority

Use the priority setting to control which documents will print first when sent to a printer. When you create two printers for the same physical printer and set different priorities for them, documents sent to the printer whose priority is higher will always print before documents sent to the printer whose priority is lower.

For example, if you are the primary user of the printer in your office, but you also share it with others over the network, you can ensure that your print jobs will always print before those of others by creating two different printers for the physical printer and setting a low priority for the shared printer.

► **To set or change the priority**

- In the Printer Details dialog box, set the priority in the Priority box.

By default, the priority is set to 1, which is the lowest priority. You can set a priority from 1 to 99.

Priority:

Creating a Printer Pool

Print Manager allows you to pool printers. When printers are pooled, several printers connected to a server behave as a single printer. When a document is sent to the server, the first available printer in the pool will print it. The printers in the pool must be identical to ensure printing consistency. To create a pool of printers, create a printer and include in the printer definition the additional ports to which the pool printers are connected.

► **To create a printer pool**

- In the Printer Details dialog box, select port names from the Print To Additional Ports box that correspond to the ports where you have connected printers.

Print to Additional Ports:

LPT2:	↑
LPT3:	
COM1:	
COM2:	
COM3:	↓

Delete Port

If the ports you need do not appear in the list, you can add them.

► **To add a port**

1. In the Printer Properties dialog box, select Network Printer in the Print To box.
2. In the Print Destinations dialog box, select Local Port and choose the OK button.
3. In the Port Name dialog box, type the name of the port you want to add in the Enter A Port Name box, and then choose the OK button.

Printing Directly to Ports

You can control how Print Manager sends documents to the printer. By default, documents are spooled before starting to print. When a document is spooled, it is stored on the hard disk first and then the spooler sends it to the printer. You can continue working with your application as soon as the document is stored on the disk. The spooler sends the document to the printer in the background.

If you want to bypass spooling, you can print directly to the printer. However, you will have to wait until the document is printed before continuing to work with your application.

► To print directly to ports

- In the Printer Details dialog box, select Print Directly To Ports.


☐ **Print Directly to Ports**

Specifying a Print Processor or Datatype

The Windows NT print processor supports ASCII, Journal, and Raw data types. In general, you should not need to change either the default print processor or datatype. These options are available so that specialized applications can modify the printing process. Such an application may require you to specify a specialized print processor and a particular datatype when you create a printer to use with the application.


► To set or change the print processor

- In the Printer Details dialog box, select the filename of the processor in the Print Processor box.

Print Processor: 

► To set or change the default datatype

- In the Printer Details dialog box, select a datatype in the Default Datatype box.

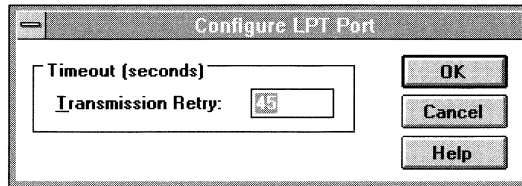
Default Datatype: 

Setting Timeouts

For printers that are connected to a computer's parallel port, for example LPT1, you can control the amount of time that elapses before Print Manager decides that the printer is not responding and notifies you of an error. The setting affects the printer you've selected and any other local printers that use the same driver. The setting for Transmission Retry determines how long Print Manager will wait for a printer to ready itself to accept more data.

► **To set timeout options**

1. Select the printer whose timeouts you want to set.
Timeouts can be set only for printers connected to a parallel port.
2. From the Printer menu, choose Properties.
3. In the Printer Properties dialog box, choose the Settings button.



4. Set the number of seconds in the Transmission Retry box, and then choose the OK button.

Securing a Printer

You can secure printers by setting permissions on them. Each permission you set specifies the access that a group or user has to the printer. For example, when you set Print permission for the group called marketing on the printer, members of that group can print documents on the printer, but cannot change any of the printer's properties.

Permissions are cumulative except that the No Access permission overrides all other permissions. For example, if the marketing group has Full Control permission while the finance group has only Print permission, and Jane is a member of both groups, Jane will have Full Control permission. However, if you change the finance group's permission to No Access, Jane will not be able to use the printer even though she is a member of group that has access to it.

By default, if you have permission to print, you also can control the printing of any document you print. As creator of the document at the printer, you are allowed to control the document through permissions granted the Creator Owner. In general, you should not change the permissions granted to the Creator Owner or remove the Creator Owner from the permissions list.

Security To change permissions on a printer, you must be the owner of the printer or have been granted Full Control permission.

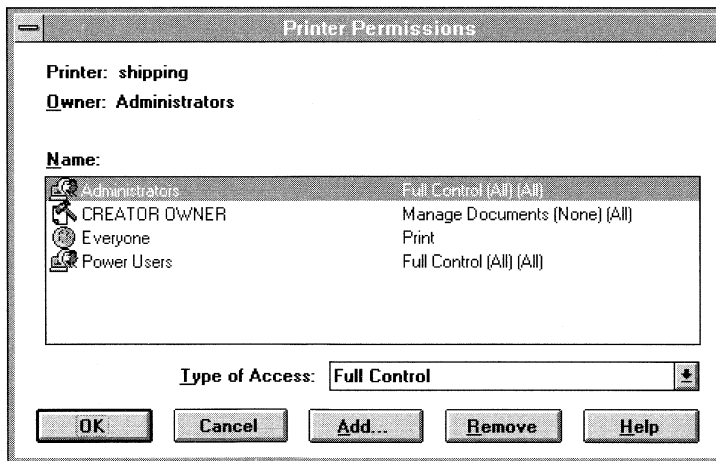
The following table shows the permissions for printers and the actions available to users for each permission.

- Permission allows use
- Permission does not allow use

	No Access	Print	Administer Documents	Administer
Print documents	○	●	○	●
Control settings for documents	○	○	●	●
Pause, resume, restart, and delete documents	○	○	●	●
Change the printing order of documents	○	○	○	●
Pause, resume, purge printer	○	○	○	●
Change printer properties	○	○	○	●
Delete printer	○	○	○	●
Change printer permissions	○	○	○	●

► To set or change printer permissions

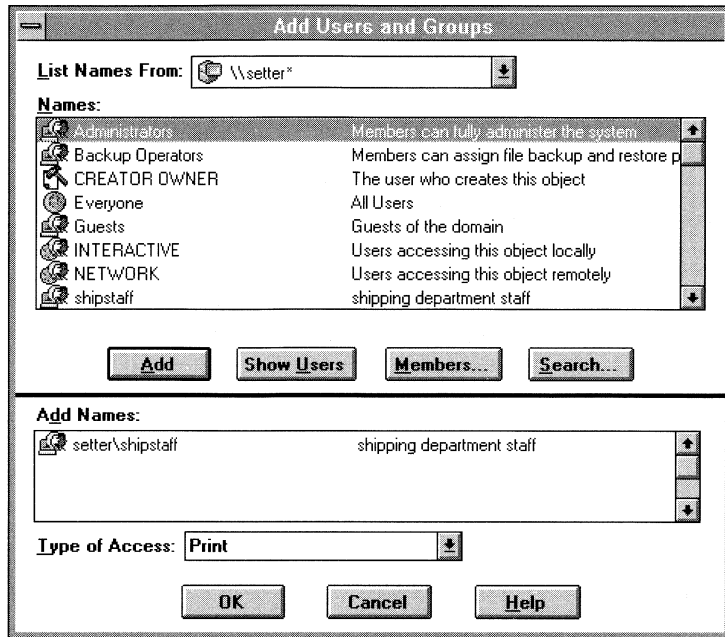
1. Select the printer window or icon for the printer whose permissions you want to set or change.
2. From the Security menu, choose Permissions.



3. Select the name of the group or user and choose a permission from the Type of Access box.
4. Choose the OK button.

► **To add a group or user to the printer permissions list**

1. In the Printer Permissions dialog box, choose the Add button.



The Add Users And Groups dialog box displays the groups on the computer or in the domain shown by the List Names From box.

You can select another domain by using the List Names From box. Domains appear only if your computer is a member of a domain on a Windows NT Advanced Server network. The domains shown have a trust relationship.

2. You can use options in the Add Users And Groups dialog box to display users, find the users in a group, or find the domain to which a group or user belongs.
 - Choose the Show Users button to display the names of users on the current computer or domain.
 - To see a group's content, select the group and choose the Members button. Users are listed in a new dialog box. On a Windows NT Advanced Server network, global groups that are members of a local group appear in the list. To see a global group's users, select the group and choose the Members button. To include the group in the Add Users And Groups dialog box, choose the Add button. To include some of the group's users, select them and choose the Add button.

- To add a group or user, you must know the domain which contains the group's or user's account. On a Windows NT Advanced Server network, choose the Search button to find the domain of a group or user. In the Find Account dialog box, type the name of the group or user in the Find User Or Group box and specify the domains to search. Then choose the Search button. To include the groups or users in the Add Users And Groups dialog box, select them in the Search Results box and choose the Add button.
3. To add groups or users to the permissions list, select them and choose the Add button, or double-click the name of the group or user.

Or you can type the names of groups and users in the Add Names box. Separate names using a semicolon. If the account of the group or user is not located on the computer or domain shown by the List Names In box, you must specify the location. Type the computer or domain name followed by group or user name and separate the names using a backslash, for example SHIPPING\ERNESTA. You can type the name without waiting for Windows NT to list groups in the Names box.

4. Select the permission for the groups or users shown in the Add box using the Type Of Access box.
5. Choose the OK button.

► **To remove printer permissions for a group or user**

1. In the Printer Permissions dialog box, select the name of the group or user.
2. Choose the Remove button.

Auditing a Printer

Auditing a printer allows you to track its usage. For a particular printer, you can specify which groups or users and which actions to audit. You can audit both successful and failed actions. Windows NT stores the information generated from auditing in a file. You can view the information using Event Viewer. For more information, see Chapter 15, "Event Viewer."

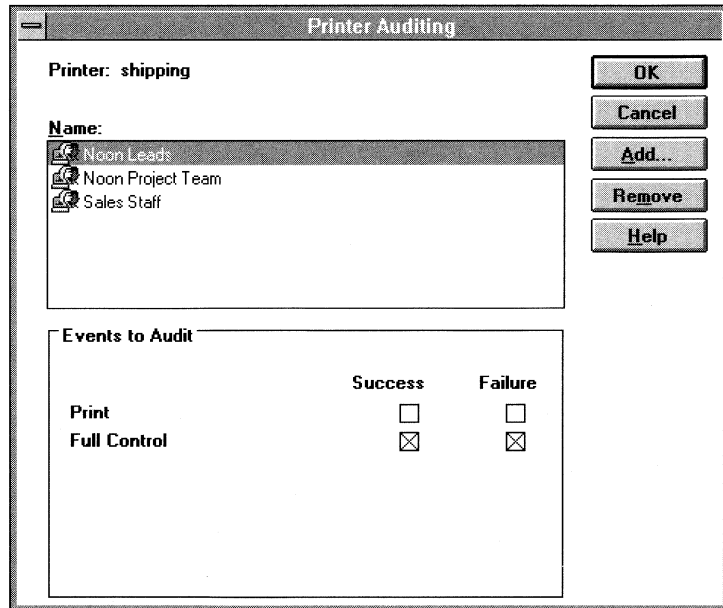
Important To audit a printer, you must set the audit policy to audit file, print and security changes. Set the audit policy using User Manager. For more information on audit policy, see Chapter 13, "User Manager."

To audit the following activities for a printer, select the events shown.

<input checked="" type="radio"/> Event audits action <input type="radio"/> Event does not audit action		
	<i>Print</i>	<i>Full Control</i>
Printing documents	<input checked="" type="radio"/>	<input type="radio"/>
Changing job settings for documents	<input type="radio"/>	<input checked="" type="radio"/>
Pausing, restarting, moving, and deleting documents	<input type="radio"/>	<input checked="" type="radio"/>
Sharing a printer	<input type="radio"/>	<input checked="" type="radio"/>
Changing printer properties	<input type="radio"/>	<input checked="" type="radio"/>
Deleting a printer	<input type="radio"/>	<input checked="" type="radio"/>
Changing printer permissions	<input type="radio"/>	<input checked="" type="radio"/>

► **To set or change printer auditing**

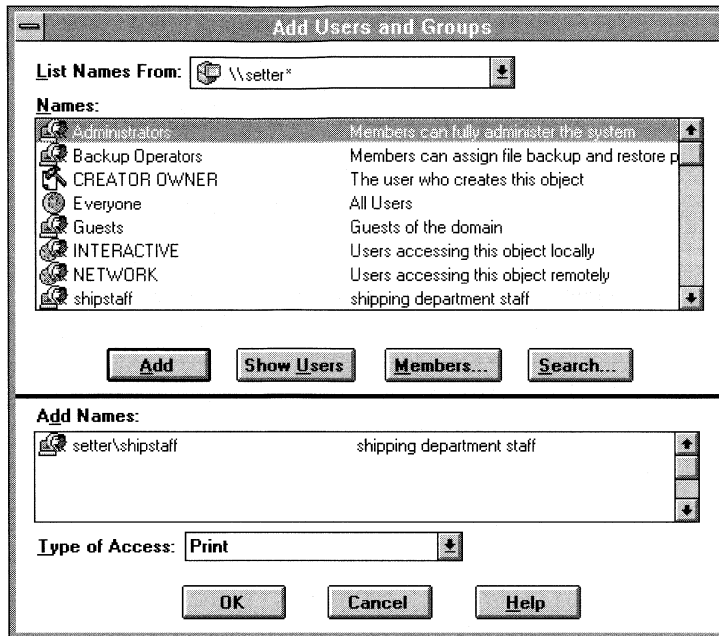
1. Select the printer window or icon for the printer that you want to audit.
2. From the Security menu, choose Auditing.



3. Select the name of the group or user and then select the Events To Audit.
4. Choose the OK button.

► **To add a group or user to the printer auditing list**

1. In the Printer Auditing dialog box, choose the Add button.



The Add Users And Groups dialog box displays the groups on the computer or in the domain shown by the List Names From box.

You can select another domain by using the List Names From box. Domains appear only if your computer is a member of a domain on a Windows NT Advanced Server network. The domains shown have a trust relationship.

2. You can use options in the Add Users And Groups dialog box to display users, find the users in a group, or find the domain to which a group or user belongs.
 - Choose the Show Users button to display the names of users on the current computer or domain.
 - To see a group's content, select the group and choose the Members button. Users are listed in a new dialog box. On a Windows NT Advanced Server network, global groups that are members of a local group appear in the list. To see a global group's users, select the group and choose the Members button. To include the group in the Add Users And Groups dialog box, choose the Add button. To include some of the group's users, select them and choose the Add button.

- To add a group or user, you must know the domain which contains the group's or user's account. On a Windows NT Advanced Server network, choose the Search button to find the domain of a group or user. In the Find Account dialog box, type the name of the group or user in the Find User Or Group box and specify the domains to search. Then choose the Search button. To include the groups or users in the Add Users And Groups dialog box, select them in the Search Results box and choose the Add button.
- 3. To add groups or users to the auditing list, select them and choose the Add button, or double-click the name of the group or user.

Or you can type the names of groups and users in the Add Names box. Separate names using a semicolon. If the account of the group or user is not located on the computer or domain shown by the List Names In box, you must specify the location. Type the computer or domain name followed by group or user name and separate the names using a backslash, for example SHIPPING\VERNESTA. You can type the name without waiting for Windows NT to list groups in the Names box.
- 4. Choose the OK button.

► **To remove printer auditing for a group or user**

1. In the Printer Auditing dialog box, select the name of the group or user.
2. Choose the Remove button.

Taking Ownership of a Printer

The owner of a printer can always change the permissions set on the printer. If you have Full Control permission for a printer, you can take ownership of it. Otherwise, you must be logged on as a member of the Administrators group to take ownership.

► **To take ownership of a printer**

1. Select the printer window or icon for the printer.
2. From the Security menu, choose Owner.



3. Choose the Take Ownership button.

Using Forms

A form specifies paper size and the size of margins. Many printers support a range of forms: letter, legal, A4, #10 envelope, and so on. When you create a printer, you assign a form to each of the printer's trays. In addition to supporting standard forms, Print Manager allows you to create custom forms and assign them to printers. Use this feature to ensure that a printer is always ready to print your special forms.

For example, you can define a letter-sized form called Letterhead whose expanded top margin reserves space for the information on your company's letterhead. You can then assign this form to a paper tray on one of your printers and keep that tray filled with letterhead paper. Users connected to the printer can select the Letterhead form when printing from their applications and be assured that their documents will be printed on the company stationery. If a user selects a form that is not assigned to a tray on the printer, the document will wait to print until the selected form has been assigned to the printer.

Forms you create are stored on the computer. When you create a form for use with a particular printer, create the form on the computer used as the printer's server.

► To create a form

1. From the Printer menu, choose Forms.

2. In the Form Description box:
 - In the Name box, type a name for the form.
 - In the Paper Size box, type the measurements for the width and height of the paper.

- In the Print Area Margins box, type the measurements for the left, right, top, and bottom margins.

You can enter sizes in either inches or centimeters by selecting the English or Metric option buttons in the Units box.

3. Choose the Add button.
4. Choose the OK button.

► **To assign a form to a printer**

1. Select the printer to which you want to assign the form.
2. Choose the Properties button, or choose Properties from the Printer menu.
3. In the Printer Properties dialog box, choose the Setup button.
4. Select the source, for example Upper Paper Tray, and the name of the form, for example Letter.

Source and form options are dependent on the printer.

5. Choose the OK button.

► **To remove a form**

1. From the Printer menu, choose Forms.
2. In the Forms On This Computer box, select the form you want to remove. You cannot delete any of the standard forms supplied with Windows NT.
3. In the Forms dialog box, choose the Delete button.

Printing Documents

The way you print documents depends on the application you are using. Use Print Manager to manipulate the documents at the printer. You can pause printing, and change the order of or remove documents that are waiting to print.

Security You can always control printing of your own documents. However, to control printing of other users' documents, you must be logged on as a member of the Administrators or Power Users group, or you must have been granted Manage Documents permission for the printer.

Setting the Default Printer

When you choose the Print command in an application, the application sends the document to the default printer. Some applications allow you to select any of the available printers when you print. Set the default printer to be the printer you print to most often.

► **To set the default printer**

- On the Print Manager toolbar, choose the Default box and select a printer from the list.



Viewing Documents at the Printer

To see the documents that are printing or waiting to be printed, display the printer's window. The printer window shows each document's status, name, and owner; the time it was sent to the printer; its size in pages and kilobytes; and its priority. Print Manager displays documents sorted by the order in which they will print.

shipping						
Status	Document Name	Owner	Printed at	Pages	Size	Priority
Printing	Microsoft Word - REPORT.DC	Administrator	2:06 PM	20	1164904 b	0
	Paintbrush - CHART.BMP	Guest	2:15 PM	1	96324 b	0
	Notepad - APPNOTES.TXT	SteveW	2:16 PM	2	654 b	0
Spooling	Remote Downlevel Document	SYSTEM	2:39 PM	0	0 b	0

Pausing and Resuming Printing

You can interrupt and restart printing of all documents on a printer or of one document on a printer.

► **To pause all printing**

1. Select the printer's window or icon.

If a document is selected in the printer window, deselect it by pressing the right mouse button or by pressing the SPACEBAR.



2. From the Printer menu, choose Pause. Or choose the Pause button on the toolbar.

► **To resume all printing**

1. Select the printer's window or icon.

If a document is selected in the printer window, deselect it by pressing the right mouse button or by pressing the SPACEBAR.



2. From the Printer menu, choose Resume. Or choose the Resume button on the toolbar.

► **To pause printing of a document**

1. Select the document in the printer window.



2. From the Document menu, choose Pause. Or choose the Pause button on the toolbar.

► **To resume printing a document**

1. Select the document in the printer window.



2. From the Document menu, choose Resume. Or choose the Resume button on the toolbar.

Changing Printing Order

You can change the order in which documents will be printed.

► **To change the order of a document**

- Select the document in the printer window, and then drag it to a new position in the printing order.

–Or–

- Select the document in the printer window, and then press CTRL+UP ARROW or CTRL+DOWN ARROW to move the document up or down in the printing order.

Restarting Documents

You can restart printing from Print Manager. When you restart a document, Print Manager reprints it from the beginning. For example, if your printer experiences a problem such as wrinkled paper, use Print Manager to restart printing. You can restart printing only when the Print Directly To Ports option is off.

► **To restart printing for a document**

- Select the document in the printer window, and then choose Restart from the Document menu.

Removing Waiting Documents

You can remove documents that are waiting to print one at a time, or you can remove all documents that are waiting to print.

► **To remove a waiting document**

1. Select the document in the printer window.



2. From the Document menu, choose Remove Document. Or choose the Remove Document button on the toolbar.

► **To remove all waiting documents**

1. Select the printer's window or icon.
2. From the Printer menu, choose Purge Printer.

Displaying or Changing Document Details

When you display detailed information on a document, Print Manager displays the file's name, status, owner, size in pages and kilobytes, and the time it was sent to the printer. Print Manager also shows who will be notified of the document's status when it prints, the range of time in which the document can be printed, the document's priority, and the document's print processor.

► **To display details about a document**

1. Select the document in the printer window.
2. From the Document menu, choose Details. Or choose the Details button on the toolbar.



Document Title: Microsoft Word -		OK
Status:	Pages: 20	Cancel
Size: 1159576	Owner: Administrator	Help
Printed On: Laser Printer	Notify: <input type="text"/>	
Printed At: 12:59 AM	Priority: <input type="text"/>	
Processor: WinPrint	Start Time: 12:00 AM	
Datatype: NT JNL 1.000	Until Time: 12:00 AM	

Changing Print Notification

By default, the owner of a document is notified when the document has been printed. You can change who is notified.

► **To change print notification**

- In the Document Details dialog box, type the username of the person you want to notify in the Notify box.

Changing Document Priority

By default, documents sent to a printer have the same priority while waiting to print. But when you raise the priority of a document, it will print before other documents that are waiting at that printer. If multiple printers with different priorities have been defined for a physical printer, documents sent to printers with higher priority will still print before documents sent to lower priority printers. For more information on printer priority, see “Setting Printer Priority” earlier in this chapter.

► **To change a document’s priority**

- In the Document Details dialog box, set the document’s priority in the priority box.

You can set a priority from 1; the highest priority, to 99.

Changing Document Printing Hours

You can specify a period of time during which the document will print. If, for example, you have a long document to print, you can specify that it print during the evening. The hours you set must be within the hours the printer is available. For more information on setting hours for a printer, see “Setting Printing Hours” earlier in this chapter.

► **To change printing hours for a document**

- In the Document Details dialog box, set the period of time during which the document will print in the Start Time and Until Time boxes.

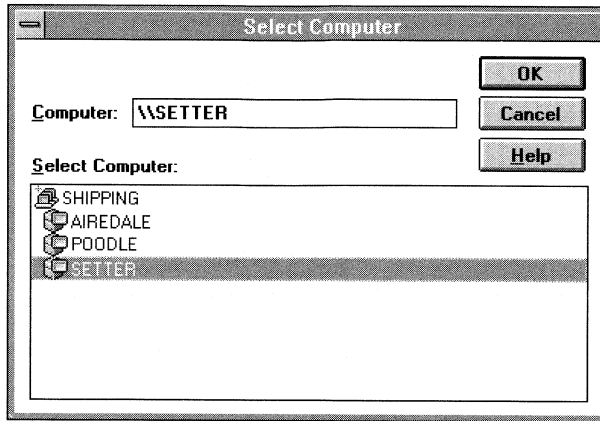
Administering Network Print Servers Remotely

Print Manager allows you to administer network print servers remotely. You can change the properties of existing printers, as well as install new printers or remove printers.

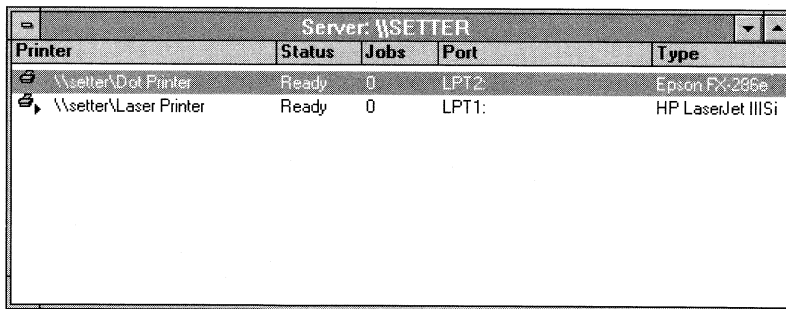
Security To administer a printer, you must be logged on as a member of the Administrators or Power Users group; or you must have been granted Full Control permission for the printer.

► **To install, remove, or change a printer remotely**

1. From the Printer menu, choose Server Viewer.



2. In the Select Computer dialog box, double-click the name of a domain to display the servers in the domain. Choose the print server you want to administer, and choose the OK button.
3. Print Manager displays a window that shows the printers on the server you have chosen. You can minimize server windows.



To

Choose

Install a new printer

Create Printer from the Printer menu. You can then install the printer just as you would a local printer.

Remove a printer

Remove Printer from the Printer menu.

Change a printer

Properties from the Printer menu.

Mail

The Mail electronic mail system helps you communicate efficiently with coworkers. This chapter provides an overview of the basic features of Mail for all users, and also provides information for the administrator who creates and manages the Workgroup Postoffice (WGPO).

The following topics are presented in this chapter:

- An overview of Mail
- Using Mail
- Setting up the Mail system
- Managing the Workgroup Postoffice
- Using Mail with other networks and other messaging systems

Although this chapter will get you started using Mail, your main source of information is online Help. To get Help, press F1 wherever you are working in Mail.

Overview

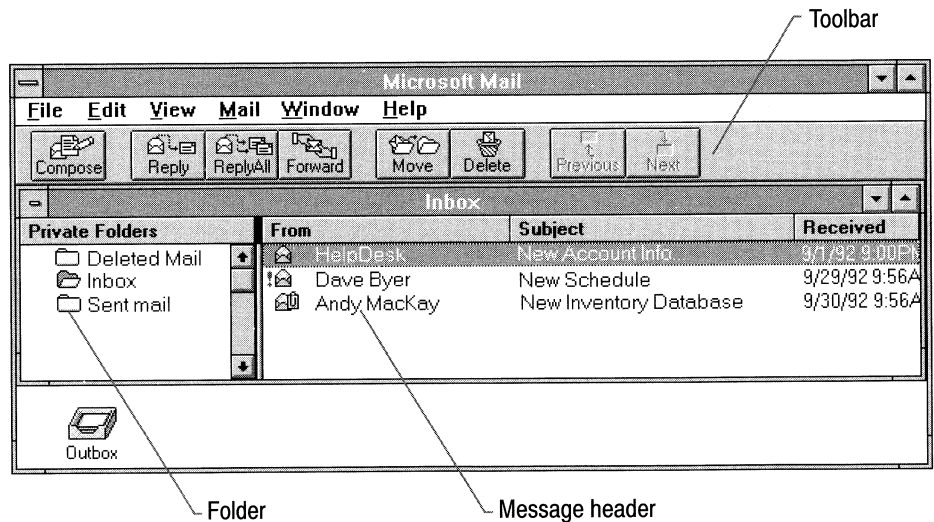
Mail is part of the set of applications that you can install on your system with Windows NT Setup. With Mail, you can:

- Send and receive electronic messages (e-mail).
- Attach files created with other applications, such as spreadsheet and word-processing applications, to your messages.
- Find messages in your mailbox according to criteria you specify.
- Print messages, organize and store messages in folders.

Before you can use Mail, an administrator must create a workgroup postoffice (WGPO), which contains all the information about Mail user accounts and serves as a collective mail drop facility for users. For information about how to create a WGPO, see “Setting Up the Mail System” later in this chapter.

When you connect to your postoffice and sign in for the first time (as described in “Starting and Quitting Mail”), Mail creates a file named MSMAIL.MMF in the directory where you installed Windows NT. Mail uses this file to store your messages, message folders, and Personal Address Book. The postoffice updates the file when it receives messages for you. Each Mail user in your workgroup has a message file, which is like a private mailbox. Each message file and the messages in it are protected by a password that only the user knows.

Each time you sign in, Mail displays the Inbox, showing your messages and folders.



The Inbox displays *message headers*, which show who sent the message, the subject, and the date and time the message was received in your mailbox. If the sender specified an urgent priority for the message, an exclamation point appears beside the message icon; a low-priority message appears with a down arrow; and a message that includes an attachment appears with a paper clip in the message icon. When you read a message, it appears in a Read Note form, as described in “Reading a Message” later in this chapter.

You can use either the toolbar or menus to reply to messages, forward them to other Mail users, or print or delete them. You can move or copy messages to organize and store them in *folders*. You can also sort messages by priority, sender, subject, or date. If you want to keep a record of the messages you send to other people, you can automatically save copies in the Sent Mail folder. For more information about these activities, see “Using Mail” later in this chapter.

To create a message, choose the Compose button on the toolbar, which displays the Send Note form. If you don’t know the recipient’s address or office number, you can use the address lists in the Address Book or in your Personal Address Book to address a message. For more information, see “Sending a Message” later in this chapter.

In the message body, you can cut and paste text between messages and files. If you want to send formatted files, such as Microsoft Word or Microsoft Excel documents, you can send them with the message as attached files. You can send as many attachments as you like with each message. For more information, see “Advanced Features of Mail” later in this chapter.

Starting and Quitting Mail

This section explains how to start Mail for the first time, connect to a postoffice, sign in to Mail, change your password, and quit Mail.

When you start Mail for the first time, you must:

- Create or connect to a postoffice.
- Create an account for yourself in the postoffice if the administrator has not set up an account for you.

If an existing Mail version 3.0 postoffice has been assigned for your workgroup or if someone in your workgroup has already created a WGPO, you must connect to that postoffice. If you need to create a new postoffice, see “Creating a Workgroup Postoffice” later in this chapter.

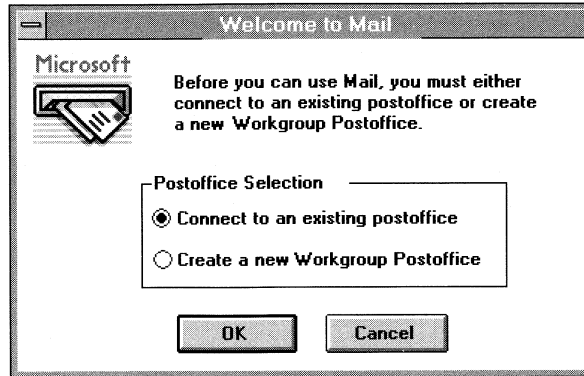
If you have already connected to a postoffice and created your account, see “Signing In to Mail” later in this section.

Connecting to a Postoffice

Before connecting to a postoffice, ask the administrator for the path to the postoffice, and verify that your computer has enough available disk space for your message file (MSMAIL.MMF). The required disk space depends on the number and type of messages stored in your mailbox. A typical small mailbox requires about 100K of disk space; a large mailbox might require several megabytes of disk space.

► **To connect to a postoffice**

1. From the Main group in Program Manager, choose the Mail icon.



2. In the Welcome To Mail dialog box, select the Connect To An Existing Postoffice option button.
3. In the Network Disk Resources dialog box, select the postoffice you want to connect to by doing one of the following:
 - In the Network Path box, type the path of the postoffice in the form `\\computername\sharename`; for example, type `\\maria\wgpo`.
 - Or in the Show Shared Directories On box, select the computername for your postoffice. Then in the Shared Directories On `\\computername` box, select the shared directory for your postoffice.
4. Choose the OK button.
5. When Mail asks if you have an account on this postoffice, choose Yes if you already have an account. You will be asked for your password.
Or choose No if you need to create an account. The Enter Your Account Details dialog box appears, so you can create your account, as explained in the following section.

Creating an Account

After you connect to a postoffice, you need to create an account. Before creating one, check that the administrator has not already created an account for you.

► **To create an account**

- In the Enter Your Account Details dialog box, fill in the appropriate information, as described in the following tables.

Enter Your Administrator Account Details

Name:

Mailbox:

Password:

Phone #1:

Phone #2:

Office:

Department:

Notes:

Required Information to Create an Account

Item	Description
Name	Type your full name, for example, Maria Smith . The maximum length is 30 characters, and the default is the user name you entered when you installed Windows NT.
Mailbox	Type a unique name with which you will sign in to Mail. Choose a mailbox name that is easy to remember, for example, MARIAS. The maximum length is 10 characters, and the default is your Windows NT username.
Password	Type a password. You will use this password and your mailbox name to sign in to Mail. Choose a password that is easy to remember. The maximum length is 8 characters, and the default is PASSWORD.

Optional Information to Create an Account

Item	Description
Phone #1	Type your phone number, for example, (206) 555-5555 . The maximum length is 32 characters.
Phone #2	If you have two phone numbers or a phone number and a fax, type your second phone number. The maximum length is 32 characters.
Office	Type your office location, for example, 205 to represent a room number. The maximum length is 32 characters.
Department	Type your department's name, for example, Sales . The maximum length is 32 characters.
Notes	Type any comments about your account. The maximum length is 128 characters.

After you create an account, Mail displays the Inbox, where your messages and folders appear, as shown earlier in this chapter.

Signing In to Mail

When you create an account, you are signed in automatically. The next time you start Mail, you sign in by typing your mailbox name and password. You can also set up Mail to enter your mailbox name and/or password automatically when you start it.

► To sign in to Mail

1. In the Main group in Program Manager, choose the Mail icon.
2. In the Name box of the Sign In dialog box, type your mailbox name and then press TAB.

Note The Postoffice Manager does not distinguish between uppercase and lowercase letters; “MARIAS,” “MariaS,” and “marias” are considered to be the same.

3. In the Password box, type your password and then press ENTER.

Mail displays your Inbox so that you can begin reading and sending messages, as described in “Using Mail” later in this chapter.

► To sign in to Mail automatically

1. In the Main group in Program Manager, choose the Mail icon.
2. From the File menu, choose Properties.
3. To have Mail automatically enter your mailbox name, at the end of the path in the Command Line box, type a space and then your mailbox name. For example, type **c:\winnt\msmail.exe marias**

Or to have Mail automatically enter your mailbox name and password, at the end of the path in the Command Line box, type a space, your mailbox name, another space, and then your password. For example, type
c:\winnt\msmail.exe marias secret

Important If security is important in your workgroup, record only your mailbox name and not your password, so others cannot read your messages or send messages under your name.

Changing Your Password

For security, change your password regularly. If security is not a concern, you don't need to change it.

► To change your password

1. From the Mail menu, choose Change Password.

2. Type your old password, and then press TAB.

For security, you do not see the characters as you type them.

3. Type your new password, and then press TAB.

4. To verify the new password, type it again and then press ENTER.

If your second attempt to type the new password does not match the first, the computer beeps; start over with a new password and then verify it.

Your new password is registered. You must use it the next time you sign in to Mail.

Note If you forget your password, you must ask the postoffice Administrator to define a new password for you.

Quitting Mail

There are two commands on the File menu you can use to quit Mail: Exit and Exit And Sign Out. If Mail is the only application you are running that requires you to sign in to your mailbox, both of these commands close Mail and sign you out.

If you are running another application such as Schedule+ that uses Mail to communicate with your workgroup, the Exit command does not sign you out. This allows the other application to continue using the postoffice when Mail is closed. If you restart Mail, you don't need to sign in.

The Exit And Sign Out command closes Mail and signs you out. This command also closes any other application using Mail that might be running. If you restart Mail, you will need to sign in again.

When you quit Mail, by default Mail permanently deletes all the messages in the Deleted Mail folder. If you don't want the messages in this folder deleted when you quit Mail, turn off this option by choosing Options from the Mail menu.

► To quit Mail and sign out

- From the File menu, choose Exit And Sign Out.

► **To quit Mail and remain signed in**

- From the File menu, choose Exit.

If other applications that use Mail are not running, the Exit command also signs you out.

Using Mail

This section covers the basic steps for sending messages and working with messages you receive, including the following topics:

- Sending a message
- Reading a message
- Replying to a message
- Deleting a message

Some advanced features of Mail are described at the end of this section.

Sending a Message

Sending a message involves a few simple steps: addressing it, typing a subject and message, and then sending it.

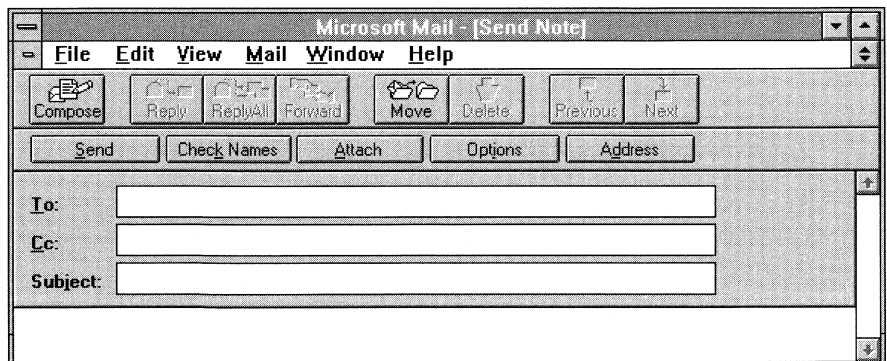
Addressing a Message

The first step in sending a message is to open a Send Note form and choose the users to whom you want to send the message.

► **To address a message**

1. Click the Compose button, or from the Mail menu, choose Compose Note.

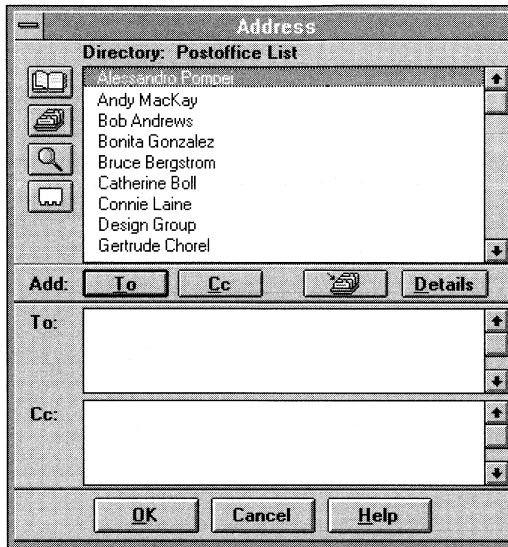
A Send Note form appears.



2. Choose the Address button.

Mail displays the Address Book, which contains the names of users on your postoffice.

For information about using the buttons in the Address Book and about using shortcut keys, see the table following this procedure.



3. To locate usernames in the address list:

- Type the first few characters of a name. The address list scrolls to the first name in the list with those characters and selects it. This is the fastest way to find a name.
- Or click the scroll arrows in the scroll bar.
- Or press the arrow keys to scroll through the list.





4. To select a name that is highlighted in the list, choose the To button or press ENTER.

The selected username is added to the To box.

5. To add names to the Cc list, repeat the steps for locating and selecting names, and then choose the Cc button or press ENTER.

6. Choose the OK button.

The display shows the Send Note form with the selected name entered in the To box. If you select a name from the Address Book, the name is underlined in the Send Note form. The underline indicates that Mail verified the name in the postoffice.

Button	Shortcut key	Use
	CTRL+L	The Directory button to select a user directory from the list of available directories for postoffices and gateways on your network.
	CTRL+P	The Personal Address Book button to display names and groups in your Personal Address Book.
	CTRL+F	The Find button to find a name or first part of a name in the current user directory.
	CTRL+N CTRL+A	The New Address button to add a new name and address to your Personal Address Book or to address a message to another mail system. You can add a gateway address plus the name and address of a user on another mail postoffice.

You can copy the names of people to whom you often send messages from the Postoffice List into your own Personal Address Book. If you often send messages to the same group of people, you can choose Personal Groups from the Mail menu to create a personal group name for them. When you include that group name on a message's recipient list, all the individuals in the group receive the message.

You can also address mail to users on another mail system if a gateway has been added to your Mail network. A gateway is software that enables direct mail systems to communicate with each other. When a message is sent from one mail system to another, the gateway filters out information specific to the originating mail system, attaches information the second mail system needs to deliver the message, and sends the message on its way. If a gateway has been added to your Mail network, its name appears in the Address Book.

Typing and Sending a Message

The next step is to type the subject and message text.

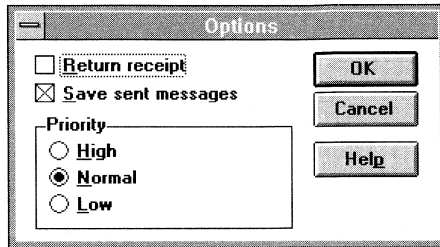
► To type a message subject and a message

1. In the Send Note form, click the Subject box, or press TAB until the insertion point is in the Subject box, and then type a short description of the message.
If you make a mistake while typing, press the BACKSPACE key to erase the error, and then continue typing.
2. Click anywhere in the message body, or press TAB, and then type the message you want to send.
If the text reaches the right margin of the form, the next word automatically moves to the next line; you don't need to press ENTER at the end of each line.

The last step is to send the message.

► To send a message

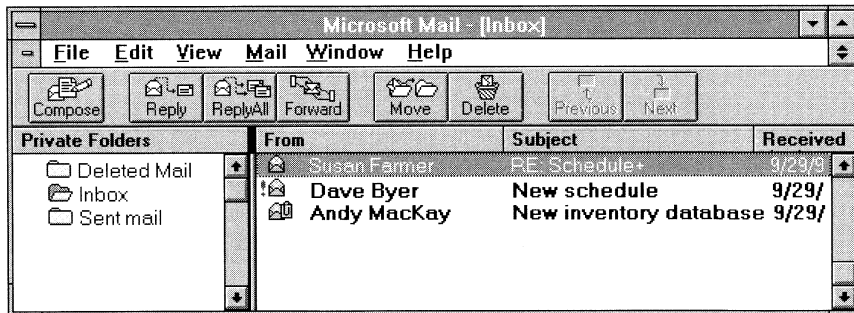
1. If you want to set options for the message you are sending, choose the Options button in the toolbar, and then select the options you want to set. For more information about the Options dialog box, see online Help.



2. In the Send Note form, choose the Send button.

Reading a Message

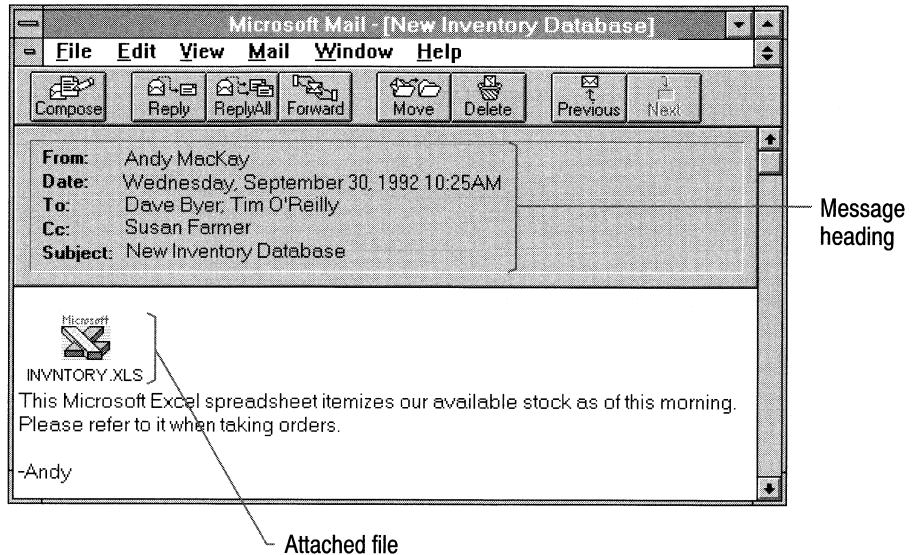
The message header in your Inbox displays information about the message, including who the message is from and the date and time it was received. Because you haven't read the new message, Mail displays a closed-envelope symbol and shows the sender's name in bold.



► To read a message

- Double-click the message in the Inbox. Or press TAB to move the highlight from the Folders list to the message list; use the arrow keys to highlight the message, and then press ENTER.

The message appears in a Read Note form.



The gray area at the top of the form is the message heading, which shows who sent the message, when it was received, the people or groups it was sent to, and the message subject.

Attached files appear in messages as icons. An attached file can contain any kind of data, including text, graphics, a spreadsheet, executable code, and so on. If you have the application used to create the file, you can open the file while reading the message by double-clicking the icon.

Note To avoid introducing a computer virus, you should use the same care when opening or activating an attached file or object in a message that you do when opening or activating a file or object from the network or a floppy disk.

Replying to a Message

After reading a message, you may want to send a reply. The Reply button or command automatically addresses the message to the person who sent it and includes the original message in the message body. Including the original message is useful because you can add comments above or within the original message.

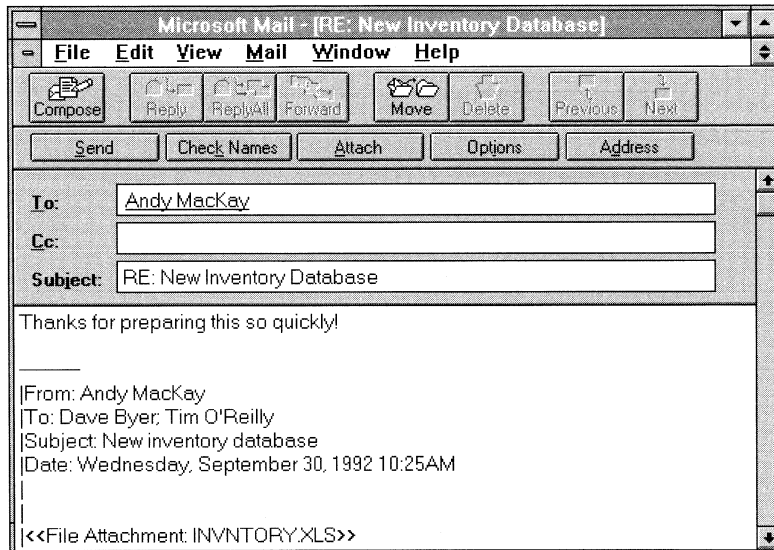
► To reply to a message

1. Choose the Reply button, or from the Mail menu, choose Reply.

If you want to reply to everyone who received the original message, choose the Reply All button.

A Send Note form appears. The name of the original sender appears in the To box, and the title of the original message appears in the Subject box, preceded by the prefix RE: (for “reply”). The original message is included in the form, below the solid line.

2. At the top of the message box, type your reply.
3. If you want to insert comments within the message you received, use the arrow keys to move the insertion point to where you want to enter a comment. Press ENTER to start a new line after the original message, and then type the comment you want to insert.
4. Choose the Send button.



Deleting a Message

To manage the number of messages in your Inbox, you should delete messages you've already read and no longer need.

► To delete a message from the Inbox

1. In the Inbox, select the message you want to delete.
2. Click the Delete button, or from the File menu, choose Delete.

The message is moved to the Deleted Mail folder, where you can retrieve it until it is deleted there. By default, Mail deletes messages in the Deleted Mail folder when you quit Mail. To change this option, choose Options from the Mail menu.

Advanced Features of Mail

This section presents some advanced features of Mail. Use Help to find more details.

Attaching Files and Embedding Objects

You can choose the Attach button from the toolbar to send one or more application files, such as Microsoft Word or Microsoft Excel documents, or batch files, programs, graphics files, or any other files that are available to you.

Mail displays the Attach dialog box, where you can select a file to attach in the same way that you select a filename in the Open or Save As dialog boxes.

Mail also includes object linking and embedding (OLE) capability, so you can copy parts of formatted documents from other applications, such as spreadsheets and word processing, into a message without losing formatting. You embed or link an object in a Mail message in the same ways as you do in any application with OLE capabilities. For information, see Chapter 7, “Object Linking and Embedding.”

Creating Message Templates

If you send a specific message on a regular basis, such as a weekly progress report, you can set up a Send Note template for the message and basic addresses.

► To create a message template

1. Choose the Compose button on the toolbar, or from the Mail menu, choose Compose Note.
2. Address the message to the people you will be sending it to regularly, and type the subject and template information.
3. Close the message window by double-clicking the Send Note window's close box or by pressing CTRL+F4.
4. When Mail asks if you want to save the message, choose the Yes button.
Mail displays the template message in your Inbox, but you can move this message to any folder.

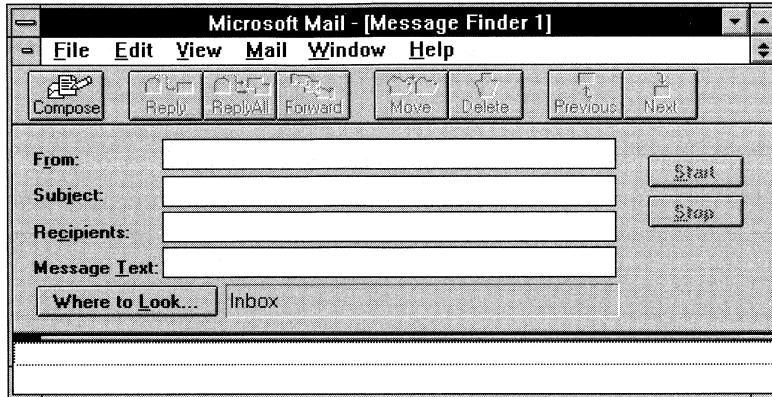
► To use a message template

1. Display the message template by doing one of the following:
 - Drag the message header to the Outbox icon.
 - Or select the message, and from the Mail menu, choose Forward.
2. Fill in the message. If necessary, change the list of recipients.
3. Choose the Send button.

Finding Messages

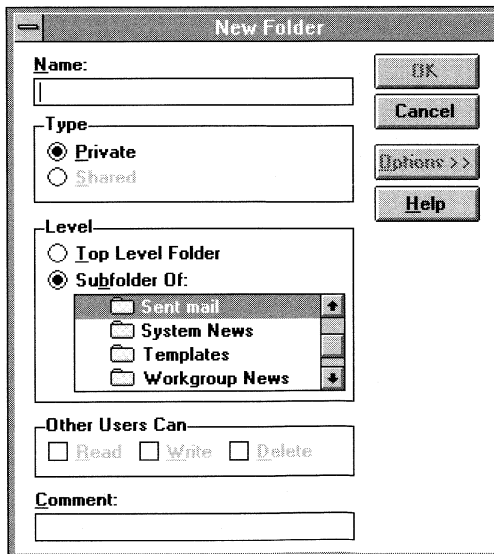


You can choose Message Finder from the File menu to search for messages you stored in Mail folders. You can also keep multiple Message Finder windows minimized on the Mail workspace, each with its own search criteria. Then, when you want to search for a message with the criteria, maximize the icon.



Using Folders

Mail stores your private messages in folders that you create and manage using the New Folder and Folder Properties commands from the File menu. Your private messages are stored on your hard disk. Shared folders are stored in your postoffice and can be accessed by other users in your postoffice.



Working Offline

You may want to create new messages or work with messages you received without being connected to the postoffice (for example, while you are traveling or working at home). If you have Mail installed on your computer, you can compose and work with messages without being connected to the postoffice. This is called working offline.

► **To move your message file to a computer or disk from your postoffice**

1. From the Mail menu, choose Options.
2. In the Options dialog box, choose the Server button.
3. In the Storage box, select the Local option button.
4. In the File box, type the path to the drive or directory where you want to save your message file, and then choose the OK button.

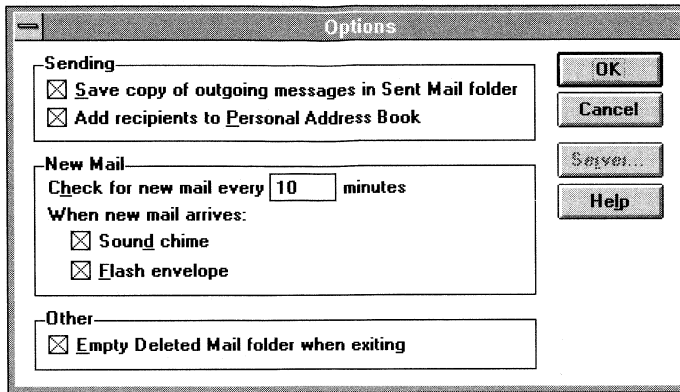
► **To work offline**

1. Start Mail on a computer that is not connected to the postoffice.
2. In the message that asks if you want to work offline, choose the OK button.
3. Type your password in the dialog box, and then choose the OK button.
4. If Mail cannot find your message file, specify the path to it.

After you finish composing a message, choose the Send button. The message is moved to the Outbox. To move it to the postoffice when you resume working online, follow the procedure above for copying your message file to a computer or disk, but choose the Postoffice option instead of the Local option. When you connect to the Mail system, the messages in your Outbox are sent automatically.

Defining Other Mail Options

You can choose the Options command from the Mail menu to define various preferences for sending mail, checking for new mail, choosing the server, and emptying the Deleted Mail folder. For more information, see Help.



Setting Up the Mail System

The following sections explain the concepts and procedures related to setting up and administering Mail in Windows NT and using Mail with other networks and other messaging systems. The rest of this chapter is written for the administrator who is responsible for creating and managing the Workgroup Postoffice.

Planning a Workgroup Postoffice

Before your workgroup can use Mail, each user needs to connect to a postoffice. If your workgroup does not have an existing postoffice, an administrator in your workgroup needs to create and manage a WGPO using the Postoffice Manager.

This section describes the Mail messaging system and the Workgroup Postoffice to help you plan your WGPO.

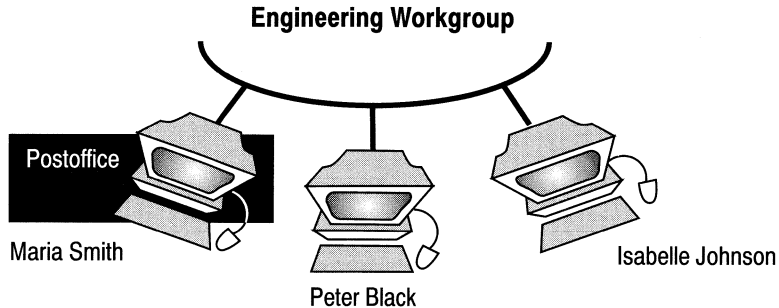
The Mail Messaging System

The Windows NT messaging system consists of the Mail application and the WGPO. The Mail application runs on each user's computer, and the WGPO is stored in a shared directory on a computer running Windows NT.

If your company already has a messaging system, you can use the Mail application with the postoffice or messaging (mail) server that is part of that system. For information, see "Using Mail with Other Messaging Systems" later in this chapter.

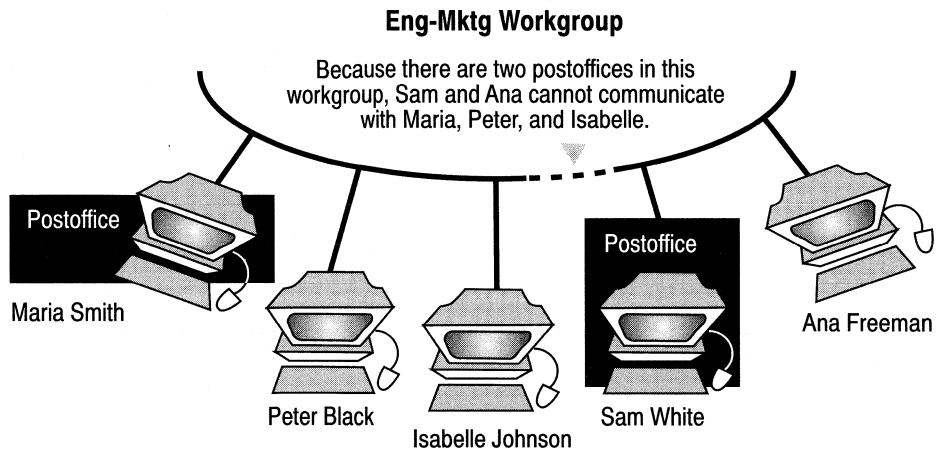
The WGPO contains all the information about Mail user accounts and serves as a collective mail-drop facility for users in your workgroup. To communicate, users must be connected to the same postoffice and have an account on that postoffice.

The following figure shows three users in a workgroup with a WGPO. Maria Smith, Peter Black, and Isabelle Johnson belong to a workgroup called Engineering. To allow users in the Engineering workgroup to use Mail, Maria created a WGPO on her computer and accounts for herself, Peter, and Isabelle. Because she created the WGPO, she will be its administrator. Maria, Peter, and Isabelle use their respective computers to run Mail, and their message files are stored on their computers as well. They can now use Mail to send messages and files to each other.



Two users connected to different WGPOs cannot exchange messages.

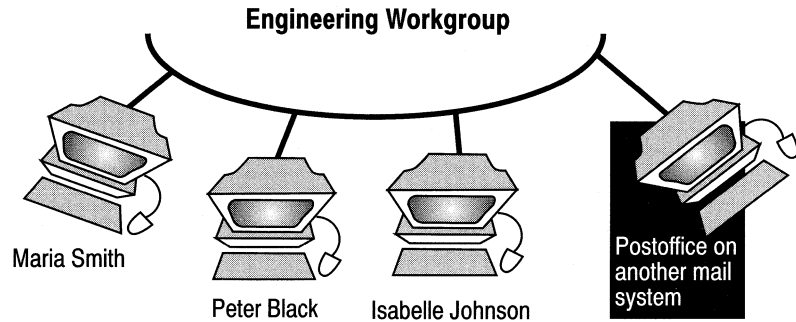
The following figure shows a new workgroup that includes the original Engineering workgroup and two new users from Marketing, Sam and Ana. Sam created another WGPO on his computer, and he created accounts for himself and Ana. In this configuration, Maria, Peter, and Isabelle can communicate with each other. Similarly, Sam and Ana can communicate. However, Sam and Ana cannot communicate with Maria, Peter, and Isabelle because they are not connected to the same postoffice.



If Sam deletes his postoffice and Maria creates accounts for Sam and Ana on her postoffice, all five can communicate with each other.

You can create a WGPO on a computer that is part of your workgroup, on a Windows NT Advanced Server, file or on an existing network such as Novell NetWare.

The following figure shows the Engineering workgroup connected to a postoffice that is part of an existing messaging system. For this configuration, the administrator of the existing messaging system is responsible for setting up and configuring the postoffice. Each member in the Engineering workgroup needs to connect to that postoffice, as explained in “Starting and Quitting Mail” earlier in this chapter.



Planning for Disk Space

Before creating a WGPO, verify that your computer meets the following requirements.

On the computer where the WGPO will be installed, there must be:

- 360K of available disk space for an empty postoffice.
- 16K of available disk space for each user account.

On each user's computer, there must be:

- Enough available disk space for each user's mailbox, depending on the number and type of messages stored in a mailbox. A typical small mailbox requires about 100K of disk space; a large mailbox can use several megabytes of disk space.

Creating the Postoffice and the Administrator Account

After you verify that the computer has enough disk space to create a WGPO, you can create a WGPO and an Administrator account. The Administrator account is the first account you create in the WGPO. After you create the Administrator account, you can modify it, but you cannot remove it.

This section describes how to create the WGPO on a Windows NT workstation or Advanced Server. If you want to create the WGPO on a network server, see "Using Mail with Other Networks" later in this chapter.

Important The computer where you create a WGPO must be turned on at all times so that users can exchange mail.

You should create only one WGPO per workgroup. Only the users connected to the same WGPO can communicate with each other.

► **To create a WGPO and the Administrator account**

1. Start Mail.

If a WGPO has not been assigned to your workgroup, Mail starts the Workgroup Postoffice Manager and displays the Welcome To Mail dialog box, as described in “Connecting to a Postoffice” earlier in this chapter.

2. In the Welcome To Mail dialog box, select the Create A New Workgroup Postoffice option button, and then choose the OK button.

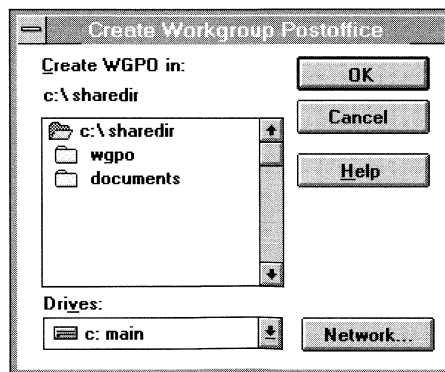
A message reminds you that there should be only one WGPO in a workgroup and that you will be responsible for managing any new WGPO you create.

3. To create a new postoffice, choose the Yes button.

Or choose No to return to the Welcome To Mail dialog box so that you can connect to an existing postoffice.

4. In the Create Workgroup Postoffice dialog box, select a location for the WGPO. You can create the WGPO either on your hard drive or on a network server:

- To create the WGPO on your hard drive, select a drive from the Drives box and a directory from the Create WGPO In list, and then choose the OK button.
- Or to create the WGPO on a network server, choose the Network button, and select a server and shared directory from the dialog box, and then choose the OK button.



5. In the Administrator Account Details dialog box, fill in the appropriate information to create the Administrator account.

The requirements and optional information in this dialog box are the same as those described in “Creating an Account” earlier in this chapter.

When you fill in this dialog box, type names that are easy to read. You can use extended characters (such as letters with accents), but it is not recommended. Only alphanumeric characters are allowed in the Mailbox and Password boxes. The Postoffice Manager is not case-sensitive; that is, “MARIAS,” “MariaS,” and “marias” are considered to be the same.

6. Choose the OK button.

When the message reminds you to share the WGPO directory that you just created, choose the OK button.

Important If you are not able to create a WGPO, it is probably because you don’t have enough disk space or, if you are creating the WGPO on a server, because you don’t have write permission on that server. In either case, the solution is to find another location with enough disk space and where you have sufficient privileges to create the WGPO.

Sharing the Workgroup Postoffice

After you create a WGPO, you must share the WGPO directory that contains the data files with all users on the postoffice.

► To share a Workgroup Postoffice on a Windows NT Workstation

1. Open File Manager and select the WGPO directory.
2. From File Manager’s Disk menu, choose Share As.
3. In the Share Name box, type a name for the postoffice. The default is WGPO.
4. Select the Re-share At Startup check box.
5. Under Access Type, select the Full Access option button.
6. Optionally, under Passwords, type a full access password for the WGPO.
7. Choose the OK button.

► To share a WGPO on a Windows NT Advanced Server

1. Create a directory on the LAN Manager server where the WGPO will be located. This can be a domain controller or backup server.
2. Share the directory you just created. Make sure you don’t share the parent directory.
3. Provide full access permissions to the directory.
4. Create a WGPO as explained in “Creating a Workgroup Postoffice” earlier in this chapter.

Note After you create a WGPO, the Postoffice Manager command appears on the Mail menu when you start Mail. This command appears only on the computer where you created the WGPO. If you want to run the Postoffice Manager from another computer in your workgroup, you must modify your MSMAIL32.INI file as explained in “Managing Your Workgroup Postoffice” later in this chapter.

Creating a Workgroup Postoffice

This section explains how to create a Workgroup Postoffice (WGPO). The person who creates the WGPO should plan to manage it. Creating the WGPO requires that you complete the following actions:

- Verify that there is enough disk space on the computer where you will install it.
- Create the WGPO and an account for the administrator.
- Share the WGPO so that all users in your workgroup can use it.

Managing Your Workgroup Postoffice

After you create a WGPO and an Administrator account, you can manage the WGPO with the Postoffice Manager.

Important Only the administrator can run the Postoffice Manager. The administrator can manage the WGPO from any computer in the workgroup. For instructions, see “Workgroup Postoffice Installation Results” later in this chapter.

With the Postoffice Manager, you can complete the following actions:

- Add users to the WGPO
- Modify existing user accounts
- Remove users from the WGPO
- Manage the disk space where the WGPO is stored

You may also need to change the name of the WGPO, move or remove a WGPO, or manage the Mail system files, as described in this section.

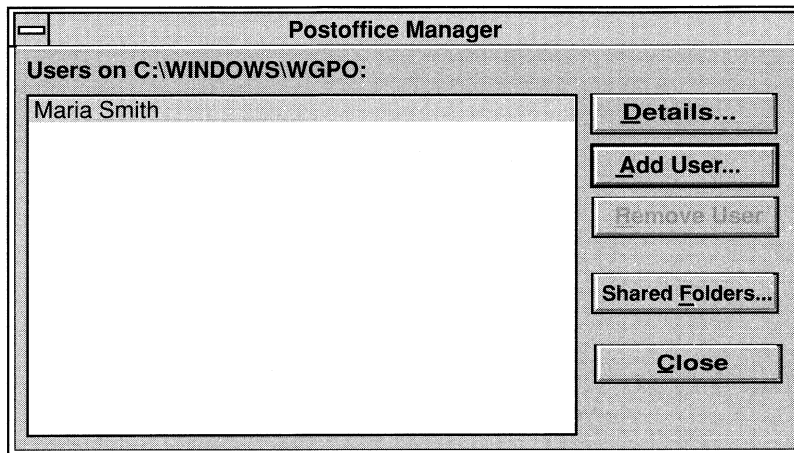
Starting the Postoffice Manager

Before you can start the Postoffice Manager, you must start Mail.

► **To start the Postoffice Manager**

- From the Mail menu, choose Postoffice Manager.

In the Postoffice Manager dialog box, you can add users, modify user accounts, and remove users.



Adding a User

To add a user to a WGPO, you must provide the user's name, mailbox name, and password. Optionally, you can also provide the user's phone number(s), office location, department, and comments about the user's account.

Note Users who do not have an account on the WGPO can each create their own account. If you create the account, be sure to give the account information to the user.

► **To add a user**

1. From the Postoffice Manager dialog box, choose the Add User button.
2. In the Add User dialog box, fill in the appropriate information, and then choose the OK button.

For a complete description of the entries in the Add User dialog box, see "Creating an Account" earlier in this chapter.

Modifying a User Account

With the Postoffice Manager, you can modify any information about the user's account.

► **To modify a user account**

1. From the Postoffice Manager dialog box, select the username you want to modify.
2. Choose the Details button.

A dialog box appears, showing the user's account information, which identical to the information defined in "Creating an Account" earlier in this chapter.

3. Change the appropriate entries, and then choose the OK button.

Removing a User

With the Postoffice Manager, you can remove a user from a WGPO.

Note You cannot remove the Administrator account.

► **To remove a user**

1. From the Postoffice Manager dialog box, select the username you want to remove.
2. Choose the Remove User button.

When the message asks you to confirm that you want to remove the selected username, choose the Yes button.

Managing Disk Space

One of the most important administrative tasks is managing the disk space where the WGPO is stored. To manage disk space, you need to check the current status of shared folders and recover unused disk space by compressing shared folders.

A shared folder is a public folder stored in the WGPO directory, unlike users' private folders, which are stored on their own computers. All users in a workgroup can open shared folders and see the messages they contain. Any user in the WGPO can create a shared folder and choose the appropriate access permissions (Read, Write, or Delete).

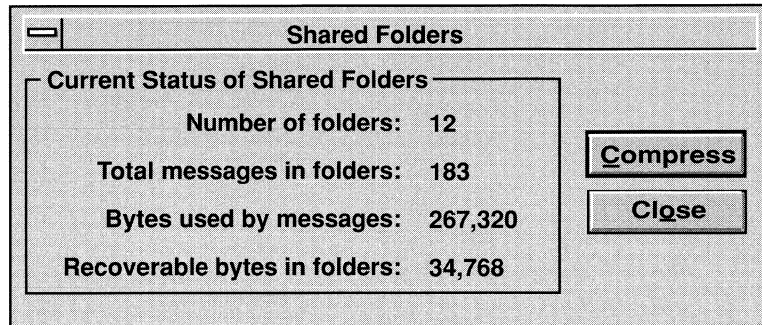
By checking the status of shared folders, you determine the following:

- The number of shared folders
- The number of messages stored in shared folders

- The amount of disk space the messages use
- The amount of disk space you can recover by compressing shared folders

► **To check the status of shared folders**

- From the Postoffice Manager dialog box, choose the Shared Folders button. The Shared Folders dialog box shows the current status of shared folders in a WGPO.



Compressing shared folders recovers disk space. When the Mail system runs out of disk space, this is the first step to take. If you still require more space, you can delete old messages and unused folders. You might also need to move the WGPO to a different location (see “Moving a Workgroup Postoffice” later in this chapter.)

If the shared folders contain a large number of messages, the compression process may take a long time.

► **To compress shared folders**

Important Do not attempt to compress shared folders while others are using them.

1. Before compressing a shared folder, ask all users in a workgroup to close the folder.
2. From the Postoffice Manager dialog box, choose the Shared Folders button.
3. In the Shared Folders dialog box, choose the Compress button.
4. Choose the Close button.

Changing the Name of a Workgroup Postoffice

You may need to change the name of a WGPO. For example, if you are part of a large company where someone else created a WGPO with the same name as yours, either you or the administrator of the other WGPO needs to change the name of one of the WGPOs.

Before you rename a WGPO, inform users in the workgroup that they cannot exchange messages until they reconnect to the renamed WGPO.

► To rename a Workgroup Postoffice

1. Ask all users in the workgroup to exit and sign out of Mail.
2. Open File Manager and select the WGPO directory.
3. From File Manager's Disk menu, choose Share As.
4. In the Share Name box, type the new name for the WGPO, and then choose the OK button.
5. Edit the **ServerPath=** entry in the [**Microsoft Mail**] section of the MSMAIL32.INI file to reflect the new name of the WGPO, in the following format:

```
ServerPath=drive:\directory or ServerPath=\\computername\sharename
```

For example, **serverpath=d:\wgpo** or **serverpath=\\domain1\wgpo**.

If the shared directory had a password, you need to delete or edit the entry specifying the password for the shared directory.

6. Ask users in the workgroup to edit the **ServerPath=** entry in the [**Microsoft Mail**] section of their MSMAIL32.INI files to reflect the new name of the WGPO, in the following format:

```
ServerPath=\\computername\sharename
```

For example, **serverpath=\\domain1\wgpo**.

They may also need to delete or edit an entry specifying a password for the shared directory.

Important Before altering an MSMAIL32.INI file, you should always make a backup copy in case you run into problems. After altering the MSMAIL32.INI file, you must restart Mail for the changes to take effect.

Moving a Workgroup Postoffice

You may need to move a WGPO to a different location—for example, if the computer where you installed the WGPO runs out of disk space.

Before you move a WGPO, inform users in the workgroup that they cannot exchange messages until they reconnect to the relocated postoffice.

► To move a WGPO

1. Ask all users in the workgroup to exit and sign out of Mail.
2. Open File Manager and select the WGPO directory.
3. From the File menu, choose Move.
4. In the To box, type the new path for the WGPO, and then choose the OK button.
5. Share the WGPO as explained in “Creating a Workgroup Postoffice” earlier in this chapter.
6. Complete steps 5 and 6 as described in the previous procedure to update the **ServerPath=** entry in the [Microsoft Mail] section of MSMAIL32.INI to reflect the new WGPO’s location. The changes must be made for both the computer that contains the WGPO directory and for each user.

Removing a Workgroup Postoffice

You may need to remove a WGPO that you just created, for example, if something goes wrong while you are creating it so that you have to re-create it.

Before you remove a WGPO, inform users in the workgroup that they cannot exchange messages until they reconnect to a new postoffice.

► To delete a WGPO

1. Delete the WGPO directory tree.
2. Delete the following entries from the [Custom Commands] section of MSMAIL32.INI on the computer that contains the WGPO:

```
WGPOMgr1=3.0;Mail;;13
WGPOMgr2=3.0;Mail;&Postoffice Manager...;14;
WGPOMGR.DLL;0;;Manage Workgroup Postoffice;MSMAIL.HLP;2870
```

Managing the Mail System Files

When you create a WGPO or when users connect to a postoffice, the Mail system files are modified. The Mail system files are the following:

- The message file, MSMAIL.MMF

This file stores messages, message folders, and the Personal Address Book for the user. The WGPO updates this file when it receives messages. The message file for each user is stored on his or her computer. Your message file is located in the directory where Windows NT was installed (the default is C:\WINNT).

- The Mail file, MSMAIL32.INI

This file contains information that controls the way Mail works. Each user's MSMAIL32.INI file is located in the directory where the user installed Windows NT (the default is C:\WINNT).

The Mail system files are automatically managed by Mail, so you shouldn't need to alter them unless you want to change specific functionality or you want to restore these files to a particular state.

The following sections describe how these files are modified when you create a WGPO and when a user connects to a WGPO. They also describe how to back up and restore the Mail system files.

Workgroup Postoffice Installation Results

When you create a WGPO, the Postoffice Manager makes the following changes to the system files for the Administrator account:

- The WGPO directory is created in the specified location.
- The following entries are added to the **[Custom Commands]** section of MSMAIL32.INI:

```
WGPOMgr1=3.0;Mail;;13
WGPOMgr2=3.0;Mail;&Postoffice Manager...;14;
WGPOMGR.DLL;0;;Manage Workgroup Postoffice;MSMAIL.HLP;2870
```

These entries instruct Mail to display the Postoffice Manager command in the Mail menu when you start Mail on the computer where you created the WGPO. This command appears only on the computer from which you created the WGPO. If you want to run the Postoffice Manager on another computer, you must add these entries to the MSMAIL32.INI file on that computer.

- A message file is created for the Administrator account, with the default name of MSMAIL.MMF.

- It adds the following entries to the [Microsoft Mail] section of MSMAIL32.INI:

```
ServerPath=drive:\directory  
Login=mailbox_name
```

Workgroup Postoffice Connection Results

When users connect to a WGPO, the Postoffice Manager makes the following changes to their system files:

- A message file is created for the user, with the default name of MSMAIL.MMF.
- The following entries are added to the [Microsoft Mail] section of MSMAIL32.INI:

```
ServerPath=\\computername\sharename  
Login=mailbox_name
```

Backing Up and Restoring the Mail System Files

After the Mail system files have been created, Mail automatically manages them for each user. In general, you don't need to alter the Mail system files; however, you might want to restore them to a given state or alter them to change the way Mail works.

You should back up the Mail system files regularly. Then, if there is a problem, you can recover your mail and the Mail environment from the last backup copy. The following procedures explain how to back up and restore your MSMAIL.MMF file and restore all folders in your mailbox.

If you want to back up or restore only some of the folders in your mailbox, use the Export Folder and Import Folder commands. For information about using Export and Import, see Help.

► To back up your MSMAIL.MMF file

1. From the Mail menu, choose Backup.
2. In the File Name box, specify the name and location of your backup file; for example, C:\USER\MARIA.MMF.
3. Choose the OK button.

► To restore an MSMAIL.MMF file

1. Open File Manager and select the backup copy of your message file.
2. From the File menu, choose Rename.
3. In the To box, type `c:\WINNT\msmail.mmf` (assuming that, by default, you installed Mail in the same directory that contains your Windows NT files).

4. Choose the OK button.

The backup file becomes your message file, and your mailbox displays the messages and folders you had when you last backed up the file. New messages that you received after you backed up the message file will not appear in your Inbox.

► **To back up an MSMAIL32.INI file**

1. Open File Manager and select the MSMAIL32.INI file, which is located in the directory where you installed Mail (the default is C:\WINNT).
2. From File Manager's File menu, choose Copy.
3. In the To box, type a name for the backup file; for example, **msmail.old**.
4. Choose the OK button.

To restore an MSMAIL32.INI file, you can rename a backup copy, if you have one, or you can edit your existing MSMAIL32.INI file. How you edit the file depends on whether you created a WGPO or are connected to one.

► **To restore an MSMAIL32.INI file after creating a WGPO**

- If you made a backup copy of an MSMAIL32.INI file, rename it to MSMAIL32.INI, and move it to the directory where you installed Mail (the default is C:\WINNT).

–Or–

1. If you don't have a backup copy, remove the following entries from the **[Custom Commands]** section of MSMAIL32.INI:

```
WGPOMgr1=3.0;Mail;;13
```

```
WGPOMgr2=3.0;Mail;&Postoffice Manager...;14;
```

```
WGPOMGR.DLL;0;;Manage Workgroup Postoffice;MSMAIL.HLP;2870
```

2. Remove the following entries from the **[Microsoft Mail]** section of MSMAIL32.INI:

```
ServerPath=drive:\directory
```

```
Login=mailbox_name
```

► **To restore an MSMAIL32.INI file after connecting to a WGPO**

- If you made a backup copy of the MSMAIL32.INI file, rename it to MSMAIL32.INI, and move it to the directory where you installed Mail (the default is C:\WINNT).

–Or–

- If you don't have a backup copy, remove the following entries from the **[Microsoft Mail]** section of MSMAIL32.INI:

```
ServerPath=\\computername\sharename  
Login=mailbox_name
```

Important If a message file becomes corrupted, a message appears with this information and also presents an option to repair the file. The user or the Administrator for the postoffice can repair the file immediately or quit mail and repair it later. However, the user cannot use Mail until the corrupted file is repaired.

Restoring a User's Password

If a user forgets a password, the Administrator for the postoffice can define a new password.

► **To define a new password for a user**

1. Sign in to Mail and start the Postoffice Manager.
2. In the Postoffice Manager dialog box, select the name of the user, and then choose the Details button.
3. In the Password box, type a new password, and then choose the OK button.
4. In the Postoffice Manager dialog box, choose the Close button.

The user can now sign in to Mail with the new password.

Caution If the Administrator for the postoffice forgets the password, that password cannot be recovered. The Administrator must create a new WGPO.

Using Mail with Other Networks and Other Messaging Systems

You can also create a Workgroup Postoffice on a file server that is part of an existing network, such as a Novell NetWare server.

If you want to use Mail with another network, you need to set up support for that network in Windows NT, using the Control Panel. For information about the necessary drivers and any further instructions, contact your network vendor.

Using Mail with a NetWare Network

To use Mail with a Novell NetWare network, you need to create a WGPO on a NetWare server and grant full trustee rights to the WGPO directory.

► To create a WGPO on a NetWare server

1. Create a directory on the NetWare server where the WGPO will be located.
2. Grant full trustee rights to this directory.
3. Use the Control Panel to set up NetWare support in Windows NT, as described in “Configuring the Network” in Chapter 4, “Control Panel.”
4. Restart Windows NT.
5. Log on to your NetWare server.
6. Use File Manager to assign a drive letter to the NetWare directory where you want to create the WGPO.
7. Create the WGPO as explained in “Creating a Workgroup Postoffice” earlier in this chapter.

Schedule+

Schedule+ is a personal scheduling tool that you can use to track important appointments and tasks, block out time for meetings, and record notes.

This chapter describes the basic features and how to use Schedule+ in the following topics:

- An overview of Schedule+
- Using the Appointment Book
- Using the Task list
- Using the Planner to schedule a meeting
- Using the Messages window to schedule a meeting
- Advanced features of Schedule+

Although this chapter contains the basic information you need to use Schedule+, your main source of information is the online Help. To get help, press F1 wherever you are working in Schedule+.

Overview

Schedule+, which you can choose to install on your system when you install Windows NT, can be used to schedule individual events and tasks, and to set automatic reminders for events.

Schedule+ can also be used as a workgroup scheduling tool. When you need to meet with coworkers, you can view the times they are available. Then you can schedule the meeting in one step—without leaving your desk or contacting each person individually.

You can also designate another Schedule+ user as your assistant, who can schedule appointments and set up meetings for you.

A scheduling tool is most effective when it's always accessible for reference and for recording impromptu appointments. With Schedule+, you can print copies of your schedule, and you can use Schedule+ from a portable or home computer that has the software installed.

In Schedule+, you can work online or offline, and then merge your changes into the copy of your schedule on the postoffice later. For more information, see "Advanced Features of Schedule+" later in this chapter.

Starting and Quitting Schedule+

You use your mailbox name and password to sign in to Schedule+. (If you are already signed in to Mail, you won't be prompted to sign in.)

► To start Schedule+ and sign in



1. From the Main group in the Program Manager, choose the Schedule+ icon.
2. In the Name box of the Sign In dialog box, type your mailbox name and press TAB.
3. In the Password box, type your password for Mail, and then press ENTER.

When you're finished working with Schedule+, you can either quit Schedule+ or quit and sign out.

► To quit Schedule+ and keep running Mail and Reminders

- From the File menu, choose Exit.

Choose this method to quit if you want to continue using Mail or receiving reminders while you aren't working with Schedule+.

► To quit Schedule+, Mail, and Reminders

- From the File menu, choose Exit And Sign Out.

Choose this method to quit if you're finished working with Schedule+, Mail, and the Reminders program (MSREMIND.EXE), which tracks reminders you set and notifies you in advance of these events. The next time you start Schedule+, the Reminders program starts automatically. (If any reminders were set to occur during the time that Reminders wasn't running, they won't be displayed when you start Schedule+.)

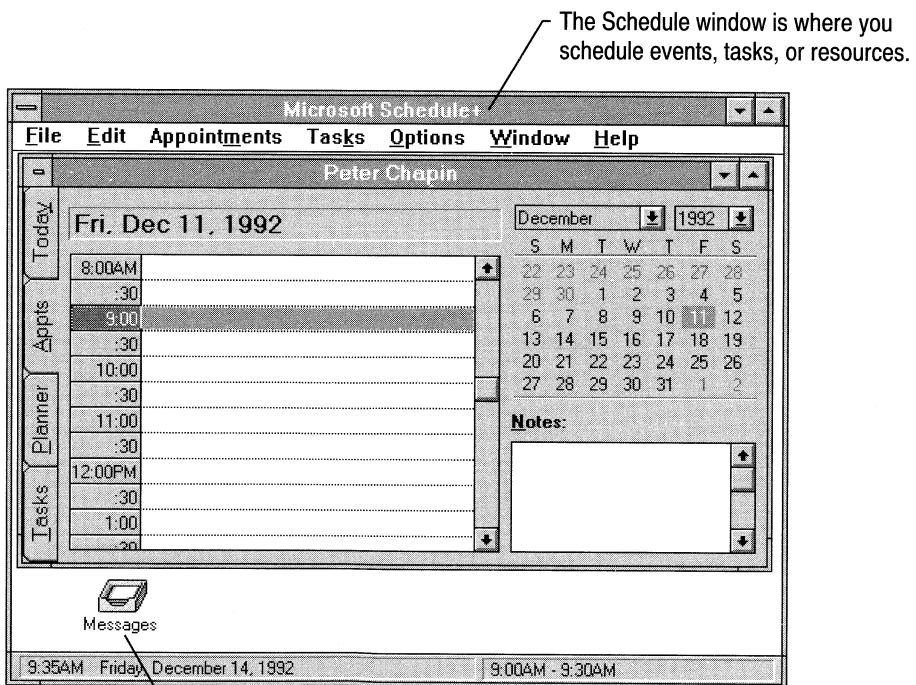
Organizing Your Screen

Organizing the workday requires two types of tasks: scheduling events and communicating with coworkers about scheduled events. Schedule+ provides a window for each type of task:

- The Schedule window. This window has your name on the title bar and tabs on the left side for your Appointment Book (Appts), Planner, and Task list (Tasks). When you want to work with your appointments or tasks, schedule meetings with others, or schedule a conference room or other resource, you work in the Schedule window.
- The Messages window (if your computer is connected to your postoffice). When you receive meeting requests or replies to your meeting requests, the messages appear in this window.

► To display the Schedule window

- From the Window menu in Schedule+, choose your name.



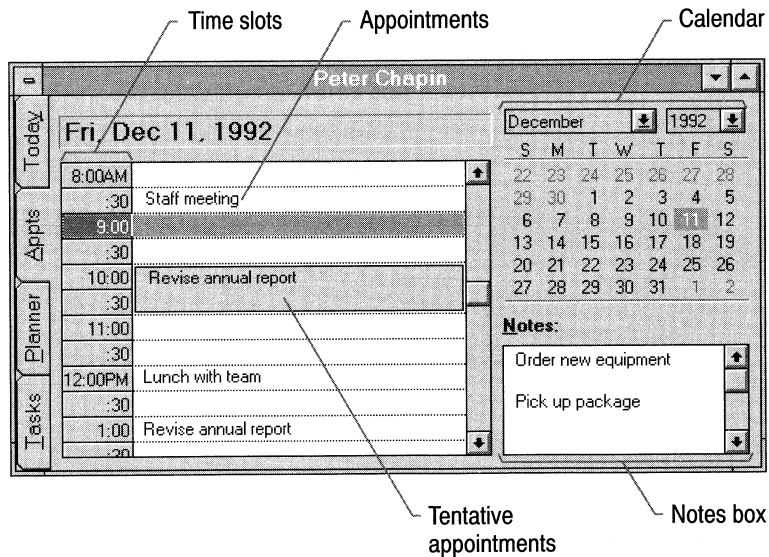
► **To display the Messages window**

- From the Window menu, choose Messages. Or double-click the Messages icon to restore the window.

For more information about the Messages window, see “Using the Messages Window to Schedule Meetings” later in this chapter.

Using the Appointment Book

The Appointment Book displays your daily schedule. A time slot can contain a combination of *appointments* and *tentative appointments*. Appointments appear as “busy” times on your schedule when other users view it. Tentative appointments appear in gray time slots in the Appointment Book and don’t appear as busy times on your schedule.



If you have an appointment that occurs regularly, you can schedule it once in your Appointment Book and designate it as recurring. Schedule+ automatically schedules the remaining occurrences in your Appointment Book.

You can also set Schedule+ to remind you before specific appointments or before all appointments, and you can designate specific appointments to be private so that other users can see that you are not available during that time, but they cannot see the description of your appointment. Schedule+ puts icons in time slots containing recurring appointments, meetings, private appointments, or appointments with reminders.

You can change the date you're viewing by choosing a new one in the calendar next to your appointments, and you can quickly return to today's date by choosing the Today tab on the left. You can also leave yourself notes for any day by typing them in the Notes box for that day.

Adding an Appointment

You can add up to six appointments and tentative appointments for a particular time slot. You can also set options to control which users (if any) can view your appointments from their Appointment Book.

► To add an appointment to your Appointment Book

1. If your Appointment Book is not already displayed, click the Appts tab.

To maximize the Schedule window, double-click the title bar or press ALT, HYPHEN, X. To restore your Schedule window to its original size, double-click the title bar again or press ALT, HYPHEN, R.

2. If you need to change the date, from the Edit menu, choose Go To Date. In the Go To Date dialog box, type the new number for the month, day, and year over the existing numbers. Then choose the OK button or press ENTER.

Or click the month box in the top right corner of the Appointment Book to display a menu, and then click the month you want. Then click the year box to display a menu, and then click the year you want. Finally, in the calendar, click a number to change the date.

Notice that the status bar at the bottom of the Schedule+ workspace displays the selected time slot.

3. To select the appointment time, drag across the numbers in the appointment list.

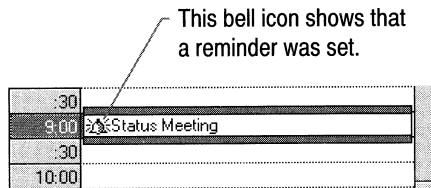
Or press SHIFT+TAB to move the selection to the appointment list, if it is not already there. Press the DOWN ARROW until the time slot you want is highlighted, and then press SHIFT+DOWN ARROW to include the all time slots you want in the selection.

4. In the selected time slot, type text to describe the appointment.

► To set a reminder for the appointment

1. Double-click the time slot for the appointment. Or select it and then, from the Edit menu, choose Edit Appt.

2. In the Appointment dialog box, select the Set Reminder For check box. Schedule+ automatically enters 15 minutes for you, but you can specify a different amount of time.
You can also change the text in the Description box of the Appointment dialog box. The change will appear in your Appointment Book.
3. To return to the Appointment Book, choose the OK button.
A small bell icon appears in the time slot of the appointment in the Appointment Book, indicating that you set a reminder.



You can choose General Options from the Options menu to specify whether Schedule+ automatically sets reminders for all new appointments and tasks. When you remove the reminder option, you must specifically set reminders for any appointments and tasks you want to be reminded of.

Adding a Tentative Appointment

When you add an appointment to the Appointment Book, that time is blocked out in your Planner. When other people view your Planner to set up a meeting, they know that you're not available at that time. Sometimes, though, you might want to schedule an event in your Appointment Book but still leave yourself available for appointments during that time slot. For these times, you can add a tentative appointment to your Appointment Book.

Tentative appointments appear in gray time slots in your Appointment Book, and they do not appear in your Planner. When other people look at your schedule, you appear to be available for meetings during that time slot.

► **To add a tentative appointment**

1. In your Appointment Book, select the time slot you want.
2. Type text to describe the tentative appointment.
3. Double-click the time slot. Or from the Edit menu, choose Edit Appt.
4. In the Appointment dialog box, select the Tentative check box, and then choose the OK button.

Your Appointment Book now displays the tentative appointment in a gray time slot. When you or other viewers look at your Planner, you don't see the tentative time slot marked as busy, so it appears that you are available for meetings during this time. Except for being "invisible" in your Planner, tentative appointments are just like regular appointments—you can set the same options for either type.

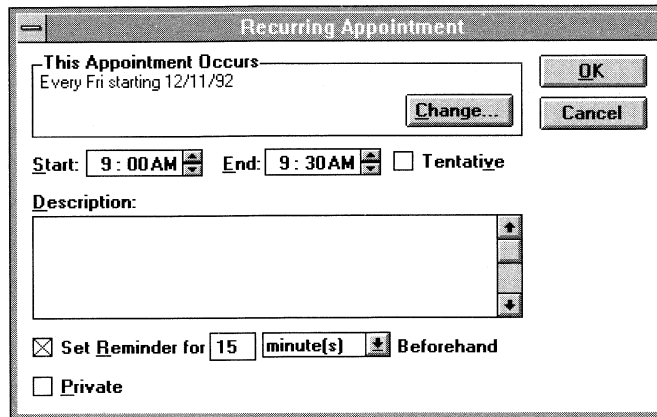
If you decide later to make this tentative appointment a regular appointment, you can clear the Tentative check box for the appointment. When you clear the Tentative check box, the appointment appears as a regular appointment.

Adding a Recurring Appointment

If you have a meeting that occurs regularly, you can have Schedule+ enter it automatically on the appropriate days. You can designate a new or existing appointment to be recurring. For example, if you attend a staff meeting that occurs every other Monday, you can book that time on your schedule for a year.

► **To add a recurring appointment**

1. If the Appointment Book is not already displayed, click the Appts tab or press ALT+A.
2. From the Appointments menu, choose New Recurring Appt.
3. In the Recurring Appointment dialog box, choose the Change button.



Recurring Appointment

This Appointment Occurs
Every Fri starting 12/11/92

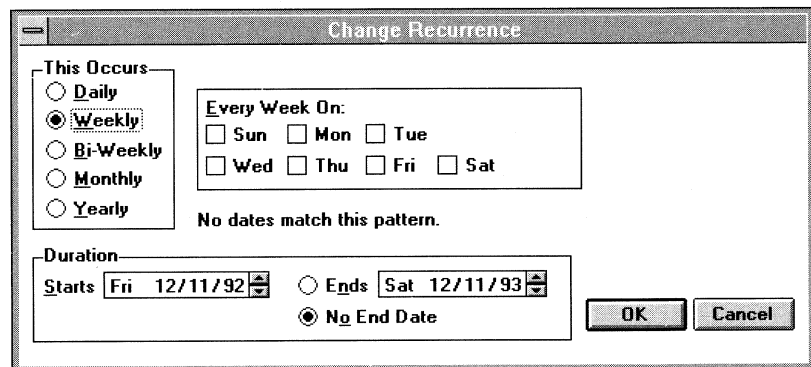
Start: 9:00AM **End:** 9:30AM ☐ Tentative

Description:

☒ Set Reminder for 15 minute(s) Beforehand

☐ Private

4. In the Change Recurrence dialog box, select the appropriate option button to specify whether this appointment should occur daily, weekly, biweekly, monthly, or yearly.



Change Recurrence

This Occurs

☐ Daily

☒ Weekly

☐ Bi-Weekly

☐ Monthly

☐ Yearly

Every Week On:

☐ Sun ☐ Mon ☐ Tue

☐ Wed ☐ Thu ☐ Fri ☐ Sat

No dates match this pattern.

Duration

Starts Fri 12/11/92

☐ Ends Sat 12/11/93

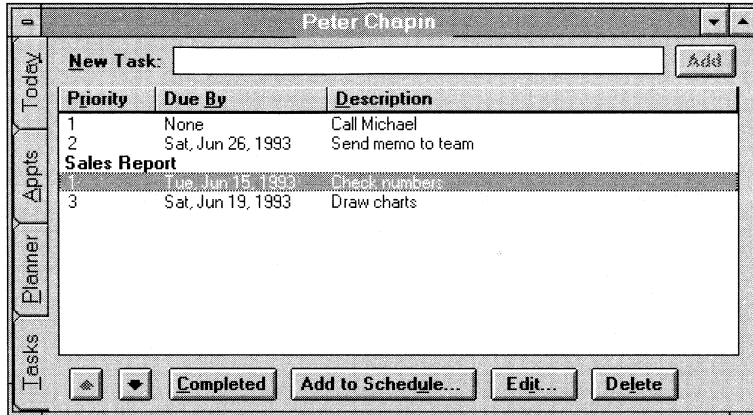
☒ No End Date

5. If the meeting occurs every week, select one or more check boxes to specify the day on which the meeting occurs.
6. In the Duration box, specify a date for when the recurring appointment begins.
7. If there's an end date for the recurring appointment, in the Duration box, select the Ends option button and enter a date in the text box.
Otherwise, select the No End Date option button.
8. Choose the OK button.

You can also designate an existing appointment to be a recurring appointment by selecting it and then performing the steps described above.

Using the Task List

When you are working on a task over a period of time, you can track it in the Schedule+ Task list. To reserve time for working on a particular task during the day, you can copy it to a specific time slot in your Appointment Book.



Callouts: 1:Project name 2: Priority controls 3: Task

Adding a Task to the Task List

Your Task list helps you keep track of tasks over a period of time. When you create a task, you give it a priority letter or number. If you need to complete the task by a certain date, you can note that, too. Tasks can be sorted by priority, due date, or alphabetically by description. You can group related tasks into projects, and then sort them by project.

► To add a task to the Task list

1. Display the Task list by clicking the Tasks tab or pressing ALT+T.
2. In the New Task box of the Task list, type text to define the task.
3. Choose the Add button to add the new task to your Task list, or press ENTER.
4. If you want to define a due date for the task, from the Task list, double-click the task, or select it and choose the Edit button.

The screenshot shows a 'Task' dialog box with the following fields and options:

- Description:** Write memo to marketing
- Project:** Sales Report (with a dropdown arrow)
- Due Date:**
 - ☐ None
 - ☒ By Wed 6 / 2 / 98 (with date selection arrows)
- Start Work:** 0 day(s) (with a dropdown arrow) Before Due ☐ Set Reminder
- Priority:** 3 (with a dropdown arrow) ☐ Private
- Buttons:** OK, Cancel

If you do not want to set a due date, make sure None is selected in the Due Date box (the default). No due date will be assigned to the task, regardless of the date displayed in the By box.

5. In the Due Date box of the Task dialog box, select the By option button and then change the date to the one you want.

To change each element of the date, select the element, and then either type the correct day or number over the existing one or click the arrows beside the box until the day or number you want appears. Schedule+ automatically fills in the correct day of the week.

6. In the Start Work box, type a number and then select whether the work should start days, weeks, or months before it is due.

For example, type **1** and select Day(s) to specify that the task will become active one day before it is due.

7. In the Priority box, type a number to indicate the priority for the task.

The default priority indicators are the numbers 1–9. If you want to change the priority indicator to letters, type the letter. You can mix letters and numbers in your Task list; number priorities are higher than letter priorities.

8. If you want to set a reminder for the Start Work date, select the Set Reminder check box.
9. If you want to ensure that other users do not see this task in your Appointment Book, select the Private check box.
10. Choose the OK button.

The task is entered in your Task list with the due date and priority you set.

► To modify a task

- Double-click it in the Task list.
- Or select the task and choose the Edit button.

► **To remove a task from your Task list**

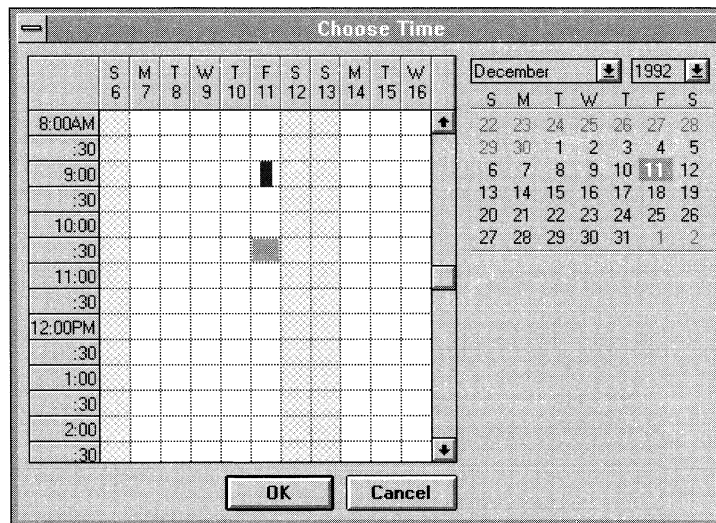
1. From the Task list, select the task.
2. Choose the Delete button, or press either ALT+L or the DEL key.

Scheduling Time in the Appointment Book for a Task

Your Task list helps you keep track of the work you need to do by the end of each day, but you can also schedule a specific time during the day to complete a task. For example, if one of your tasks is to file a trip report, you can schedule a specific time slot in your Appointment Book to be sure you have time to do it.

► **To schedule time in your Appointment Book for a task**

1. In the Task list, select the task you want to schedule.
2. Choose the Add To Schedule button.



3. In the Choose Time dialog box, select the day, month, year, and time slot you want to schedule the task for, and then choose the OK button.

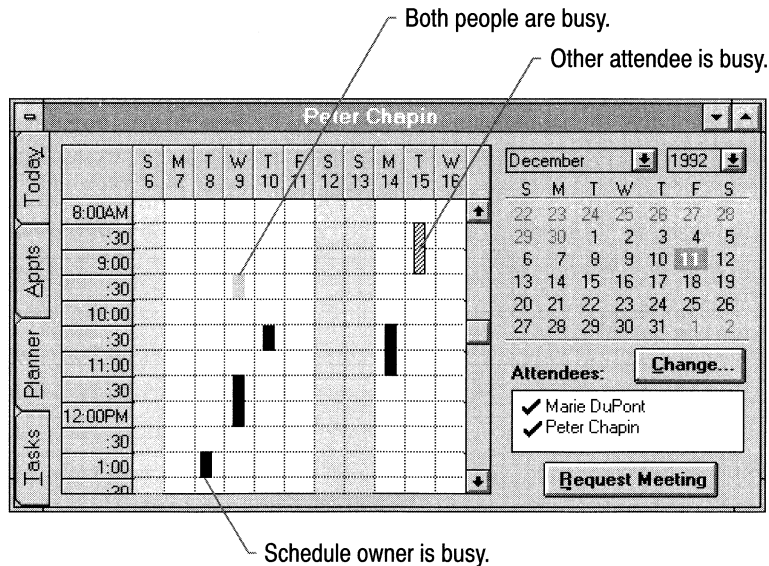
The task remains in your Task list, but now it is also booked as an appointment in your Appointment Book for the day and time slot you chose. If the Private option is selected in the Task dialog box, other users cannot see the description for this task in your appointment book, although the time is reserved.

Using the Planner to Schedule Meetings

With the Schedule+ Planner, you can scan appointments several days at a time or compare other people's schedules to your own to determine when others are available for a meeting. You can also schedule resources.

Scheduling Attendees

When you compare potential attendees' schedules to your own, their appointments show a different-colored bar from your appointments. Empty slots are times when everyone is available for a meeting. When two or more people have overlapping appointments, the color bar shows a pattern of diagonal stripes, depending on the colors set with the Display command on the Options menu. Unless you change the colors, your busy time slots contain a blue color bar. Other users' busy time slots contain a gray color bar.



After you see the schedules for everyone, you can decide the time and date for the meeting and send requests from the Planner. The Auto-Pick feature automatically highlights the next time slot when all attendees are available.

Note To schedule meetings with other Schedule+ users, you must be working online—your computer must be connected to your postoffice.

► To set up a meeting

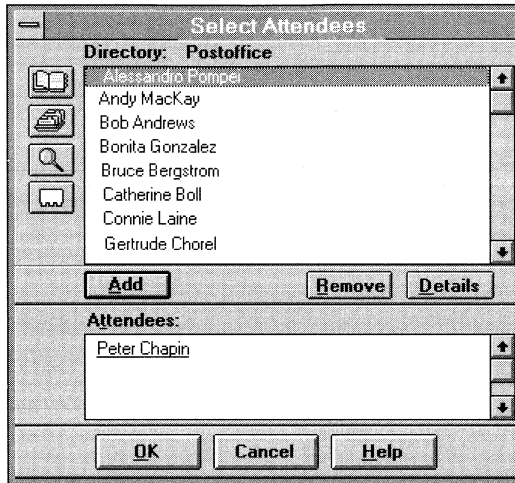
1. Display your Planner by clicking the Planner tab or pressing ALT+P.

2. To select a date for a meeting, from the Edit menu, choose the Go To Date command, and then type the correct numbers.

The vertical color bars in the time slots indicate your current appointments.

Note that your name automatically appears in the Attendees box.

3. Choose the Change button.



The list of names in the Select Attendees dialog box are the Schedule+ users on your postoffice. If any conference rooms or other resources have been set up on Schedule+, the rooms and resource names also appear in the address list.

4. From the address list, select the name of a person you want to invite to the meeting, and then choose the Add button or press ENTER.

The person's name appears with yours in the Attendees box.

Repeat this step for each additional person you want to invite.

5. Choose the OK button.

In your Planner, the names you selected appear in the Attendees box, and those users' schedules are overlaid on yours. The color bars indicate busy time slots. The empty time slots indicate when all attendees are available.

You can view the schedule for an particular individual by selecting the names of the other attendees in the Attendees box and choose the Remove button to remove their schedule information from the grid.

6. In the Planner, select a time slot when all the attendees are available by dragging across the desired time, or press the appropriate arrow keys until the time slot is selected.
7. Choose the Request Meeting button, or press ENTER.

The attendee(s), date, and time you selected in your Planner are entered automatically in the Send Request dialog box.

8. In the Subject box of the Send Request dialog box, type a brief description of the meeting.
9. If you want to receive a response, select the Ask For Responses check box. These responses will be collected in your Messages window.
10. Choose the Send button.

When Schedule+ has successfully sent the request to the attendees, it books the meeting automatically for the appropriate date and time slot in your Appointment Book.

Scheduling Resources

You can use Schedule+ to reserve resources, such as conference rooms, equipment, or services.

Any technician, conference room, piece of equipment, or anything else can be assigned an Appointment Book by the Schedule+ administrator. The administrator who designates an account as a resource account can set it up so that an assistant controls the resource's schedule, or can give users access privileges to reserve the resource directly.

► **To schedule a room or resource while you are scheduling a meeting**

- Include the room or resource in the Attendees list.

► **To schedule a room or resource without inviting people to a meeting**

1. Display your Planner.
2. If the conference room or resource isn't in the Attendees box, choose the Change button and select the name of the room or resource from the address list. Then choose the OK button.

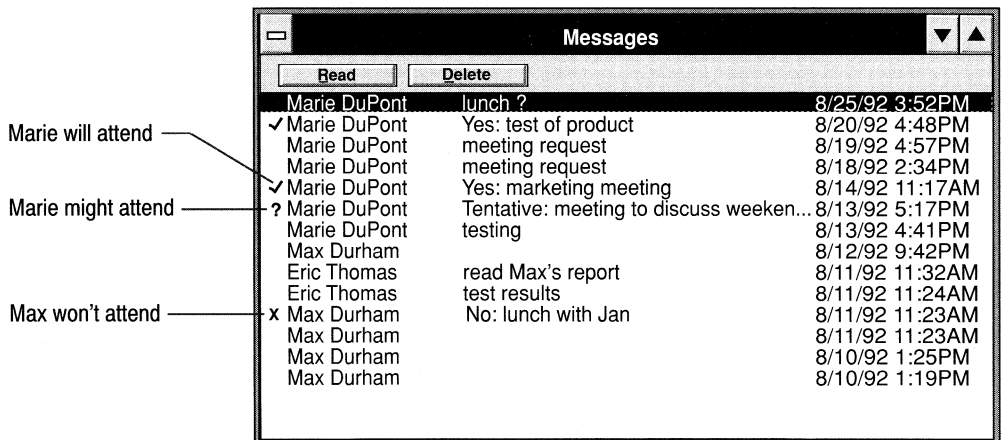
If the name of the resource you want to invite isn't in the address list currently shown, check another address list. You can view other address lists the same way you do in mail.
3. Select a time slot for using the resource, based on the times when it is available.
4. Choose the Request Meeting button.
5. In the Subject box, type a brief description of the meeting (optional).
6. Optionally, in the message area, type any message you want to include in your meeting request.
7. Choose the Send button.

If the room or resource has been set up so that you can enter your own requests in its Appointment Book, the appointment is booked automatically. If an assistant controls the schedule for the resource, he or she sends you a reply to your request.

Using the Messages Window to Schedule Meetings

If you are connected to a postoffice, the Messages window is available. The Messages window contains two types of Schedule+ messages: meeting requests and meeting responses. Meeting requests invite you to meetings other users have set up, and meeting responses are other users' replies to your meeting requests.

To use the Messages window, you must make it the active window by double-clicking its icon, clicking the restored window, or choosing Messages from the Window menu.



Schedule+ messages appear in your Mail Inbox, as well as in your Schedule+ Messages window. You can use the buttons in the window to read, respond to, and delete messages from either place. For more information about your Mail Inbox, see Chapter 7, "Mail."

When you accept a request, Schedule+ automatically notifies the sender that you will attend and then schedules the meeting in your Appointment Book. When you decline a request, Schedule+ notifies the sender that you won't attend and makes no changes to your Appointment Book. When you tentatively accept a request, Schedule+ notifies the sender that you might attend and schedules the meeting as a tentative appointment in your Appointment Book.

When you invite people to a meeting, they reply by sending meeting responses to let you know whether they'll attend. The meeting responses arrive in your Schedule+ Messages window as entries in the message list. A check mark in a meeting response entry means the person is planning to attend; an "X" means the person is not planning to attend; and a question mark means the person might attend. Entries in bold letters are requests or responses you haven't read.

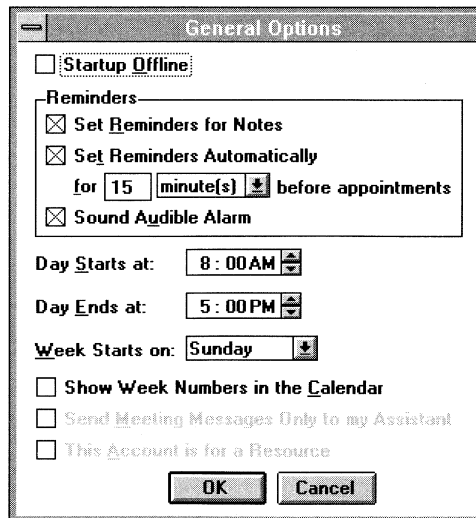
When you read a Schedule+ meeting request in the Mail Inbox or Schedule+ Messages window, you can accept, decline, or tentatively accept the invitation, using the buttons at the top of the request.

Although you can see whether someone is planning to attend by looking at the symbol in the message list, you can also display the message to see whether the person provided more information in the reply.

Advanced Features of Schedule+

Some of the advanced features of Schedule+ are described here briefly. For more information, see online Help.

- You can choose General Options from the Options menu to define how Reminders are sent, the start and end times for your daily schedule, and other items.



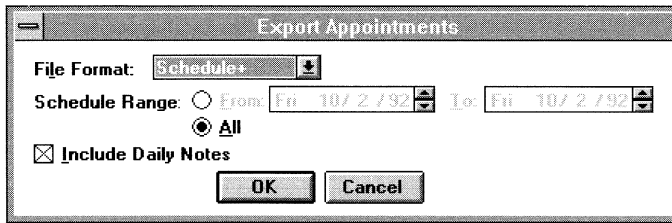
- You can allow other users to see or update your schedule.

You can choose Set Access Privileges from the Options menu to specify which users can see your Appointment Book and Task list. When other users check your schedule to coordinate an event, they usually can only view the times you are available or busy.

If you want another person to update your schedule for you, you can designate that person as your assistant in the Set Access Privileges dialog box. Your assistant can modify your schedule and send and receive meeting requests on your behalf.

- You can archive data and exchange data with other schedule programs.

To create and manage your Schedule+ archives, choose Create Archive or Open Archive from the File menu. To exchange appointment information with other scheduling programs, choose Export Appointments or Import Appointments from the File menu.



- You can work offline and then merge changes back into your schedule on the postoffice.

When your computer is connected to your postoffice, you are working *online*, and your appointments are recorded in a file on the postoffice and on your computer. The filename for this file has your username plus the .CAL filename extension. If you have the Schedule+ software on another computer, such as a portable or home computer, you can use the Move Local File command from the File menu to copy this file to the other computer.

While you are working *offline* (without connection to your postoffice), you can add and modify appointments. When you return to your office computer and reconnect to Schedule+ on the postoffice, Schedule+ automatically merges the changes made offline into the copy of your schedule on the postoffice.

Command Prompt

The command prompt is the character-based interface to Windows NT and its subsystems. Any supported command or application can be run at the command prompt regardless of the operating system it was designed for: Windows NT, Windows 3.1, MS-DOS, MS OS/2 1.x, or POSIX. The command prompt also supports batch programs, redirection between subsystems, cutting and pasting information between subsystems, and file management for the NTFS, FAT, and HPFS file systems.

This chapter explains how to use the Windows NT command prompt. The chapter includes the following topics:

- An overview of the Windows NT command prompt
- Lists of available commands
- An explanation of command syntax
- An explanation of command prompt functions
- A comparison of Windows NT and MS-DOS version 5.0 commands and Windows NT and LAN Manager 2.1 commands.

Overview

The Windows NT command prompt is a single interface providing seamless operation and integration of applications from four different operating systems. The Windows NT command prompt is a major enhancement to the command line interface on current personal computer operating systems allowing you to:

- Start any Windows NT, Windows 3.1, MS-DOS, character-based MS OS/2 version 1.x, or POSIX-compliant programs.
- Issue Windows NT commands. The command prompt retains and enhances almost all the commands used in MS-DOS version 5.0 and contains several new commands.

- Administer or use network resources. Many LAN Manager 2.1 commands are available.
- Cut and paste information between applications with the Clipboard.
- Use piping or redirection of data between subsystems

Starting and Quitting the Command Prompt

Start the command prompt by double-clicking the Command Prompt icon. The Command Prompt window displays copyright information plus the command prompt in monospaced characters followed by a blinking cursor. The default command prompt is the current drive and directory enclosed in brackets.

► To quit the Command Prompt

- Type **exit** at the command prompt, or choose Close from the Control menu, or double-click the Control menu box.

► To quit the Command Prompt when it, or an application started at the Command Prompt, fails to respond

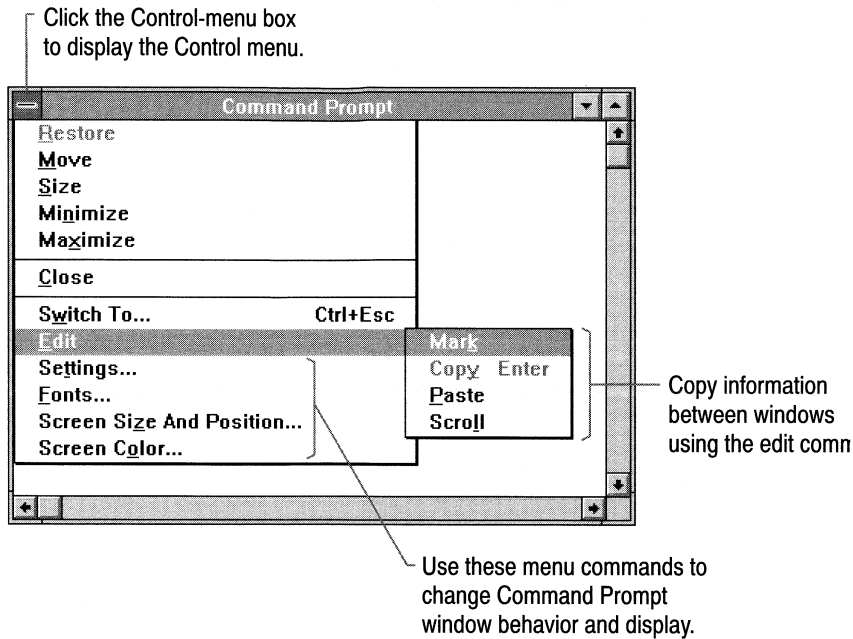
1. From the Control menu, choose Settings.
2. In the Special box, choose the Terminate button.

Use Terminate as a last resort. You should quit applications by using the application's Quit or Exit command.

Changing the Command Prompt Display

You can configure the appearance of the command prompt window using the Control menu. The icon in the upper-left corner of any window is that window's Control menu. The Control menu allows you to:

- Cut and paste information between any two windows.
- Toggle between window mode and full-screen mode.
- Change fonts used in window mode.
- Set the screen buffer size and the position of the window.
- Change the colors of text and background for the main screen and pop-up boxes.



► To open the Control menu

- Click the control-menu box once, or press ALT+SPACEBAR.

The Control menu opens and you can select from the list of commands. (If you are in full-screen mode, the application will minimize and the control menu will appear from the icon.) For information on Control menu commands not listed below, see Chapter 2, “Windows NT Basics.”

Control menu settings are stored with the icon used to start the command prompt. You can have more than one command prompt icon, but the settings for each command prompt icon are independent. This allows you to have different defaults for different needs.

An application’s internal display settings will usually override font and color settings made in the Control menu.

Changing Window Modes

The command prompt can be used in either window or full-screen mode. You can also use QuickEdit mode which allows you to use your mouse to cut and paste, bypassing the Edit menu.

► **To toggle between window and full-screen mode**

- Press ALT+ENTER.

By default, the command prompt opens as a window on your desktop.

► **To change the default window display options**

1. From the Control menu, choose Settings.
2. In the Display Options box, choose either Window or Full Screen.
3. To use this Display Option every time you start the command prompt from this icon, select the Save Configuration check box. If this box is not selected, the Display Option will be in effect only while this window is open.
4. Choose the OK button.

► **To turn QuickEdit mode on or off**

1. From the Control menu, choose Settings.
2. Select the QuickEdit Mode check box.
3. Choose the OK button.

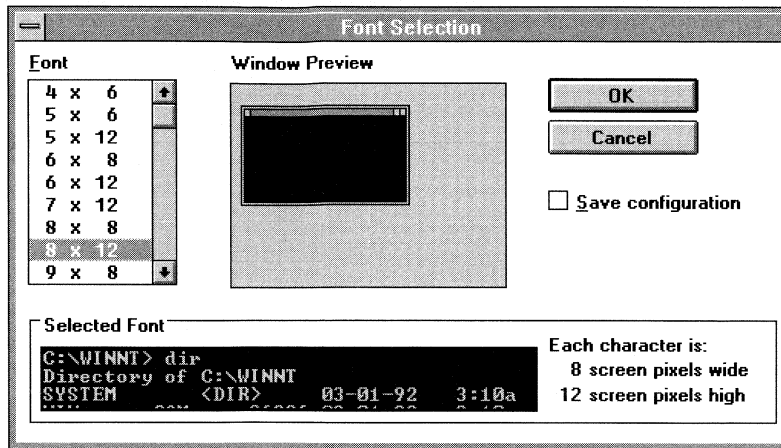
You can always use the Edit menu commands, whether QuickEdit mode is on or off. For more information about QuickEdit, see “Transferring Information to or from a Command Prompt Window” later in this chapter.

Changing Fonts for Window Mode

You can choose from many font sizes for the window mode of the command prompt display. Fonts for the command prompt are measured in screen pixels. Default fonts are saved based on the title of the window. The size of the window will change relative to the font selected, but you can always resize the command prompt window up to the maximum screen buffer size, as discussed in the following section.

► **To change fonts for the command prompt**

1. From the Control menu, choose Fonts.



2. In the Font box, choose a font size.

The Selected Font box displays an example of the selected font and its width and height. The Window Preview box displays how the current window size will change based on the font you choose, although you can later resize the window up to the maximum screen buffer size.

3. To use the font every time you start the command prompt from this icon, select the Save Configuration check box. If this box is not selected, the new font is displayed only while this window is open.
4. Choose the OK button.

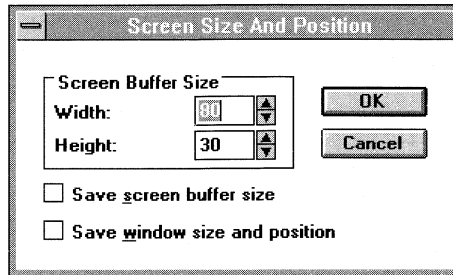
Changing the Screen Size and Position

The *screen buffer* size is the size reserved in memory for the command prompt display. The buffer size is measured by the number of characters wide by the number of lines high. The position is the current window position on the screen.

Scroll bars are displayed if the current size of the window is smaller than the screen buffer size settings. You cannot resize a window to be larger than the area set by the screen buffer settings. The settings have no effect when you are using a full screen display.

► To change the screen buffer size

1. From the Control menu, choose Screen Size And Position.



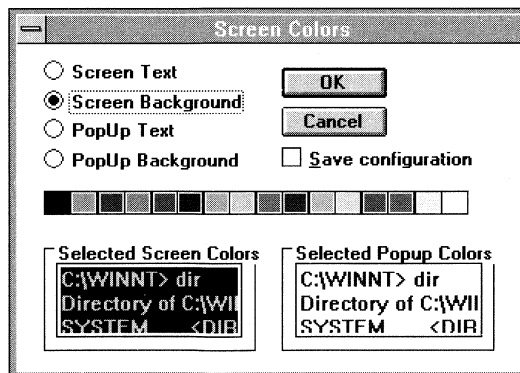
2. In the Screen Buffer Size box, set the width and height of the window using the up or down arrows next to the settings, or type the new value.
The width setting determines the number of characters in width. The height setting determines how many lines are stored in memory.
3. To use these screen buffer size settings every time you start the command prompt from this icon, select the Save Screen Buffer Size check box. If this box is not selected, your screen buffer settings are displayed only while this window is open.
4. Select the Save Window Size And Position check box if you want to use the current window size and position every time you start the command prompt.
5. Choose the OK button.

Changing Screen Colors

You can specify the color of the text and background of the command prompt window. You can also specify the color of the text and background of pop-up windows that originate from the command prompt. Pop-up windows are smaller character-based windows that present information to choose from.

► To change screen colors

1. From the Control menu, choose Screen Colors.



2. In the Screen Colors dialog box, choose the colors for screen text, screen background, pop-up text, and pop-up background by clicking the element you want to change, and then clicking the color you want.
The Selected Screen Colors or Selected Popup Colors box displays your choice.
3. To use the same colors every time you start the command prompt from this icon, select the Save Configuration check box. If this box is not selected, your settings are displayed only while this window is open.
4. Choose the OK button.

Getting Help for the Command Prompt

Online Help is available for all commands at the command prompt and in a Windows NT help file.

Help at the Command Prompt

Online Help is available for all Windows NT commands. The following table shows how to access the different types of help available at the command prompt and the information provided.

Syntax	Information provided
help	Names of native system commands.
command /?	Description, syntax, parameters, and switches for native system commands. This syntax also provides help for MS-DOS subsystem commands that are not listed when you type help .
help command	Description, syntax, parameters, and switches for native system commands.
net help	Names of available network commands.
net command /?	Syntax only for network commands.
net command /help	Syntax and description for network commands.
net help command	Syntax and description for network commands.
net help command /options	Parameters and switches for network commands.

Online Command Reference

The Windows NT online Command Reference is available to provide command syntax and parameters, details about a command, and examples of the command in use. To use the online Command Reference, double-click the Help icon in the Main program group.

Command Prompt Commands

Any supported Windows NT command can be run at the same command prompt. Windows NT commands are classified as follows:

- Native commands
- Subsystem commands
- Configuration commands
- TCP/IP utilities
- Special purpose utilities
- Command symbols

Native Commands

A *native* command means the command takes advantage of the 32-bit operating system. Most commands familiar to MS-DOS 5.0 users are now native Windows NT system commands.

Some commands, such as **dir** and **chdir**, are *internal*, meaning the command is stored in the file CMD.EXE and resides in memory at all times. Other commands, such as **chkdsk** and **xcopy**, are *external*, meaning the command is stored in its own file and loads from disk when you use the command. Batch commands are for use in batch programs, as described later in this chapter.

Command	Purpose
at	Schedules commands and programs to run on a computer at a specified time and date.
attrib	Displays or changes file attributes.
break	Sets or clears extended CTRL+C checking.
call	Calls one batch program from another. (Batch command only.)
chcp	Displays or sets the active code page number.
chdir (cd)	Displays the name of or changes the current directory.
chkdsk	Checks a disk and displays a status report.
cls	Clears the screen.
cmd	Starts a new session of the Windows NT command interpreter.
comp	Compares the contents of two files or sets of files.
convert	Converts FAT and HPFS disk partitions to NTFS partitions.
copy	Copies one or more files to another location.
date	Displays or sets the date.
del	Deletes one or more files.

Command	Purpose
dir	Displays a list of files and subdirectories in a directory.
diskcomp	Compares the contents of two floppy disks.
diskcopy	Copies the contents of one floppy disk to another.
doskey	Edits command lines, recalls commands, and creates macros.
echo	Displays messages or turns command echoing on or off.
endlocal	Ends localization of environment changes in a batch file. (Batch command only.)
erase	Deletes one or more files. (See del .)
exit	Quits the Windows NT command interpreter (CMD.EXE).
fc	Compares two files or sets of files, and displays the differences between them.
find	Searches for a text string in a file or files.
findstr	Searches for strings in files using literal text or regular expressions.
for	Runs a specified command for each file in a set of files.
format	Formats a disk for use with MS-DOS or Windows NT.
goto	Directs Windows NT to a labeled line in a batch program. (Batch command only.)
graftabl	Enables Windows NT to display an extended character set in graphics mode.
help	Provides Help information for Windows NT commands.
if	Performs conditional processing in batch programs. (Batch command only.)
keyb	Configures a keyboard for a specific language.
label	Creates, changes, or deletes the volume label of a disk.
mkdir (md)	Creates a directory.
mode	Configures a system device.
more	Displays output one screen at a time.
move	Moves one or more files from one directory to the specified directory on the same drive.
net accounts	Displays or sets password and logon requirements of servers in a domain.
net computer	Adds computers to Windows NT Advanced Server domains (Advanced Servers only).
net config	Displays the controllable services that are running.
net config server	Displays or changes settings for the Server service while the service is running.

Command	Purpose
net config workstation	Displays or changes settings for the Workstation service while it is running.
net continue	Reactivates suspended services.
net file	Displays the names of all open shared files on a server and the number of file locks, if any, on each file. This command also closes individual shared files and removes file locks.
net group	Adds, displays, or modifies global groups.
net help	Provides a list of network commands and topics you can get help with, or provides help with a specific command or topic.
net helpmsg	Provides help with a network error message.
net localgroup	Adds, displays, or modifies local groups.
net name	Adds, deletes, or displays messaging names on a workstation.
net pause	Pauses services or shared printers.
net print	Displays or controls print jobs.
net send	Sends messages to other computers on the network.
net session	Lists or disconnects sessions between a server and workstations.
net share	Creates, deletes, or displays shared resources.
net start	Starts a service or displays a list of started services.
net start alerter	Starts the Alerter service.
net start computer browser	Starts the Computer Browser service.
net start directory replicator	Starts the Directory Replicator service.
net start eventlog	Starts the Eventlog service.
net start locator	Starts the RPC locator service.
net start messenger	Starts the Messenger service.
net start net logon	Starts the Net Logon service.
net start rpcss	Starts the RPC subsystem.
net start schedule	Starts the Schedule service.
net start server	Starts the Server service.
net start ups	Starts the Uninterruptible Power Supply service.
net start workstation	Starts the Workstation service.
net statistics	Displays the statistics log.
net stop	Stops a network service.
net time	Synchronizes the workstation's clock with that of a server or domain, or displays the time for a server or domain.

Command	Purpose
net use	Connects a workstation to or disconnects a workstation from a shared resource, or displays information about workstation connections.
net user	Adds or modifies user accounts or displays user account information.
net view	Displays a list of servers or displays resources being shared by a server.
path	Displays or sets a search path for executable files.
pause	Suspends processing of a batch file and displays a message. (Batch command only.)
popd	Changes to the directory stored by the pushd command.
print	Prints a text file while you are using other Windows NT commands.
prompt	Changes the Windows NT command prompt.
pushd	Stores the current directory for use by the popd command, and then changes to the specified directory.
recover	Recovers readable information from a bad disk.
rem	Records comments (remarks) in batch files. Also available as a CONFIG.SYS command for the MS-DOS and OS/2 subsystem.
rename (ren)	Renames a file or files.
replace	Replaces files.
restore	Restores files that were backed up with MS-DOS backup .
rmdir (rd)	Removes a directory.
set	Displays, sets, or removes Windows NT environment variables.
setlocal	Begins localization of environment changes in a batch file. (Batch command only.)
shift	Shifts the position of replaceable parameters in batch files. (Batch command only.)
sort	Sorts input.
start	Starts a separate window to run a program or command.
subst	Associates a path with a drive letter.
time	Displays or sets the system time.
title	Sets the title for the command prompt window.
tree	Graphically displays the directory structure of a drive or path.
type	Displays the contents of a text file.
ver	Displays the Windows NT version number.
verify	Tells Windows NT whether to verify that your files are written correctly to a disk.

Command	Purpose
vol	Displays a disk volume label and serial number.
xcopy	Copies files (except hidden and system files) and directory trees.

Subsystem Commands

Windows NT includes 16-bit commands (non-native) for the MS-DOS and other subsystems. These are older commands, such as **edlin** or **graphics**, and MS-DOS-specific commands, such as **debug** or **exe2bin**. These 16-bit commands are included to maintain MS-DOS 5.0 and MS OS/2 version 1.x compatibility.

Other MS-DOS subsystem commands, such as **share**, perform functions that are now inherent to Windows NT or the MS-DOS subsystem. The commands are accepted to preserve compatibility with existing files, but the commands have no effect because the functionality is automatic in Windows NT.

Command	Purpose
append	Allows programs to open data files in specified directories as if they were in the current directory.
backup	Backs up one or more files from one disk onto another.
debug	Runs Debug, a program testing and editing tool for MS-DOS applications.
edit	Starts MS-DOS Editor, which creates and changes ASCII files.
edlin	Starts Edlin, a line-oriented text editor.
exe2bin	Converts .EXE (executable) files to binary format.
graphics	Loads a program that can print graphics.
loadfix	Loads a program above the first 64K of memory, and then runs the program.
loadhigh (lh)	Loads a program into the upper memory area.
mem	Displays the amount of used and free memory for the MS-DOS subsystem.
nlsfunc	Loads country-specific information.
qbasic	Starts the QBASIC™ programming environment.
setver	Sets the version number for MS-DOS that Windows NT reports to a program.
share	Starts the share program, which installs file-sharing and locking capabilities on your hard disk.

Configuration Commands

You configure the MS-DOS subsystem with configuration commands, such as **device** or **lastdrive**. Place these commands in the CONFIG.NT file in the \WINNT\SYSTEM32 directory. These commands affect only the MS-DOS subsystem. Many of them, such as **buffers** and **break**, are ignored because the MS-DOS subsystem works without them. They are accepted for compatibility only.

You configure the OS/2 subsystem with CONFIG.SYS commands, such as **devicename** or **libpath**. Use an OS/2 editor to edit C:\CONFIG.SYS. These commands affect only the OS/2 subsystem.

For more information on Windows NT subsystems, see Chapter 11, “Other Application Environments.”

Command	Purpose
buffers	Allocates memory for a specified number of disk buffers when the system starts.
codepage	Specifies which code pages your system is prepared to use. (OS/2 only.)
country	Enables a subsystem to use international time, dates, currency, case conversions, and decimal separators.
device	Loads into memory the device driver you specify.
devicehigh	Loads into high memory the device driver you specify.
devinfo	Specifies the information a device needs in order to use a particular code page. (OS/2 only.)
dos	Specifies that the MS-DOS subsystem is to maintain a link to its upper memory area or is to load part of itself in the high memory area (HMA).
driveparm	Defines parameters for block devices. (OS/2 only.)
echoconfig	Displays messages when the MS-DOS subsystem CONFIG.NT file is read.
fcbs	Specifies the number of file control blocks (FCBs) the command prompt can have open at the same time.
files	Sets the number of files that the command prompt can access at one time.
install	Loads a memory-resident program into memory.
lastdrive	Specifies the maximum number of drives you can access.
libpath	Specifies the location of OS/2 dynamic-link libraries. (OS/2 only.)
protshell	Specifies the name and location of the MS OS/2 command interpreter.

Command	Purpose
shell	Specifies the name and location of the command interpreter for the MS-DOS subsystem.
stacks	Supports the dynamic use of data stacks to handle hardware interrupts.
switches	Forces an enhanced keyboard to behave like a conventional one.

TCP/IP Utilities

The TCP/IP utilities offer network connections to non-Microsoft hosts such as Unix workstations. You must have the TCP/IP network protocol installed to use the TCP/IP utilities.

For more information about the TCP/IP utilities and network protocol, see the Windows NT Resource Kit.

Command	Purpose
arp	Displays and modifies the IP-to-Ethernet address translation tables.
finger	Displays information about users on a remote system.
ftp	Transfers files to and from a node running ftp service; similar to tftp .
hostname	Prints the name of the current host.
nbtstat	Displays the contents of various NetBIOS data structures.
net start nbt	Starts the NetBIOS over TCP/IP service.
net start snmp	Starts the Simple Network Management Protocol (SNMP) service.
net start tcpip	Starts and configures the TCP/IP service.
net start telnet	Starts the TELNET service.
netstat	Displays the contents of various network-related data structures.
ping	Bounces echo packets from a specified host to troubleshoot network problems.
rcp	Copies files between computers.
rexec	Provides remote execution facilities similar to rsh . Rexec is password protected.
route	Manually manipulates network routing tables.

Command	Purpose
rsh	Connects to a specified host and executes a specified command.
telnet	Enables terminal emulation.
tftp	Transfers files to and from a node running ftp service; similar to ftp .

Special Purpose Utilities

Special purpose utilities are native 32-bit utilities, but they have a very limited purpose and may not appear in future versions of Window NT.

Command	Purpose
aclconv	Restores OS/2 2.x ACLs to NTFS volumes.
diskperf	Starts, stops and displays system disk performance counter use.
portuas	Converts a LAN Manager user account subsystem to a Windows NT user account database.

Command Symbols

Nine command symbols allow you to manipulate the input or output of a command and permit conditional execution of a command. Used with commands and filter commands, the command symbols are powerful tools.

Symbol	Purpose
>	Redirects output.
>>	Appends redirected output to existing data.
<	Redirects input.
 	Pipes output.
 	Runs the command following the symbol only if the command preceding the symbol fails.
&	Separates multiple commands on the command line.
&&	Runs the command following the symbol only if the command preceding the symbol is successful.
()	Groups commands.
^	Allows input of command symbols as text. Escape character.

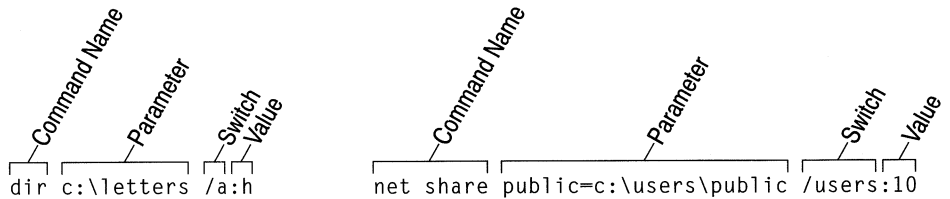
Sort, **more**, and **find** are the native filter commands that allow you to sort input and output, cause output to the screen to be displayed one screen at a time, and search for specified text in a file.

For complete syntax and explanations of the command symbols and filter commands, see the online Command Reference.

Command Syntax

Syntax is the order in which you must type a command and the elements that follow the command. Windows NT commands have up to four elements: command name, parameters, switches, and values.

These two examples contain all four elements. Each element is explained below.



The first example lists all hidden files in the C:\LETTERS directory. The second example allows up to 10 users to connect to the C:\USERS\PUBLIC directory.

Command Names

The command name, which you type first, states the action you want Windows NT to carry out. Some commands (such as the **cls** command, which clears your screen) consist only of a command name. Most Windows NT commands require more than a name. All network commands are preceded by the word **net**, for example, **net share** or **net use**.

Parameters

Windows NT sometimes requires additional information, which you specify in one or more parameters after the command name. A parameter defines or creates the object you want Windows NT to act on. For example, the **del** command requires a parameter that is the name of the file you want to delete.

Some commands require more than one parameter. For example, to rename a file by using the **rename (ren)** command, you must include the original name of the file in addition to the new name. The following command renames LETTER.TXT to MEMO.TXT: **ren letter.txt memo.txt**

Position in the syntax line determines how a command works and whether a parameter is a *source* (first) or a *destination* (second). In the example above the source, LETTER.TXT, specifies the location of data to be transferred or used as input to a command. The destination, MEMO.TXT, specifies a location to which the data specified by source is to be transferred.

Using Special Characters in Parameters

In a Windows NT command, a computer name, share name, username, or group name can contain special characters (for example, PROFIT&LOSS).

► To type a parameter with a special character

- Type the escape character (^) before the special character. For example, type **net use g: \\profit^&loss\reports**

Note The command prompt will not accept the extended ANSI characters (characters greater than 127).

Switches

Switches modify how a command performs a task. A switch is a forward slash (/) usually followed by words, letters, or numbers. Some Windows NT commands do not have switches, whereas others have several.

If a command has more than one switch, you type them one after the other, separated with a space. Switches may be in any position or order after the command name. Some commands accept more than one switch after a forward slash. Some commands also accept a hyphen (-) instead of the forward slash.

The following command lists all hidden files in the current directory: **dir *.* /ah**

The terms “parameter” and “switch” are often interchanged, since both elements follow the command name. The only meaningful difference between a switch and parameter is the presence of a forward slash or hyphen to indicate a switch and the parameter position in the syntax line to indicate whether the parameter is a source or destination.

Using the /Yes and /No Switches

With some network commands, Windows NT issues a prompt that requires a user response before a task can be completed. You can append the **/yes (/y)** or **/no (/n)** switch to a command to force a Yes or No answer for all responses. For example, stopping the Workstation service causes Windows NT to stop dependent services; Windows NT will prompt you before stopping each dependent service unless the **/yes** switch is included, as in the following: **net stop workstation /y**

Values

Values determine how a switch works. A value is a colon (:) or an equal sign (=) followed by a word, letter, or number and must immediately follow the switch it modifies without a space. The following example of the **format** command contains two values, the file system to use (NTFS) and a volume label (Backup2):
format d: /fs:ntfs /v:backup2

Check the syntax for the specific command in online Help to determine if the command you want to use requires an equal sign or a colon.

Using the Command Prompt

This section explains how to:

- Start applications and use batch programs.
- Cut and paste information to or from a command prompt window.
- Simplify entering repetitive commands.
- Pause or cancel execution of a command.

Starting Programs at the Command Prompt

You can start any program at the command prompt by typing the filename of the program.

► To start a program at the command prompt

- Type the program's executable file name, and then press ENTER.

For example, typing **clock** will start Clock (from the Accessories group).

The command prompt window used to start the program is unavailable until you stop the program.

► To start a program at the command prompt and retain use of the command prompt window

- Type **start** followed by the program's executable file name, and then press ENTER.

For example, typing **start calc** will start Calculator (from the Accessories group).

The command prompt window still accepts commands.

You can also pass additional parameters to a program at the command prompt. For example, the command **notepad letter.txt** starts Notepad and automatically loads the file LETTER.TXT.

Other programs may accept parameters specific to the program. Each program determines the parameters it will accept at the command prompt. To determine whether a program will accept parameters at the command prompt, see the documentation for that program.

While a program or command is running, the window or icon title displays the program or command currently running. When the command finishes running, the command is removed from the window or icon title.

Batch Programs

Batch programs (also called batch files) allow you to simplify routine or repetitive tasks. A *batch program* is an unformatted text file that contains one or more commands and has a .BAT or .CMD filename extension. When the filename is typed at the command prompt, the commands in the file are executed sequentially.

Any command can be included in a batch file. In addition, several commands allow conditional processing of the commands in the batch file. For example, the **if** command carries out a command based on the results of a condition. Other commands allow you to control input and output and call other batch programs. For more information about batch programs, see the online Command Reference.

Transferring Information to or from a Command Prompt Window

You can transfer information to or from the command prompt using either QuickEdit mode or the Edit menu commands.

Note To quickly switch a command prompt or subsystem application between a full screen and a window, press ALT+ENTER.

Copying and Pasting Information using QuickEdit Mode

QuickEdit mode allows you to copy and paste text in command prompt windows using only your mouse, bypassing the control menu's Edit commands. QuickEdit mode copies data only when the command prompt is running as a window; however, you can paste in QuickEdit mode when the command prompt is either a window or a full screen. The data is treated as text. Use the Settings command from the control menu to turn QuickEdit mode on or off.

- **To cut and paste text at the command prompt using QuickEdit mode**
 1. If necessary, use the Settings command from the control menu to turn QuickEdit mode on.

2. Position the arrow cursor at the beginning of the text you want to copy. Press the left mouse button. Keeping the left mouse button depressed, drag the cursor to the last character of the section you want to copy and release the left mouse button. The portion of the screen you want to copy is highlighted.
If necessary, redo this step until the exact area you want is highlighted.
3. Press the right mouse button to copy the highlighted area to the Clipboard. The highlight will disappear.
4. Press the right mouse button to copy the contents of the Clipboard to the command prompt cursor. If the area copied was more than one line, a carriage return (ENTER) is added at the end of each line.

You must still use the Edit Paste command to paste the contents of the Clipboard into Windows applications.

Copying and Pasting Information Using the Edit Menu

The Edit menu commands allow you to copy and paste information in any window, not just command prompt windows. The data is transferred as text or as a bitmap to the Clipboard depending on how it was copied.

- **To copy selected information from a command prompt window or character-based application running in a window as text**
 1. If necessary, press ALT+SPACEBAR to open the Control menu.
 2. From the Control menu, choose Edit.
 3. From the Edit menu, choose Mark.
 4. Select the information you want to copy using a mouse.
 5. Press the right mouse button to transfer the selected information to the Clipboard or choose Edit Copy from the Control Menu.
- **To copy the contents of an entire screen onto the Clipboard as a bitmap**
 1. Make sure the information you want to copy is on the screen.
 2. Press PRINT SCREEN.
The contents of the screen are copied onto the Clipboard.
- **To copy a window and its contents onto the Clipboard as a bitmap**
 1. Make sure the window you want to copy is the active window.
 2. Press ALT+PRINT SCREEN.
A bitmap of the active window is created and placed onto the Clipboard. The application you want to transfer the information to must be able to read bitmap (.BMP) files.

► **To paste information into an application as text**

1. Make sure the information you want is on the Clipboard.
2. Switch to the destination window.
3. Place the insertion point where you want the information from the Clipboard to appear.
4. If the application is running in full-screen mode, press ALT+SPACEBAR to open the Control menu.
5. From the window's Control menu, choose Edit.
6. From the Edit menu, choose Paste.

Editing Commands with Doskey and Editing Keys

Windows NT provides Doskey to give you quick access to your most recent commands and enable you to assign frequently used command(s) to a single keystroke. Doskey is always available; you do not need to load the program into memory.

The UP ARROW and DOWN ARROW keys cycle through commands previously entered. Press F7 to display all of the previous commands in a pop-up box; then use the UP ARROW and DOWN ARROW keys to select a command and press ENTER (or press ESCAPE to cancel). Doskey also allows you to assign multiple commands to a single key or typed alias.

In addition to Doskey, several editing keys allow you to use and edit the last command you typed. Press F1 to display the last command one character at a time, or press F3 to display the entire command. Use the BACKSPACE or LEFT ARROW key to move the cursor in a command. The Insert key toggles between insert and overtype mode.

For more information on Doskey and the command editing keys, see the online Command Reference.

Pausing or Canceling a Command

You can pause or stop the output of a command.

► **To pause the output of a command**

- Press CTRL+S or PAUSE.

Press any key except PAUSE to restart the output of the command. You can stop and restart the output of a command as many times as you want.

► **To stop Windows NT from completing a command**

- Press CTRL+BREAK or CTRL+C.

Your command is canceled, and the command prompt appears.

Important Any action Windows NT carried out before you pressed CTRL+BREAK or CTRL+C cannot be undone.

Differences from MS-DOS 5.0 Commands

Windows NT retains and enhances almost all the functionality of MS-DOS 5.0. This table explains new Windows NT system commands.

Command	Function
aclconv	Restores OS/2 2.x ACLs to NTFS volumes.
convert	Converts file systems from FAT or HPFS to NTFS.
diskperf	Starts, stops, and displays system disk performance counter use.
echoconfig	Displays messages when reading the MS-DOS subsystem CONFIG.NT file.
endlocal	Ends localization of environment variables.
findstr	Searches for text in files using regular expressions.
move	Moves files on the same disk drive.
popd	Changes to the directory last set with the pushd command.
pushd	Saves the current directory for use by the popd command, and then changes to the specified directory.
setlocal	Begins localization of environmental variables.
start	Runs a specified program or command in a secondary window.
title	Sets the title of the command prompt window.

This table lists changes and improvements to MS-DOS 5.0 commands.

Command	Changed features
cmd	CMD.EXE replaces COMMAND.COM.
del	New switches provide many more functions.
dir	New switches provide many more functions.
diskcomp	Switches /1 and /8 are not supported.
diskcopy	Switch /1 is not supported.
doskey	Several enhancements improve doskey .
format	20.8 MB floptical drive supported. Switches /b , /s , and /u are not supported.

Command	Changed features
keyb	KEYBOARD.SYS is no longer used.
label	The symbols ^ and & can be used in a volume label.
mode	Extensive changes.
more	New switches provide many more functions.
path	The %PATH% environment variable appends the current path to a new setting at the command prompt.
print	Switches /b, /u, /m, /s, /q, /t, /c, and /p are not supported.
prompt	New character combinations allow you to add ampersands (\$a), parentheses (\$c and \$f), and spaces (\$s) to your prompt.
recover	Recovers files only.
sort	Does not require TEMP environment variable. File size is unlimited.

Command	New or Changed Feature
xcopy	New switches provide many more functions.
&&	Command following this symbol runs only if the command preceding the symbol succeeds.
 	Command following this symbol runs only if the command preceding the symbol fails.
&	Separates multiple commands on the command line.
()	Groups commands.
^	Escape character. Allows input of command symbols as text.

The following MS-DOS 5.0 commands are not available at the command prompt.

Command	New procedure or reason for obsolescence
assign	Not supported in Windows NT.
ctty	Not currently supported.
dosshell	Unnecessary with Windows NT.
expand	Used only for files on the MS-DOS 5.0 distribution disks.
fastopen	Windows NT inherent caching is superior to this utility.
fdisk	Disk Administrator prepares hard disks for use with Windows NT.
join	Increased partition size and an improved file system eliminate the need to join drives.
mirror	Not supported in Windows NT.

Command	New procedure or reason for obsolescence
sys	Windows NT will not fit on a standard 1.2 MB or 1.44 MB floppy disk.
undelete	Not supported in Windows NT.
unformat	Not supported in Windows NT.

Differences from LAN Manager 2.1 Commands

Windows NT retains many LAN Manager version 2.1 commands. This table lists new network related commands.

Command	Function
at	Schedules commands and programs to run on a computer at a specified time and date.
net start computer browser	Starts the Computer Browser service.
net start eventlog	Logs any significant system, security, and application occurrences that require users to be notified.
net localgroup	Manages local groups.
net start locator	Starts the RPC Locator service.
net start nbt	Starts the NetBIOS over TCP service.
net start rpcss	Starts the RPC subsystem.
net start schedule	Starts the Schedule service, enabling the at command.
net start tcpip	Starts the TCP/IP service.
net start telnet	Starts the Telnet service.
portuas	Converts a LAN Manager user account subsystem to a Windows NT user account database.

This table identifies changes to LAN Manager commands.

Command	New or changed feature
net accounts	Server roles cannot be set. Windows NT security controls lockout.
net config	Peer functionality is an inherent part of Windows NT and no longer requires separate commands.
net config server	Most network services are self-configuring. The switches /autodisconnect , /srvcomment , and /hidden can be configured. The switch /srvhidden is now /hidden .
net config workstation	Most network services are self-configuring. The switches /charcount , /chartime , and /charwait can be configured.

Command	New or changed feature
net continue	Use Print Manager to control printing. See net pause in this table for the list of services that can be paused.
net group	Manages global groups and is only for computers that are members of a domain.
net pause	You can pause these network services: Alerter, Browser, Messenger, Netlogon, Replicator, Server, Telnet, and Workstation. Use Print Manager to manage printers.
net print	Use Print Manager to manage printers.
net send	Sending files is not supported.
net share	Remote administration is automatic. Use Print Manager to share printers. Communication-device queues are not supported in this release.
net start	You can start these network services: Alerter, Browser, Eventlog, Messenger, Netlogon, Replicator, Server, Snmp, Tcpip, Nbt, Telnet, and Workstation. Services can be configured to start automatically.
net start alerter	Self-configuring.
net start messenger	Self-configuring.
net start net logon	Self-configuring. Service name is now two words.
net start directory replicator	Use Server Manager to configure the Directory Replicator service. Previously called net start replicator .
net start server	Use Server Manager to configure the Server service.
net start snmp	New options permit logging.
net start workstation	The Workstation service is configured at setup and in various applications.
net statistics	Peer functionality is an inherent part of Windows NT and no longer requires separate commands. The statistics log cannot be cleared.
net stop	You can stop these network services: Alerter, Browser, Messenger, Netlogon, Replicator, Server, Snmp, Telnet, and Workstation.
net use	The /persistent switch has only yes and no values. Communication-device queues are not supported in this release.
net user	Switches /logonserver , /maxstorage , /operator , and /privilege are not supported.
net view	New /domain switch permits viewing of domains and computers in a specified domain.

This table lists LAN Manager commands that are no longer available at the command prompt. The table tells how to accomplish the command, or explains why the command no longer exists.

Command	New procedure or reason for obsolescence
net	Use the Windows NT administrative tools to administer the network.
net admin	Use the Windows NT administrative tools to administer the network.
net access	Use File Manager to set permissions on files.
net audit	Use Event Viewer to track network resource use.
net comm	Communication-device queues are not currently supported.
net config peer	Not needed with Windows NT.
net console	Use Windows NT security features to prevent unwanted access.
net copy	Use File Manager or the system copy command to copy files.
net device	Use Print Manager to display information about shared printers.
net error	Use Event Viewer to track network resource use.
net forward	You cannot forward network messages with Windows NT.
net log	Message logging is not supported.
net logoff	Logging off is an inherent part of Windows NT.
net logon	Logging on is an inherent part of Windows NT.
net move	Use File Manager or the system copy and delete commands to move files.
net password	Press CTRL+ALT+DEL to change your password.
net run	Programs cannot be executed remotely in Windows NT.
net separator	Use Print Manager to control separator pages.
net start netpopup	Windows NT processes network messages automatically.
net start netrunc	Not supported in Windows NT.
net start nvalert	The Nvalert service is not currently supported.
net start peer	Peer functionality is an inherent part of Windows NT.
net start remoteboot	The Remoteboot service is not currently supported.
net status	The information can be found using net config server and net share .
net start timesource	The functionality is included in the Server service.
net version	Use Winver to determine the current Windows NT version.
net who	Use Server Manager to view connections to a server.

Object Linking and Embedding

In Windows NT, you can share information between applications using the special object linking and embedding (OLE) capabilities of Windows-based applications.

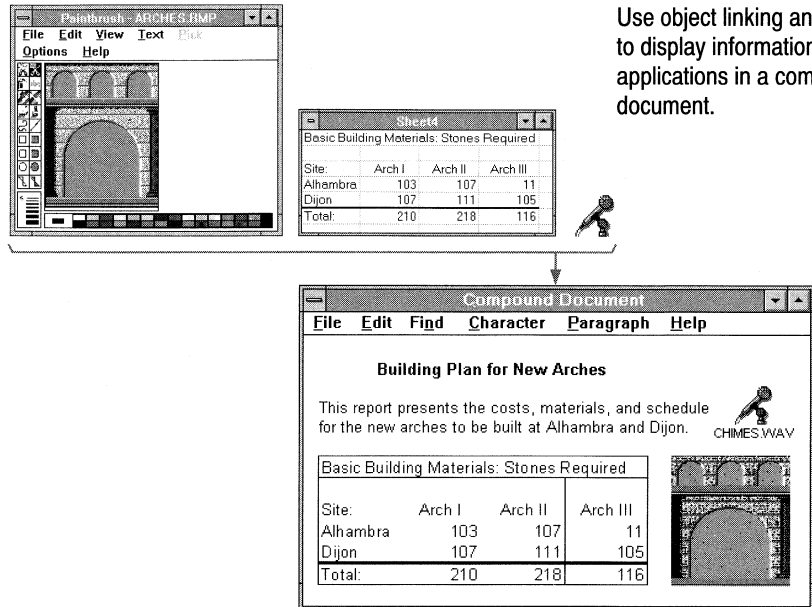
This chapter provides an overview of methods for sharing information between applications or documents, including the following topics:

- An overview of object linking and embedding
- Linking or embedding an object with menu commands
- Linking or embedding objects with OLE applications
- Maintaining linked or embedded objects

Overview

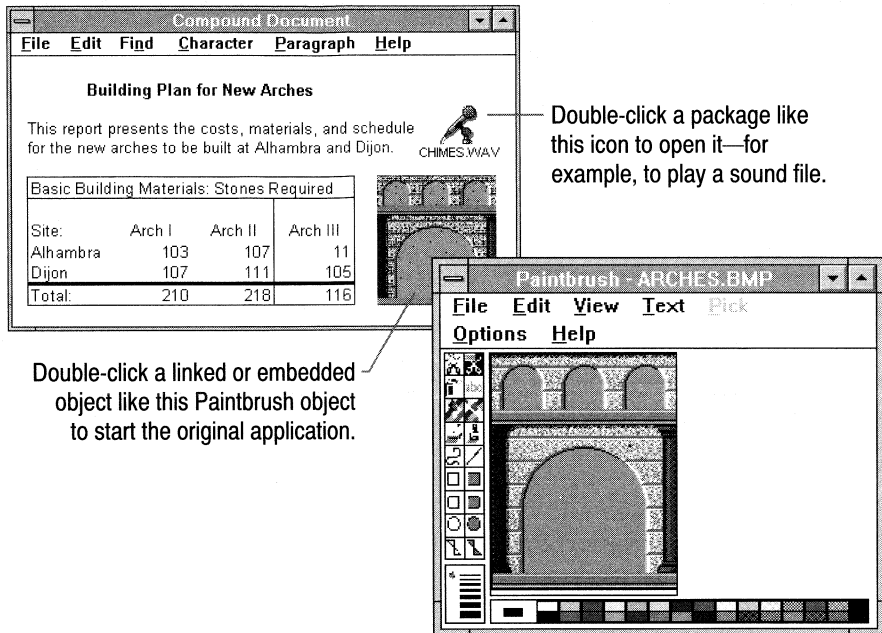
With object linking and embedding, you can combine information from several applications into one compound document. You can also edit the information, without knowing which application was used to create it.

The applications included with Windows NT that have OLE capabilities are Cardfile, ClipBook Viewer, Mail, Paintbrush, Sound Recorder, and Write. For more information about how to use the OLE features of these Windows NT accessories, see the online Help for each. For information about the OLE capabilities of your Windows-based applications, see the documentation for those applications.



The following are basic OLE terms:

- An *object* is any information that you can display and change in a document created in a Windows-based application that has OLE capabilities. For example, a single cell in a spreadsheet, a range of cells, or an entire spreadsheet might be inserted as a linked or embedded object in a word processing document. When you choose an object to edit it, the application associated with that object starts automatically.
- A *package* is an embedded icon that contains an object, a document or part of a document, or a command. A package can be inserted into any document created in an OLE application. When you choose a package, Windows executes any command associated with the package or runs the application in which the packaged information was originally created.

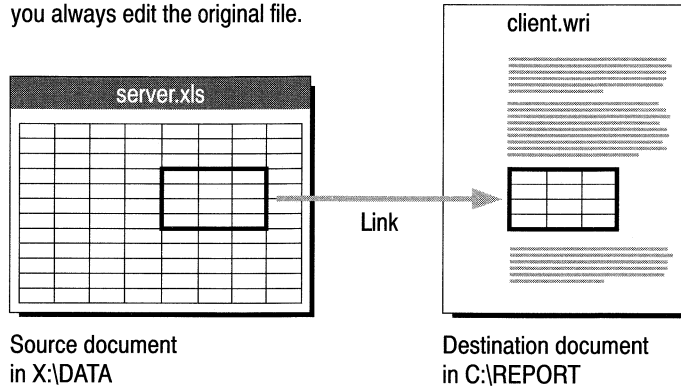


Two kinds of documents can be involved when you create linked or embedded objects and packages:

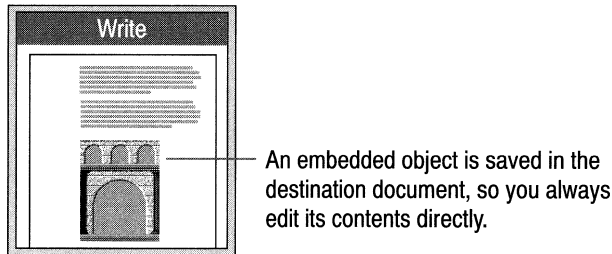
- A *source document* is the file where the information in the object or package was originally created. For example, if you want to paste art from Paintbrush into another document, the .BMP or .PCX file that contains the original artwork is the source document. If an object is embedded, it no longer has a source document.
- A *destination document* is the file where the object or package is inserted. For an embedded object, this is sometimes also called the *container document*. For example, if you paste art from Paintbrush into a document created in Microsoft Write, that text file is the destination document.

You can insert a *linked object* in a destination document to display information that was created and saved in another document. The information in the destination document can be updated dynamically (that is, continuously and automatically) whenever the source document changes.

The content of a linked object is saved in the source document, so you always edit the original file.



You can insert an *embedded object* in a destination document to present information created in another application; the information in the embedded object does not exist in another file outside your document. Use an embedded object when you want to make changes while working in your document, but do not need to save the information separately.



You can also insert a package in a document when you want users to be able to run a command from within a compound document or when you only need to display a representation of the information it contains. For example, if some readers will want to view background information, place a background document as a package in a summary report; readers can choose the package to open that document or ignore it.

OLE applications can act as either client or server:

- A *client application* is any Windows-based application that can display and store linked or embedded objects. For example, if you paste art into a Write document, then Write is the client application. The OLE client application stores all information for an embedded object, such as its page position and how the object is activated and displayed.

- A *server application* is any Windows-based application in which you can edit an object that you selected in an OLE client application. For example, if you choose art you pasted in a Write document, then the server application runs (for example, Paintbrush).

You can create a compound document that includes formatted text, graphics, and information from a spreadsheet or a database, plus icons that run sound recordings or play multimedia devices. The more hardware your system has for creating and playing multimedia through sound boards, CD-ROM, and other media players, the more complex and rich a document you can create using object linking and embedding.

But even using a basic PC and the applications included with Windows NT such as Write and Paintbrush, you can take advantage of linking and embedding to create compound documents. You use applications and features in Windows with which you may already be familiar, including several Edit menu commands in Windows-based applications, plus ClipBook Viewer, File Manager, and Object Packager.

Feature or application	Used for
Edit-menu commands in Windows-based applications	Creating objects, editing object content, and repairing or removing links “Linking or Embedding an Object with Menu Commands”
ClipBook Viewer	Saving and sharing Clipboard contents, and linking objects saved on another computer “Using ClipBook Viewer”
File Manager	Linking or embedding files in documents through copying or drag-and-drop “Using File Manager to Create a Package”
Object Packager	Creating and editing packages that contain files, parts of documents, or command “Using Object Packager to Create a Package”

Linking or Embedding an Object with Menu Commands

The procedures for linking or embedding objects with menu commands are generally the same as those you use for copying and pasting information.

The following table shows typical commands used for sharing information in Windows-based applications. Check the documentation for your application to find the actual command names used.

Command	Action
Paste	Inserts information from the Clipboard into the destination document, without creating a linked or embedded object.
Paste Link	Inserts a linked object from the Clipboard. The information appears in the destination document but is defined and stored in the source document.
Paste Special	Displays a dialog box so you can choose the data format for the object before pasting it, and also choose either to paste a linked object or to paste only the information.
Links	Displays the Links dialog box so you can update the display of an object, cancel links, repair broken links, or edit an object.
Insert Object	Displays a dialog box so you can choose the type of object to insert, and then embeds the object you create in the destination document. This command is a shortcut for running the server application to create the information, copying the information to the Clipboard, and then pasting it into the destination document with Paste Special.
Object (command name varies)	Starts the server application so you can edit or open a linked or embedded object. The actual command name depends on the selected object, such as Package Object or Picture. This command name might also be, for example, Edit Object, depending on the action allowed for that object. If several actions are possible, choosing this command displays a cascading menu that lists other commands.

Some Windows-based applications such as Microsoft Excel provide macros to control linking and embedding actions, using the term *dynamic data exchange* (DDE). For more information, see the technical reference for your application.

The following sections describe basic procedures for linking and embedding objects using the menu commands in your Windows-based applications.

Creating a Linked or Embedded Object

You can use the copy-and-paste commands from the Edit menu of OLE applications to create linked or embedded objects.

► To create an embedded object using the Edit menu commands

1. Open the source document, select the information to be embedded, and then choose Copy from the Edit menu.
2. Open the destination document, and then move the insertion point to where you want to insert the embedded object.
3. Choose Paste from the Edit menu.

The result depends on the OLE capabilities of the applications used to create the source and destination documents. If you choose the Paste command in an application that does not support OLE, a static copy of the information is placed in the document. But if the application supports OLE, the information is placed in the best available format. For example, in Microsoft Write when there is text on the Clipboard, the information is pasted as text, not as an object. If the information is in Bitmap format, then the information is pasted as a Picture object.

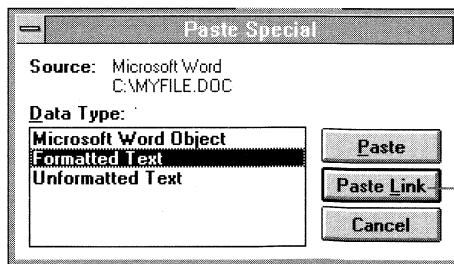
You can also create an embedded object while working in the destination document by choosing the Insert Object command. For more information, see the documentation for your application.

► **To create a linked object using the Edit menu commands**

1. In the server application, open the source document.
If you want to create a linked object, make sure the file for the source document has been saved.
2. Select the information to be linked.
3. From the server application's Edit menu, choose Copy.
4. In the client application, open the destination document, and then move the insertion point to where you want to insert the linked or embedded object.
5. Choose Paste Link from the client application's Edit menu.

If the Paste Link command is not available, but you know there is information on the Clipboard, then the source document has not been saved. You must save the document before copying information, or save the information on the Clipboard in your local ClipBook, as described in "Using ClipBook Viewer" later in this chapter.

In some applications, you can choose Paste Special if you want to choose the data type before pasting. Choosing the Paste button in this dialog box without choosing another data type has the same effect as choosing Paste from the Edit menu. The Paste Link button is available only if the format you select is supported by the application used to create the destination document.



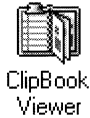
Choose Paste Link to create a linked object.

Note If you copy a linked object and paste it into another destination document, the link to the original source document is also copied and pasted.

Linking or Embedding Objects with OLE Applications in Windows NT

In addition to the accessories included with Windows NT such as Write and Sound Recorder that have OLE capabilities, several applications in Windows NT can be used to manage activities related to creating linked or embedded objects. These applications include the ClipBook Viewer for managing the Clipboard contents, and also File Manager and Object Packager for creating packages.

Using ClipBook Viewer



ClipBook Viewer provides temporary or permanent storage for information you want to transfer or share between applications and among members of your workgroup. You start ClipBook Viewer in the same way as you do other applications, by choosing its icon in the Program Manager Main group. For information about all the options available in ClipBook Viewer, choose the Help button or press F1.

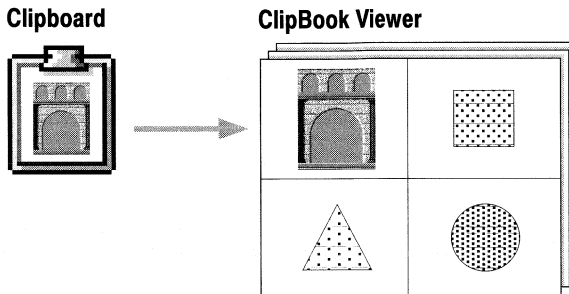
The following list shows the tools on the ClipBook Viewer toolbar. You can use these tools to choose commands and switch views.

Use	To	Use	To
	Connect to a ClipBook on another computer		Paste the contents of the Clipboard into the ClipBook
	Disconnect from a ClipBook on another computer		Delete contents of the Clipboard or selected ClipBook page
	Share a ClipBook page		Display the titles of the pages saved in the ClipBook
	Stop sharing a ClipBook page		Display thumbnail pictures of each page in the ClipBook
	Copy a selected ClipBook page onto the Clipboard		Display the contents of a selected ClipBook page

Saving and Sharing Information with ClipBook Viewer

You can use the Cut, Copy, and Paste commands in Windows-based applications to place part or all of a document onto the Clipboard for pasting into another document. To store information placed on the Clipboard, you can paste it into your local ClipBook. Each item you paste into the ClipBook is called a *page*.

Your local ClipBook can hold up to 127 pages of information, and each page can have a name of up to 47 characters. The amount of information each page can hold is limited only by available storage space on your computer's hard disk.



► To save information in ClipBook Viewer



1. Cut or copy any amount of information in your Windows-based application.
2. From the Edit menu in ClipBook Viewer, choose Paste. Or choose the Paste button from the toolbar.
3. In the Paste dialog box, type a name for the page, and then choose the OK button.



You can copy information from ClipBook pages to place into documents created by other OLE applications, and you can share ClipBook pages with other users.

► To share a ClipBook page



1. In ClipBook Viewer, select the page you want to share.
2. From the File menu, choose Share. Or choose the Share button on the toolbar.
3. In the Share ClipBook Page dialog box, select the Start Application On Connect check box.

If this check box is cleared, other users cannot establish links unless the application used to create the information is already running.

4. Select the Read-Only, Full, or Depends On Password option to specify the level of access that you want others to have to the page.

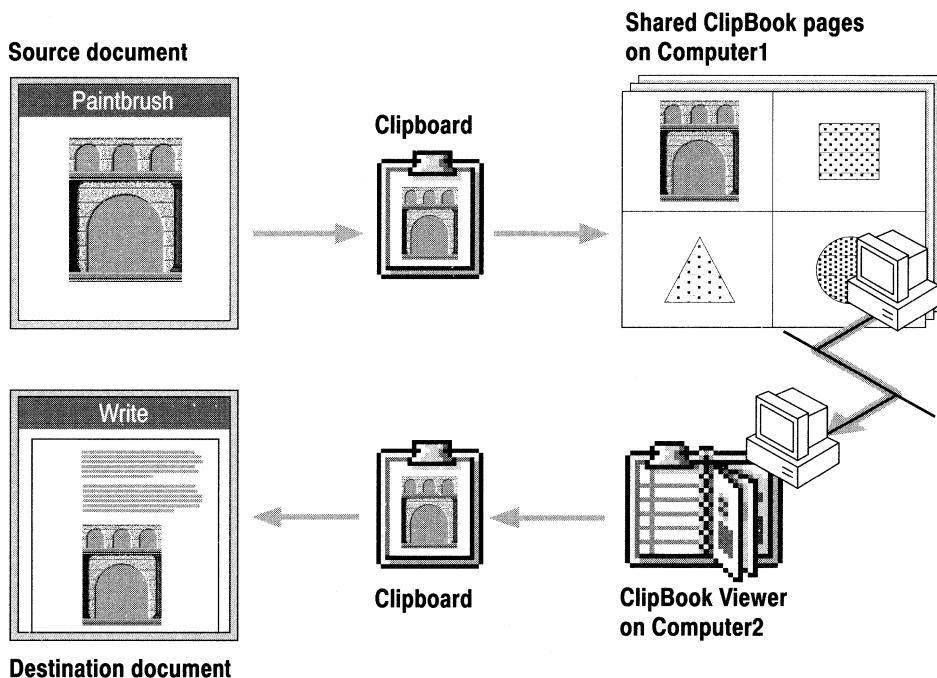
5. If you selected the Depends On Password option, type a password in the appropriate Password box.

After you share a page, other workgroup members who know the correct password for the page can connect to your computer and use the shared page in their documents. You can also use ClipBook Viewer to connect to another person's computer, and then use any shared ClipBook pages from that computer in your documents, as described in the following section.

Linking an Object from Another Computer

If the source document is stored on a different computer, you can use ClipBook Viewer to place a linked object in a destination document stored on your computer. To take advantage of this, the object must be pasted as a page on the other computer's ClipBook, and the page must be designated as shared.

When you use ClipBook Viewer to link objects, the changes made in the source document are made automatically in all destination documents that contain the object.



► To link an object stored on another computer



1. Start ClipBook Viewer, and then from the File menu, choose Connect. Or choose the Connect button from the toolbar.

2. In the Select Computer dialog box, type the name of the computer you want to connect to, or select the name from the Computers list, and then choose the OK button.

ClipBook Viewer displays the shared pages available in the ClipBook on the other computer.

3. Select the page that contains the information you want to place as a linked object in your document.



4. From the Edit menu, choose Copy. Or choose the Copy button from the toolbar.

5. Open the destination document where you want to place the linked object.

6. From the Edit menu of the destination document, choose Paste Link.

Or, if the application has a Paste Special command, choose Paste Special. Select the format for displaying the information, and then choose the Paste Link button.

7. Save the destination document.

Using Clipboard Viewer

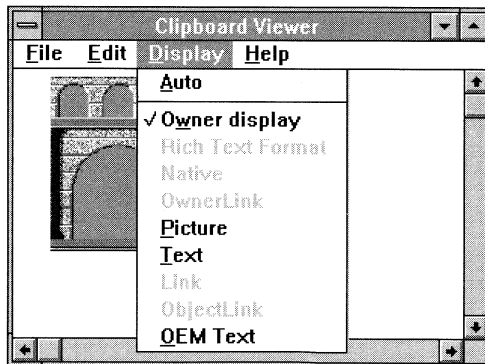
The Windows NT Clipboard Viewer is an application you can use to see the contents of the Clipboard and to save the Clipboard contents in a file. The Clipboard stores information in multiple formats so that you can transfer information between applications that use different formats.

► To start Clipboard Viewer



Clipboard Viewer

- In the ClipBook Viewer window, choose the Clipboard Viewer icon.



The Display menu in Clipboard Viewer lists all the formats for the information currently on the Clipboard. Some formats are internal descriptions used by applications, so they cannot be displayed on the screen. Such formats are unavailable on the menu.

- To view the Clipboard contents in another format, choose a format name from Clipboard Viewer’s Display menu. To return to the format that appeared when you first started Clipboard Viewer, choose Auto.

The available formats depend on the source application. For example, a graphics application such as Paintbrush might provide formats such as Bitmap, Picture, and Enhanced Metafile that other graphics applications can use. The Native, ObjectLink, and OwnerLink formats cannot be displayed in Clipboard Viewer, but are used by the client application to identify what kind of information is on the Clipboard.

- To save the Clipboard contents in a file that you can later open for pasting into documents, choose Save As from the File menu, and then specify a filename. Clipboard Viewer automatically adds the .CLP filename extension to the file.
- To open a Clipboard file for pasting contents into a document, choose Open from Clipboard Viewer’s File menu and select a filename.

Embedding a Package

A package is an embedded icon that contains an object, a file or part of a file, or a command. You might choose to embed a package in a document in various situations. For example, you can embed an icon:

- To represent non-visual information, such as a sound clip for multimedia. At any time, you can choose the icon to play the recording.
- To represent a specific document or executable file in a Mail message, so your readers can easily view or use the file contents.
- To serve as a navigational link that connects information in various parts of other documents.

You can create, edit, and insert a package in several other ways, as described in the following sections. The following table summarizes these methods.

To create a package	To insert a package in a destination document
Copy a file in File Manager.	From the client application’s Edit menu, choose Paste or Paste Link.
Drag a file icon from File Manager.	Drop the file icon in the window of the destination document.
Start Object Packager and follow the steps in Help.	From the client application’s Edit menu, choose Paste.

Using File Manager to Create a Package

You can copy a file in File Manager and then use the Edit menu commands in your application to insert it as a package in a destination document. Or you can drag a file icon from File Manager to an application window if you want to link or embed the file as a packaged object.

For example, in a summary document you might embed a file package to serve as a token for another report or supporting details. Anyone who reads the summary document online can click the icon to view the supporting report.

The embedded file must be associated with a file type and its filename extension defined in the Associate dialog box in File Manager. For information about how to add or change these associations, see Chapter 4, “File Manager.”

► **To link or embed a file package with Edit menu commands**

1. In File Manager, copy the file you want to link or embed.
2. From the Edit menu in the destination document, choose Paste or Paste Link.

► **To embed a file package with drag-and-drop**

1. Start File Manager.
2. Start the client application and open the destination document.
3. To embed a file as a packaged object, drag its icon from File Manager, and then drop it in the window that contains the destination document.

The icon for the associated application is displayed in the destination document, with the filename as its label.

Note If you want to create a file package with File Manager, the server application must have been written for Windows NT or Windows 3.1. If your application was written for an earlier version of Windows, you must use Object Packager to create the file package. Also, if you want the package to contain a linked document, you must use File Manager to place the file in Object Packager.

Using Object Packager to Create a Package

Object Packager is an application provided with Windows NT that you can use to create packages for placement in documents. With Object Packager, you can:

- Create a package that contains a document or an executable command.
- Create a package that contains a linked object.
- Edit a package’s contents, icon, or label.



File Manager



Object
Packager

► **To use Object Packager**

1. From the File menu in Program Manager, choose Run.
2. In the Command Line box, type **packager** and then press ENTER.
To get help with Object Packager features and commands, press F1.

Note If you place information in Object Packager that was created in an application that does not support OLE, the Picture option is not available.

Creating a package with Object Packager is the best choice when you want, for example, to share an object by including it in an electronic mail message. This way, all users can view the object contents without having to receive large files that may or may not be important to individual recipients, as described in the following procedure.

► **To create a package in an e-mail message**

1. Save the source document in a shared directory.
2. Start Mail and compose your e-mail message.
3. From the Edit menu in Mail, choose Insert Object, and then in the Object Type box select Package.
4. From the Edit menu in Object Packager, choose Command Line, and then type a complete path name for the file that you saved in a shared directory in Step 1.

For example, type `\\server1\public\filename.txt` to identify a file saved in the root directory of the network server named `\\server1\public`.

5. Choose the Insert Icon button in the Object Packager window, and then select an icon for the package you are sending. You can also choose Label from the Edit menu to define a label for the package.
6. From the File menu in Object Packager, choose Exit, and then choose Yes in the message that asks if you want to update the mail message.
7. Send your e-mail message in the usual way.

Each user who receives this e-mail message can choose the icon in the message to start the server application and view the contents of the file in the shared directory.

Maintaining Linked or Embedded Objects

After you create a linked object, you can edit, change, or break the link. You can also follow several steps to solve problems you might encounter with objects in destination documents, such as fixing broken links, finding unavailable server applications, or updating a linked object.

Editing an Object

After a linked or embedded object has been inserted into a document, you can edit it by choosing the object or by using menu commands to run the server application.

If the object is a package, you must copy that package and paste it into Object Packager to edit it. Then you can follow the usual steps for placing the revised package back in your destination document.

► To edit a linked object

1. In the destination document, choose the object to run the associated server application and to open the source document for the object.

After you finish editing, the changes are automatically reflected in the destination document that displays the linked object.

Or, if the object has a manual link, choose the Update Now button in the Links dialog box to update the object. (For more information, see the online Help for the Links command in your OLE application.)

2. To save changes, choose Save from the server application's File menu while working in the source document.

► To edit an embedded object

1. In the destination document, choose the object to run the server application associated with the object.
2. After you finish editing, choose Update from the server application's File menu, and then choose Exit to close the server application.
3. To save changes, while working in the destination document choose Save from the client application's File menu.

The changes are saved only in the destination document, not in a separate file.

You can cancel a link so that updates in the source document are no longer made in the destination document. If you cancel a link and then decide you want to make changes, you must edit the object in the original application or source document, and then copy and paste it back into the destination document.

► To cancel a link

1. In the destination document, select the object whose link you want to cancel.
2. In the Links dialog box, make sure the selected object is highlighted in the list. Choose the Cancel Link button, and then choose the OK button.

The information contained in the linked object remains in the destination document. Only the link has been removed.

In many applications, you can lock a linked object so that its contents are not updated or changed when other links are updated. You cannot edit a linked object that is locked.

► **To lock or unlock a linked object**

1. Select the linked object in your document, and then from the application's Edit menu, choose Links.
2. Select or clear the Locked check box to lock or unlock a linked object, respectively, and then choose the OK button.

You can, of course, delete an unlocked object by choosing the Cut or Clear command from the Edit menu to remove the information from the destination document.

Solving Problems with Linked or Embedded Objects

This section describes solutions to problems you might encounter with linked or embedded objects in OLE applications.

Changing or Fixing a Broken Link

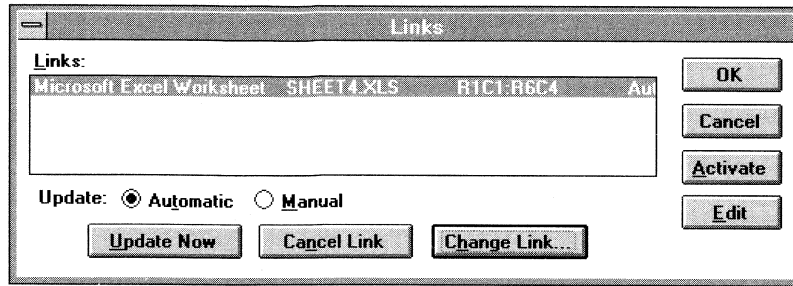
You can use the Links command in the client application to change the filename of the source document to which an object is linked. For example, you might insert a report as a linked object in a spreadsheet. If you want that linked report to show information from a new file, you can change the link without replacing the object.

Also, the link to a source document can be broken if the location of the source document changes. To repair a broken link in the destination document, you can use the Links command to change the filename or path of the source document so that the link will work correctly again.

► **To change a link or fix a broken link**

1. In the destination document, select the object whose link you want to change.
2. From the Edit menu, choose Links.

The following illustration shows an example of the Links dialog box, though it may appear somewhat different in various applications.



3. In the Links dialog box, choose the Change Link button.

The Change Link dialog box appears, with options and control buttons that work the same as those in the Open or Save As dialog box.

4. In the File Name box of the Change Link dialog box, select the source document for the object's link, and then choose the OK button.
5. When the Links dialog box reappears with the filename of the new source document selected, choose the OK button.

If a link no longer works after you try to repair it, you might need to delete the linked object, and then start over by pasting the object from the source document.

Responding to a “Server Unavailable” Message

You might receive a “server unavailable” message when you try to create, edit, play, or update an object in a destination document. The server application cannot respond if it is currently printing or performing other actions, or if a dialog box is open. To solve this problem:

- Wait a few moments to find out if the application becomes available. If it does, the message disappears and your request is processed.
- Or choose the Cancel button in the message, and then switch to the server application. Complete or cancel the action that causes the application to be unavailable.
- Or make sure that the server application and source document are located in shared directories to which you have access. If the source document is on a different computer, make sure that computer is running.

Finding an Application if the Insert Object Command Fails

If you select an object type in the Insert Object dialog box, but the application doesn't open, then Windows NT cannot find the application. To solve this problem:

- Make sure the server application for this object type is on your computer. For example, Sound Recorder (SOUND.EXE) must be on your computer before you can insert or run a Sound object.
- Make sure the directory for the server application matches the location specified in the Associate dialog box in File Manager.

Updating a Linked Object

Sometimes a linked object must be manually updated in the destination document before changes appear in the destination document, regardless of whether the object is designated for automatic or manual updating. This is true for links that contain text, spreadsheets, or pictures because these objects are represented by images reproducing the information in the source documents. This is not true for links to sound or animation files because these links are represented by icons.

If you make changes in the source document while the destination document is open, you must save the source document and update the linked object in the destination document to see the changes. If you still have problems when you are trying to edit a linked object from the destination location, try the following:

- Make sure the source document for the linked object you are editing is not located on another computer.
- If the source document is located on another computer, make sure that computer is running.

Other Application Environments

In addition to 32-bit applications designed for Windows NT, Windows NT supports applications designed for the following environments: Windows 3.1, MS-DOS, 16-bit OS/2, and POSIX.

This chapter provides information on these environments, including the following topics:

- How Windows NT runs applications
- The Windows 3.1 environment
- The MS-DOS environment
- The OS/2 environment
- Setting up and starting applications
- Creating program information files (PIFs)

How Windows NT Runs Applications

Windows NT is a modular operating system that uses operating subsystems to run applications. Each subsystem provides a different operating environment for applications. Windows NT runs Windows 3.1, MS-DOS, 16-bit OS/2, and POSIX based applications in addition to 32-bit applications designed for Windows NT.

The table below shows the Windows NT subsystems and the applications each subsystem supports.

Subsystem	Supports
Windows	Windows NT and Windows 3.1 based applications
MS-DOS	Windows 3.1 and MS-DOS based applications
OS/2	16-bit character-based OS/2 applications (on x86-based computers only)
POSIX	POSIX applications compliant with IEEE Std 1003.1 and compiled using Windows NT

The Windows NT Executive is the portion of the operating system at the center of Windows NT that manages processes and memory. You can think of a process as a discrete set of computing tasks. Each time you start an MS-DOS, Windows 3.1, OS/2, or POSIX application, the Executive starts a process for the application's subsystem and starts the application within the process. When you run Windows 3.1 based applications, applications run as tasks within a single process.

Each process is protected. That is, the Executive makes sure that each process runs in its own area of the computer's memory. In this way, processes cannot interfere with one another. If an application fails, that failure will not affect the rest of the system.

Any application that you can run in Windows NT runs seamlessly. That is, you can start any application from Program Manager, File Manager, or the command prompt without concern for what sort of operating environment the application requires. This seamlessness allows full interaction among applications. Windows NT supports object linking and embedding (OLE), dynamic data exchange (DDE), full clipboard operation, and named pipes.

Supported Applications

Windows NT can run most Windows 3.1, MS-DOS, and 16-bit character-based OS/2 applications. Some existing applications require special device driver support because they directly address computer hardware. Without special device drivers, these applications could cause the entire system to fail or could violate system security.

In many cases, such applications require only a new device driver in order to run on Windows NT. New device drivers are supplied with Windows NT for some common applications. For more information on the device drivers supplied with Windows NT, see the READ ME program item in the Main program group. If you have an application for which a device driver is not supplied, check the application's manufacturer for the availability of new drivers. In other cases, the manufacturer may have upgraded the application. Check the application's manufacturer for the availability of an upgrade designed to run with Windows NT.

The following types of existing applications require either new device drivers or an application upgrade:

- Applications that directly address hardware; for example, FAX cards, scanner cards, or terminal emulation cards
- Applications that rely on their own disk device drivers; for example, applications that increase hard disk capacity
- Applications that directly address disk drives; for example, disk maintenance applications

- Applications that rely on their own graphics device drivers to address the hardware; for example, applications that use private printer drivers

Windows 3.1 Environment

Windows NT provides a complete operating environment for Windows 3.1 applications. The environment is comparable to the enhanced mode environment in Windows 3.1 where:

- Virtual memory is supported (on x86-based computers only).
- Object linking and embedding (OLE) is supported.
- Dynamic data exchange is supported.

Configuring the Windows 3.1 Environment

When you install Windows NT, the installation program checks to see whether a previous version of Windows is installed on the computer. If it is, you should install Windows NT in the same directory as the previous version of Windows. This allows Windows NT to configure the Windows environment based on the existing environment and allows Windows NT to support all the features of currently installed Windows 3.1-based applications.

Previous versions of Windows store Windows environment information in the WIN.INI and SYSTEM.INI files. Unlike previous versions of Windows, Windows NT stores this information in its registry database. If you installed Windows NT in the same directory as Windows 3.1, Windows NT automatically coordinates the two Windows environments.

Each time you start Windows NT, Windows NT reads the WIN.INI and SYSTEM.INI files, and stores the information in the registry. Thus, if you made changes to the Windows environment while running Windows 3.1, these changes will be reflected in the Windows NT environment as well.

When you shut down Windows NT, Windows NT records changes to the environment by updating the WIN.INI and SYSTEM.INI files. The next time you run Windows 3.1, changes made to the environment while running Windows NT will appear in the Windows 3.1 environment.

If you run Windows NT only, the WIN.INI and SYSTEM.INI files will not contain any Windows environment information. However, the files are available for use by Windows 3.1-based applications that require them to store their own configuration information.

MS-DOS Environment

Windows NT provides a complete operating environment for MS-DOS applications. The environment is comparable to the enhanced mode environment in Windows 3.1.

- Expanded memory is emulated for applications that require it.
- On x86-based computers, character-based applications run either in a window or the full screen. Applications that use graphics run in the full screen.
- On RISC-based computers, character-based and graphics-based applications run in a window only. You can change the size of the window using the Screen Size And Position command from the Control menu.

Configuring the MS-DOS Environment

Windows NT configures the MS-DOS environment by reading the AUTOEXEC.BAT file when you log on, and by reading the AUTOEXEC.NT and CONFIG.NT files each time you start an application. The AUTOEXEC.NT and CONFIG.NT files are the Windows NT versions of AUTOEXEC.BAT and CONFIG.SYS. In addition, you can use custom startup files to configure the MS-DOS environment. For more information on custom startup files, see “Creating Program Information Files (PIFs)” later in this chapter.

When you log on to Windows NT, the path and environment variables stored in the AUTOEXEC.BAT file are appended to the Windows NT path and environment settings. Because this portion of the operating environment is established at logon, the values set for the path and environment variables are available to each application you use. If you change these values, you must log off and log on to Windows NT again so that the changes take effect.

Each time you start an application, Windows NT also reads the CONFIG.NT and AUTOEXEC.NT files to configure the environment for the application. If, for example, you change an application’s driver in the CONFIG.NT file, restarting the application puts the change into effect. You can edit these files just as you would CONFIG.SYS and AUTOEXEC.BAT. The files are located in the C:\WINNTSYSTEM32 directory.

As in previous versions of Windows, Windows NT allows you to customize the environment for each MS-DOS application by using program information files (PIFs).

Commands Available in CONFIG.NT

Windows NT supports the MS-DOS configuration commands shown in the table below. If you include commands in your CONFIG.NT file that are not supported, Windows NT ignores them. For more information on Windows NT commands, see Chapter 9, “Command Prompt.”

Command	Function
country	Sets the language conventions for a specific country.
device	Loads an installable device driver. If necessary, you can load drivers that control memory, such as HIMEM.SYS, or that control character-based display, such as ANSI.SYS.
dos	Specifies how the upper memory area will be used.
echoconfig	Switches on the display of CONFIG.NT and AUTOEXEC.NT messages when you start an application.
fcbs	Sets the number of file control blocks (FCBs) that can be opened concurrently.
files	Sets the number of files that can be open at one time.
install	Loads a memory-resident program into memory.
loadhigh	Loads device drivers into the upper memory area.
rem	Marks lines in the CONFIG.NT file as comments (remarks).
shell	Specifies the command interpreter. Only the Windows NT command interpreter is supported.
stacks	Sets the amount of RAM reserved for processing hardware interrupts.

Commands Available in AUTOEXEC.NT

Windows NT supports a similar range of commands as MS-DOS 5.0 for use in the AUTOEXEC.NT file. For more information on Windows NT commands, see Chapter 9, “Command Prompt.”

Using Program Information Files

As in previous versions of Windows, when you start an MS-DOS application, Windows NT looks for a program information file (PIF) to use with the application. If you have been using a PIF to run an application in previous versions of Windows, you can continue to use it with Windows NT. However, Windows NT eliminates the need to set many PIF options and ignores options that do not apply. Windows NT also supports one new option. You can specify startup files to configure an application's environment for each application you run. For more information on PIF options and creating PIFs, see “Creating Program Information Files (PIFs)” later in this chapter.

Some software manufacturers provide a PIF for an application. To determine whether a PIF has been supplied, contact the software manufacturer or search the disks for a file that has a .PIF filename extension. If you have PIFs from both Windows NT and the software manufacturer, use the PIF supplied by the manufacturer.

To use a PIF supplied with an application, copy the PIF to the directory where the application's files are located or to the directory where you set up Windows NT. Then, set up a program item so you can run the application from its PIF. For information about setting up a program item, see Chapter 3, "Program Manager."

Windows NT includes a PIF named _DEFAULT.PIF, located in the \WINNT directory. This PIF contains settings that work with most MS-DOS applications. Windows NT uses this PIF when it is the only one available for your application.

Running Memory-Resident Programs

Windows NT supports MS-DOS memory-resident programs, also called pop-up and TSR (terminate and stay resident) programs. Like any MS-DOS-based application you run in Windows NT, memory-resident programs run in the window in which they are started and can be used only within that window.

In general, you should not start memory-resident programs from your AUTOEXEC.NT or CONFIG.NT files. If you do, each time you start an application that reads these files, you will also start another copy of the memory-resident program, thereby wasting memory.

If one of your applications requires a memory-resident program to work properly, start the memory-resident program and then start the application in the same command window. You can also create a custom startup file that starts the memory resident program, and then specify that startup file in the application's PIF. For more information on custom startup files, see "Custom Startup Files" later in this chapter.

► To run a memory-resident program with another application

1. Start the memory-resident program.

You can start the program as you would any program in Windows NT: from the command prompt, from File Manager, or from Program Manager.

After the program is loaded, a message confirms that the memory resident program is running.

2. Press CTRL+Z.

Windows NT returns you to the command prompt.

3. Start the application in the same window by typing its name at the command prompt and pressing ENTER.

After you quit the application, you will not be able to reach the memory-resident program, although it is still loaded. You can use the memory-resident program again by starting any MS-DOS application in the same command window.

A convenient way to start a memory-resident program with an application is to create a batch program that starts both programs, and then create a PIF for the batch program. For example, to create a batch program that starts the pop-up program SideKick 2.0 and the word processor XyWrite, use Notepad to create the following program and save the file as SKXYLOAD.BAT.

```
SK2  
EDITOR
```

Then use PIF Editor to create a PIF that specifies SKXYLOAD.BAT in the Program Filename box. Give the PIF the same base name as the batch program, for example SKXYLOAD.PIF. You can then start both programs using either the PIF or batch program from the command prompt or in File Manager. You can start the programs from Program Manager by creating a program item for either the PIF or the batch program.

If you want to keep a pop-up program easily available while you are using Windows NT, you can start and run the program in a window. You can then switch to the window whenever you want, just as with any other program.

► **To run a pop-up program in a window**

1. Start the pop-up program.

You can start the program as you would any program in Windows NT: from the command prompt, from File Manager, or from Program Manager.

After the program is loaded, Windows NT displays a message to confirm that it is running.

2. Press the appropriate key combination to display the program in the window.

A few pop-up programs require a key combination that is reserved for Windows NT, for example ALT+ESC. In such a case, create a PIF for the pop-up program and select the Reserve Shortcut Keys option for the conflicting key combination. Windows NT will reserve the key combination for use by the program so that you can display it.

OS/2 Environment

Windows NT supports 16-bit character-based OS/2 applications on x86-based computers only. OS/2 bound applications (applications that can run under both OS/2 and MS-DOS) will run on RISC-based computers using the MS-DOS subsystem.

Configuring the OS/2 Environment

When you start an OS/2 application, Windows NT starts the OS/2 subsystem. When the subsystem starts, it sets up the OS/2 operating environment by reading configuration information from the Windows NT registry.

When the OS/2 subsystem is started for the first time, it checks the registry for OS/2 subsystem configuration information. If none is found, it looks for information in the original CONFIG.SYS file and adds the information to the registry. If the original CONFIG.SYS file does not exist or is not an OS/2 configuration file, the subsystem adds the following default information to the registry:

```
PROTSHELL=c:\os2\pmsHELL.exe c:\os2\os2.ini c:\os2\os2sys.ini
    %SystemRoot%\system32\cmd.exe
SET COMSPEC=%SystemRoot%\system32\cmd.exe
```

The subsystem updates the environment variable Os2LibPath with LIBPATH information found in the original CONFIG.SYS file. The updated Os2LibPath is %SystemRoot%\system32\os2dll concatenated with the list of directories specified in the LIBPATH line of the original CONFIG.SYS file.

The PATH information found in the original CONFIG.SYS is not entered automatically into the default Windows NT path. You can add the location of OS/2 applications using the System option in Control Panel by adding PATH information to the User Environment Variables box. This information is appended automatically by Windows NT each time a user logs on to the system.

Windows NT supports the OS/2 configuration commands shown in the table below. If you use commands that are not supported, Windows NT ignores them.

Command	Function
protshell	Specifies the command interpreter. Only the Windows NT command interpreter is supported.
devicename	Specifies a user-defined NT device driver used by OS/2 applications.
libpath	Specifies the location of OS/2 16-bit dynamic-link libraries.
set	Sets environment variables.
country	Sets a country code that defines country-dependent information such as time, date, and currency conventions.
codepage	Specifies which code pages your system is prepared to use.
devinfo=KBD	Specifies the information the keyboard needs in order to use a particular code page.

The **libpath**, **set**, and **devicename** commands are processed as follows:

- **libpath** appends path information to the OS/2 library path in the Windows NT environment. At the command prompt, you can change the library path for OS/2 applications by using the **os2libpath** command.

- The following **set** commands are ignored:

set path	set compspec	set video_devices
set vio_ibmvga	set vio_vga	set prompt

- **devicename** specifies a device driver compatible with Windows NT for use with an OS/2 application. The syntax of the command is:

```
DEVICENAME=OS/2devicename [[path][NTdevicename]]
```

Devicename is the logical name OS/2 applications use to address the device. *Path* and *NTdevicename* specify the Windows NT device driver to which the OS/2 device name is mapped. If these are not specified, the device is mapped to `\DEVICE\os/2devicename`.

Changing OS/2 Configuration Information

Although the OS/2 configuration information is stored in the registry, you can edit that information just as you would edit an OS/2 CONFIG.SYS file. To edit the information, you must use an OS/2 text editor.

Security To change configuration information, you must be logged on as a member of the Administrators group.

► To change configuration information

1. While running Windows NT, start an OS/2 text editor in a window.
2. Open a file called C:\CONFIG.SYS.

Windows NT retrieves the configuration information from the registry and stores it in a temporary file that you can edit.

3. Edit the configuration information.
4. Save and close the file.
5. Exit the editor.

Windows NT stores the new information in the registry.

6. Log off from Windows NT and restart your computer.

Setting Up and Starting Applications

Set up a Windows 3.1, MS-DOS, OS/2, or POSIX application just as you would other applications, by using the Windows NT Setup program or Program Manager.

When you use the Windows NT Setup program to set up an MS-DOS application, Setup creates a PIF (program information file) or uses the PIF that accompanies the application or the Windows NT default PIF. Windows 3.1, OS/2, and POSIX applications do not use PIFs. For more information on Windows NT Setup, see Chapter 12, “System Maintenance with Windows NT Setup.”

When you use Program Manager to set up an MS-DOS-based application, Program Manager searches for a PIF to use with that application:

- If it finds one, it sets up the application and the PIF to work together.
- If no PIF is available, Windows NT uses the default PIF, named `_DEFAULT.PIF`, when you start the application.

For more information on using Program Manager to set up applications, see Chapter 3, “Program Manager.”

You can start applications from Program Manager, File Manager, or from the command prompt.

► **To start an application from Program Manager**

1. Open the group that contains the program-item icon for the application.
2. Choose the icon. Or select it, and then press ENTER.

► **To start an application using the Program Manager Run command**

1. From the File menu, choose Run.
2. In the Command Line box, type the name of the file that starts the application, including the filename extension. You can also include any optional parameters that the application uses when it starts.

If the application is MS-DOS-based, you can type the name of the application's PIF.

3. Choose the OK button.

► **To start an application from File Manager**

1. In the Main group, choose the File Manager icon.
2. In the directory window, choose the filename for the application. Or select the filename, and then press ENTER.

If the application is MS-DOS-based, you can use the filename of its PIF.

► **To start an application from the command prompt**

1. In the Main group, choose the Command Prompt icon.
2. At the command prompt, type the application's executable filename, and then press ENTER.

Or, to run the application and retain use of the current command window, type **start** and the application's executable filename, and then press ENTER.

Include the path to the application if necessary. You can include any startup parameters for the application after the application's name.

If the application is MS-DOS-based, you can use the filename of its PIF.

Note The first MS-DOS-based application started at the command prompt establishes the MS-DOS environment for all MS-DOS-based applications run in that window. To ensure that an MS-DOS-based application always runs in the environment you specified in its PIF, start the application in a new command window. You can open a new command window from Program Manager or by using the **start** command at the command prompt.

Creating Program Information Files (PIFs)

A program information file provides information to Windows NT on how best to run MS-DOS applications. Windows 3.1, OS/2, and POSIX applications do not use or require PIFs.

Create, modify, and save PIFs using PIF Editor. Typically, a PIF has the same filename as the associated application's main program file, except that a PIF has the .PIF filename extension. During Windows NT setup, PIFs are placed in the \WINNT directory.

Windows NT includes a PIF named _DEFAULT.PIF, located in the \WINNT directory where you set up Windows NT. This PIF contains settings that work with most MS-DOS applications. Windows NT uses this PIF when there is no other one available for your application.

Because Windows NT might use the default PIF with more than one MS-DOS application, you should not modify it. You can use the default PIF as a starting point for creating a new PIF.

► **To create or change a PIF**



1. Start PIF Editor by choosing the PIF Editor icon in the Main group.

PIF Editor displays a new, untitled PIF window with PIF options set to their default values.

To edit an existing PIF, choose Open from the File menu, and then specify the PIF you want.

2. Specify the PIF options for the application.

For more information on PIF options, see “Specifying PIF Options” later in this chapter.

3. Save the PIF by choosing the Save or Save As command from the File menu.

If you are modifying the _DEFAULT.PIF file, be sure to choose the Save As command and to rename the file when you save it.

Always use the .PIF extension when you name a PIF file.

Using Multiple PIFs for an Application

You can create more than one PIF for an application. You may find it useful to do this if you run an application differently under different circumstances.

For example, you can specify in a PIF how much EMS (expanded) memory an application has access to. By using two PIFs, you could give an application access to a large amount of EMS memory when you’re using large data files, but limit its use of memory when you’re working with smaller files.

► **To set up two PIFs for an application**

1. Create two PIFs.
2. For each PIF, indicate the appropriate settings.

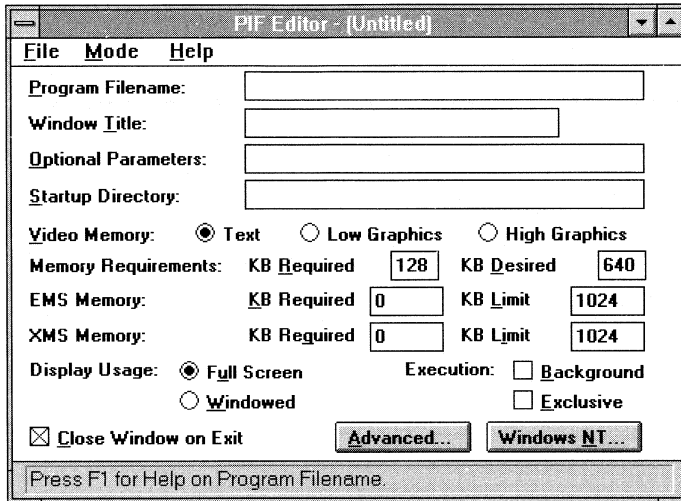
In this example, you would set the EMS Required: KB Limit setting to -1 for one PIF. For the other PIF, you would set the EMS Required: KB Limit setting to 1024K.

3. Save each PIF with a unique filename.
4. Create program-item icons for both PIFs in Program Manager, giving each a distinct title. Because you want to start the application from its PIF in this case, be sure to specify the PIF filename, not the application’s filename, in the Command Line box.

You can choose either icon to start the application.

Specifying PIF Options

Windows NT eliminates the need to set many PIF options for MS-DOS applications. However, Windows NT allows you to specify all PIF options in case you want to create PIFs for use when running applications with Windows 3.1. Only PIF options used by Windows NT are explained below. For information on other PIF options, including standard mode options, see your *Windows 3.1 User's Guide*.



Program Filename

In the Program Filename box, type the name of the file that starts the application. Include the path if necessary.

For most applications, you can type the path of the main program file, which usually has the extension .EXE or .COM. For example, to create a PIF for Microsoft Word, type **c:\word\word.exe**. If you start the application from a batch program, type its path, including the filename extension (usually .BAT).

You can also specify an environment variable in this box. Using an environment variable allows you to place the variable name in the PIF and assign it a value using the **set** command in the AUTOEXEC.BAT file. When you type the variable name, enclose it in percent signs (%). For example, in your AUTOEXEC.BAT file assign the value "c:\word\word.exe" to an environment variable named "worddir" by adding the line **set worddir = c:\word\word.exe**. Then in PIF Editor specify the environment variable **%worddir%** as the Program Filename.

Window Title

You can type a descriptive name in the Window Title box. For example, type **Lotus 1-2-3** if you are creating a PIF for that application. The name you type appears under the application's icon when the application is minimized, and in the window title bar when the application is running in a window.

This entry is optional. If you leave the Window Title box blank, the application's title bar displays the name of the PIF without the filename extension.

You can also specify a title by using Program Manager. You do this by choosing the Properties command from Program Manager's File menu, and specifying a name in the Description box. Program Manager settings override PIF settings.

You can also specify an environment variable in this field. By using an environment variable, you can place a variable name in the PIF and assign it a value by using the **set** command in the AUTOEXEC.BAT file. When you type the variable name, enclose it in percent signs (%).

Optional Parameters

You can type application parameters in the Optional Parameters box. These are the same parameters you type after the application's filename when starting the program at the command prompt. For example, if you use the **/c** when you start Microsoft Word at the command prompt, type **/c** in the Optional Parameters box.

Parameters can be filenames, letters, numbers, or any type of information up to 62 characters in length. For information about valid parameters, see the application's documentation.

If you want Windows NT to prompt you for parameters whenever you start the application, type a question mark (?) in this box. You can also specify an environment variable in this field. By using an environment variable, you can place a variable name in the PIF and assign it a value by using the **set** command in the AUTOEXEC.BAT file. When you type the variable name, enclose it in percent signs (%).

This entry is optional. If the application does not require parameters, or if you do not want to use any parameters when you start your application, leave this box blank.

When you start the application by using the Run command in File Manager or Program Manager, any optional parameters you specify override the optional parameters specified in the PIF.

Start-up Directory

Some applications require access to files in a particular directory before they can run. You can type a path in the Start-up Directory box to specify the directory you want to be the current directory when the application starts, usually the directory where the application's program file is located. This entry is optional.

You can also specify this directory by using Program Manager. You do this by choosing the Properties command from Program Manager's File menu, and then specifying a directory in the Working Directory box. Program Manager settings override PIF Editor settings.

You can also specify an environment variable in this field. By using an environment variable, you can place a variable name in the PIF and assign it a value by using the **set** command in the AUTOEXEC.BAT file. When you type the variable name, enclose it in percent signs (%).

EMS Memory

Windows NT can simulate expanded memory for applications that use it. Use the EMS Memory options to specify how much expanded memory Windows NT should provide to an application. Although few applications actually require expanded memory, many run better if they can use it. For more information on how a particular application uses expanded memory, see the application's documentation. The following table describes the options.

Use	To
KB Required	<p>Specify how many kilobytes of expanded memory are needed to start the application. In general, you can leave this option at the standard setting of 0, indicating that the application does not require expanded memory. The KB Required option does not limit how much expanded memory the application receives; Windows NT gives it at least as much as is specified by KB Required, plus any available expanded memory up to the amount specified by the KB Limit option.</p> <p>Windows NT starts the application only if it can provide at least as much expanded memory as the KB Required option specifies. Otherwise, Windows NT displays a message indicating there is not enough expanded memory to run the application. If other applications are running, you can quit one or more of them, and then try running the application again.</p>

Display Usage

Use the Display Usage options to set whether a character-based application starts in a window or in a full screen. While a character-based application is running, you can move it from a window to a full screen, or vice versa, by pressing ALT+ENTER.

Use	To
Full Screen	Start the application in a full screen.
Windowed	Start the application in a window.

While an application is running, you can set display usage from the Control menu using the Settings command. Display usage set using the Control menu overrides the setting made using PIF Editor.

On RISC-based computers, applications run in a window only and this option does not apply. On x86-based computers, graphical applications run using the full screen only. If a character-based application running in a window switches to graphics mode, for example to display a chart, Windows NT will switch the display to the full screen automatically.

Use	To
KB Limit	<p>Limit the amount of expanded memory provided to the application. Windows NT gives an application as much expanded memory as it requests, up to the amount you type in this box, or until no more memory is available.</p> <p>This option is useful for limiting an application's access to expanded memory, since some applications take all available expanded memory whether they need it or not. The default setting of 1024 provides the application with as much expanded memory as it requests, up to a limit of 1024K, or until no more memory is available.</p> <p>A setting of -1 allocates as much expanded memory to an application as it requests, up to a limit determined by the system. This can slow down the rest of your system.</p> <p>To prevent Windows NT from providing any expanded memory to the application, set both KB Required and KB Limit to 0.</p>

XMS Memory

Use the XMS Memory options to allocate extended memory to an application that uses memory according to the Lotus-Intel-Microsoft-AST eXtended Memory Specification (XMS) standard. Because few applications require extended memory, you can usually leave these options at their default settings. A description of the options follows.

Use	To
KB Required	<p>Specify how many kilobytes of extended memory are needed to start the application. In general, you can leave this option at the default setting of 0, indicating that this application does not require extended memory.</p> <p>The KB Required option does not limit how much extended memory the application receives; Windows NT gives it as much extended memory as the application requests, up to the limit set by the KB Limit option or until no more memory is available.</p> <p>Windows NT starts the application only if it can provide at least as much extended memory as the KB Required option specifies. Otherwise, Windows NT displays a message indicating there is not enough memory to run the application. If other applications are running, you can quit one or more of them and try running the application again.</p>
KB Limit	<p>Limit the amount of extended memory provided to the application. Windows NT gives an application as much extended memory as it requests, up to the amount you type in this box, or until no more memory is available. This option is useful for limiting an application's access to extended memory, since some applications take all available extended memory whether they need it or not.</p> <p>The default setting of 1024 provides the application with as much extended memory as it requests, up to a limit of 1024K, or until there is no more memory available.</p> <p>A setting of -1 allocates as much extended memory to an application as it requests, up to a limit determined by the system. This can slow down the rest of your system.</p> <p>To prevent Windows NT from providing any extended memory to the application, set both KB Required and KB Limit to 0.</p>

Reserve Shortcut Keys

Normally, Windows NT uses the key combinations in the table below to perform some action. Selecting one or more of the shortcut-key check boxes instructs Windows NT to ignore the specified key combination when the application is running in the foreground. Instead, the application responds to the key combination.

Use	To
ALT+TAB	Reserve the ALT+TAB shortcut key for the application. Otherwise, Windows NT switches between applications when you press this key combination.
ALT+ESC	Reserve the ALT+ESC shortcut key for the application. Otherwise, when you press this key combination, Windows NT cycles through the applications in the order each was started.
CTRL+ESC	Reserve the CTRL+ESC shortcut key for the application. Otherwise, Windows NT displays the Task List when you press this key combination.
PRTSC	Reserve the PRINT SCREEN shortcut key for the application. Otherwise, Windows NT copies the contents of the screen onto the Clipboard when you press this key.
ALT+PRTSC	Reserve the ALT+PRINT SCREEN shortcut key for the application. Otherwise, Windows NT copies the contents of the active window onto the Clipboard when you press this key combination.
ALT+SPACE	Reserve the ALT+SPACEBAR shortcut key for the application. Otherwise, Windows NT displays the application's Control menu when you press this key combination.
ALT+ENTER	Reserve the ALT+ENTER shortcut key for the application. Otherwise, when you press this key combination, Windows NT switches the application between a window (if it can run in one) and a full screen.

Application Shortcut Key

An application shortcut key allows you to switch immediately to an application that is running in the background. By using an application shortcut key, you can switch to a particular application quickly, no matter where you are in Windows NT or which application you are using.

To assign an application shortcut key to an application, you can use the Properties command on the File menu in Program Manager, or you can use the Application Shortcut Key option in the application's PIF. Shortcut-key settings made in Program Manager override settings made in a PIF. The key combination you specify must include either the ALT or CTRL key. For example, the key combinations CTRL+Y, ALT+F4, CTRL+SHIFT+F11, and CTRL+ALT+7 are all valid application shortcut keys. You cannot specify a key combination that includes the ESC, ENTER, TAB, SPACEBAR, PRINT SCREEN, or BACKSPACE key.

After you assign an application shortcut key, the key combination works as a shortcut key only when that application is loaded. No other application (including Windows NT, Windows NT applications, and the application that uses the shortcut key) can use that key combination for any other purpose. For this reason, you should select application shortcut keys carefully. For example, suppose you specify ALT+F as the application shortcut key for Lotus Freelance. In many Windows applications, ALT+F is a shortcut key that displays the File menu. However, if Freelance is loaded when you are using Notepad, pressing ALT+F makes Freelance the active application, rather than displaying Notepad's File menu.

► **To specify a shortcut key by using Program Manager**

1. Switch to Program Manager.
2. Select the icon for the application whose shortcut key you want to specify.
3. From the File menu, choose Properties.
4. Select the Shortcut Key box, and then press the key combination you want to use for this application.
5. Choose the OK button.

If you press an invalid key combination, a message appears and Windows NT resets the key definition to its previous value.

► **To delete a shortcut-key definition by using Program Manager**

1. Switch to Program Manager.
2. Select the application's icon.
3. From the File menu, choose Properties.
4. Select the Shortcut Key box, and then press SHIFT+BACKSPACE.
The shortcut key is set to None.
5. Choose the OK button.

► **To specify a shortcut key by using PIF Editor**

1. From the File menu, choose Open.
2. Select the PIF for the application whose shortcut key you want to specify, and then choose the OK button.
3. Choose the Advanced button.
4. In the Advanced dialog box, select the Application Shortcut Key box.
5. Press the key combination you want.

Windows NT interprets any key combination you press as an application shortcut key unless you press keys that move you to another area in the dialog box (such as TAB).

6. Choose the OK button.

If you press an invalid key combination, a message appears, and Windows NT resets the key definition to its previous value.

► **To delete a shortcut-key definition by using PIF Editor**

1. Open the PIF for the application whose shortcut key you want to delete.
2. Choose the Advanced button.
3. Select the Application Shortcut Key box.
4. Press SHIFT+BACKSPACE to set the shortcut key to None.

Or, while pressing a key combination, press BACKSPACE to reset the shortcut key definition to its previous value.

Custom Startup Files

Windows NT allows you to create custom startup files that you can specify in an application's PIF. When you start the application, Windows NT will read the custom files you specify rather than the CONFIG.NT and AUTOEXEC.NT files. This allows you to create a custom MS-DOS environment for each application you use. For example, if one of your applications requires a memory resident program when it runs, you can include the name of that program in a custom startup file. When you start the application using its PIF, Windows NT will automatically start the memory resident program.

When you create startup files, base them on the AUTOEXEC.NT and CONFIG.NT files. That way, the basic information needed to configure the MS-DOS environment will already be included in your files. In configuration files, Windows NT uses the variable %SystemRoot% to represent the Windows directory. When processing the files, Windows NT automatically expands this variable.

► **To create custom startup files**

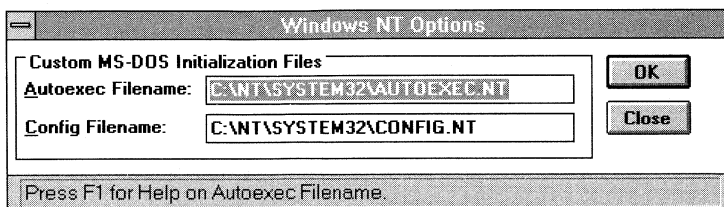
1. Using a text editor, for example Notepad, edit the CONFIG.NT and AUTOEXEC.NT files.

The files are located with your other Windows NT files in the directory \WINNT\SYSTEM32.

2. Save each file under a new name.

► **To specify custom startup files in PIF Editor**

1. From the File menu, choose Open.
2. Select the PIF for the application whose startup files you want to specify, and then choose the OK button.
3. Choose the Windows NT button.



4. In the Config Filename box, type the name of the file you want to use in place of CONFIG.NT.
5. In the Autoexec Filename box, type the name of the file you want to use in place of AUTOEXEC.NT.
6. Choose the OK button.

System Maintenance with Windows NT Setup

You can use Windows NT Setup for system maintenance—whether Windows NT was initially installed from disks or from the network, or was installed by your equipment manufacturer. If you change the hardware or software in your computer, you need to ensure that your system configuration includes the correct device drivers and components for Windows NT.

This chapter presents the following topics:

- Changing system configuration settings
- Setting up applications to run from Program Manager
- Installing a new device driver
- Adding and removing drivers for SCSI adapters and tape drives
- Adding and removing Windows NT components
- Deleting user profiles
- Repairing your system with the Emergency Repair disk

To change printer drivers, use Print Manager. To install and configure network components, choose the Network icon in Control Panel. To change your keyboard layout or language, choose the International icon in Control Panel.

Starting and Quitting Windows NT Setup

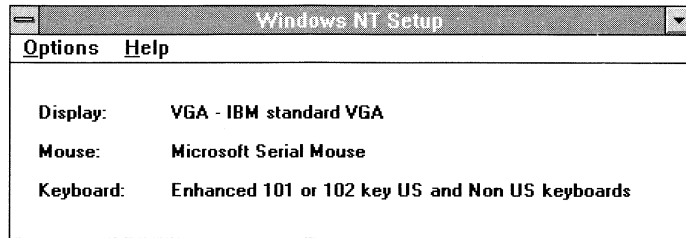
When you want to run Windows NT Setup for system maintenance, you start it like any other application that appears in a program group—by double-clicking its icon.

Security You can change some system settings only if you are logged on as a member of the Administrators group. If you cannot run Windows NT Setup or use the tools in Control Panel to change system settings, ask your system administrator for assistance.

► **To run Windows NT Setup for system maintenance**



- In Program Manager, choose the Windows NT Setup icon.
You can press F1 at any time to get help for Windows NT Setup.



Important Before running the setup program for an application created for any version of Windows, you must quit Windows NT Setup. Otherwise, the application's setup program will fail.

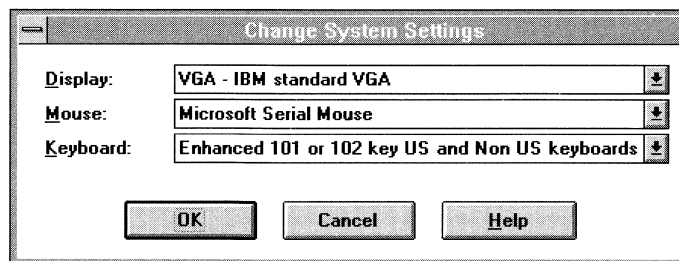
► **To quit Windows NT Setup**

- From the Options menu, choose Exit.

Changing System Configuration Settings

You can use Windows NT Setup to change the system setting for your display, keyboard, or mouse by specifying new options in the Change System Settings dialog box. For example, if your computer currently uses a device driver for a 256-color SuperVGA display and you want the display to appear in standard VGA 16-color mode, you must use Windows NT Setup to change this setting.

Security To make system setting changes, you must be logged on as a member of the Administrators group for your computer.



► **To change system settings for the display, keyboard, or mouse**

1. Make sure your hardware is set up to match the setting you are changing to.
2. From the Options menu in Windows NT Setup, choose Change System Settings.
3. In the Change System Settings dialog box, open the list for the setting you want to change by clicking the arrow at the right of the list.
4. Make sure your hardware is listed, and then select the setting you want.

To install a new or updated driver file, choose Other, and then when Setup prompts you for a disk, insert a disk containing the driver file into drive A.

If Setup asks you to supply a Windows NT disk, insert the disk in the drive.

To install a sound driver or a supporting driver for multimedia devices, see “Working with Device Drivers” in Chapter 5, “Control Panel.”

5. Choose the OK button.

If Setup asks you to supply a Windows NT disk, insert the disk in the drive.

After you complete all Setup options and quit Windows NT Setup, a message reminds you to restart your computer for the changes to take effect.

6. To restart your computer, choose Shutdown from Program Manager’s File menu. Do not flip the power switch to restart your computer.

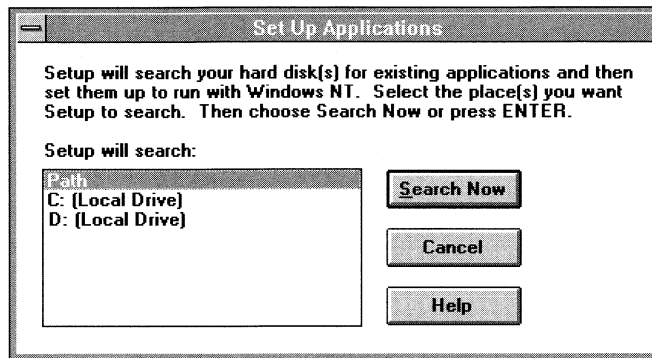
Setting Up Applications to Run from Program Manager

Security You can choose to set up applications on your hard disk that you want to run under Windows NT. To do this, you must be logged on as a member of the Administrators group.

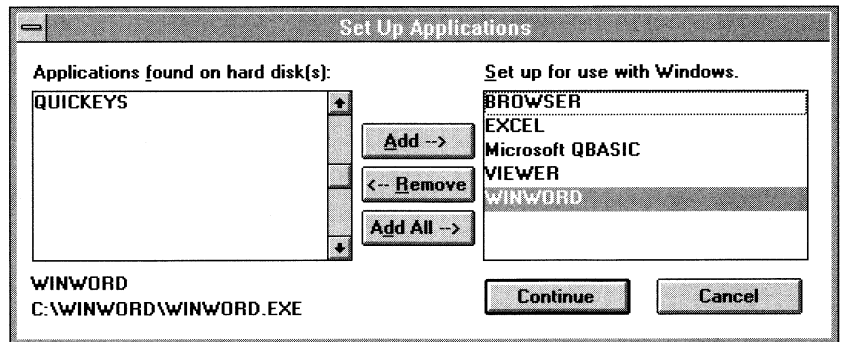
► **To set up applications to run from Program Manager**

1. From the Options menu, choose Set Up Applications.
2. In the Set Up Applications dialog box, specify where Setup should search for applications—either all directories on your hard disk or only the directories listed in your path.

3. Choose the Search Now button.



4. If Setup finds applications with executable filenames identical to other applications, a message asks you to select the correct names for the ambiguously named applications on your hard disk. Select the application name(s) in the list, and then choose the OK button.
5. In the second Set Up Applications dialog box, select the specific applications you want in the left box, and then choose the Add button.



6. When all the applications you want to install appear in the right list, choose the Continue button.

Setup adds program-item icons for the selected applications in the common Applications group in Program Manager. You can move the program-item icons to other program groups, if you want.

For more information about running applications created for other operating environments, see Chapter 11, “Other Application Environments.”

Installing a New Device Driver

New device drivers may periodically become available to supplement the device drivers supplied with Windows NT. You must use Windows NT Setup to install a new device driver.

If a new version is made available of a device driver already installed on your computer, use the procedure described in this section to install the revised driver.

To start a new device driver, use the Devices option in Control Panel or restart your computer.

Obtaining New Device Drivers

For information about obtaining new device drivers for your system, contact your hardware manufacturer or Microsoft Customer Support Services.

Setting Up New or Revised Device Drivers

Before running Windows NT Setup to install a new device driver, check for any special installation instructions that came with the driver. There may be other steps you need to take to set up the hardware. Some drivers include information files that tell Windows NT Setup what type of files (such as font files) the driver supports. If you are not sure what your driver supports, contact the hardware manufacturer.

► To install a device driver not supplied with Windows NT

1. Make sure your hardware matches the setting you are changing to.
2. From the Options menu in Windows NT Setup, choose Change System Settings.
3. In the Change System Settings dialog box, click the arrow beside the display, mouse, or keyboard setting you want to change and choose Other.
Setup prompts you to insert the disk containing the device driver.
4. Insert the disk in the drive, and then choose the OK button.

If the file is located on your hard disk or on a network drive, type the path of the drive that contains the file, and then choose the OK button.

Setup displays a list of the device drivers on that disk or drive.

5. From the list of drivers, select the appropriate driver, and then choose the OK button.

If you are sure you want the displayed option, choose the OK button in the Change System Settings dialog box.

You may be asked for additional disks if more than one disk was provided by the hardware manufacturer. You might also be asked for specific Windows NT disks.

Setup copies the appropriate files to the Windows NT system driver subdirectory. The default subdirectory is \WINNT\SYSTEM32\DRIVERS.

After all files are copied and you quit Windows NT Setup, a message reminds you to restart your computer for the changes to take effect.

6. To restart your computer, choose Shutdown from Program Manager's File menu. Do not flip the power switch to restart your computer.

Correcting a Faulty Device-Driver Installation

Occasionally, Windows NT may not be able to run using the changes you make to the Windows NT system configuration. For example, you might specify the wrong video device driver when you change the system settings.

If a new configuration leaves your computer unable to start correctly, Windows NT will automatically restore your previous working system configuration the next time you restart your computer. Windows NT can automatically maintain a working system configuration because changes that you make in Windows NT Setup and the previous working configuration are both saved.

Note If you cannot correctly install a new device driver, check with your hardware manufacturer to ensure that you have the current driver.

Adding and Removing Drivers for SCSI Adapters and Tape Drives

Security If you add or remove a tape drive or a SCSI drive such as a CD-ROM device as part of your system, you must tell Windows NT about the change by choosing the appropriate Add/Remove command from the Options menu in Windows NT Setup. This requires that you be logged on as a member of the Administrators group.

Note When you use a SCSI tape drive, the tape drive must be turned on before you start your computer. Otherwise, the driver will not load properly.

► **To add a driver for a SCSI device or tape drive**

1. From the Options menu in Windows NT Setup, choose Add/Remove SCSI Adapters or choose Add/Remove Tape Devices.
2. In the SCSI Adapter Setup dialog box, choose the Add button.
3. In the Select SCSI Adapter Option dialog box, select a driver from the list, and then choose the Install button.

Follow the instructions on the screen. If you are asked to insert a disk, insert the disk in the designated drive, and then choose the OK button.
4. When driver installation is complete, choose the Continue button to return to Windows NT Setup.

► **To remove a driver for a SCSI device or tape drive**

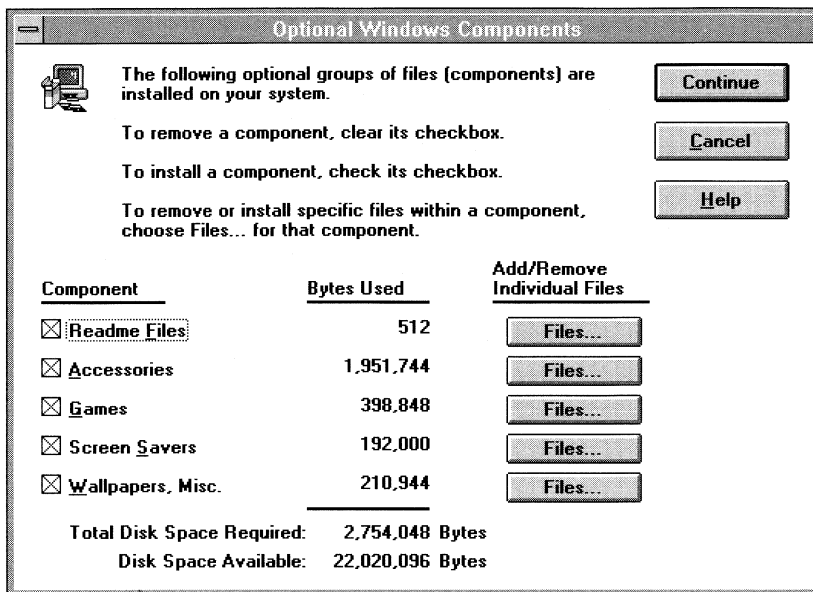
1. In the SCSI Adapter Setup list in the Add/Remove dialog box, select the SCSI device or tape device you want to remove
2. Choose the Remove button, and then choose the Continue button to return to Windows NT Setup.

When you complete any other Setup options and quit Windows NT Setup, a message reminds you to restart your computer so that the changes will take effect. To restart your computer, choose Shutdown from Program Manager's File menu. Do not flip the power switch to restart your computer. The next time you start Windows NT, the correct system configuration will appear.

Adding and Removing Windows NT Components

You can use Windows NT Setup to add and remove various components that are not essential to the operation of Windows NT. For example, you might want to remove some non-essential Windows files to free up space on your hard disk, or add components you previously removed or that you did not install during initial setup. You can decide at any time to add or remove all or parts of components such as README files, accessories, games, screen savers, and wallpapers.

Caution When you remove components, the files are deleted from your computer. If you want to add them later, you must supply the files from the Windows NT installation disks or from a source directory on your network.



► To add or remove Windows NT components

1. From the Options menu in Windows NT Setup, choose Add/Remove Windows Components.

In the Windows Components dialog box, Setup lists the optional components and the hard disk space required to set them up on your computer:

- Components currently on your computer are marked with an “X” in the check boxes. You can remove some or all of these components.
- Total Disk Space Required shows the total hard disk space required by all selected components. This number increases or decreases as you select or clear the components’ check boxes.
- Disk Space Available shows your computer’s total unused hard disk space. This number changes after adding or removing components or files.

Note Windows NT Setup does not check whether the space required for the files you want to add matches the space available on disk. Check these amounts carefully before proceeding to ensure that you have adequate disk space to add the selected components.

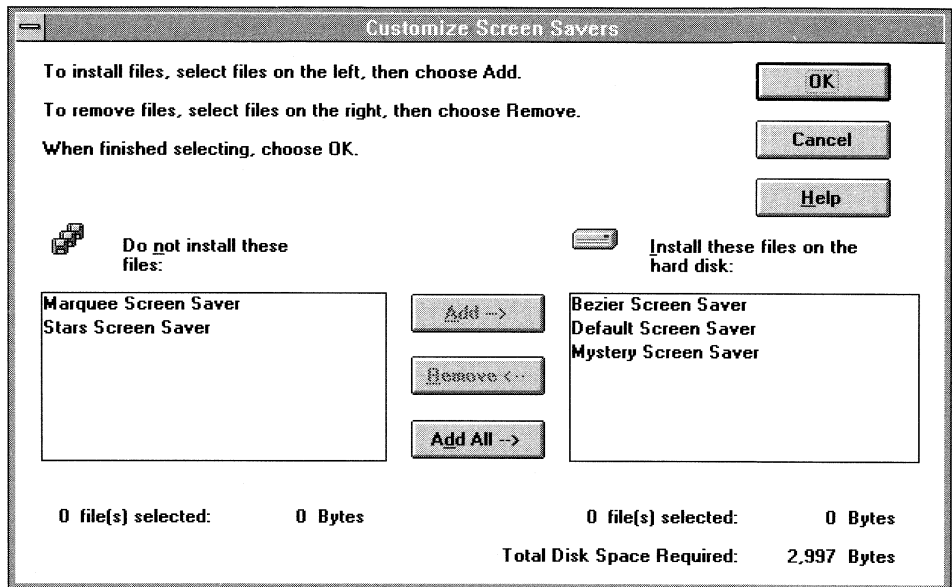
2. To add or remove a component, do one or more of the following:
 - To add an entire component (for example, all README files), select the check box next to it.
 - To remove an entire component, clear the check box.

- To add or remove part of a component, follow the steps in the next procedure.
3. Choose the OK button.

If you are adding a component or part of a component, a message asks you to insert the appropriate Windows NT disk. Insert the disk in the drive, and then choose the OK button.

If you are removing files, a message asks you to confirm the deletion. Choose the Yes button to delete the files.

Not all files for various components are required. For example, you may want to delete some screen saver files but keep others on your computer. You can add or remove just a portion of a Windows NT component.



► **To add or remove part of a Windows NT component**

1. In the Windows NT Setup dialog box for adding and removing components, choose the Files button next to the component you want to change.

The Customize dialog box lists that component's files. Files on the right are currently included on your computer and can be removed. Files on the left are not included and can be added.

2. In either list of files, select the names of the files you want to add or remove, and then choose the Add or Remove button. Or choose the Add All button to add all files.

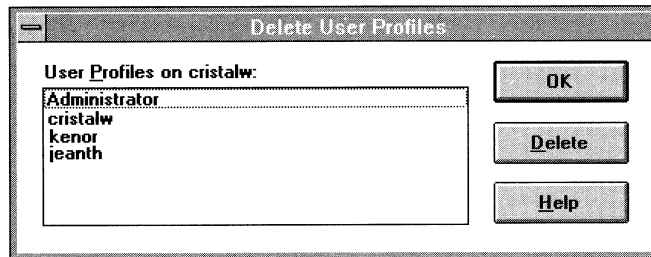
Total Disk Space Required shows the total hard disk space needed for the files you want to set up on your computer. Check this number to be sure there is adequate space on your disk for the files you have selected.

3. Choose the OK button to return to the Windows NT Setup dialog box, and then choose the Continue button to add or remove the selected files.

Deleting User Profiles

A user profile defines the content and arrangement of Program Manager groups, screen colors, network and printer connections, mouse and keyboard settings, and other settings in the Windows NT environment. The user profile ensures that Windows NT will look and act in a familiar way while another user is working on your computer.

Each copy of a user profile remains on your computer until you delete it. You can remove these additional profiles from your computer with Windows NT Setup.



► To delete a user profile from your computer

1. From the Options menu in Windows NT Setup, choose Delete User Profiles.
2. In the User Profiles list, select the user profile you want to remove from your computer.
3. Choose the Delete button to remove the selected profile.
4. Repeat this process until you have removed all the profiles you want, and then choose the OK button.

Setup warns you if it cannot delete a profile because the profile is currently in use or because you are not logged on as a member of a group that can delete profiles. Otherwise, the selected profiles are deleted from your computer.

Repairing Your System

You can restore any corrupt or missing Windows NT system files using the Emergency Repair disk you created while installing Windows NT. To repair a Windows NT computer, you must use the Emergency Repair disk specifically created for that computer.

If your system becomes corrupt but you did not create a Repair disk during installation, you must reinstall Windows NT from the original installation disks.

► **To restore Windows NT with a Repair disk on an x86-based computer**

1. Insert Disk 1 of the original Windows NT installation disks in drive A and start the computer.
2. In the first text-based Setup screen, type **r** to indicate that you want to repair your Windows NT files.
3. Follow the instructions on the screen, inserting the Repair disk in drive A and providing any other Windows NT Setup disks as requested.
4. When the final message appears, remove the Repair disk from drive A, and then press CTRL+ALT+DEL to restart your computer.

- **To restore Windows NT with a Repair disk on a RISC-based computer**
 1. Start the Windows NT Setup Program as instructed in your manufacturer-supplied documentation. (How you start Windows NT Setup depends on the type of RISC-based computer you are installing on.)
 2. In the first text-based Setup screen, type **r** to indicate that you want to repair your Windows NT files.
 3. Follow the instructions on the screen, inserting the Repair disk in drive A if Repair asks for it.
 4. When the final message appears, remove the Repair disk, and then press **ENTER** to restart your computer.

The Repair program automatically completes the following steps:

- Runs the **chkdsk** utility on the partition that contains the Windows NT system files.
- Checks the Windows NT directory tree against the log file on the Repair disk to ensure that all system files are present and none are corrupt.

If any files are missing or corrupt, Repair restores the files from the appropriate Windows NT Setup disk or compact disk. On an x86-based computer, you are asked to insert the floppy disk or compact disc originally used for installation. Also, if you originally installed Windows NT from the network, you must supply the original installation disks.
- Checks the configuration registry for errors. If any are found, Repair restores the default registry created when you first installed Windows NT.

User Manager

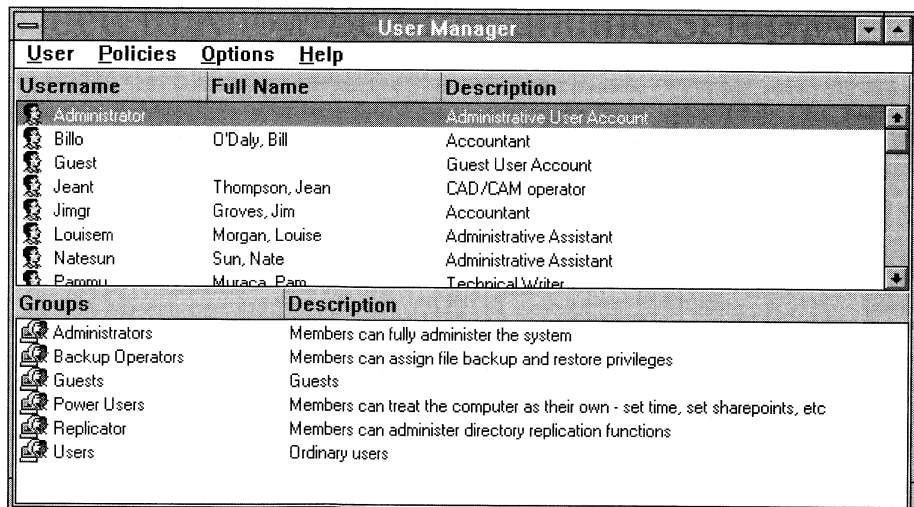
User Manager is a tool used to manage security for a Windows NT workstation. This chapter presents a brief overview of User Manager, and then provides procedures for:

- Managing user accounts
- Managing groups
- Managing security policies

Overview

With User Manager you can create and manage user accounts, create and manage groups, and manage the workstation's account, user rights, and auditing policies.

The User Manager window contains two lists, one showing the user accounts of the workstation, and the other the groups of the workstation.



Starting and Quitting User Manager

► **To start User Manager**

1. Open the Administrative Tools group.
2. Choose the User Manager icon.



► **To start User Manager from the command line**

1. From the File menu in Program Manager, choose Run.
2. In the Command Line box, type **musrmgr**.
3. Choose the OK button.

► **To quit User Manager**

- From the User menu, choose Exit.

When you quit User Manager, if the Options menu Save Settings On Exit command is enabled, the main window size and position and the setting of the Confirmation command are saved.

Who Can Use User Manager?

The actions a user can perform in User Manager are determined by the group memberships of the user account the user is logged on to.

If a user does not have sufficient authority to perform an action in User Manager, that command or option is usually shown as unavailable. In some cases a command is displayed as available and the user is able to use it, but the command is not executed by the system and is not completed.

Following are discussions of the User Manager abilities provided by some of the built-in Windows NT groups. If a user account belongs to more than one group, the user receives the greater of the possible abilities.

Administrators

A user who is logged on to a user account that is a member of the Administrators group can perform all User Manager functions.

Power Users

A user who is logged on to a user account that is a member of the Power Users group can use User Manager to create user accounts and groups, and to modify or delete those user accounts and groups.

Users

A user who is logged on to a user account that is a member of the Users group can use User Manager to create groups, can modify or delete those groups, and can give any user accounts membership in those groups.

This means such a user cannot create, modify, or delete user accounts, cannot administer groups other than those created by the user, and cannot administer the security policies.

Managing User Accounts

A user account consists of all the information that defines a user to Windows NT. This includes such things as the user name and password required for the user to log on, the groups in which the user account has membership, and the rights and permissions the user has for using the system and accessing its resources. It also includes an account description, the user's full name, and other account configuration information.

Some built-in user accounts are provided when Windows NT is installed. You can add additional user accounts, and you can modify existing user accounts.

Built-In User Accounts

The following built-in user accounts are provided when Windows NT is installed on a workstation.

Administrator

The built-in Administrator account is a member of the built-in Administrators group, and receives the rights and permissions granted to that group. It cannot be removed from that group.

The Administrator account is the account used by the person who manages the workstation's overall configuration. The Administrator has more control over the Windows NT workstation than does any other user. For example, the Administrator can create, modify, or delete user accounts and groups; manage security policy; create, administer, and connect to file administrative shares; install and connect to printers; format or partition a fixed disk; back up and restore files; debug the system; take ownership of files and other objects; modify operating system software; install or update device drivers; unlock a workstation; and more.

The built-in Administrator account can be renamed, but it cannot be deleted.

During installation, Windows NT prompts the person doing the installation to enter a password for the built-in Administrator account. Guard this password carefully, not only for security purposes but also because if the password is forgotten or the person who knows the password becomes unavailable, the built-in Administrator account becomes unusable.

Following installation, it is a good idea to create an additional administrative account for each person who needs administrative-level abilities, and reserve the built-in Administrator account for emergency purposes. When each administrative user has a separate account, their actions can be audited. For information on creating user accounts, see “Adding User Accounts” later in this chapter.

Guest

The built-in Guest account is a member of the Guests group, and receives the rights and permissions granted to that group. For example, a user can log on to the Guest account, create files and delete those files, and read files that an administrator specifically permits Guests to read.

The Guest account is provided as a convenience so that occasional or one-time users of the computer can log on and be granted limited abilities. The Guest account is installed with a blank password.

The built-in Guest account can be renamed, but it cannot be deleted.

Initial User

The computer’s primary user is expected to use the Initial User account. Because it is a member of the Administrators group, the Initial User account can fully administer the workstation.

The Initial User account is created if, during Windows NT installation, the computer is added to a workgroup or if it is not configured for network operation. The system prompts the installation user to provide a user name and password. An account is created under the provided user name, so there is never an account that is actually named “Initial User.”

If the computer is added to a domain during Windows NT installation, the Initial User account is not created, since the user of the computer is expected to log on using an account from the domain.

Adding User Accounts

If more users need to log on than are supported by the built-in user accounts, additional user accounts can be added. A user account can be added either by creating a new user account, or by copying an existing user account.

When adding a user account you will be asked to provide a user name, which can be up to 20 characters. It must be unique, meaning it cannot be identical to any other user name or group name of the workstation. It can contain any uppercase or lowercase characters except the following:

" / \ [] : ; | = , + * ? < >

Be consistent in the way you enter user names, because when Windows NT presents lists of user accounts they are usually sorted by the user names. It is a good idea to establish a standard for user names, such as a shortened combination of the first and last names (Marysm for Mary G. Smith).

You will also be asked to provide a full name, which is the complete name of the user. It is a good idea to establish a standard for full names, so that they always begin with either the last name (Smith, Mary G.) or the first name (Mary G. Smith).

When Windows NT displays a user name and when the distinction is necessary, Windows NT identifies the domain or workstation the user account is from by presenting the name in the form *domainname\username* or *computername\username*. This happens most often when a Windows NT workstation participates in a Windows NT Advanced Server domain and a user name from the domain is displayed. For example, a user account named Jeffho from a domain named Engineering would be displayed as Engineering\Jeffho. In some situations the full name will be appended, for example, Engineering\Jeffho (Howard, Jeff).

► To create a new user account

1. From the User menu, choose New User.

The screenshot shows the 'New User' dialog box. It has a title bar with the text 'New User'. Inside the dialog, there are five text input fields labeled 'Username:', 'Full Name:', 'Description:', 'Password:', and 'Confirm Password:'. To the right of these fields are three buttons: 'OK', 'Cancel', and 'Help'. Below the input fields, there are four checkboxes with labels: 'User Must Change Password at Next Logon' (which is checked), 'User Cannot Change Password', 'Password Never Expires', and 'Account Disabled'. At the bottom of the dialog, there are two buttons: 'Groups' and 'Profile'.

2. In the Username box, type a user name of up to 20 characters.
3. In the Full Name box, type the user's complete name. This entry is optional, but is highly recommended.
4. In the Description box, type a description of the user or the user account. This entry is optional, but is highly recommended.
5. In both the Password and Confirm Password boxes, type a password of up to 14 characters.

Passwords are case-sensitive. Password attributes are controlled by the Account policy. For information see "Managing the Account Policy" later in this chapter.

6. Select or clear the following options.

Option	Description
User Must Change Password At Next Logon	Forces the user to change the password. When this option is selected, make sure the User Cannot Change Password option is cleared.
User Cannot Change Password	Prevents the user from changing the assigned password. Usually, this option is selected only for user accounts (such as the Guest account) used by more than one person. When this option is selected, make sure the User Must Change Password At Next Logon option is cleared.
Password Never Expires	Prevents the password from expiring, overriding the Maximum Password Age setting in the Account policy. Use this option for user accounts to which services (for example, the Replicator service) will be assigned using the Services option in Control Panel. Selection of this option overrides a selection of the User Must Change Password At Next Logon option.
Account Disabled	Prevents use of this account. For example, you might disable a new account to create an inactive template account that can be copied to create new accounts. Or, you might temporarily disable an account if it does not need to be used until a later date. For more information, see the discussion of disabled accounts under "Disabling or Deleting User Accounts" later in this chapter.

7. To administer a user account property associated with one of the buttons at the bottom of the dialog box, choose a button and complete the dialog box that appears.

Choose	To
Groups	Specify the groups in which the user account will be a member.
Profile	Specify a logon script and home directory for the user account.

These buttons and their dialog boxes are described later in this chapter.

8. Choose the OK button.

In many situations it may be quicker and more convenient to copy an existing user account than it would be to create an entirely new one. The main benefit of copying a user account is that the group memberships are copied to the new account.

When a user account is copied, the description and group memberships are copied exactly. The profile information is copied, but it is copied conditionally as described in “Managing the User Environment Profile” later in this chapter. The user name, full name, and password of the new account are blank, and must be entered. The User Must Change Password At Next Logon check box is always cleared, and the User Cannot Change Password and Password Never Expires check boxes are copied.

The Account Disabled check box is always cleared so that a new account is always active, regardless of the setting in the original user account. This is done so that you can create a new user account, configure it as needed, disable it, and then use it as a template. To rapidly create several similar accounts, you can repeatedly copy the disabled template account.

User Manager does not copy any rights and permissions that have been granted to a user account. However, it is recommended that these be provided only to groups, and not be granted directly to user accounts. Because the group memberships of the original account are copied to the new user account, the new user account will usually have the same abilities and access to resources as the original account.

► **To make a copy of an existing user account**

1. Select a user account from the list in the User Manager window, and then choose Copy from the User menu.
2. In the Copy Of dialog box, configure the user account as described in the previous procedure for creating a new user account.
3. When the user account is configured, choose the OK button.

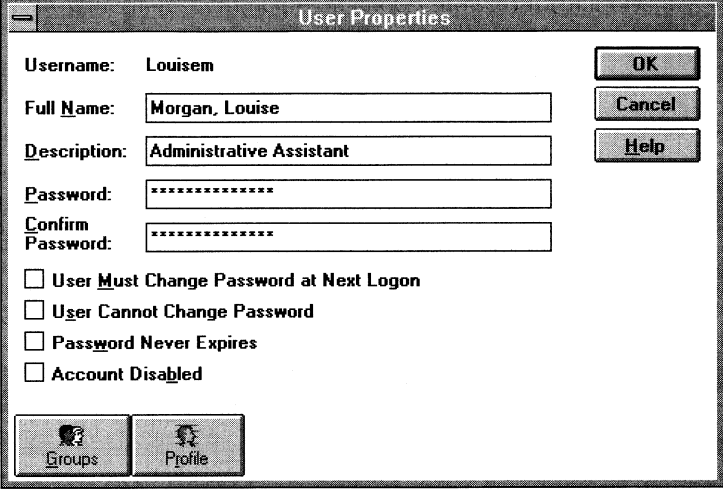
Managing User Account Properties

The procedure you use to modify user accounts differs slightly, depending on whether you are modifying one user account or multiple user accounts.

When you change the properties of an existing user account, the changes take effect the next time that user logs on.

► **To modify one user account**

1. In the User Manager, double-click a user account. Or select a user account, and then choose Properties from the User menu.

The image shows a 'User Properties' dialog box. It has a title bar with the text 'User Properties'. Inside, there are several fields: 'Username:' with the value 'Louisem', 'Full Name:' with the value 'Morgan, Louise', 'Description:' with the value 'Administrative Assistant', 'Password:' with a row of asterisks, and 'Confirm Password:' with a row of asterisks. To the right of these fields are three buttons: 'OK', 'Cancel', and 'Help'. Below the password fields are four checkboxes: 'User Must Change Password at Next Logon', 'User Cannot Change Password', 'Password Never Expires', and 'Account Disabled'. At the bottom of the dialog box are two buttons: 'Groups' and 'Profile', each with a small icon to its left.

For security, the password is represented by a row of asterisks, with the number of asterisks different from the actual number of characters in the password.

2. To change the Full Name or the Description, type new text in those boxes.
3. To change the password, type a password of up to 14 characters in both the Password and Confirm Password boxes.

Remember to provide the new password to the user of this account.

4. To change the settings of the Account Disabled or the three password options, select or clear those check boxes.
5. To administer a property associated with one of the buttons at the bottom of the User Properties dialog box, choose a button and complete the dialog box that appears.

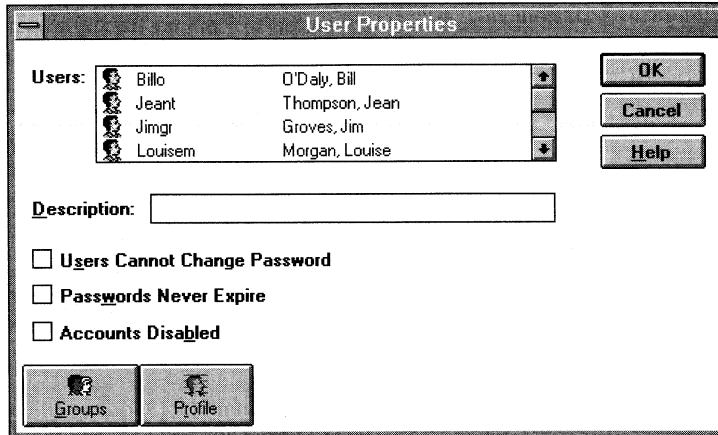
These buttons and their dialog boxes are described later in this chapter.

6. Choose the OK button.

The advantage of modifying multiple user accounts is that you can make the same change simultaneously to several accounts. For example, you might select several accounts and add them to a new local group.

► **To modify two or more user accounts in the same way**

1. In the User Manager window, select two or more user accounts.
2. From the User menu, choose Properties.



If all the selected user accounts have an identical description, that text appears in the Description box. If one or more of the accounts have a different description, the Description box is empty.

If all the selected user accounts have the same setting for one of the accounts disabled or password attributes options, the setting for that check box is displayed. If one or more of the accounts have a different setting for one of the options, that check box is indeterminate (filled with gray).

3. To change the Description for all the selected user accounts, type new text in that box.
4. To change the settings of the Account Disabled and the two password options for all the selected user accounts, select or clear those check boxes.
5. To administer a property associated with one of the buttons at the bottom of the User Properties dialog box, choose a button and complete the dialog box that appears.

These buttons and their dialog boxes are described later in this chapter.

6. Choose the OK button.

Any changes you made are applied to all the selected user accounts.

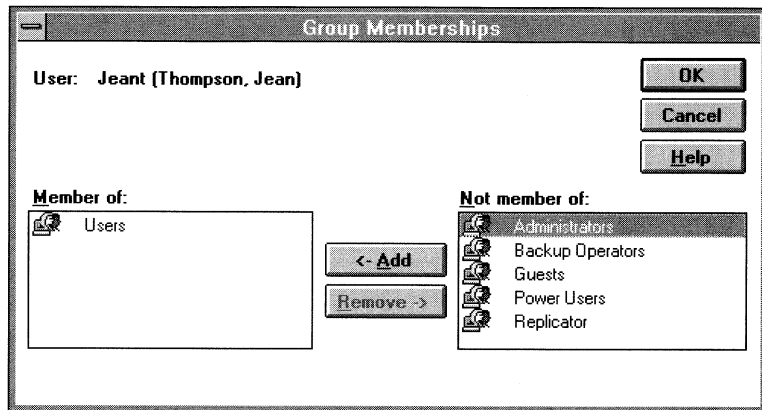
Managing Group Memberships

Use the Group Memberships dialog box to manage, for the selected user accounts, membership in the groups of this workstation.

The procedure you use to manage group memberships depends on whether you are administering one user account or multiple user accounts.

► **To manage group memberships when only one user account is selected**

1. Choose the Groups button from the New User, Copy Of, or User Properties dialog box.



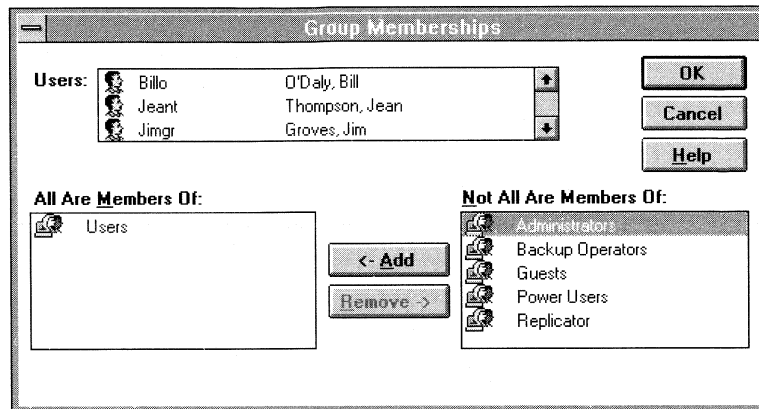
In the Group Memberships dialog box, the Member Of box lists the groups this user account belongs to, and the Not Member Of box lists the groups this user account does not belong to.

2. To add the user account to one or more groups, select one or more groups in the Not Member Of box, and then choose the Add button. Or, select one or more groups in the Not Member Of box, and then drag one of the selected group icons into the Member Of box.
3. To remove the user account from one or more groups, select one or more groups in the Member Of box, and then choose the Remove button. Or, select one or more groups in the Member Of box, and then drag one of the selected group icons into the Not Member Of box.
4. Choose the OK button.

When two or more user accounts are selected, you can use the Group Memberships dialog box to add all the selected user accounts to one or more groups of this workstation, or to remove all the selected user accounts from one or more groups of this workstation.

► **To manage common group memberships for two or more user accounts**

1. In the User Manager window, select two or more user accounts, and then choose Properties from the User menu.
2. In the User Properties dialog box, choose the Groups button.



In the Group Memberships dialog box, the All Are Members Of box lists the groups that every one of the selected user accounts belong to. If one or more of the selected user accounts do not belong to a particular group, that group is listed in the Not All Are Members Of box.

3. To add the selected user accounts to one or more groups, select one or more groups in the Not All Are Members Of box, and then choose the Add button. Or, select one or more groups in the Not All Are Members Of box, and then drag one of the selected group icons into the All Are Members Of box.
4. To remove the selected user accounts from one or more groups, select one or more groups in the All Are Members Of box, and then choose the Remove button. Or, select one or more groups in the All Are Members Of box, and then drag one of the selected group icons into the Not All Are Members Of box.
5. Choose the OK button.

When multiple user accounts are selected and the Group Memberships dialog box is open, the groups in the All Are Members Of box always have all the selected user accounts as members. But the groups in the Not All Are Members Of box may have none or some of the selected user accounts as members.

Because of this, if you need to ensure that a group has none of the selected user accounts as members, perform the following procedure.

- **To ensure that a group has none of the selected user accounts as members**
 1. In the Group Memberships dialog box, move the group from the Not All Are Members Of box into the All Are Members Of box.
 2. Choose the OK button to save the change.
 3. In the User Properties dialog box, choose Groups.
 4. In the Group Memberships dialog box, move the group from the All Are Members Of box back into the Not All Are Members Of box.
 5. Choose the OK button.

Managing Profiles

Use the User Environment Profile dialog box to define the logon script name and home directory for the selected user accounts. All entries in this dialog box are optional.

Logon Script Name

A logon script runs automatically every time the user logs on. It can be used to configure a user's working environment at every logon, and it allows an administrator to affect a user's environment without managing all aspects of it. A logon script can be assigned to one or more user accounts.

A logon script is typically a batch file (any text file with a .BAT or .CMD filename extension), but any executable program (.EXE filename extension) can also be used.

In the User Environment Profile dialog box, logon scripts are assigned to user accounts by typing the filename in the Logon Script Name box. At logon, the system finds the logon script by looking for that filename in the Windows NT root directory (usually C:\WINNT).

Because the entry in the Logon Script Name box only specifies the filename and does not create the actual logon script, you will need to create a logon script of the specified name, and place it in the Windows NT root directory.

Home Directory

A home directory is a directory that is accessible to the user and contains files and programs for that user. It becomes that user's default directory for the File Open and Save As dialog boxes, for the command prompt, and for all applications that do not have a working directory defined. A home directory can be assigned to an individual user or can be shared by many users.

Home directories make it easier for an administrator to back up user files and delete user accounts, because they collect many or all of a user's files in one location.

A home directory might be a local directory on the workstation, or a shared network directory. When administering the user accounts of a Windows NT workstation, you will usually assign local directories.

In most cases, User Manager automatically creates the home directory you specify in the User Environment Profile dialog box. If it can't, a message appears instructing you to manually create the directory.

In order for users to access their home directories, appropriate permissions must be granted. User Manager automatically applies those permissions if it creates the home directory. When one user account is being administered and a new home directory is created, that user is granted Full Control. When two or more user accounts are being administered and a new home directory is created, Full Control is granted to Everyone.

User Manager does not automatically apply permissions if the directory already exists. In this case, you must apply the permissions using File Manager.

Using %USERNAME% in the Home Directory Path

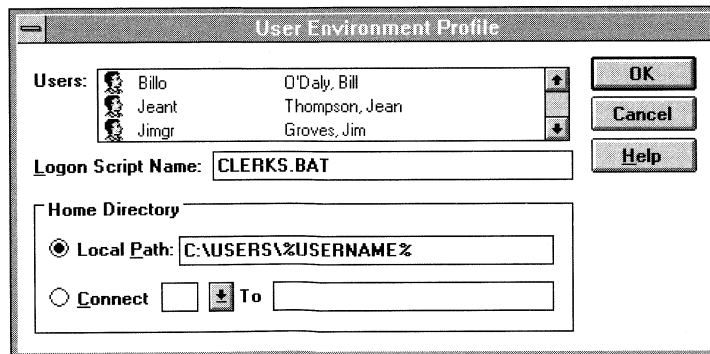
When entering a path for a home directory, %USERNAME% can be substituted for the last subdirectory in the path, and the system will later substitute the user name of the user account. This is useful when multiple user accounts are selected.

For example, say eight user accounts are selected. Under Home Directory you might select the Local Path box and type `c:\users\%username%`. When you choose the OK button and the User Environment Profile is saved, for each user account the actual user name will be substituted for the %USERNAME% entry.

Managing the User Environment Profile

► To configure the user environment profile

1. Choose the Profile button from the New User, Copy Of, or User Properties dialog box.



2. Optionally, to specify a logon script, type the filename in the Logon Script Name box.
3. Optionally, to specify a local directory as a home directory, select the Local Path box and type the local path (including the drive letter). For example, you might type `c:\users\%username%`.
A local directory is recommended.
4. Optionally, to specify a network directory as the home directory, select the Connect box, specify a drive letter, and then select the To box and type a network path. For example, you might specify drive H and type `\\airedale\users\jeffho`.
5. Choose the OK button.

How the User Environment Profile Is Copied

When a user account is copied, the logon script name is copied exactly. However, only the filename entered in the User Environment Profile dialog box is copied, not the actual logon script.

The home directory for the new account is copied based on this rule: if in the original account the last subdirectory in the home directory path is identical to the user name, the new account substitutes the new user name there. If not, the entry is copied exactly. Here are two examples:

- If the original account has a user name of CARYR and a home directory of `C:\USERS\CARYR`, then a new account with a user name of BILLO is given a home directory of `C:\USERS\BILLO`.
- If the original account has a user name of BLAKER and a home directory of `\\HOUND\USERS\HOME`, then a new account with a user name of JIMGR is given the same home directory: `\\HOUND\USERS\HOME`.

Disabling or Deleting User Accounts

A user's ability to log on can be rescinded by either disabling or deleting the user account. A disabled user account still exists, but the user is not permitted to log on. A disabled account continues to appear in the user account list of the User Manager window. A disabled account can be restored to enabled status at any time.

Be certain you want to delete a user account before you do so, because a deleted user account cannot be recovered. Internally, Windows NT knows every user account by its security identifier (SID), a unique number that identifies it. Every group and user account ever created on the workstation has a SID. Internal processes in Windows NT refer to a user account's SID rather than its user name. So if you delete a user account and then create another user account with the same user name, the new user account will not have any of the rights or permissions previously granted to the old user account because the user accounts have different SID numbers.

Because of this it is a good idea to first disable a user account, and then periodically delete the workstation's disabled accounts. This is a low-risk way to remove users from the workstation.

Another reason to disable an account occurs when you want to create an inactive template account that can be copied to create new accounts. You can create a new user account, configure it as needed, disable it, and then use it as a template. As described earlier in "Adding User Accounts," you can quickly make numerous enabled copies of a disabled template account.

► **To disable one or more user accounts**

1. In the User Manager window, select one or more user accounts.
2. From the User menu, choose Properties.
3. Select the Account Disabled check box.
4. Choose the OK button.

Logons are no longer allowed for those user accounts.

► **To enable one or more disabled accounts**

1. In the User Manager window, select one or more user accounts.
2. From the User menu, choose Properties.
3. Clear the Account Disabled check box.
4. Choose the OK button.

Logons are now allowed for those user accounts.

► **To delete one or more user accounts**

1. In the User Manager window, select one or more user accounts.
The built-in Administrator and Guest accounts cannot be deleted.
2. From the User menu, choose Delete.
3. If a confirmation message appears, choose the OK button.
4. When the delete message appears, choose the Yes button. If multiple user accounts are selected, choose the Yes To All button.

Renaming User Accounts

Any user account can be renamed, including the built-in user accounts provided with the system. Because it retains its security identifier (SID), a renamed user account retains all its other properties—for example, its description, password, group memberships, user environment profile, and any assigned permissions and rights. The Rename command is only available when one user account is selected.

► **To rename a user account**

1. In the User Manager window, select one user account.
2. From the User menu, choose Rename.
3. In the Rename dialog box, type a user name of up to 20 characters in the Change To box.
4. Choose the OK button.

Managing Groups

Groups are collections of user accounts. Giving a user account membership in a group gives that user all the rights and permissions that have been granted to the group. This provides an easy way to grant common capabilities to sets of users.

The built-in groups provided with Windows NT have been granted useful collections of rights and built-in abilities for the workstation. In most cases, one of these built-in groups will provide all the capabilities needed by a particular user. For example, logging on to a user account that belongs to the built-in Administrators group gives you administrative capabilities over the workstation. To give a user account a needed set of capabilities, assign it to the appropriate built-in group.

You can also use groups to easily manage access to resources such as directories, files, or printers. You assign resource permissions to a group, and then add user accounts to that group. If you need to change the permissions provided to that set of users, you simply add or remove the permissions assigned to the group, rather than to each of the user accounts. Or, if you need to give a new user access to a specific set of resources (for example, a number of directories and files), all you have to do is add the user's account to the appropriate group, rather than changing the permissions on each individual resource. Maintaining permissions for a group is simpler than maintaining permissions for many user accounts.

In most situations the built-in groups provide all the capabilities needed by users of a workstation. However, if necessary User Manager can be used to create and define additional groups in order to control access to specific sets of resources by specific sets of users.



All the groups that can be maintained on a Windows NT workstation are of the same type. They are called local groups, and are represented by the local group icon. Such a group is called “local” because it can only be granted permissions and rights for its own workstation. However, it can contain user accounts from the workstation, and if the workstation participates in a domain, it can contain user accounts and global groups from its domain and from trusted domains. Local groups provide a way for you to create handy sets of users from both inside and outside the workstation, to be used only at the workstation.



If a Windows NT workstation participates in a domain there is another type of group that can be given access to the workstation. This is a global group, and it is represented by the global group icon. Such a group is called “global” because it can be used in many places: its own domain, servers and workstations of the domain, and trusting domains. This means that if a workstation participates in a domain, the global groups of that domain and of trusted domains can be granted permissions and rights for the workstation, and membership in local groups of the workstation. A global group can contain only user accounts from its own domain.

When adding a group you will be asked to provide a group name. It must be unique, meaning it cannot be identical to any other group name or user name of the workstation. It can contain any uppercase or lowercase characters except the following:

" / \ [] : ; | = , + * ? < >

When Windows NT displays a group name and when the distinction is necessary, Windows NT identifies the domain or workstation the group is from by presenting the name in the form *domainname\groupname* or *workstationname\groupname*. This happens most often when a Windows NT workstation participates in a Windows NT Advanced Server domain and a domain group name is displayed. For example, a group named Managers from a domain named Engineering would be displayed as Engineering\Managers.

Built-In Groups

The actions a user can perform depend on the group memberships of his or her user account. Several built-in groups are provided with Windows NT, and by default each of these groups is granted a particular set of user rights.

In addition to rights, some of the built-in local groups are granted built-in abilities. Although rights can be directly granted to and removed from groups and user accounts, these built-in abilities are not directly administrable. The only way for you to provide these built-in abilities to a user is to make that user a member of the appropriate local group.

The rights and built-in abilities granted to the built-in groups are shown in the following table. In most situations these built-in groups provide all the capabilities needed by the users of a workstation.

Windows NT workstations

	<i>Administrators</i>	<i>Power Users</i>	<i>Users</i>	<i>Guests</i>	<i>Everyone</i>	<i>Backup Operator</i>
Rights:						
Log on locally	●	●	●	●	●	●
Access this computer from network	●	●	○	○	●	○
Take ownership of files	●	○	○	○	○	○
Manage auditing and security log	●	○	○	○	○	○
Change the system time	●	●	○	○	○	○
Shut down the system	●	●	●	○	●	●
Force shutdown from a remote system	●	○	○	○	○	○
Back up files and directories	●	○	○	○	○	●
Restore files and directories	●	○	○	○	○	●
Built-in abilities:						
Create and manage user accounts	●	●(1)	○	○	○	○
Create and manage local groups	●	●(2)	○	○	○	○
Assign user rights	●	○	○	○	○	○
Lock the workstation	●	●	●	○	○	○
Override the lock of the workstation	●	○	○	○	○	○
Format workstation's hard disk	●	○	○	○	○	○
Create common groups	●	●	○	○	○	○
Keep local profile	●	●	●	○	○	●
Share and stop sharing directories	●	●	○	○	○	○
Share and stop sharing printers	●	●	○	○	○	○

(1) A Power User can create user accounts, but can modify and delete only those accounts he or she creates.

(2) A Power User can create local groups. A Power User can also add and remove users from local groups he or she has created, as well as the Power Users, Users, and Guests local groups, but cannot modify the Administrators or Backup Operators local groups.

To provide these rights and built-in abilities to a user, add the user's account to the appropriate group. Following are brief discussions of each built-in group.

Administrators

The Administrators group is the most powerful group on a workstation. Administrators have more control over the Windows NT workstation than do any other users, and they manage the workstation's overall configuration. The built-in Administrator user account is a member of the Administrators group, as is the Initial User account (if one was created during installation).

If the Windows NT workstation participates in a domain, the Domain Admins group is by default a member of the workstation's Administrators group, and members of that domain group can administer the workstation. (However, this can be prevented by removing the Domain Admins global group from the workstation's Administrators group.)

Note that administrators do not automatically have access to every file on the workstation. If a file's permissions do not grant access, the administrator cannot access the file. Every file on an NTFS volume has an owner, who can set permissions on the file. If needed, an administrator can take ownership of a file and thus have access to it. But if the administrator does so, this event is recorded in the security log (if auditing of files is turned on), and the administrator cannot give ownership back to the original owner. For more information, see Chapter 4, "File Manager."

Power Users

The Power Users group provides limited administrative abilities to its member user accounts. A Power User can share directories on the network; set the computer's internal clock; install, share, and manage printers; and create common program groups.

A Power User can use User Manager to create user accounts and groups, and to modify or delete those user accounts and groups.

Users

Membership in the Users group provides the abilities a user needs to perform normal tasks. Except for the built-in Administrator, Guest, and Initial User accounts, all workstation user accounts belong to the Users group. When a new user account is added, it is automatically a member of this group.

If a Windows NT workstation participates in a domain, the Domain Users group is by default a member of the workstation's Users group, and domain users have normal user access to and abilities on the workstation. (However, this can be prevented by removing the Domain Users global group from the workstation's Users group.)

Guests

The Guests group allows occasional or one-time users to log on and be granted limited abilities. The built-in Guest user account is a member of the Guests group.

Resource permissions granted to the Users group can be withheld from the Guests group, effectively restricting the abilities of Guests.

Backup Operators

Members of the Backup Operators group can back up directories and files, and restore directories and files.

Replicator

The Replicator group supports directory replication functions. The only member of the Replicator group should be a domain user account used to log on the workstation's Replicator Service. Do not add the accounts of actual users to this group.

Before directory replication can occur, the Replicator group must be granted the Log On As A Service right at the workstation. For information about assigning rights, see "Managing the User Rights Policy" later in this chapter.

Special Groups

In addition to the built-in groups mentioned above, some other groups are created by the system and are used for special purposes. These groups are not listed in the User Manager window.

However, when you administer a workstation and Windows NT presents lists of groups, these special groups sometimes appear in the list. For example, they can appear when assigning permissions to directories, files, shared network directories, or printers.

Group	Refers to
Everyone	Anyone using the computer. This includes all local and remote users (that is, the Interactive and Network groups combined). Members can access the network, connect to the workstation's shared network directories, and print to the workstation's printers.
Interactive	Anyone using the computer locally.
Network	All users connected over the network to the computer.
Creator Owner	The user who created or has ownership of a directory, a subdirectory, a file in a directory or subdirectory, a printer, or a document sent to a printer.

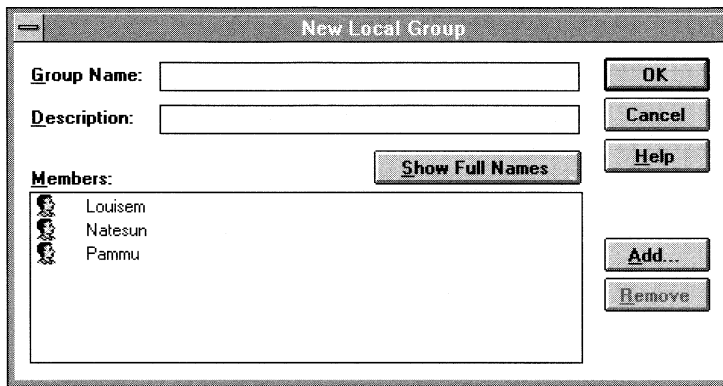
Adding Local Groups

A local group can be added either by creating a completely new local group, or by copying an existing local group.

► To create a new local group

1. In the User Manager window either select the user accounts you want to be the initial members of the new group, or select any group to ensure no user accounts are initially selected.
2. From the User menu, choose New Local Group.

If you selected one or more user accounts in step 1, the selected users are the initial members of the new group.



3. To view the Full Names of the listed user accounts, choose the Show Full Names button.

This can be a lengthy operation when the workstation participates in a domain, and the local group contains numerous users from other domains.

4. In the Group Name box, type a name for the new group.
5. In the Description box, type a description.
6. To add members to the local group, choose the Add button and complete the Add Users And Groups dialog box that appears.

You can add user accounts from the local workstation. If the workstation participates in a domain, you can also add user accounts and global groups from that domain and from trusted domains. For information on the Add Users And Groups dialog box, see Chapter 4, “File Manager.”

7. To remove members from the local group, select one or more members in the Members box, and then choose the Remove button.
8. Choose the OK button.

The main advantage of copying a group is that the new group will have the same members as the original group. However, any rights or permissions granted to the original group are not copied to the new group.

► **To make a copy of an existing local group**

1. In the User Manager window, select one local group.
2. From the User menu, choose Copy.
3. Define the new group as described in the previous procedure for creating a new local group.

You must provide a group name. You can accept or change the description and group members, which were copied from the original account.

4. Choose the OK button.

After a local group has been created, it can be granted permissions at its workstation. These permissions might allow, for example, access to files (as set in File Manager) or printers (as set in Print Manager).

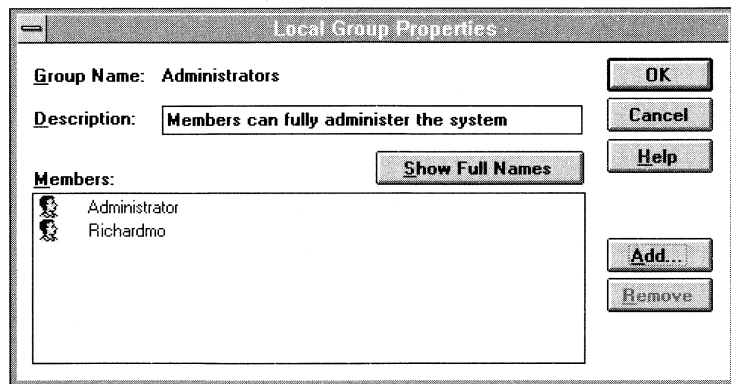
Managing Local Group Properties

The description and the membership of an existing local group can be modified.

► **To modify a local group**

1. In the User Manager window, double-click one local group. Or select the local group, and then choose Properties from the User menu.

In the Local Group Properties dialog box, the group name is displayed but cannot be changed.



2. To view the Full Names of the listed user accounts, choose the Show Full Names button.

This can be a lengthy operation when the workstation participates in a domain, and the local group contains numerous users from other domains.

3. To change the description, type new text in the Description box.
4. To add members to the local group, choose the Add button and complete the Add Users And Groups dialog box that appears.

You can add user accounts from the local workstation. If the workstation participates in a domain, you can also add user accounts and global groups from that domain and from trusted domains. For information on the Add Users And Groups dialog box, see Chapter 4, “File Manager.”

5. To remove members from the local group, select one or more members in the Members box, and then choose the Remove button.
6. Choose the OK button.

Deleting Groups

Groups that have been created using User Manager can be deleted, but the built-in groups provided with Windows NT cannot.

Be certain you want to delete a group before you do so, because a deleted group cannot be recovered. Internally, Windows NT knows every group by its security identifier (SID), a unique number that identifies it. Every group and user account ever created on the workstation has a SID. Internal processes in Windows NT refer to a group's SID rather than its group name. So if you delete a group and then create another group with the same group name, the new group will not have any of the rights or permissions granted the old group, because the groups have different SID numbers.

Deleting a local group removes only that group: It does not delete any user accounts or global groups that were members of the deleted local group.

► To delete a local group

1. Select the local group from the group list in the User Manager window.
2. From the User menu, choose Delete.
3. If a confirmation message appears, choose the OK button.
4. When the delete message appears, choose the Yes button.

Managing the Security Policies

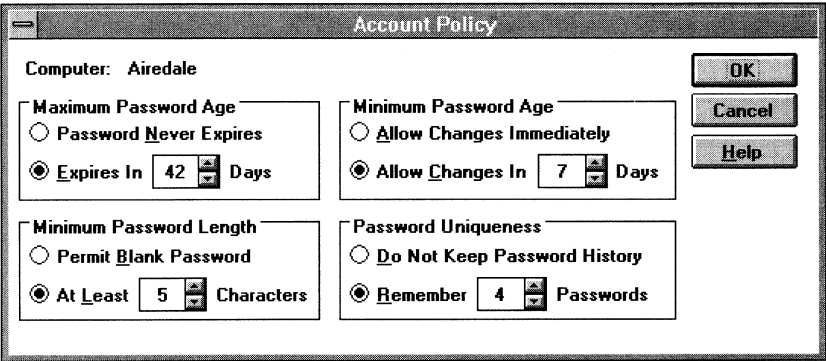
The following security policies can be managed with User Manager:

- The Account policy, which controls the way passwords must be used by all user accounts
- The User Rights policy, which controls the rights assigned to groups and user accounts
- The Audit policy, which defines the security events that will be audited and what Windows NT will do when the security log becomes full

Managing the Account Policy

The Account policy controls the way passwords must be used by all user accounts. Changes to this policy affect each user at the next login.

- **To manage the Account policy**
 1. From the Policy menu, choose Account.



2. In the Account dialog box, define the four password parameters controlled by the Account Policy dialog box.

Item	Meaning	Range of entries
Maximum Password Age	The period of time a password can be used before the system requires the user to change it.	Password Never Expires –or– 1–999 days maximum
Minimum Password Age	The period of time a password must be used before the user can change it.	Allow Changes Immediately –or– 1–999 days minimum
	Do not allow immediate changes if a Password Uniqueness value is entered.	

Item	Meaning	Range of entries
Minimum Password Length	The fewest characters a password can contain.	Permit Blank Passwords —or— 1–14 characters minimum
Password Uniqueness	The number of new passwords that must be used by a user account before an old password can be reused. For uniqueness to be effective, immediate changes should not be allowed under Minimum Password Age.	Do Not Keep Password History —or— 1–8 passwords

3. Choose the OK button.

Managing the User Rights Policy

A *right* authorizes a user to perform certain actions on the system. A user who logs on to an account to which the appropriate rights have been granted can carry out the corresponding actions. When a user does not have appropriate rights, Windows NT blocks attempts to carry out those actions.

Rights apply to the system as a whole, and are different from permissions, which apply to specific objects. A *permission* is a rule associated with an object (usually a directory, file, or printer) to regulate which users can have access to the object and in what manner. Most often the creator or owner of the object sets the permissions for the object.

Rights are not associated with a specific object. Instead, a right applies to the entire system, and may override permissions set on an object. For example, a user logged on as a member of the Backup Operators group has the right to perform backup tasks. Doing so requires the ability to read all files on the system, even files on which their owners have set permissions that explicitly deny access to all users, including members of the Backup Operators group. A right, in this case the right to perform backup, takes precedence over all file and directory permissions.

Each of the built-in groups conveys certain rights and built-in abilities to the user accounts that belong to it. For information on the capabilities of these groups see “Built-In Groups” earlier in this chapter.

The following table describes the user rights managed with the User Rights policy.

User right	Allows a user to
Manage auditing and security log	Specify what types of events and file access are to be audited. View and clear the security log.
Back up files and directories	Back up files and directories. This right supersedes files and directory permissions.
Restore files and directories	Restore files and directories. This right supersedes files and directory permissions.
Change the system time	Set the time for the internal clock of the computer.
Access this computer from network	Connect over the network to the computer.
Log on locally	Log on at the computer itself, from the computer's keyboard.
Shut down the system	Shut down Windows NT.
Take ownership of files and other objects	Take ownership of files, directories, and other objects on the computer.
Force shutdown from a remote system	This right is not currently implemented. It is reserved for future use and will be supported in one of the subsequent upgrades of the operating system.

In addition to the user rights listed above, if the Show Advanced User Rights option is selected, some additional rights can be managed with the User Rights policy. Many of these advanced rights are useful only to programmers writing applications to run on Windows NT, and usually will not be granted to a group or user. For more information on their use, see the Windows NT programming documentation. These programming rights are shown in the following list:

- Act as part of the operating system
- Create pagefile
- Create token object
- Create permanent shared objects
- Debug programs
- Generate security audits
- Increase quotas
- Increase scheduling priorities
- Load and unload device drivers
- Lock pages in memory
- Modify firmware environment values
- Profile single process

- Profile system performance
- Receive unsolicited device input
- Replace process level token

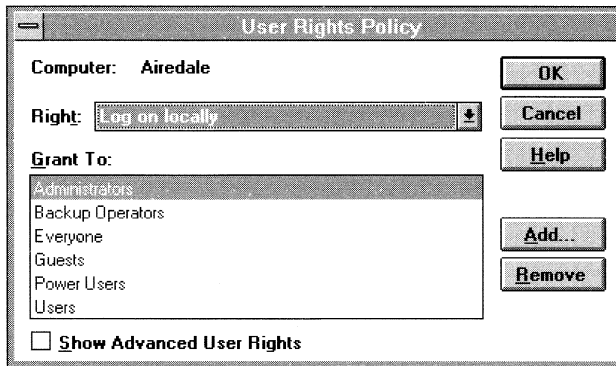
A few of the advanced rights may be of interest to workstation administrators. These are shown in the following table.

Advanced user right	Allows
Bypass traverse checking	A user to change directories and travel through a directory tree, even if the user has no permissions for those directories.
Log on as a service	A process to register with the system as a service. This right must be assigned to the Replicator local group when setting up the Replicator service.

In most situations the easiest way to provide rights to a user is to add that user's account to one of the built-in groups that already possesses the needed rights, rather than by administering the user rights policy. However, if a special situation occurs, it is possible to assign a right to or remove it from a user or a group by employing the following procedure.

► To manage the User Rights policy

1. From the Policy menu, choose User Rights.



2. Select a user right from those listed in the Right box.

When you select a right, the Grant To box lists the groups and user accounts that are assigned that right.

3. To grant the selected right to additional groups or user accounts, choose the Add button and complete the Add Users And Groups dialog box that appears. Local groups and user accounts from this workstation can be granted rights. If this workstation participates in a domain, user accounts and global groups from the local domain and trusted domains can also be granted rights. For information on the Add Users And Groups dialog box, see Chapter 4, “File Manager.”
4. To remove a group or user account from the list of those granted this right, select a name in the Grant To box, and then choose the Remove button.
5. Repeat steps 2 through 4 as necessary.
6. To administer the advanced user rights, select the Show Advanced User Rights check box, and then follow steps 2 through 4.
7. Choose the OK button.

Managing the Audit Policy

Through auditing, you can track selected activities of users. The Audit policy determines the amount and type of security logging Windows NT will perform, and determines whether the workstation will halt when its security log becomes full.

Windows NT can record a range of event types, from a system-wide event such as a user logging on, to an attempt by a particular user to read a specific file. Both successful and unsuccessful attempts to perform an action can be recorded.

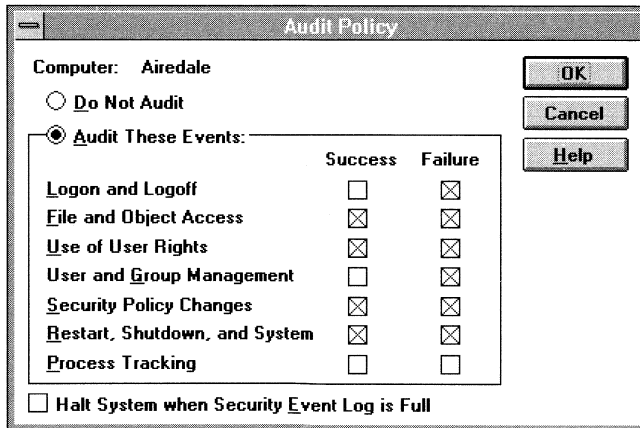
Use the Audit policy to define the events that will be audited, plus what Windows NT will do when the security log becomes full. The following table describes the types of events that can be audited.

Type of event	Description
Logon and Logoff	A user logged on or off the workstation, or made a network connection.
File and Object Access	A user accessed a directory, a printer, or a file that is set for auditing in File Manager.
Use of User Rights	A user used a user right (except those rights related to logon and logoff).
User and Group Management	A user account or group was created, changed, or deleted. A user account was renamed, disabled, or enabled; or a password was set or changed.
Security Policy Changes	A change was made to the User Rights or Audit policies.
Restart, Shutdown, and System	A user restarted or shut down the computer; or an event has occurred that affects system security or the security log.
Process Tracking	These events provided detailed tracking information for things like program activation, some forms of handle duplication, indirect object accesses, and process exit.

Because the security log is limited in size, carefully choose the events to be audited, and consider the amount of disk space you are willing to devote to the security log. The maximum size of the security log is defined in Event Viewer.

► To manage the Audit policy

1. From the Policy menu, choose Audit.



2. Select one of the two main auditing options.

If you select	Then
Do Not Audit	Security events are not recorded in the Security log
Audit These Events	Selected events are recorded in the Security log

3. If you select Audit These Events, specify the events to be audited by selecting or clearing the Success and Failure check box for each type of event.
4. Optionally, select the Halt System When Security Event Log Is Full check box.

Caution Only select this option if you need to create the most secure environment. Do not select this option unless you are certain you want the computer to halt when the security log fills. When this occurs, all running programs and services are stopped, and the computer is unusable until an administrator clears the Security log or extends the event retention period. Data loss is likely.

5. Choose the OK button.

Backup

Backup is a graphical tool for protecting data from accidental loss or hardware and media failures. It makes it easy for you to use a tape drive to back up and restore your important files on either the NTFS, FAT, or HPFS file system. It also makes it easier to archive that data for legal or historical purposes and remove older, unused files, safe in the knowledge that you can recover them if necessary.

This chapter provides information on how to use the graphical commands for selective backups and restores or to create your own batch file to automate the process, and includes the following main topics:

- Backing up disk files to tape
- Restoring tape files to disk
- Maintaining tapes

Overview

In Microsoft Windows NT, doing simple backups and restores on your local tape drive has been made easy with the Backup program. This program is located in the Administrative Tools group in Program Manager.

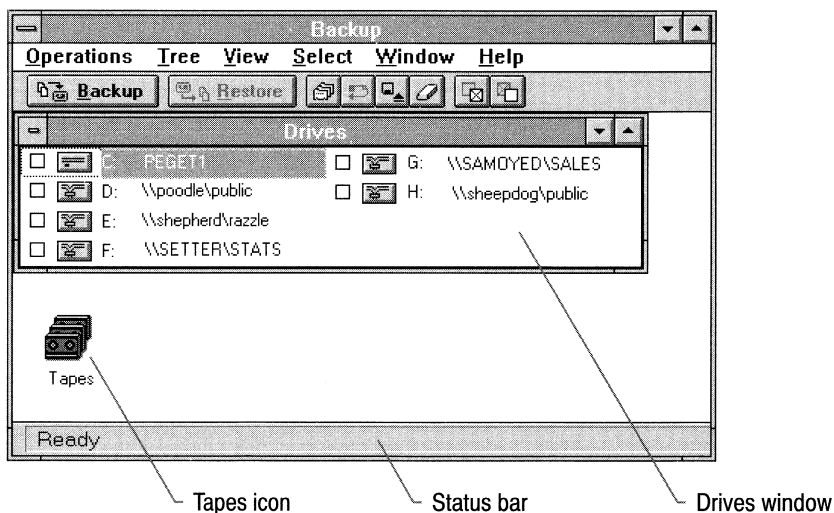
The following list provides an overview of some of the things you can do with this graphical tool to protect your data:

- Back up and restore both local and remote files on an NTFS, FAT, or HPFS file system from your own computer using an attached tape drive.
- Select files for backing up or restoring by volume, directory, or individual filename and view detailed file information, such as size or modification date.
- Select an optional verification pass to ensure reliable backups or restorations.
- Perform any of the following common backup operations: Normal, Copy, Incremental, Differential, and Daily Copy.
- Place multiple backup sets on a tape, and either append new backup sets or replace the old ones with new ones.

- Span multiple tapes with both backup sets and files, since there is no file-size restriction.
- Create a batch file to automate repeated backups of drives.
- Review a full catalog of backup sets and individual file and directory information so you can select files to be restored.
- Control a restore's destination drive and directory.
- Save log information on tape operations to a file. Also view tape-operation information in the Windows NT Event Viewer.

Starting and Quitting Backup

Double-click the Backup icon in the Administrative Tools group to display the main Backup window with the Drives window open and a Tapes icon. (You can also type **ntbackup** or **start ntbackup** at the command prompt.) The menu bar is supplemented with a toolbar for easier access to the most commonly used commands. The status bar at the bottom of the window provides descriptions of each of the commands and program-status information. Both context-sensitive and standard Help are provided for all Backup commands.



Security You can only back up files on a disk drive to which you normally have access. Otherwise, you need to be logged on as a member of the Administrators or Backup Operators group. Notice that backup rights enable you to bypass the protection provided by normal file permissions. Also, use caution in granting restore rights since they enable a user to ignore normal file-permission conflicts during restoration and to overwrite existing files.

The following most commonly used commands from the Operations and Select menus are also available on the toolbar:

Backup	Retention Tape	Check
Restore	Eject Tape	Uncheck
Catalog	Erase Tape	

The Tree, View, and Window menus provide commands for manipulating your windows the same as in File Manager. The View menu also enables you to display or hide the status bar and toolbar, and to change your font selection. See online Help for detailed procedures.



To quit Backup, you can choose either Exit from the Operations menu or Close from the Control menu. To remove the tape before quitting, you can choose Eject Tape from the Operations menu or click the Eject Tape button on the toolbar. If the tape device supports software control of tape ejection, the tape is rewound and ejected. If it does not, the tape is simply rewound in preparation for manual ejection.

Selecting Your Hardware

The system automatically checks for the proper hardware when you start Windows NT and initializes it each time you start Backup. Notice, however, that the tape drive must be turned on before you start Windows NT for the drivers to be loaded properly. If you have more than one tape backup device, you can use the Hardware Setup command from the Operations menu to select a different device.

Note If you do not have a tape drive, you can use the **backup** or **xcopy** commands to back up files to a floppy disk.

Windows NT currently supports both high-capacity SCSI tape backup devices for 4 mm DAT, 8 mm, and 1/4-inch drives and the less expensive mini-cartridge drives. You may have more than one tape drive connected to your system. However, only one tape drive may be selected at a time.

Backing Up Disk Files to Tape

Because information is the most important resource on a workstation or network, backing up that information is an administrator's most critical function. And, therefore, you need to create backup policies and standard hardware-maintenance policies for disaster avoidance rather than just recovery.

When formulating your policies, decide what needs to be backed up and what you consider to be a reasonable period of time during which essential services can be unavailable. Based on that decision, determine what steps you will take to protect critical data, which can range from a simple backup done with the Windows NT Backup program to the use of alternate sites or disk fault-tolerance methods. The Windows NT Advanced Server Disk Administrator program provides fault-tolerance functionality for creating mirror sets and stripe sets with parity.

Then decide how often you need to redo such a complete risk assessment. You will need to evaluate the continuing importance of various operations and determine likely new areas of exposure. If security is important to you, your backup policy should also provide for an independent review of the security audit log to ensure that backups are being performed according to policy.

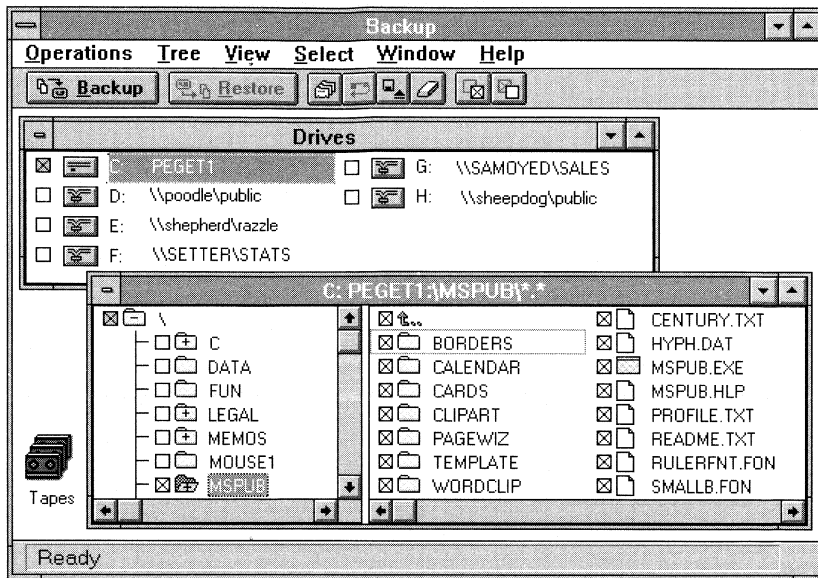
Choosing Files to Back Up

You can select either all the files on a disk, or individual files only, the same way you would in File Manager. After selecting your files, choose the Check button on the toolbar to select each file's check box. Or if you only want to select a few files, just select the check box for each filename.



The Drives window will normally be open when you start the Backup program. However, sometimes you will want to minimize it and then reopen it when needed, either by double-clicking the Drives icon or by choosing Drives from the Window menu.

There will also be times when you will leave Backup, use File Manager to connect to another network drive, and then return to Backup and need to choose Refresh from the Window menu to update the Drives window and view the additional network drive.



► **To open the Disk File Selection window**

- In the Drives window, double-click the appropriate disk drive icon or letter.

Disk and Tape File Selection windows are organized the same as in File Manager, with the same viewing options for seeing the directory tree structure and the directory and filenames list. The default is a split, resizable panel showing both options. Filenames are only shown in the Directory List panel. Selecting All File Details displays filenames, size, last modification date and time, and file attributes (such as hidden, system, read-only, or archive).

► **To select all the files on a disk**



- In the Drives window, select the disk drive and then, from the Select menu, choose the Check command. Or choose the Check button on the toolbar.

–Or–

- In the Drives window, select the check box for the appropriate disk drive.

Notice that, even when a disk drive is selected, the program will not back up those files and directories that the user does not have security permission to read, including files that are hidden in a directory with no read permission and displayed with an exclamation point in the file's icon. All file attributes are preserved, including permissions.

► **To select files individually**

1. Open the Disk File Selection window.

2. To select a few files, select the check box for each filename.

To select several files, select the first filename and then do one of the following:

- Press and hold down the **SHIFT** key and then select the last contiguous filename.
- Drag the mouse to the last contiguous filename.
- Press and hold down the **CTRL** key and then select each non-contiguous filename.

3. Choose the **Check** command from the **Select** menu, or the **Check** button on the toolbar, to select each file's check box.



Choose the **Uncheck** command from the **Select** menu, or the **Uncheck** button on the toolbar, to undo all your selections.

Notice that when only some files are selected, the corresponding disk-drive and directory check boxes have a gray background.

Setting the Tape Options

After selecting one or more disk drives or files to back up, choose the **Backup** command from the **Operations** menu to open the **Backup Information** dialog box. The upper section provides information on the tape that you loaded. You can choose whether you want to append the new backup set after the last backup set or replace an old set with the new one. If you want to secure the tape by limiting access to it, select the check box for **Restrict Access To Owner Or Administrator**. If you want to confirm that the tape was backed up accurately, select the **Verify After Backup** check box. If you want to add a copy of your Windows NT Registry files to the backup set, select the **Backup Local Registry** check box.

Backup Information

Current Tape: Directory Backups 1/28/93

Creation Date: 1/28/93 1:46:14 PM

Owner: peget1\Administrator

Tape Name:

☒ Verify After Backup ☐ Backup Local Registry

☒ Restrict Access to Owner or Administrator

Operation

☒ Append
☐ Replace

Backup Set Information (1 of 1 sets)

Drive Name: C: PEGET1

Description:

Backup Type:

Log Information

Log File:

☒ Full Detail ☐ Summary Only ☐ Don't Log

OK Cancel Help

The following table describes the options in the upper section of the Backup Information dialog box.

Item	Description
Current Tape	The current tape's name is shown here unless there is no tape loaded, it is blank, or it has an unrecognized format.
Tape Name	You can use up to 32 characters to create or change a current tape name.
Creation Date	The creation date of the original backup set, or the date when it was last replaced, is automatically displayed here
Owner	The owner of the tape, that is, whoever put the first backup set on the tape, is automatically displayed here.
Append	This operation adds the backup set(s) to the end of the last backup set on the active tape. Tape Name and Restrict Access To Owner Or Administrator are unavailable with this operation.
Replace	This operation overwrites all the information on the tape. However, if you do not confirm the choice, another message gives you the option of appending instead.
Verify After Backup	You can select whether or not to perform a verification comparison of the files that are written to tape and the files on the disks.

Item	Description
Restrict Access To Owner Or Administrator	You can designate the tape as “secure.” Only the tape owner, or a member of the Administrators or Backup Operators group, can read, write, or erase the tape on the owner’s original computer using the Windows NT Backup program. To restore it on another computer, even if it has the same username, you must be logged on as a member of the Administrators or Backup Operators group.
Backup Local Registry	You can include a copy of the local Windows NT Registry files in the backup set.

Setting the Backup Set Options

The second section of the Backup Information dialog box shows how many backup sets have been selected, each set being a collection of related files on one drive that is backed up during a single backup operation. If you select more than one disk drive, Backup provides a scroll bar for moving between backup sets so you can enter separate descriptions, up to a length of 32 characters, and select different backup types for each drive selected.

When deciding which backup type to use, one of the criteria should be whether or not it will mark the files as having been backed up. Windows NT maintains a marker (called the *archive bit*) for each file that allows backup programs to mark the files after backing them up. When the file changes, Windows NT marks the file as needing to be backed up again.

With Windows NT Backup, you can choose to back up only those files that have this marker set, and you can choose whether or not to mark the files as having been backed up. The normal (or full) backup type is best when a large amount of data changes between backups, or to provide a baseline for the other backup types. The incremental backup type is good if you need to keep frequent “checkpoint” versions of changed data. The differential backup type simplifies the process for restoring files. To provide for long-term storage with fewer tapes, you can use a combination of a normal backup plus either incremental or differential backups.

The following table describes the different types of backup operations that you can choose.

Choose	To
Normal	Back up and mark as such all the selected files on the disk. A normal backup is the same as a full backup.
Copy	Back up, but not mark as such, all the selected files on the disk.
Incremental	Back up and mark as such only those selected files that have been modified on the disk.
Differential	Back up, but not mark as such, only those selected files that have been modified on the disk.
Daily	Back up, but not mark as such, only those selected files that have been modified that same day on the disk. (This can be useful if you want to take work home and need a quick way to select the files that you worked on that day.)

Setting the Log Options

In the final section of the Backup Information dialog box, you can choose not to log information or you can choose to create a log that contains either a summary of major operations or full details on all operations. If you choose to create a log, you can type the name of the text file into which the information on completed tape operations will be logged. You can also use the Browse button at the end of the Log File box to help you locate the correct filename for the log.

The following are descriptions of the three logging options.

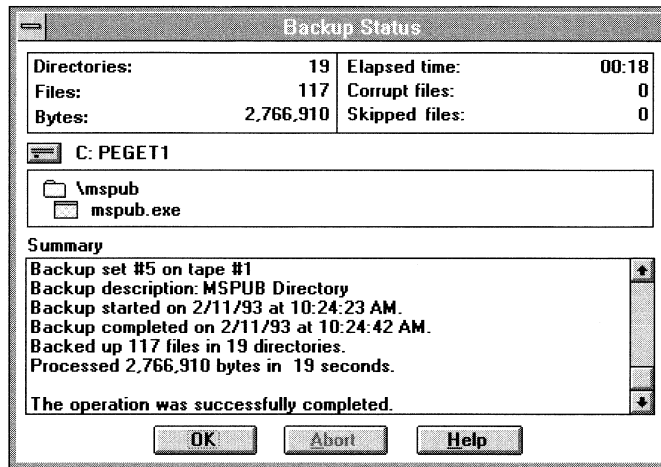
Choose	To
Summary Only	Log only the major operations such as loading a tape, starting the backup, and failing to open a file.
Full Detail	Log all operations information including the names of all the files and directories that are backed up.
Don't Log	Log no information.

When you are done, choose the OK button to display the Backup Status dialog box and start the backup process.

Checking the Backup Status

The Backup Status dialog box contains an active status area; the names of the drive, directory, and file(s) that are being backed up; and a Summary section showing a log of major operations. You can also choose to stop the backup operation. If a large backup operation reaches the end of a tape before finishing, the Insert New Tape dialog box prompts you to insert a new tape. A collection of related tapes containing several backup sets is called a *family set*.

- **To display the Backup Status dialog box and start backing up**
 - In the Backup Information dialog box, choose the OK button.



The status area at the top of the box shows the following information:

- Directories, files, and bytes processed
- Elapsed time in hours, minutes, and seconds
- Number of corrupt or skipped files (that is, files that are unable to be copied because of both read errors and open/locked files)

Additional information provided includes the selected disk drive, directory path, and filename, along with a Summary section showing the tape label and an event log.

Note If the status area shows the existence of any corrupt files, a record of them is available in a file called CORRUPT.LST. You should check that file before trying to restore the tape and then delete it. If you do not delete it, you will see a message about the existence of corrupt files whenever you try to restore from that tape or any other tape in your collection.

If you need to stop a backup job before it is completed, choose the Abort button. The current file will be completed if less than 1 MB remains. Otherwise, a message asks whether to continue or stop now and show it as a corrupted file. The Summary section then gives the final operation details and shows whether or not the operation completed successfully.

Using Batch Files to Do Backups

You can create a command-line batch file that automatically backs up one or more drives on a regular basis. The parameters included in this batch command give you most of the same functionality that is provided in the graphical user interface.

NTBackup [*operation pathnames* [*options*]]

where

operation

Backup

pathnames

{**A: B: C: ... Z:**}[*directory\...*]*

options

{Mode Verify Restrict_Access Description Backup_Local_Registry
Backup_Type Log_Options}

where

Mode = /**A**[ppend]

Verify = /**V**[erify]

Restrict_Access = /**R**[estrict]

Description = /**D**[escription] "*text*"

Backup_Local_Registry = /**B**

Backup_Type = /**T**[ype] {**Normal Copy Incremental Differential Daily**}

Log_Options = [*Log_filename*] [*Log_exceptions_only*]

where

Log_filename = /**L**[ogfile] "*filename*"

Log_exceptions_only = /**E**[xceptions]

When the Append option is not specified, the program reuses the tape and replaces previous data. Specifying Append causes backup sets to be added after the last backup set on the tape. When more than one drive is specified and the Append option is not, the program overwrites the contents of the tape with the information from the first drive selected and then appends the backup sets for the remaining drives.

The following are two examples that show how to implement this command. Notice that a path name may also include wildcards (* and ?) to specify only certain files in a directory. For example, to back up all the batch files in the directory called C:\MYDIR, type:

NTBackup Backup C:\MYDIR*.BAT

To do a normal backup of drives C, D, and E; restrict access to the owner or administrator; apply the description “Full Backup of drives C, D, and E” to all three backup sets; perform a verification pass upon completion of the backup; and record the results of the session in the log file named C:\LOG\LOG.TXT, type:

NTBackup Backup C: D: E: /V /R /D “Full Backup of drives C, D, and E” /L “C:\LOG\LOG.TXT”

To do a normal Copy-type backup of the files in C:\EXCEL, not restrict access, use the description “Copy of Excel Directory,” perform a verification pass upon completion of the backup; and record the results of the session in the log file named C:\LOG.TXT, type:

NTBackup Backup C:\EXCEL /T COPY /V /R /D “Copy of Excel Directory” /L “C:\LOG.TXT”

Restoring Tape Files to Disk

Backed-up information is useless if it cannot be restored. Windows NT provides a Restore command to give access to tapes, backup sets, and files for restoring as they are needed.

Restoration policies for everyday maintenance, as well as disaster recovery, are just as important as backup policies. Practice ahead of time on spare drives, though, so you do not risk real data. You should also periodically do trial restorations to check whether or not files have been backed up properly. These verification restores can check for possible hardware problems that do not show up with the software or whose symptoms are not easily recognized. For that reason, you should also keep a backup status log and check it regularly for error messages.

When restoring a large number of files, you will need to consider what backup type you used. If you did differential or incremental backups, you will first need to restore the selected files from the most recent normal backup, then files from all subsequent incremental backups of those files, and finally the most recent differential backup performed after the last incremental backup.

For tape-management purposes, each tape has the following information associated with it:

- A user-specified tape name
- An original tape-creation date plus the date and time that each backup set was created
- The computer name and the username of the user who created the tape
- A tape-sequence number in the case of tape sets

Choosing What You Want to Restore



You can choose to restore either the current tape, one or more backup sets, or individual files. Open the Tapes window and make your selections the same way you would in File Manager and for backing up.

All catalog information is maintained on the corresponding tape for that backup set. Family sets have the information on the last tape.

The tape name appears in the left panel of the Tapes window to the right of each tape icon. The following information is shown in the right panel of the Tapes window:

- Drive backed up
- Backup set number
- Tape number, and what number it is in a set of tapes
- Backup type
- Date and time of backup
- Backup description

When you insert a tape to be restored, only information on the first backup set appears in the right panel. If you want to restore the entire tape, you need to load the tape's catalog to display a list of any other backup sets. If you want to know what files are in each backup set, you need to load the individual catalogs for each backup set.

► To load a catalog of the backup sets on a tape



1. In the Tapes window, select the tape whose catalog you want to load.

2. Double-click that tape's icon. Or, from the Operations menu, choose Catalog. Or choose the Catalog button on the toolbar.

The Catalog Status dialog box appears and provides the option of stopping the cataloging process.

After searching the tape, a complete list of backup sets appears in the Tapes window, with question marks displayed in each of their icons to show that their individual catalogs have not been loaded.

► **To load a catalog for an individual backup set**

1. In the Tapes window, select the backup set whose catalog you want to load.
2. Double-click that backup set's icon. Or, from the Operations menu, choose Catalog. Or choose the Catalog button on the toolbar.

The Catalog Status dialog box appears and provides the option of stopping the cataloging process.

After searching the tape, a complete list of the directories and files in the backup set appears in a Tape File Selection window. The list in the Tapes window now appears with a plus sign in the backup set's icon to show that it has been cataloged. Corrupt files (that is, files that contain errors) and their corresponding directories are marked by an icon with a red "X."

The procedures for selecting files to restore are similar to those for selecting files to back up. Notice, however, that when you load a tape, only the first backup set on the tape is displayed until you load the tape's catalog. Therefore, when you select an entire tape, you are really only selecting those sets that are already displayed, and so you must load the tape's catalog first to get the complete list of backup sets. See online Help for detailed procedures.

Building Partial Tape and Backup Set Catalogs

If a backup operation spans several tapes and you choose to restore a single backup set, you are prompted to insert the last tape to load the tape catalog information and get a complete list of all the backup sets and their locations. However, if the last tape in such a family set is missing or damaged, you must build a partial tape catalog by inserting the available tapes and loading each tape's catalog of backup sets. If the backup set that you want spans several tapes and you are looking for a specific directory, you must then load each backup set's catalog of directories and files.

Sometimes, you will want to restore from a tape with files that were not backed up with the Windows NT Backup program. If the tape has the Microsoft/Maynard Tape Format (MTF), Windows NT Backup can read it. However, the tape may or may not have the full on-tape catalog (OTC) information that Windows NT Backup produces. Also, some older tape backup devices may not support creating full on-tape catalogs with the Windows NT Backup program.

► **To build a catalog from a tape without a full on-tape catalog**

1. Insert the MTF-compatible tape in the tape backup device.
2. Load whatever on-tape catalog information is available.

The Catalog Status dialog box appears and provides the option of stopping the cataloging process.

- If there is no catalog information, the entire tape is scanned to determine all the backup sets and then scanned again slowly to determine the contents of each backup set.
- If there is partial information on the backup sets, that information is accessed quickly and then the entire tape is scanned slowly to determine the contents of each backup set.

Setting the Restore Options

After selecting one or more tapes, backup sets, or files to restore, choose the Restore command from the Operations menu to open the Restore Information dialog box. The first section provides information about the backup set(s) on the loaded tape and tells you how many other tapes are in that family set. For each backup set, you must specify the drive to which you want the information restored.

You can also specify an alternate directory path to place a backup set's files into a different directory instead of into the original one on the default drive. This might be done to compare them to the files on the disk. You can use the Browse button at the end of the Alternate Path box to help you find the correct path name.

If you want to verify the contents of the files restored onto disk against the files on tape and then log any exceptions, select the Verify After Restore check box. When you select the Restore File Permissions check box, the system restores the permissions information along with the file. Otherwise, the files inherit the permissions information of the directory into which they are restored. When you want to restore the Registry files, select the Restore Local Registry check box. However, you will need to restart the computer for the restored information to take effect.

When you restore files that were backed up from an NTFS volume to an NTFS volume, you can restore the original file-access permissions as well. You should do so only if you are restoring files to the computer from which they were originally backed up and want the original file-access controls to be in effect. Do not restore file permissions if you are using the backup tape to transfer files to another computer or if you are restoring files to a computer that has not been completely restored following the corruption of the operating system. Because file permissions include the unique identifier of the computer on which the files are stored, they are valid only on the original computer.

Restore Information

Backup Set Information (1 of 1 sets)

Tape Name: Directory Backups from 2/11/93

Backup Set: MSPUB Directory

Creation Date: 2/11/93 10:05:25 AM

Owner: peget1\Administrator

Restore to Drive: C: [PEGET1]

Alternate Path:

☒ Verify After Restore ☐ Restore File Permissions

☐ Restore Local Registry

Log Information

Log File: C:\nt\RESTORE.LOG

☒ Full Detail ☐ Summary Only ☐ Don't Log

OK Cancel Help

Setting the Log Options

In the bottom section of the Restore Information dialog box, you can choose not to log information or you can choose to create a log that contains either a summary of major operations or full details on all operations. If you choose to create a log, you can type the name of the text file into which the information on completed tape operations will be logged. You can also use the Browse button at the end of the Log File box to help you locate the correct filename for the log.

The following are descriptions of the three logging options.

Choose	To
Summary Only	Log only the major operations such as loading a tape, starting the restore process, and failing to create a file.
Full Detail	Log all operations information including the names of all the files and directories that are restored.
Don't Log	Log no information.

When you are done, choose the OK button to display the Restore Status dialog box and start the restore process.

Checking the Restore Status

The Restore Status dialog box contains an active status area; the names of the drive, directory, and files that are being restored; and a Summary section showing a log of major operations. You can also choose to stop the restore operation. If a file being restored already exists on disk and is newer than the one on the tape, the Confirm File Replace dialog box will prompt you to confirm whether or not to restore the file from the tape. If the restore operation reaches the end of a tape before finishing the restoration of a backup set or file, the Insert New Tape dialog box will prompt you to insert a new tape.

► **To display the Restore Status dialog box and start restoring**

- In the Restore Information dialog box, choose the OK button.

The status area at the top of the box shows the same types of information as in the Backup Status dialog box.

If you need to stop a restore job before it is completed, choose the Abort button. The current file will be completed if less than 1 MB remains. Otherwise, a message asks whether to continue or stop now. The Summary section then gives the final operation details and shows whether or not the operation completed successfully.

Maintaining Tapes



The Windows NT Backup program provides two commands to help you maintain your backup tapes. The Erase Tape command causes the whole tape to be erased. A warning message in the Erase Tape dialog box advises you that all the information on the tape will be destroyed. It also gives you the name of the tape and when it was created.

You can do either a Quick Erase, during which the tape header is simply rewritten, or a Secure Erase, during which the entire tape is overwritten. The secure-erase method may take several hours to complete, depending on the drive technology and tape length. You should categorize the information on the backup tapes by which method of erasing to use, and then create and maintain a list for easy reference.



The Retension Tape command eliminates loose spots on the tape by fast forwarding to the end of the tape and then rewinding. This procedure winds the tape evenly so it will run more smoothly past the tape drive heads.

To reduce tape slippage, manufacturers of tape backup drives recommend that you retension 1/4-inch tape once every 20 uses. 4 mm and 8 mm tapes do not require retensioning, and so the option is unavailable. How much time it takes to forward and rewind the media depends on the device technology. See the manufacturer's documentation for specific retensioning requirements.

Event Viewer

In Windows NT, an event is any significant occurrence in the system or in an application that requires users to be notified. For some critical events such as a full server or an interrupted power supply, you may see a message on screen. For many other events that do not require immediate attention, Windows NT adds information to an event log file to provide information without disturbing your usual work. This event logging service starts automatically each time you start Windows NT.

You can use Event Viewer to view and manage event logs for your system. You can also save event logs to view later or to generate reports about your system. This chapter describes how to use Event Viewer, with the following topics:

- An overview of Event Viewer
- Viewing event logs
- Setting options for logging events
- Viewing specific logged events
- Using archived log files

Overview

Event Viewer is the tool you can use to monitor various kinds of events in your system, which are recorded in event logs. Windows NT records events in three kinds of logs:

- The system log records events logged by the Windows NT system components. For example, the failure of a driver or other system component to load during startup is recorded in the system log.
- The application log records events logged by applications. For example, a database program might record a file error in the application log.

- The security log records security events. This helps track changes to the security system and identify any possible breaches to security. For example, attempts to log on the system may be recorded in the security log, depending on the Audit settings in User Manager.

To control the types of security events that are audited, choose the Audit command from the Policies menu in User Manager. For more information, see “Managing the Audit Policy” in Chapter 13, “User Manager.”

To control the auditing of file and directory access, choose the Auditing command from the Security menu in File Manager. For more information, see “Auditing Files and Directories” in Chapter 4, “File Manager.”

After you select a log for display in Event Viewer, you can view, sort, filter, and search for details about events. You can also archive logs in various file formats.






Event Viewer displays events from a single log. Each line in the log shows information about one event, including date, time, source, event type, category, Event ID, user account, and computer name.

Event Viewer - System Log on Wterrier						
Log View Options Help						
Date	Time	Source	Category	Event	User	Computer
1/1/93	11:30:21 AM	Service Control Manager	None	7026	N/A	cristalw
1/1/93	11:30:04 AM	Service Control Manager	None	7024	N/A	cristalw
1/1/93	11:30:04 AM	NETLOGON	None	3095	N/A	cristalw
1/1/93	11:30:00 AM	Atdisk	None	19	N/A	cristalw
1/1/93	11:29:56 AM	Service Control Manager	None	7000	N/A	cristalw
1/1/93	11:27:21 AM	Service Control Manager	None	7026	N/A	cristalw
1/1/93	11:27:04 AM	Service Control Manager	None	7024	N/A	cristalw
1/1/93	11:27:04 AM	NETLOGON	None	3095	N/A	cristalw
1/1/93	11:27:00 AM	Atdisk	None	19	N/A	cristalw
1/1/93	11:26:56 AM	Service Control Manager	None	7000	N/A	cristalw
1/1/93	11:17:25 AM	Service Control Manager	None	7026	N/A	cristalw
1/1/93	11:17:08 AM	Service Control Manager	None	7024	N/A	cristalw

The terms in the following table describe items in the Event Viewer window.

Item	Meaning
Source	The software that logged the event, which can be either an application name, such as “SQL Server,” or a component of the system or of a large application, such as a driver name. For example, “Elnkii” indicates the Etherlink II driver.
Category	A classification of the event by the event source. For example, the security categories include Logon and Logoff, File and Object Access, Use of User Rights, and User and Group Management.
Event ID	A unique number for each source to identify the event. The Event ID can also be used by product support representatives to track what event occurred in the system.
User	The user name for the user who was logged on and working when the event occurred. “N/A” indicates that the entry did not specify a user.
Computer	The computer name for the computer where the event occurred.

The icon on the left side of the Event Viewer screen describes the classification of the event by Windows NT such as Error, Warning, Information, Success Audit, and Failure Audit.

Icon	Event Type	Meaning
	Error	Significant problems, such as a loss of data or loss of functions. For example, an Error event might be logged if a service was not loaded during Windows NT startup.
	Warning	Events that are not necessarily significant but that indicate possible future problems. For example, a Warning event might be logged when disk space is low.
	Information	Infrequent significant events that describe successful operations of major server services. For example, when a database program loads successfully, it may log an Information event.
	Success Audit	Audited security access attempts that were successful. For example, a user's successful attempt to log on to the system might be logged as a Success Audit event.
	Failure Audit	Audited security access attempts that failed. For example, if a user tried to access a network drive and failed, the attempt might be logged as a Failure Audit event.

Starting and Quitting Event Viewer

You start and quit Event Viewer in the same way as any application in Program Manager.

► **To start Event Viewer**

- In the Administrative Tools group in Program Manager, choose the Event Viewer icon.

► **To quit Event Viewer**

- From the Log menu, choose Exit.

Viewing Event Logs

You determine the log and computer selected for viewing in Event Viewer, and you can refresh the view, as described in the sections that follow.

Selecting a Log for Event Viewing

By default, the system log on the local computer is displayed the first time you start Event Viewer. You can also view the security and application logs.

► **To select another log for viewing**

- From the Log menu, choose System, Security, or Application.

Event Viewer shows the events recorded in that log. The corresponding command name is checked on the Log menu, and the log name appears on the title bar.

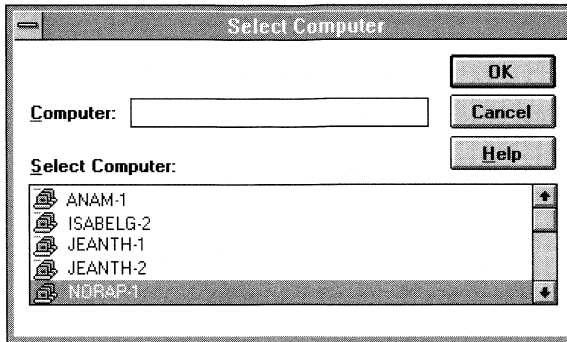
Security To view the content of a security log, you must be logged on as a member of the Administrators group.

When you first start Event Viewer, the events for the local computer are displayed.

If you want to view events for another computer, choose Select Computer from the Log menu.

► **To select another computer in Event Viewer**

1. From the Log menu, choose Select Computer.



2. In the Computer box, type the computer name of the computer to view. Or select a computer name in the Select Computer box.

If you type the computer name you want to select, you must preface the computer name with two backslashes (\\). For example, type **\\mypo1**.

3. Choose the OK button.

Refreshing the View

When you first open a log, Event Viewer displays the current information for that log. Unless you choose the Refresh command to refresh the view, this information is not updated. That is, any new events that occur while viewing the log are not added to the list and overwritten entries are not removed from the list. The event listing is updated automatically only when you select a different log for viewing or when you start Event Viewer again.

► **To update the events currently shown in Event Viewer**

- From the View menu, choose Refresh. Or press F5.

If you are viewing an archived log, the Refresh command is not available because archived files are never updated.

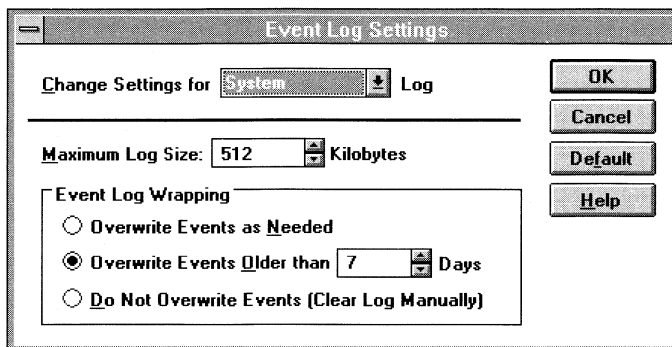
Setting Options for Logging Events

You can use the Log Settings command from the Log menu to define parameters for logging events in each kind of log, including the maximum size for the log and whether the events are overwritten or stored for a certain period of time.

For the security log, the administrator can also set auditing policies in User Manager that cause the system to halt when the security log is full.

► **To set event logging options**

1. From the Log menu, choose Settings.



2. In the Change Settings For box, select the kind of log for which you want to specify settings.
3. In the Maximum Log Size box, specify the size of the log in kilobytes.
For example, type **640** for a maximum log size of 640 kilobytes. The default setting is 512.
4. Select an Event Log Wrapping option to define how the events are retained in the log selected in the Change Settings For box. The options include the following.

Use	To
Overwrite Events As Needed	Have new events continue to be written when the log is full. Each new event will replace the oldest event in the log.
Overwrite Events Older than [] days	Retain the log for the number of days you specify before overwriting events. The default setting for this option is seven days. This is the best choice if you want to archive log files weekly.
Do Not Overwrite Events	Clear the log manually rather than automatically. Select this option only if you cannot afford to miss an event—for example, for the security log at a site where security is extremely important. You will probably also want to select the Halt System When Full option under Auditing Policies in User Manager when you select this option.

5. If you want to restore all default settings, choose the Default button.
6. Choose the OK button.

Note When a log is full (no more events can be logged), you can free the log by clearing it. Reducing the amount of time you keep an event also frees the log if it allows the next record to be overwritten.

If you specify that events cannot be overwritten in a log, you must clear the log periodically—either when the log reaches a certain size or when a message notifies you that the log is full. Archived logs cannot be cleared.

► **To clear a log**

1. Switch to the log whose events you want to clear.
2. From the Log menu, choose Clear All Events.

A message asks if you want to archive the currently logged events. If you answer Yes, the Save As dialog box appears. For more information about this dialog box, see “Archiving a Log” later in this chapter.

After you answer Yes or No, Event Viewer empties the current log. All new events are recorded in the log.

Viewing Specific Logged Events

After you select a log to view in Event Viewer, you can:

- Sort events from old to new or from new to old.
- Filter events so that only events with specific characteristics are displayed.
- Search for events based on specific characteristics or event descriptions.
- View descriptions and additional details that the event source might log.

These subjects are covered in detail in the following sections.

Sorting Events

The events displayed in Event Viewer are listed in sequence by date and time of occurrence. You can specify the order as newest events first or oldest first. The default listing order is from newest to oldest.

When a log is archived, the sort order affects the order in which event records are archived in a text format or comma-delimited text format file, but sort order does not affect the order of event records in a log archived in log file format. For more information, see “Using Archived Log Files” later in this chapter. If the Save Settings On Exit command from the Options menu is checked when you quit, the current sort order is used the next time you start Event Viewer.

► **To specify sort order**

- From the View menu, choose Newest First or Oldest First.
The command currently in effect is checked on the menu.

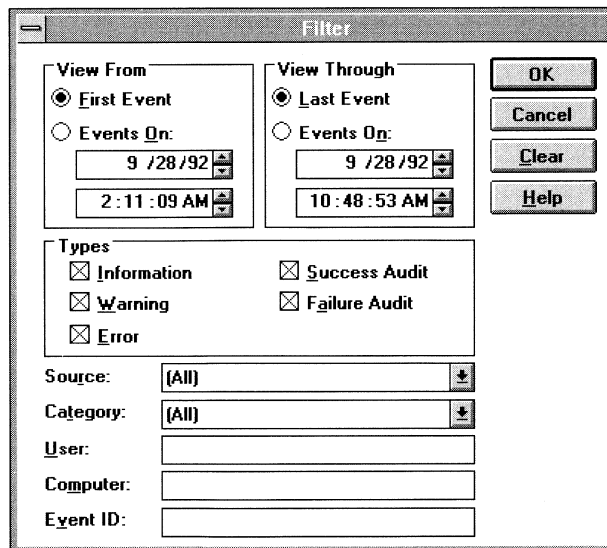
Filtering Events

When you first start Event Viewer, all events recorded in the selected log are displayed automatically. You can choose Filter Events from the View menu if you want to view only events with specified characteristics. Filtering has no effect on the event log whatsoever; all events are logged all the time, whether the filter is active or not. The filter affects only what is displayed, and you can see all the logged events any time you want by turning off the event filter.

Your choices for filtering are used throughout the current Event Viewer session, unless you decide to change them. If Save Settings On Exit from the Options menu is checked when you quit Event Viewer, your choices for filtering remain in effect the next time you start Event Viewer. When filtering is on, a check mark appears by the Filter command on the View menu and “(Filtered)” appears on the title bar.

► **To filter events**

1. From the View menu, choose Filter Events.



2. In the Filter dialog box, specify the characteristics that qualify an event for display in Event Viewer.

The following table describes the options in the Filter dialog box. Entries in the Filter dialog box are not case sensitive.

3. Choose the OK button to view the filtered events.

► **To return to the default criteria**

- In the Filter dialog box, choose the Clear button.

► **To turn off filtering of events**

- From the View menu, choose All Events.

The following table describes the options available in the Filter dialog box.

Use	To filter for
View From	Events after a specific date and time. By default, this is the date of the first event in the log file.
View Through	Events up to and including a specific date and time. By default, this is the date of the last event in the log file.
Information	Infrequent significant events that describe successful operations of major server services. For example, when a database program loads successfully, it may log an Information event.
Warning	Events that are not necessarily significant but that indicate possible future problems. For example, a Warning event might be logged when disk space is low.
Error	Significant problems, such as a loss of data or loss of functions. For example, an Error event might be logged if a service was not loaded during Windows NT startup.
Success Audit	Audited security access attempts that were successful. For example, a user's successful attempt to log on to the system might be logged as a Success Audit event.
Failure Audit	Audited security access attempts that failed. For example, if a user tried to access a network drive and failed, the attempt might be logged as a Failure Audit event.
Source	A source for logging events, such as an application, a system component, or a driver.
User	A specific user that matches an actual user name. This field is not case sensitive.
Category	A classification of events defined by the source. For example, the security event categories are Logon and Logoff, File and Object Access, Use of User Rights, and User and Group Management.
Computer	A specific computer that matches an actual computer name. This field is not case sensitive.
Event ID	A specific number that corresponds to an actual event.

Searching for Events

Searching for events can be useful when you are viewing large logs. You can search for each event that matches the type, source, or category that you want by choosing Find from the View menu. For example, you can search for all Warning events related to a specific application. Or search for all Error events from all sources.

Your choices in the Find dialog box are in effect throughout the current session. The default settings are restored the next time you start Event Viewer.

► **To search for specific kinds of events in a log**

1. From the View menu, choose Find.
2. In the Find dialog box, select any of the Types of events you want to find.
3. Specify any other Source, Category, Event ID, Computer, and User events you want to find, as described in “Filtering Events” earlier in this chapter.
4. In the Description box, type text that matches any portion of an event record description.

Because you can search for any portion of an event record description, the complete description is not required.

5. To specify the direction of the search, select the Up or Down option button.
The search direction is independent of the sort order checked on the View menu.
6. Choose Find Next to begin the search.

► **To find the next matching event**

- Press F3 to continue searching without displaying the Find dialog box again.

► **To restore the default search criteria**

- In the Find dialog box, choose the Clear button.

Viewing Details About Events

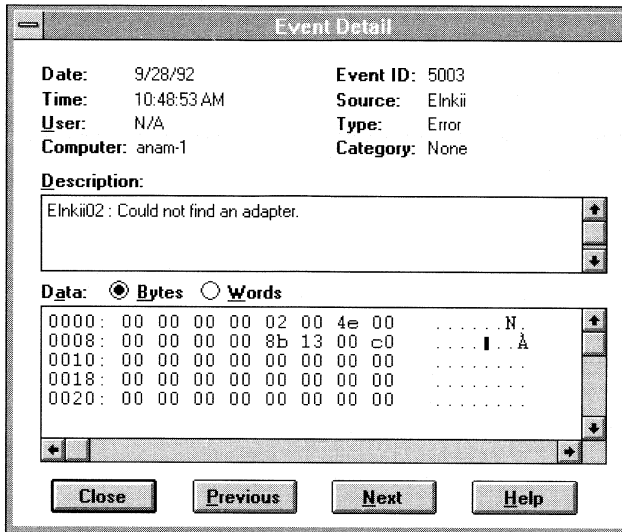
For many events, you can view more information than is displayed in Event Viewer by choosing Detail from the View menu.

The Event Detail dialog box shows a text description of the selected event and any available binary data for the selected event. This information is generated by the application that was the source of the event record. Because the data appears in hexadecimal format, its meaning can only be interpreted by a support technician familiar with the source application. Not all events generate such data.

The event data is saved if you archive a log in log file format, but is discarded if you archive it in text or comma-delimited text format. The event description is saved in all archived logs.

► **To view more details about an event**

1. In Event Viewer, double-click the event you want to view details about. Or select an event in the list, and then choose Detail from the View menu.



2. In the Description or Data box, use the scroll box to browse the information about the event.
3. To view details about other events in sort-order sequence, choose the Next or Previous button.
4. When you finish viewing details, choose the Close button to return to Event Viewer.

Using Archived Log Files

You can archive an event log in log file format so that you can later reopen it in Event Viewer. Or the log can be saved in text format or comma-delimited text format so that you can use the archived information in other applications.

These subjects are covered in more detail in the sections that follow:

- Saving a log as an archived file
- Viewing a log archived in log file format
- Using log files saved in text format or comma-delimited text format

For example, you might choose to archive security logs so that you can monitor security events over a period of time. Or you might archive application logs so that you can track the Warning and Error events that occur for specific applications.

When you archive a log file, the entire log is saved, regardless of any filtering options you specified in Event Viewer. If you changed the sort order in Event Viewer, the event records are saved exactly as displayed if you archive the log in a text or comma-delimited text file.

An archived log contains all events that were current when the file was saved, so the archived file might contain new events or might not contain events overwritten after you first displayed the log in Event Viewer.

Archiving a Log

When you archive an event log, you can save the log in one of three file formats:

- Log file format, which you should choose if you want to view the archived log again in Event Viewer.
- Text file format, for using the information in an application such as a word processor.
- Comma-delimited text file format, for using the information in an application such as a spreadsheet or a flat-file database.

► To archive an event log

1. From the Log menu, choose Save As.
2. In the File Name box, type a filename for the archived log file.
Event Viewer adds the .EVT filename extension for log files, or the .TXT extension for either kind of text format file.
3. In the Save File As Type box, select a file format option for saving the log information, and then choose the OK button.

Archiving a log has no effect on the current contents of the active log. To clear the original log, you must choose Clear All Events from the Log menu. To remove an archived log file, delete the file in the same way that you delete other kinds of files.

Viewing a Log Archived in Log File Format

You can view an archived file in Event Viewer only if the log was saved in log file format. You cannot choose the Refresh or Clear All Events commands to update the display or to clear an archived log. To remove an archived log file, you must delete the file in File Manager.

► **To display an archived log in Event Viewer**

1. From the Log menu, choose Open.
2. In the File Name list, select the filename of the log you want to view, and then choose the OK button.
3. In the Open File Type dialog box, select the kind of log you saved originally—System, Security, or Application. Then choose the OK button.

Note If you do not specify the correct log type, the Description displayed for the archived log in the Event Detail dialog box will not be correct.

Using Logs Archived in a Text Format

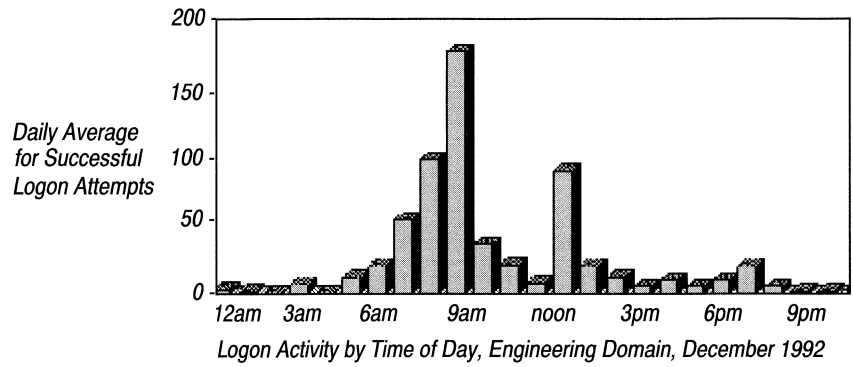
If you save an event log in text or comma-delimited text format, you can open that file in other applications. Those other applications can be used to filter, sort, and format the archived event records. Or you might combine event records from two or more archived text files to create reports.

If an archived log is saved in text or comma-delimited text format, the binary data for each event record is discarded. The sequence of data in an event record saved in either text format is the following:

- | | | |
|----------------------|-------------|----------------|
| 1. Date ¹ | 4. Type | 7. User |
| 2. Time | 5. Category | 8. Computer |
| 3. Source | 6. Event | 9. Description |

¹ Depends on the sort order specified in the View menu.

For example, you might copy lines of text from an archived log to include as supporting information in an electronic mail message. As another example, you might archive a security log in comma-delimited format so you can place the information in a spreadsheet and produce a chart depicting the archived information.



Disk Administrator

Disk Administrator is a graphical tool for managing disk resources. This tool encompasses and extends the functionality of character-based disk management programs such as MS-DOS Fdisk.

This chapter provides information on using Disk Administrator to set up and organize your hard disks to function more efficiently. The following main topics are included:

- Partitioning disks
- Creating and deleting volume sets
- Extending volumes and volume sets
- Creating and deleting stripe sets

Overview

Partitioning the internal hard disk on a new computer is done during initial setup when you load the Windows NT operating software. Making changes to that disk or partitioning an additional new hard disk is done using the Disk Administrator program. Disk Administrator is located in the Administrative Tools group in Program Manager.

The following list provides an overview of some of the things you can do with this graphical tool:

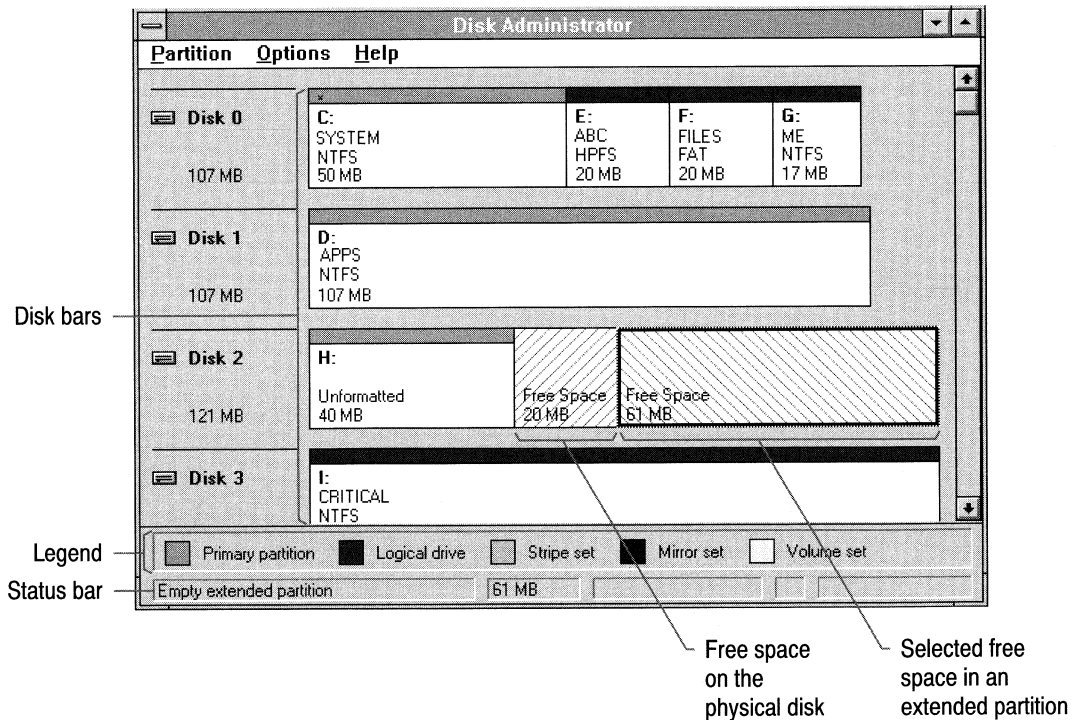
- Create and delete partitions on a hard disk and logical drives within an extended partition.
- Read status information about disks such as the partition sizes and the amount of unformatted free space that is available for creating additional partitions.
- Read status information about Windows NT volumes such as the drive-letter assignment, volume label, file system type, and size.
- Make and change drive-letter assignments.

- Create and delete volume sets.
- Extend volumes and volume sets.
- Create and delete stripe sets without parity.

Starting and Quitting Disk Administrator

Security You can only open Disk Administrator if you are logged on as a member of the Administrators group. Double-click the Disk Administrator icon in the Administrative Tools group to display a scrollable graphical representation of all the physical disks connected to your workstation along with their partitions. (You can also type **windisk** or **start windisk** at the command prompt.)

A status bar at the bottom of the window provides basic information on partitions. A color-coded legend on top of the status bar shows what the different partition colors and patterns represent. Both context-sensitive and standard Help are provided for all Disk Administrator commands.



To quit Disk Administrator, you can choose either Exit from the Partition menu or Close from the Control menu. If you have requested any significant changes to your disk partitions or drive-letter assignments, Disk Administrator displays a message to remind you about the irreversibility of certain changes, such as deleting a partition, and to ask whether or not you want to save those changes. Disk Administrator only performs updates to the disks after you agree to saving those changes and quit the program. If you decide not to save the changes, choose the No button and Disk Administrator will close without making any changes. If you decide not to quit and want to continue using Disk Administrator, choose the Cancel button.

If you make changes and commit to them upon quitting, Disk Administrator makes the requested changes and displays a message when the disks have been successfully updated. After you choose the OK button, another message advises you that changes have been made that require you to restart the computer. When you choose the OK button, Disk Administrator initiates a complete system shutdown, closes all open applications, and restarts the computer for you. Restarting makes the new volumes accessible. You can then format and label your volumes.

Organizing Your Screen

From the Options menu, you can choose whether or not to display the status bar and legend, customize the colors and patterns used in the legend and disk displays, and change how the disk regions are displayed. See online Help for detailed procedures.

When you select an area of free space, notice that Disk Administrator makes a distinction in the status bar between free space on the disk and free space in an extended partition. You can also see the distinction graphically in the way Disk Administrator uses forward slanting lines to fill free space on the disk and backward slanting lines to fill free space in an extended partition.

You can change the colors and patterns that are used on the screen to distinguish between the following items: primary partition, logical drive, stripe set, mirror set, and volume set.

Since you may have several disks with a wide range of capacities, you can change the relative display size of partitions. Disk regions are shown as being proportionate to each other within a single disk bar. You can choose either to display the regions on each disk based on their relative size, size all the regions equally, or let Disk Administrator decide how to size the regions. You can do this differently for each disk or choose the Reset All button to let Disk Administrator decide how to display all the disks connected to your system.

Note The total lengths of the bars used to represent disks are generally proportional to the size of the disk. However, the total length of a single disk bar is never less than 25 percent of the total length of the largest disk bar.

Managing Disks

Windows NT Disk Administrator provides a simple, graphical way for you to enhance your system's performance and to manage your disks by creating and deleting all the partitions you may need to run your system effectively.

If you use only the Windows NT operating system, you can create one partition that occupies your entire disk or as many as four partitions. If you want to use other operating systems on your hard disk (such as UNIX or MS-DOS) with file systems that are not recognized by Windows NT, you must create separate partitions for each non-Microsoft operating system. Notice, though, that MS-DOS and Windows NT can share the same primary partition when using the File Allocation Table (FAT) file system.

On an x86-based computer, the operating system starts from the active system partition on the first internal hard disk (that is, Disk 0). Computers using reduced instruction set computing (RISC) processors can have several system partitions that are configurable by the manufacturer's configuration program. Such partitions must be formatted for the FAT file system. Consult your hardware documentation for detailed information on setting up more than one system partition on a RISC-based computer.

When you partition a disk, you specify which portion of the disk a file system can use. When you format a partition, Windows NT prepares an existing partition with a drive letter to use a specific file system. After you partition a disk and save the changes, Disk Administrator restarts the computer for you to make those new volumes accessible. You must then go to the Windows NT command prompt and format each new partition. To do this, use the Format command and the appropriate switch for the file system that you will use on that partition. For more information on formatting partitions under Windows NT, see "Formatting and Labeling Partitions" later in this chapter, and online Help for the Format command.

Partitioning Disks

Disk management under Windows NT is very flexible. You can create up to four partitions in the free space on a physical hard disk, create multiple logical drives in the free space of an extended partition, and delete partitions. You can also add hard disks to your system configuration, recover disk configuration information, and assign specific drive letters to each primary partition or logical drive.

Setting Up a New Hard Disk

You can create any of the following in the free space on a hard disk:

- A single primary partition
- Additional partitions up to the maximum of four
- An extended partition with a number of logical drives that is limited only by the size of the partition
- Other types of Windows NT volumes, such as volume sets and stripe sets

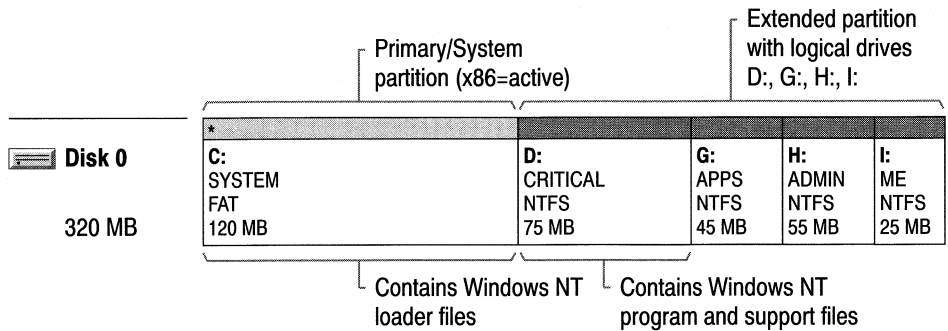
Free space is an unused and unformatted portion of a hard disk that can be partitioned or subpartitioned. Free space within an extended partition is available for the creation of logical drives. Free space that is not within an extended partition is available for the creation of a partition, with a maximum of four partitions allowed.

A *partition* is a portion of a physical disk that functions as though it were a physically separate unit. A *volume* is a partition or collection of partitions that have been formatted for use by a file system. A Windows NT volume can be assigned a drive letter and used to organize directories and files.

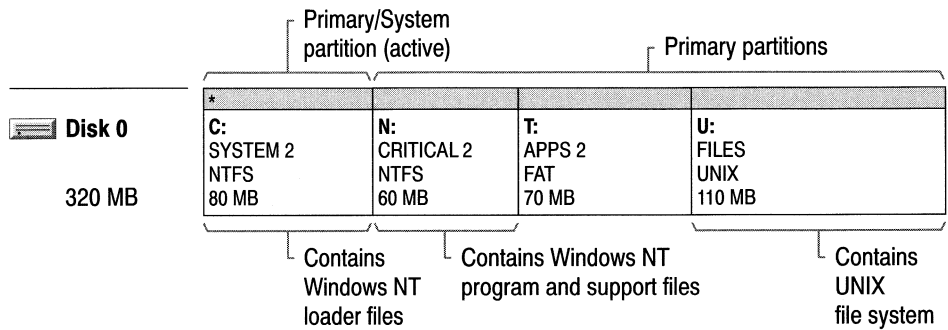
A partition is usually referred to as either a primary or an extended partition. A *primary partition* is a portion of a physical disk that can be marked for use by an operating system. There can be up to four primary partitions (or up to three, if there is an extended partition) per physical disk. A primary partition cannot be subpartitioned.

An *extended partition* is created from free space on a hard disk and can be subpartitioned into zero or more logical drives. The free space in an extended partition can also be used to create volume sets or other kinds of volumes for fault tolerance purposes. Only one of the four partitions allowed per physical disk can be an extended partition, and no primary partition needs to be present to create an extended partition. Free space in an extended partition is described as such in the status bar.

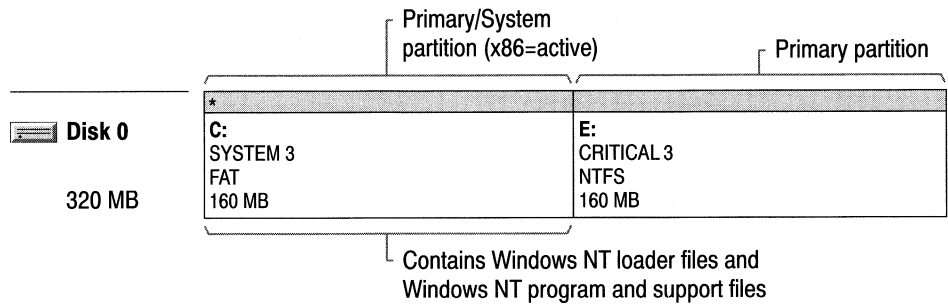
The following illustration shows examples of different disk-partitioning schemes on x86- and RISC-based computers and where certain files might be located.



x86- or RISC-based computers



x86-based computers



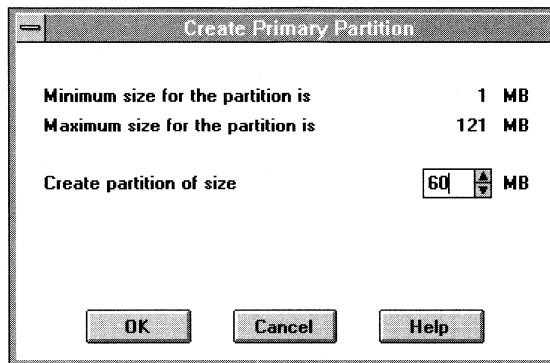
x86- and RISC-based computers

Creating Primary Partitions

When creating primary partitions, the system assigns space to a partition starting from the beginning of the space available. Therefore, in the beginning, there are no gaps between partitions. Gaps only happen when you delete a partition later on. For example, if you delete the second of three partitions and create a new smaller-sized second partition, that will leave a gap of free space between the second and third partitions.

► To create a primary partition

1. Select an area of free space on a disk.
2. From the Partition menu, choose Create.



Disk Administrator displays what the minimum and maximum sizes for the primary partition can be.

3. In the Create Primary Partition dialog box, type the size of the primary partition that you want to create.
4. Choose the OK button.

Creating an Extended Partition

One of the four partitions that you can create under Windows NT, if disk space allows, is an extended partition. You can use the free space in the extended partition to create multiple logical drives or use all or part of it when creating volume sets or other kinds of volumes for fault-tolerance purposes.

► To create an extended partition

1. Select an area of free space on a disk.
2. From the Partition menu, choose Create Extended.

Disk Administrator displays what the minimum and maximum sizes for the extended partition can be.

3. In the Create Extended Partition dialog box, type the size of the extended partition that you want to create.
4. Choose the OK button.

► **To create logical drives in an extended partition**

1. Select an area of free space in an extended partition.
2. From the Partition menu, choose Create.
Disk Administrator displays what the minimum and maximum sizes for the logical drive can be.
3. In the Create Logical Drive dialog box, type the size of the logical drive that you want to create.
4. Choose the OK button.

Formatting and Labeling Partitions

Before you can store files and directories on the partitions that you have created, you must restart your computer and then format each partition individually for use with the file system of the operating system with which you want to work. You can also assign descriptive volume labels at this time.

► **To format a partition and label the volume**

1. In the Program Manager window, choose the Command Prompt icon.
2. At the command prompt, type **format /?**
Help information is displayed, showing you the complete command syntax and the meaning of each switch. Be careful not to reformat a partition that already contains information. After typing the appropriate format command, you are asked to assign a volume label to the new volume.

► **To change or delete a volume label**

1. In the Program Manager window, choose the Command Prompt icon.
2. At the command prompt, type **label [drive:][label]**
If you do not add a volume label name, the system displays the current label, the volume serial number, and then asks for a new label. Pressing **ENTER** before supplying a label deletes the current label or leaves the volume without a label.

Marking Partitions as Active

The names commonly used for the partition(s) containing the startup and operating system files are the system and boot partitions, respectively.

The *system partition* for Windows NT is the volume that has the hardware-specific files needed to load Windows NT. On x86-based computers, it must be a primary partition that has been marked as active for startup purposes and must be located on the disk that the computer accesses when starting up the system. There can only be one active system partition at a time, which is denoted on the screen by an asterisk. If you want to use another operating system, you must first mark its system partition as active before restarting the computer.

Partitions on a RISC-based computer are not marked active. Instead, they are configured by a hardware configuration program supplied by the manufacturer. On RISC-based computers, the system partition must be formatted for the FAT file system. On either type of computer, the system partition can never be part of a stripe set or volume set.

The *boot partition* for Windows NT is the volume, formatted for either an NTFS, FAT, or HPFS file system, that has the Windows NT operating system and its support files. The boot partition can be (but does not have to be) the same as the system partition. It also cannot be part of a stripe set or volume set.

► **To mark a partition as active on an x86-based computer**

1. Select the primary partition that contains the startup files for the operating system that you want to activate.
2. From the Partition menu, choose Mark Active.

A message advises you that the partition has been marked active and that the operating system on that partition will be started after you restart your computer.

3. In the Disk Administrator message box, choose the OK button.

An asterisk appears in the color bar of the active partition.

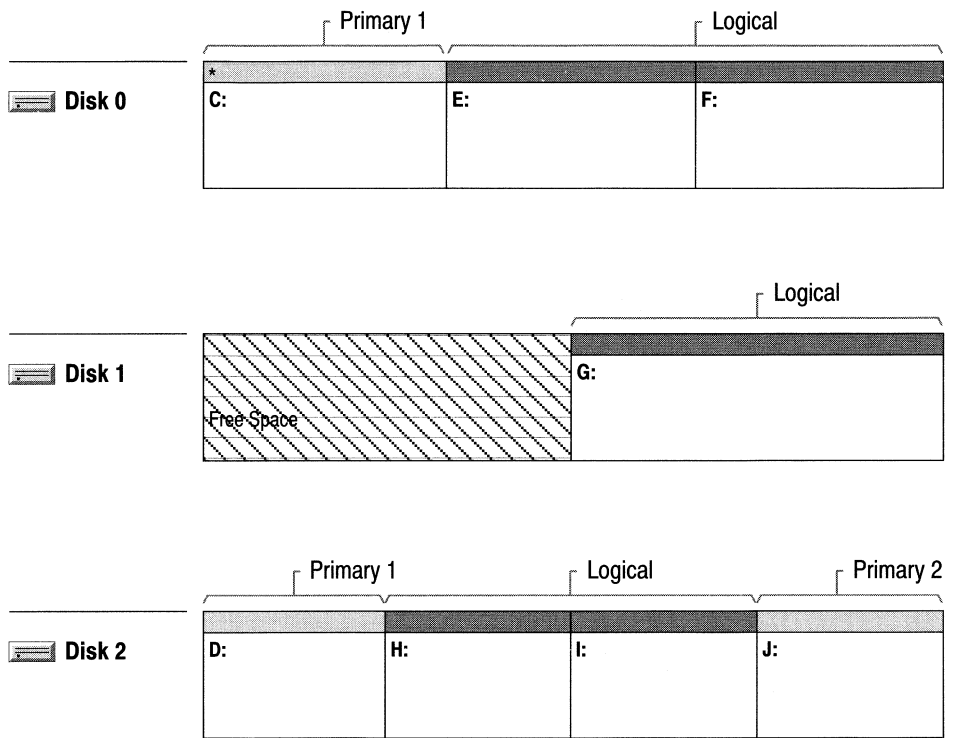
Assigning Drive Letters

You can create more than 24 volumes with Windows NT, but you will not be able to assign more than 24 drive letters for accessing these volumes. Drive letters A and B are reserved for floppy disk drives.

Windows NT allows the static assignment of drive letters. This means that a drive letter can be permanently assigned to a specific hard disk and partition/volume. When a new hard disk is added to an existing computer system, it will not affect statically assigned drive letters.

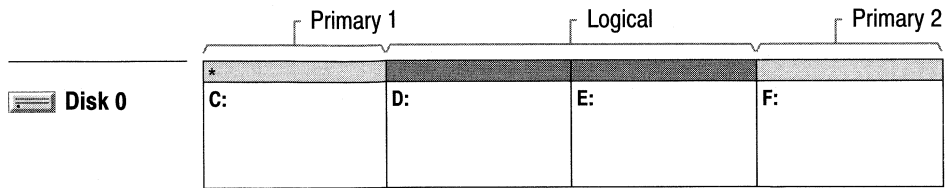
However, this static assignment of drive letters occurs only after Disk Administrator has been used on the workstation. Until then, drive letters are assigned by Windows NT in the same manner as by MS-DOS, which adheres to the following rule: first the primary partitions on each hard disk get letters assigned starting with the letter “C.” Windows NT then continues assigning the next available drive letter to each of the logical drives in order on each hard disk, and then to the secondary primary partitions on each hard disk. The active system partition is typically the C drive.

The following is an example with three hard disks:



System with three hard disks

The following is an example with only one hard disk:



System with one hard disk

Note You should be careful when making drive-letter assignments because many MS-DOS and Windows programs make references to a specific drive letter. For example, the Path environment variable shows specific drive letters in conjunction with program names.

► To assign a drive letter

1. Select the partition or logical drive whose drive letter you want to assign.
2. From the Partition menu, choose Drive Letter.
3. In the Assign Drive Letter dialog box, select the appropriate option button.
If you decide to assign a drive letter, you can either accept the next letter available or select a different one.
4. Choose the OK button.

Deleting Partitions, Volumes, or Logical Drives

Before deleting partitions, volumes, or logical drives under Windows NT, you need to ensure that the information on them has been backed up onto another storage medium and verified, or is no longer needed.

Windows NT places certain restrictions on your freedom to delete. It will not let you delete the volume with the files needed to run Windows NT. Nor can you delete individual partitions that are part of a set without deleting the entire set. But, on a RISC-based computer, you can delete the system partition with the files needed to load Windows NT, so be very careful. Windows NT also requires that all the logical drives or other volumes in an extended partition be deleted before you can delete the extended partition.

However, remember that no changes actually happen until you agree to save them when you quit Disk Administrator.

► **To delete a partition, volume, or logical drive**

1. Select the partition, volume, or logical drive.
2. From the Partition menu, choose Delete.

A message advises you that all data will be lost and asks you to confirm your action.

3. In the Confirm message, choose the Yes button.

The partition, volume, or logical drive and any data are deleted, and the space becomes free again.

Adding Hard Disks

The maximum number of hard disks that you can add to a computer depends on your hardware configuration, such as how many SCSI adapters you have attached. After adding additional hard disks to your computer, restart your computer and then start Disk Administrator. Before the Disk Administrator window opens, a message advises you that Disk Administrator has noticed a change and will update the system configuration after you choose the OK button. However, drive letters are not changed by the system when you add new hard disks if they have already been statically assigned.

Recovering Disk Configuration Information

In addition to the Emergency Repair disk that you created during Setup, Disk Administrator provides options for saving and restoring the following currently defined disk configuration information: assigned drive letters, volume sets, stripe sets, stripe sets with parity, and mirror sets.

You can also search for disk configuration information among different installed versions of Windows NT and select a specific version to replace another. However, you should be careful to update this version's information every time you make a change to your disk's configuration. Make your changes first, quit Disk Administrator, restart your computer and Disk Administrator, and then save the configuration information and quit Disk Administrator.

► **To save disk configuration information**

1. From the Partition menu, choose Configuration.
2. From the Configuration menu, choose Save.

A message describes what will be saved and where you should save it. It also warns you that changes made during this session will not be included.

3. Insert a blank floppy disk, a floppy disk with a previous version of the configuration information, or the Emergency Repair disk.
4. Choose the OK button.

► **To restore disk configuration information**

1. From the Partition menu, choose Configuration.
2. From the Configuration menu, choose Restore.

A message warns you that this operation will overwrite your current disk configuration information with what was previously saved on the floppy disk. Also, any changes made during this session will be lost.

3. Insert the floppy disk containing the saved configuration information.
4. Choose the OK button.

► **To search for disk configuration information**

1. From the Partition menu, choose Configuration.
2. From the Configuration menu, choose Search.

A message warns you that this operation will overwrite your current disk configuration information with the information from a different installation of Windows NT. Also, any changes made during this session will be lost.

3. Choose the OK button.

Disk Administrator scans your disk for other Windows NT installations and then displays a list of the installations.

4. Select an installation.
5. Choose the OK button.

Deleting Mirror Sets

If you are using Windows NT on your computer and inherit several hard disks that were formerly used on a Windows NT Advanced Server computer, you may also inherit two volumes with duplicated, or mirrored, information. Establishing mirror sets and then breaking them, without deleting the information in the two volumes, is part of the fault-tolerance functionality provided with Windows NT Advanced Server.


However, Windows NT will not recognize such volumes unless you first saved the configuration information from the Windows NT Advanced Server computer to a floppy disk and then restored that information on the Windows NT computer. They will appear in the disk bar with the color bar for a primary partition or logical drive, and there will be no drive letter assigned. You may then choose either to assign them drive letters or to delete the volumes and regain the use of that disk space.

Creating and Deleting Volume Sets


Volume sets are a mechanism for more effectively using the total available free space on a disk. They are created, as shown in the following illustration, by combining various-sized areas of free space on from one to 32 disks into one large logical volume set that is treated like a single partition.


Note Operating systems, such as MS-DOS, that do not have volume-set functionality cannot recognize any volume sets that are created by Windows NT. Therefore, if you create a volume set on a dual-boot computer, those partitions become invisible to MS-DOS.

 Disk 0	*		
	C:		F:
320 MB	FAT 60 MB	Free Space 110 MB	NTFS 150 MB

 Disk 1			
			I:
320 MB	Free Space 220 MB		NTFS 100 MB

Results showing what the system sees:
Volume set (V:) created from free space
on 2 disks=330 MB

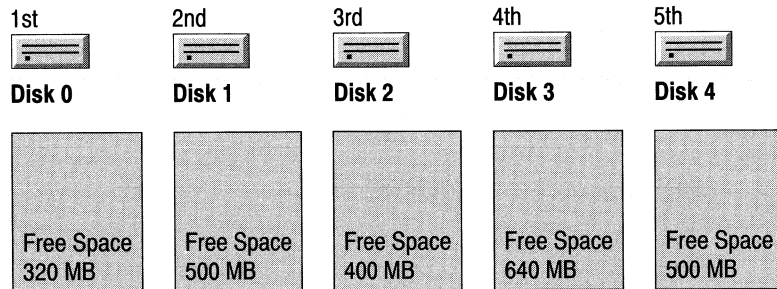
 Disk 0	*		
	C:	V:	F:
320 MB	FAT 60 MB	Unformatted 110 MB	NTFS 150 MB

 Disk 1			
	V:		I:
320 MB	Unformatted 220 MB		NTFS 100 MB

The areas of free space used to create volume sets can be of different sizes, as shown in the following illustration. Volume sets are organized in such a way that the free space on one disk gets filled up and then, starting at the beginning of the next disk, all that free space gets filled up. The process continues in the same way on each subsequent disk up to a maximum of 32.

This volume set is a combination of different-sized areas of free space on 5 hard disks for a total of 2360 MB.

Information is stored in the following order:



Deleting partitions to create free space that is then combined into one volume set also frees up drive letters for other uses, enables the creation of a large volume for file system use, and may improve system performance by better balancing data input and output (I/O) across the drives.

► **To create a volume set**

1. Select two or more areas of free space on from one to 32 hard disks by selecting the first area of free space, and then pressing CTRL and clicking each of the other areas.
2. From the Partition menu, choose Create Volume Set.
Disk Administrator displays the minimum and maximum sizes for the volume set.
3. In the Create Volume Set dialog box, type the size of the volume set that you want to create.
4. Choose the OK button.

If you choose to use less than the total available space, Disk Administrator divides the total size by the number of disks to create almost equal-sized unformatted partitions in each of the selected disks and assigns a single drive letter to the collection of partitions that make up the volume set.

When you no longer want to have a volume set, or you want to reorganize the data on your disks, or you have a problem with a faulty disk drive, you should first back up all the information on the volume set and then choose the Delete command. Deleting the volume set deletes all the information contained in the volume set.

► **To delete a volume set**

1. Select the volume set that you want to delete.
2. From the Partition menu, choose Delete.

A message advises you that all the data will be lost and asks you to confirm that you want to delete it.

3. In the Confirm message, choose the Yes button.

Extending Volumes and Volume Sets

Existing NTFS volumes and volume sets can also be extended by adding free space. Disk Administrator forces the system to restart after you quit and save your changes, and then formats the new area without affecting any existing files on the original volume or volume set.

► **To extend a volume or volume set**

1. Select an existing volume (that is not part of a stripe set or mirror set) or a volume set and one or more areas of free space.
2. From the Partition menu, choose Extend Volume Set.

Disk Administrator displays the minimum and maximum sizes for the volume set.

3. In the Create Extended Volume Set dialog box, type the size of the volume set that you want to create.
4. Choose the OK button.

Depending on the size that you specified, Disk Administrator determines how much of the free space to use.

Creating and Deleting Stripe Sets







Stripe sets are created similarly to volume sets, but with more restrictions. Each member partition of the stripe set must be on a different disk up to a limit of 32 disks. Also, Disk Administrator will make all the partitions approximately the same size.

Note Operating systems, such as MS-DOS, that do not have stripe-set functionality cannot recognize any stripe sets that are created by Windows NT. Therefore, if you create a stripe set on a dual-boot computer, those partitions become invisible to MS-DOS.

Stripe sets are created by combining areas of free space on from two to 32 disks into one large logical volume. The partitions in stripe sets are all approximately the same size so that the data can be written in stripes across each partition. This enables I/O commands to be issued concurrently and increases throughput.

The following illustration shows a set of six hard disks and how the stripes are distributed across them.

Information is written across the 5 rows of each partition from stripe #0 to #29, leaving 2 areas of unused space.

					
Disk 0	Disk 1	Disk 2	Disk 3	Disk 4	Disk 5
0	1	2	3	4	5
6	7	8	9	10	11
12	13	14	15	16	17
18	19	20	21	22	23
24	25	26	27	28	29
	unused		unused		

► To create a stripe set

1. Select two or more areas of free space on from two to 32 hard disks by selecting the first area of free space on the first disk, and then pressing **CTRL** and clicking an additional area of free space on each of the other hard disks.

2. From the Partition menu, choose Create Stripe Set.

Disk Administrator displays the minimum and maximum sizes for the stripe set.

3. In the Create Stripe Set dialog box, type the size of the stripe set that you want to create.

4. Choose the OK button.

Disk Administrator divides the total size by the number of disks to create equal-sized unformatted partitions in each of the selected disks and assigns a single drive letter to the collection of partitions that make up the stripe set. If you choose a number that cannot be divided equally, Disk Administrator rounds to the closest higher or lower value.

When you no longer want a stripe set or you have a problem with a faulty disk drive, you should first back up all the information on the stripe set and then choose the Delete command. Deleting the stripe set deletes all the information there.

► **To delete a stripe set**

1. Select the stripe set that you want to delete.
2. From the Partition menu, choose Delete.

A message advises you that all the data will be lost and asks you to confirm that you want to delete it.

3. In the Confirm message, choose the Yes button.

Performance Monitor

Performance Monitor provides administrators and other users with a very capable monitoring tool to help with initial performance troubleshooting and capacity planning.

This chapter explains how to use the four windows in Performance Monitor to better understand how well your own computer or other computers on a network are performing. The following main topics are included:

- Monitoring performance
- Charting current activity
- Logging current activity
- Setting alerts on current activity
- Creating reports on current activity
- Working with existing log files

Overview

Performance Monitor is a graphical tool for measuring the performance of your own computer or other computers on a network. On each computer, you can view the behavior of objects such as processors, memory, cache, threads, and processes. Each of these objects has an associated set of counters that provide information on such things as device usage, queue lengths, and delays, as well as information used for throughput and internal congestion measurements.

It provides charting, alerting, and reporting capabilities that reflect current activity along with ongoing logging. You can also open log files at a later time for browsing and charting as if they were reflecting current activity. Performance Monitor is located in the Administrative Tools group in Program Manager.

The following list provides an overview of what you can do with this graphical tool to view the performance of objects:

- View data from any number of computers simultaneously.
- View and dynamically change charts reflecting current-activity counter values that are updated at a user-defined frequency.
- Export data from charts, logs, alert logs, and reports to spreadsheet or database programs for further manipulation and printing.
- Add system alerts that list an event in the Alert Log and, optionally, notify you by reverting to the Alert view or issuing a network alert.
- Run a predefined program every time, or just the first time, a counter value goes over or under a user-defined value.
- Create log files containing data about various objects from different computers.
- Append to one file selected sections of other existing log files to form a longterm archive.
- View current-activity reports or create reports from existing log files.
- Save individual chart, alert, log, or report settings, or the entire workspace setup, and reuse when needed.

Starting and Quitting Performance Monitor

Security You do not need any special privileges to open Performance Monitor. However, you do need to be logged on as a member of the Administrators group to use the **diskperf** command. This command turns on and off the counters for physical and logical disk activity on your own or another computer. After restarting the computer, you can then use Performance Monitor to view disk performance data.

► To activate the physical and logical disk counters

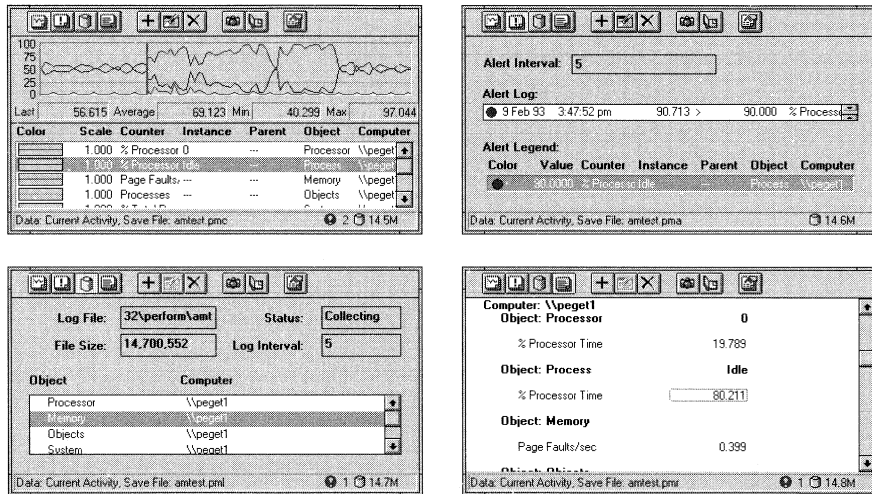
1. Log on as a member of the Administrators group.
2. At the command prompt, type **diskperf /?** to view help information on how to turn **diskperf** on and off and specify a remote computer's name.

It will also state whether or not the disk performance counters have been activated already on that computer.

3. Restart the computer to activate the disk performance counters.

Double-click the Performance Monitor icon in the Administrative Tools group to display the Performance Monitor window in the Chart view. (You can also type **perfmon** [*settings file*] at the command prompt. The previously saved settings file can consist of selections made within a single view or within all four views, which is known as a Workspace and saved as a .PMW file. If you do not specify a settings file, Performance Monitor searches the current working directory for the default chart file _DEFAULT.PMC.)

Performance Monitor actually consists of four main windows, which you display by choosing to view Chart, Alert, Log, or Report. All four windows contain different information and have only the menu bar, status bar, and toolbar in common. Both context-sensitive and standard Help is provided for all the Performance Monitor commands.



The following most commonly used commands from the View, Edit, and Options menus are also available on the toolbar:

Chart	Add To	Bookmark
Alert	Edit	Options
Log	Delete From	
Report	Update Now	

An important menu item that is available in all four windows is the Data From command under the Options menu. You use this command to specify if you want to view current activity and work with current values or if you would rather manipulate an existing log file. The default value for displaying data is from current activity. Therefore, you will not need to change it until you want to examine an existing log file.

You can quit Performance Monitor by choosing either Exit from the File menu or Close from the Control menu. Be sure to save your individual chart, alert, log, or report settings, or the entire workspace, to a file before quitting, unless you are sure you will not need that exact combination of settings again.

► **To save settings in any view**

1. From the File menu, choose the corresponding Save Settings command.

If you have not already assigned a filename, the Performance Monitor - Save As dialog box appears.

2. Type a name in the File Name box.
3. Choose the OK button.

The assigned filename now appears in the status bar.

► **To change the name of a settings file**

1. From the File menu, choose the corresponding Save Settings As command.
2. In the Performance Monitor Save As dialog box, type a name in the File Name box or choose one from the list of existing filenames.
3. Choose the OK button.

The new filename now appears in the status bar.

► **To save related settings from all four windows**

1. From the File menu, choose Save Workspace.
2. In the Performance Monitor - Save Workspace As dialog box, type a name in the File Name box or choose one from the list of existing filenames.
3. Choose the OK button.

Organizing Your Screen

You can choose to view one of four windows: Chart, Alert, Log, or Report. The only consistent elements among the four windows are the display options: Menu and Title, Toolbar, Status Bar, and Always On Top. By showing or hiding any of these options, you can vary the amount of screen space available for display purposes. The Always On Top option ensures that Performance Monitor, even when no longer the active window, stays visible over any other window on your screen.

Performance Monitor also has a chart-highlighting feature that provides better visibility for a selected counter by changing the counter's on-screen color to white. While in chart-highlighting mode, you can change selections in the legend area and see the corresponding chart line change to white on the screen. To stop highlighting your selections, you must turn off the chart-highlighting mode.

► To show or hide a display option

- From the Options menu, choose the appropriate display option's command.

When an option is in effect, a check mark appears next to the command in the Options menu.

- ▶ **To show or hide only the menu bar and title bar**
 1. Double-click anywhere in the display area that does not contain text information.
 2. Double-click again to reverse the action.
- ▶ **To move the window while the title bar is hidden**
 - Click anywhere in the display area that does not contain text information and drag the mouse to move the window.
- ▶ **To turn the chart-highlighting mode on or off**
 1. To turn the chart-highlighting mode on and change the color of the selected counter to white, press CTRL+H.
 2. To stop highlighting selected counters, press CTRL+H again.

Monitoring Performance

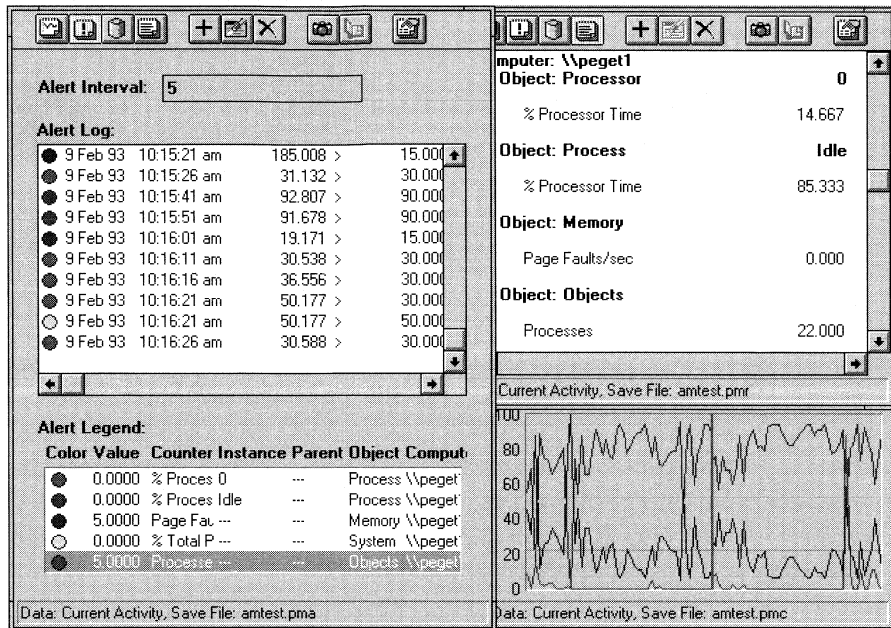
Performance Monitor is a graphical tool that almost everybody can use to gain a better understanding of how efficiently their computer is functioning and what the problems might be if it is performing poorly. You can use it to find bottlenecks on a network, to help in capacity planning, to do configuration management, and to verify or predict problem areas in a program design.

You can create charts, set alerts, build log files, and format reports that enable you to monitor the current performance of selected counters and instances for objects on Windows NT such as the following. However, notice that the objects will be different when viewing computers with different operating systems.

Cache	Paging File	Redirector
LogicalDisk	PhysicalDisk	Server
Memory	Process	System
Objects	Processor	Thread

Each area can have several scenarios that may demand the use of different features in Performance Monitor. For example, a network administrator working in the configuration management area may routinely monitor network activity to watch for problems and may also need to report on any failure to provide guaranteed service levels.

You can receive immediate feedback on how changes that you make affect the computer. You can also view information gathered over a period of time to see trends before and after the changes were made. And you can view all this in several different ways.



You can view information on current activity as well as from log files that you recorded earlier for viewing at a more convenient time. Current-activity data or selected data from log files can also be exported to a spreadsheet or database program and rearranged to fit your needs. Or, for a quick snapshot of the current activity, you can press ALT+PRINTSCREEN and then use the Paste command in Paintbrush to display a printable bitmap of the active window.

The same objects and counters are available for monitoring in all four views. When you select an object to monitor in Log view, all the counters for that object, or for each instance of that object, are monitored when you start collecting data in a log file. However, when you choose to view the results in one of the other three view windows, you can selectively add those counters and instances that are of interest to you.

Despite its wide applicability, Performance Monitor does not answer every performance-tuning question. It should be thought of as a broad tool that provides an overview of the computer's performance. And, generally, it will be the first tool used on any performance problem. Frequently, you will be able to use it to resolve the problem completely. In other cases, you will use it to indicate which specialized tool (such as a profiler, a working set monitor, a disk optimizer, or a LAN packet sniffer) to use next.

Working with Information on Current Activity

Performance Monitor provides four different views for information on the current behavior of objects, counters, and instances. However, you can use the same approach to accessing and working with the information in all four windows: Chart, Alert, Log, or Report.

► To work in any view with information on current activity

1. From the view's File menu, choose either a new settings file or open an existing one.

You can open either a separate chart (.PMC), alert (.PMA), log (.PML), or report (.PMR) settings file, or a workspace (.PMW) file containing settings for all four windows.

2. From the view's Edit menu, choose the Add To command to select one or more computers to monitor and the appropriate objects, counters, or instances.

For details on how to select a computer in any view, see the following procedure.

To select multiple objects and counters, select the first item and then do one of the following:

- Press and hold down the SHIFT key and then select the last contiguous item.
 - Drag the mouse until you reach the last contiguous item.
 - Press and hold down the CTRL key and select each non-contiguous item.
5. Choose either the Add To or Edit command to make changes, if you want, to how selections are represented.
 6. From the view's File menu, choose to save selections in a new settings file or update the current one.
 7. From the view's Options menu, change any of the options provided with that view, such as specifying the time interval and update method, hiding and displaying items, changing the graphic format, starting and stopping logging, adding bookmarks, and specifying the notification method.
 8. Change to another window, or view, and repeat the process to gain a different perspective on the same information or to monitor some other aspect of the problem.
 9. If you have related information in all four windows, save the settings for the entire workspace.

► To select a different computer

1. From the view's Edit menu, choose the Add To command.
2. In the Computer box, type the computer's name. Or click the gray button at the end of the box to display the Select Computer dialog box.

The names of the domains or workgroups to which you have access appear in the Select Computer box. The first time you use this, there may be some delay while Performance Monitor searches the accessible domains and workgroups for member computers.

3. Double-click the name of the appropriate domain controller or workgroup to display a list of the servers and workstations connected to it.
4. Select the name of the server or workstation that you want to monitor.
5. Choose the OK button.

Notice that the Add button is disabled while Performance Monitor searches for that computer. If the computer is found, the Add button is enabled again, and the boxes change to show the default settings of the new computer. If the computer is not found, a message appears and you revert back to your own computer's default settings.

Clearing the Display vs. Deleting Selections

You can also use the same approach in all four views to deleting either a full screen of information or a single selection.

► To clear the values displayed on the screen

- From the view's Edit menu, choose Clear Display.

► To delete a selection

1. Select the legend, log, or report item that you want to delete.



2. From the view's Edit menu, choose the Delete command. Or choose the Delete button on the toolbar.

Updating the Display

All four views have a command under the Options menu and a button on the toolbar that enable you to update manually the information on the screen. You can use the Update Now command or button between automatic data updates to get a current snapshot of the situation. Each view also has within its own Options dialog box an Update Time box for choosing the automatic updating frequency or for switching to only manual updates.

► To update the screen display in any view



- From the view's Options menu, choose Update Now. Or choose the Update Now button on the toolbar.

► To change the updating method within each view

1. In the appropriate view's Options dialog box, select either periodic or manual updating.

2. If you selected Periodic Update, type a number in the Interval box to determine the time, in seconds, between updates.
3. Choose the OK button.

Printing a Snapshot of the Window Display

You can use the PRINTSCREEN key to capture a graphical view of the current window at certain intervals or during peak periods to keep a record over time. You can then use the Paintbrush program in the Accessories group to clean up and print out a copy of the window display.

► To print a snapshot of the current window

1. Press ALT+PRINTSCREEN to copy a view of the active window. If Performance Monitor is maximized, press PRINTSCREEN to copy the whole desktop.
2. Start the Paintbrush program in the Accessories group.
3. From the Edit menu, choose Paste and then, if you want to save the bitmap to a file, choose Save As from the File menu.
4. From the File menu, choose Print.

Exporting Data

When you want to manipulate a snapshot of the current window's data in a spreadsheet or database program before printing it or when you want to change how the information is presented, use the view's Export command.

► To export data to a spreadsheet or database program

1. From the view's File menu, choose the Export command.
The Performance Monitor - Export As dialog box appears.
2. In the Column Delimiter box, choose either the Tab (*.TSV) or Comma (*.CSV) method for separating the data columns in the file.
3. Select or type a path name, with the appropriate extension for the column-delimiter, for the file that you want to export.
If you want to select a file that is on another computer, choose the Network button to display and select from the Network Connections dialog box.
4. Choose the OK button.
5. Start the spreadsheet or database program.
6. Open your Performance Monitor file and work with it.

Working with Information from Log Files

Performance Monitor provides four different views of historical information on the behavior of objects, counters, and instances. As with information on current activity, you can use a similar approach to accessing and working with these existing log files in all four windows: Chart, Alert, Log, or Report.

► **To work in any view with information from log files**

1. From the view's Options menu, choose Data From to select an existing log file.
2. From the view's Edit menu, choose Time Window to change the starting and stopping times, if necessary.
3. Choose the appropriate Add To command to select one or more computers to monitor and the appropriate objects, counters, or instances.

Or you can open an existing settings file or workspace file with the Open command from the view's File menu.

For details on how to select a computer in any view, see the procedure given in the "Working with Information on Current Activity" section.

5. Choose either the Add To or Edit command to make changes, if appropriate, to how selections are represented.
6. From the view's File menu, choose to save selections in a new settings file or update the current one.
7. From the view's Options menu, change any options, if available, such as hiding and displaying items, changing the graphic format, starting and stopping relogging, specifying the logging interval, and adding bookmarks.
8. Change to another window, or view, and repeat the process to gain a different perspective on the same information or to study some other aspect of the problem.
9. If you have related information in all four windows, save the settings for the entire workspace.

Charting Current Activity

The ability to create customized charts to monitor the current performance of selected counters and instances is useful for doing tasks such as the following:

- Investigating why a computer or application is slow or inefficient
- Continuously monitoring systems to find intermittent performance bottlenecks
- Discovering why you need to increase capacity

For help understanding a selected counter, choose the Explain button in the Add To Chart dialog box to display the Counter Definition box.

► **To view the Chart window**



- From the View menu, choose Chart. Or choose the Chart button on the toolbar.

If you are switching from another view, the Chart window is blank unless you already created or opened a chart during that session or from the command prompt.

► **To open an existing chart settings file**

1. From the File menu, choose Open.
2. In the Performance Monitor - File Open dialog box, select or type the path name for the .PMC file containing the selections that you want to reuse.

If you want to select a file that is on another computer, choose the Network button to display and select from the Network Connections dialog box.

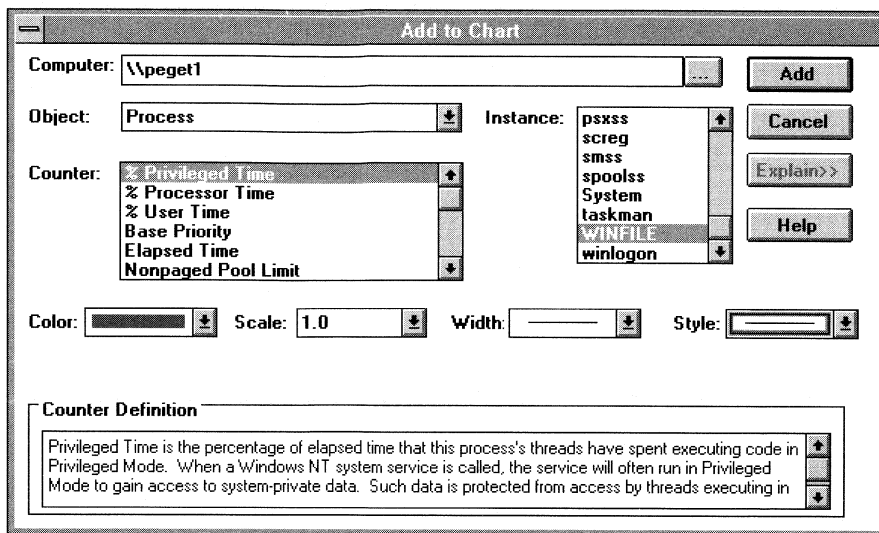
3. Choose the OK button.

► **To create a new blank chart**

- From the File menu, choose New Chart.

Adding Chart Selections

Different problems require different settings. Creating charts to reflect these different requirements is a simple matter of selecting the computer to be monitored and adding the appropriate objects, counters, and instances. You can then save these selections under a filename for viewing whenever you want an update on their performance. To make the graphs more readable, vary the scale of the displayed information and the color, width, and style of the line for each counter as you add it to the chart. You can also modify these properties after you add a selection.



► To add selections to a chart



1. From the Edit menu, choose Add To Chart. Or choose the Add To Chart button on the toolbar.

The Add To Chart dialog box appears with the default settings and your workstation or server listed in the Computer box. To select a different computer, see the procedure given in the “Working with Information on Current Activity” section.

2. In the Object box, select an object to monitor from the list of those that are available on the chosen computer.

The Counter and Instance boxes change to display the items that are available for that object on the chosen computer.

3. In the Counter box, select one or more counters.

For a definition of the selected counter, choose the Explain button.

4. In the Instance box, select one or more instances if appropriate.

5. If you do not want the next available color to be assigned to a counter along with the default 1.0 scale and the default line width and style, make your own selections now.

The scale factor is applied to all the currently selected counters. The factor displayed is multiplied times the counter value, and the product is charted. Notice, however, that the value bar continues to show the actual value, not the scaled value.

6. Choose the Add button.
7. Repeat the process for any additional objects or computers that you want to monitor.

8. When you finish adding selections, choose the Done button.

A list of your selections appears in the legend at the bottom of the window, and Performance Monitor displays the changing values of your selections on the chart.

► **To save chart selections in a settings file**

1. From the File menu, choose Save Chart Settings As.
2. In the Performance Monitor - Save As dialog box, select or type a path name for the file that will contain the selections that you want to reuse.
3. Choose the OK button.

Changing Chart Selections

Creating a readable chart is important. Sometimes, you should change the scale at which you graph the counter information to display the activity more in the center of the chart, but the actual reported values are not changed. To make each counter's line stand out better, you might want to vary the color, style, and width used. You might also want to use the chart-highlighting mode on a selected counter.

► **To change how a selected counter is represented on the chart**

1. In the legend, select the counter that you want to change.



2. Double-click the selected counter. Or, from the Edit menu, choose Edit Chart Line. Or choose the Edit Chart Line button on the toolbar.

The same dialog box as the one used for Add To Chart appears, showing only the information for the counter that you selected in the legend.

3. Change any of the following options:

Select an option under	To
Color	Use colors to reflect your personal preferences.
Scale	Change the scale at which the information is displayed. The numbers shown in the value bar, however, are not scaled.
Width	Make the line thicker or thinner. Thick lines, however, cannot be styled.
Style	Use a different style with a thin line.

4. Choose the OK button.

The legend information area now displays the new selections.

► **To update chart selections that have been saved in a settings file**

- From the File menu, choose Save Chart Settings.

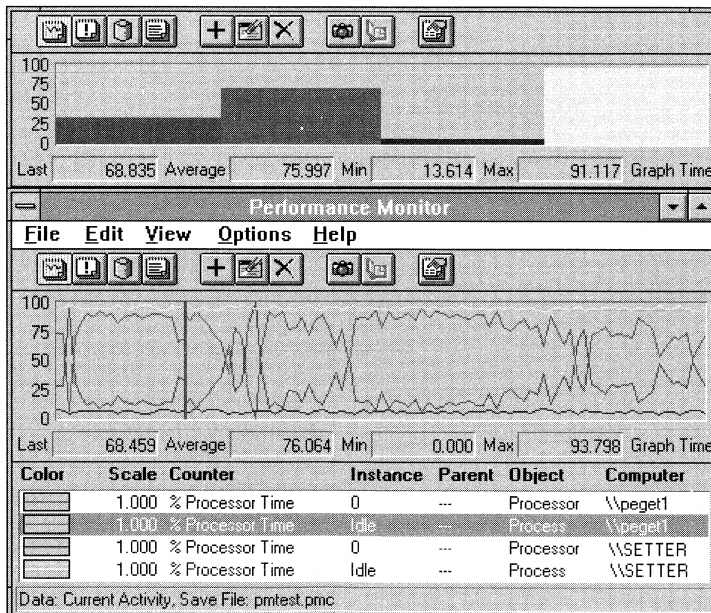
Changing the Chart Options

The Chart window shows a blank grid area and legend until you add information to it by selecting objects, counters, and instances to be monitored with the Add To Chart command from the Edit menu. Choosing the Chart command from the Options menu enables you to customize the charts that you create and change the method used for updating the chart values.

In the Chart Options dialog box, you can choose whether or not to display or hide horizontal and vertical grid lines, vertical labels, the value bar, and the legend and legend-information area.

You can also change the vertical maximum value of the displayed graph labels and the time interval used for graphing the information from the counters. The chosen graph-time interval is reflected in the value bar, which also displays the last, average, minimum, and maximum values for the data visible on the chart.

Finally, you can change from a graph format to a histogram bar-type representation (as shown in the following illustration) of the information that you are gathering. This is useful for better viewing the simultaneous behavior of many instances of the same object.



The Options menu also enables you to update manually the information on the screen. You can use the Update Now command between automatic data updates to get a current snapshot of the situation. In the Chart Options dialog box, use the Update Time box for choosing the automatic updating frequency or for switching to only manual updates.

► **To change chart options**



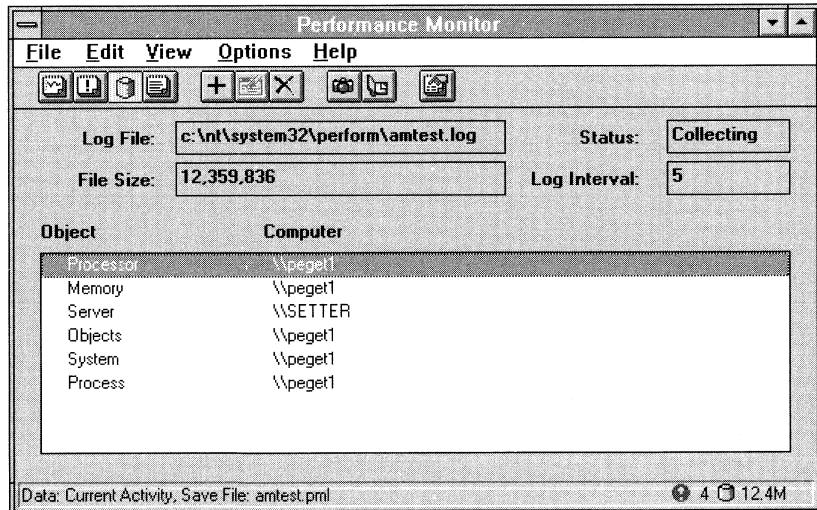
1. From the Options menu, choose Chart. Or choose the Options button on the toolbar.
2. In the Chart Options dialog box, select the options that you want to display.
3. In the Vertical Maximum box, type the maximum value to which the vertical axis should extend.
4. In the Update Time box, select either Manual Update or Periodic Update and then type a number in the Interval box to determine the time, in seconds, between updates of the charts.

The Graph Time value displayed in the value bar shows the time, in seconds, that it takes to create a complete chart across the window.

5. In the Gallery box, select how you want to display information in the chart.
6. Choose the OK button.

Logging Current Activity

Logging enables you to record information on the current activity of selected objects and computers for viewing later.



You can create a log file on the performance of counters and instances for objects on Windows NT. You can also collect data from multiple systems into a single log file. Log files contain detailed data for bottleneck detection or other detailed analysis. For capacity planning, you need to view trends over a longer period, which requires the ability to create a log file and to produce reports from that file.

► **To view the Log window**



- From the View menu, choose Log. Or choose the Log button on the toolbar.

If you are switching from another view, the Log window is blank unless you already created or opened a log file during that session or from the command prompt.

► **To open an existing log settings file**

1. From the File menu, choose Open.
2. In the Performance Monitor File Open dialog box, select or type the path name for the .PML file containing the selections that you want to reuse.

If you want to select a file that is on another computer, choose the Network button to display and select from the Network Connections dialog box.

3. Choose the OK button.

► **To create a new blank log file**

- From the File menu, choose New Log Settings.

Adding to a Log

You can create different logs to accumulate information on the behavior of selected objects on various computers to be studied later. You can then save these selections under a filename and reuse them when you want to create another log of the same type of information for comparison.

► **To add selections to a log**



1. From the Edit menu, choose Add To Log. Or choose the Add To Log button on the toolbar.

The Add To Log dialog box appears with the default settings and your workstation or server listed in the Computer box. To select a different computer, see the procedure given in the “Working with Information on Current Activity” section.

2. In the Objects box, select an object or set of objects to monitor from the list of those that are available on the chosen computer.
3. Choose the Add button.
4. Repeat the process for any additional computers that you want to monitor.

5. When you finish adding objects, choose the Done button.
A list of your selections appears in the white display area.

► **To save log selections in a settings file**

1. From the File menu, choose Save Log Settings As.
2. In the Performance Monitor - Save As dialog box, select or type a path name for the file that will contain the selections that you want to reuse.
3. Choose the OK button.

Changing the Log Options

The Log window has a display area for listing the objects and their corresponding computers that you have selected with the Add To Log command from the Edit menu. Choosing the Log command from the Options menu enables you to fill in or change the information shown in the gray boxes in the Log window, to start or stop logging, and to change the method used for updating the log values.

The Log window displays a list of objects and computers along with the current file size and the following items that you can specify in the Log Options dialog box:

- Complete path and name of the log file.
- Log Interval in seconds, from 1 to 3600 seconds (1 hour).
- Status, either Collecting or Closed.

The Options menu also enables you to update manually the information on the screen. You can use the Update Now command between automatic data updates to get a current snapshot of the situation. In the Log Options dialog box, use the Update Time box to select either an automatic updating frequency or only manual updates.

► **To change the log options**



1. From the Options menu, choose Log. Or choose the Options button on the toolbar.
2. In the Log File box, type a name for the log file that you are creating.
If this is the name of an existing file, the new data will be appended to the old data. To replace the old data, you must first delete the file and then create a new one with the old name.
3. In the Update Time box, select either Manual Update or Periodic Update and then type a number in the Interval box, or open the list and select a number, to determine the time, in seconds, between updates of the log.
4. If you do not want to start logging yet, choose the OK button.

► **To start or stop logging**

1. From the Options menu, choose Log.
2. To start logging, choose the Start Log button, which then changes to Stop Log.

If the Start Log button is not enabled, you must first type or select a log file name and add some objects to log.

After you start logging, a log symbol with the changing total file size appears on the right side of the status bar and remains there in all four views.

3. To stop logging, choose the Stop Log button.

Adding Bookmarks

Log files become more usable when you add bookmark comments at various points while logging. Bookmarks serve as reminders by describing the circumstances under which the file was created or by highlighting major points of interest. You can then refer to these bookmarks when you work with the log file later. The Bookmark command becomes available when you start logging.

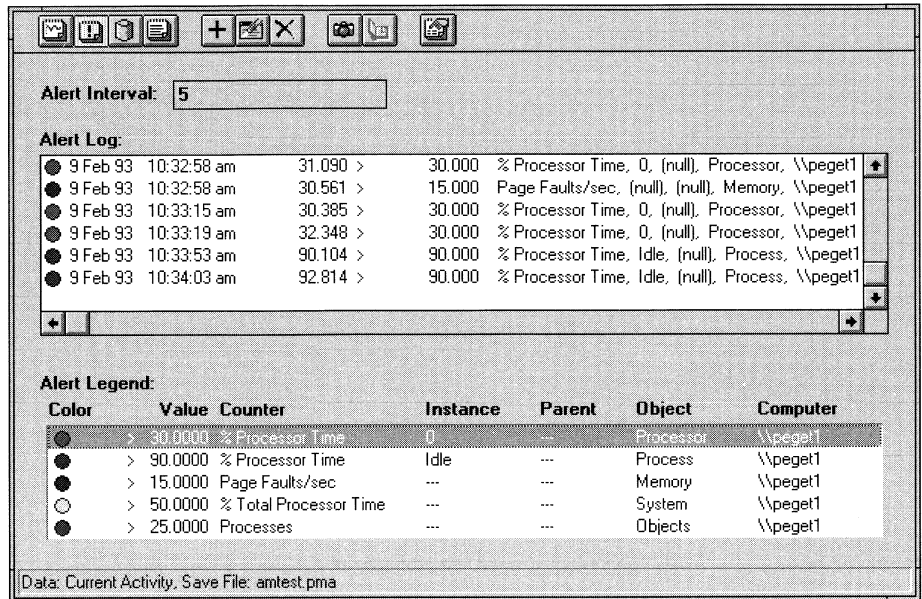
► **To add a bookmark**



1. From the Options menu, choose Bookmark. Or choose the Bookmark button on the toolbar.
2. In the Bookmark Comment box, type a comment.
3. Choose the Add button.

Setting Alerts on Current Activity

Alerts enable you to continue working while Performance Monitor tracks events for you and notifies you in the way that you specify. In the Alert view, you can create an alert log that enables you to monitor the current performance of selected counters and instances for objects on Windows NT.



With the alert log, you can monitor several counters at the same time. When a counter exceeds a given value, the date and time of the event are recorded in the Alert window. A total of one thousand events are recorded, after which the oldest event is discarded when the next new one is added. An event can also generate a network alert. When an event occurs, you can have a specified program run every time or just the first time that it occurs.

For help understanding what a selected counter shows, choose the Explain button in the Add To Alert dialog box to display the Counter Definition box.

► To view the Alert window



- From the View menu, choose Alert. Or choose the Alert button on the toolbar.

If you are switching from another view, the Alert Log area is blank unless you already created or opened an alert log file during that session or from the command prompt.

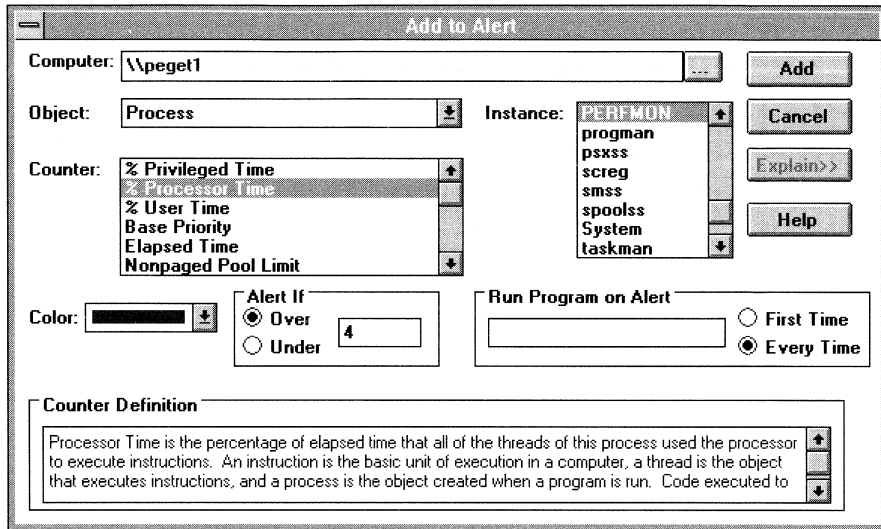
► To open an existing alert log settings file

1. From the File menu, choose Open.
2. In the Performance Monitor - File Open dialog box, select or type the path name for the .PMA file containing the selections that you want to reuse.
If you want to select a file that is on another computer, choose the Network button to display and select from the Network Connections dialog box.
3. Choose the OK button.

- To create a new blank alert log file
 - From the File menu, choose New Alert Settings.

Adding Alert Selections

You can create alert logs to warn yourself about problems in different situations. You can then save these selections under a filename and reuse them when you want to see if the problems have been fixed.



► To add selections to an alert log



1. From the Edit menu, choose Add To Alert. Or choose the Add To Alert button on the toolbar.

The Add To Alert dialog box appears with the default settings and your workstation or server listed in the Computer box. To select a different computer, see the procedure given in the “Working with Information on Current Activity” section.

2. In the Object box, select an object to monitor from the list of those that are available on the chosen computer.

The Counter and Instance boxes change to display the items that are available for that object on the chosen computer.

3. In the Counter box, select one or more counters.

For a definition of the selected counter, choose the Explain button.

4. In the Instance box, select one or more instances if appropriate.

5. If you do not want the next available color to be assigned to a counter, make your own selection now.
6. In the Alert If box, select either Over or Under and add a value that is appropriate for that counter.
7. In the Run Program On Alert box, select either First Time or Every Time and type the complete path name for the program or macro that you want to run whenever the specified alert occurs.

The Alert Log entry is passed to the program on the command line.

8. Choose the Add button.
9. Repeat the process for any additional objects or computers that you want to monitor.
10. When you finish adding selections, choose the Done button.

A list of your selections appears in the Alert Legend box at the bottom of the window, and Performance Monitor displays the changing values of your selections in the Alert Log area.

When an alert occurs while you are not in the Alert view, an alert icon appears in the status bar showing the number of alerts that have occurred since you were last in the Alert view.

► **To save alert log selections in a settings file**

1. From the File menu, choose Save Alert Settings As.
2. In the Performance Monitor - Save As dialog box, select or type a path name for the file that will contain the selections that you want to reuse.
3. Choose the OK button.

Changing Alert Selections

After monitoring the alert log for a while, you may decide to change the Alert If criterion, what program to run and how often to run it, or the color used to display certain alerts.

► **To change how a selected counter is represented in the alert log**



1. Double-click the selected counter in the legend. Or, from the Edit menu, choose Edit Alert Entry. Or choose the Edit Alert Entry button on the toolbar.

The same dialog box as the one used for Add To Alert appears, showing only the information for the counter that you selected in the legend.

2. Change any of the following options:

Select an option under	To
Color	Use colors to reflect your personal preferences.
Alert If	Change the alert warning criteria.
Run Program On Alert	Change how often the program is run or change to a different program.

3. Choose the OK button.

The Alert Legend information area now displays the revised selections.

► **To update alert log selections that have been saved in a settings file**

- From the File menu, choose Save Alert Settings.

Changing the Alert Options

The Alert window has a display area for an alert log reflecting current activity, an Alert Legend box showing the information that you selected for logging with the Add To Alert command from the Edit menu, and an Alert Interval box showing, in seconds, how often you want the system to be monitored.

The Options menu enables you to update manually the information on the screen. You can use the Update Now command between automatic data updates to get a current snapshot of the situation. In the Alert Options dialog box, use the Update Time box to select either an automatic updating frequency or only manual updates.

Choosing the Alert command from the Options menu enables you to specify not only the alert interval but also how you want to be notified when an alert occurs, which can be by either or both of the following two methods:

- Switching to the Alert view
- Sending a network alert message to yourself or someone else

► **To change alert options**



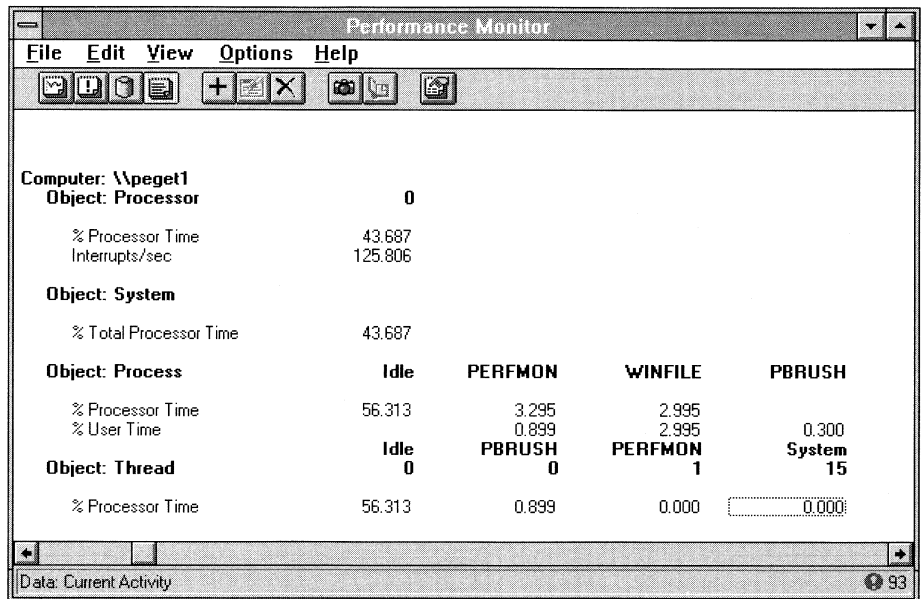
1. From the Options menu, choose Alert. Or choose the Options button on the toolbar.
2. In the Alert Options dialog box, select one or both of the notification options: Switch to Alert View or Send Network Message.
3. In the Network Alert box, type the computername, without backslashes (\), of the recipient's computer or another predefined name on the recipient's computer in the Net Name box.

The Messenger service must already be started and the net name defined on the recipient's computer. To do so, at the command prompt, type **net start messenger /?** and **net name /?** to view Help information on how to use these commands.

4. In the Update Time box, select either Manual Update or Periodic Update and then type a number in the Interval box to determine the time, in seconds, between updates of the alert log.
5. Choose the OK button.

Creating Reports on Current Activity

The Report view provides a simple report format for displaying constantly changing values.



With Performance Monitor, you can create reports showing current information on counter and instance values for selected objects. The information is presented in columns for each individual instance. You can adjust report intervals, print snapshots, and export data.

For help understanding a selected counter, choose the Explain button in the Add To Report dialog box to display the Counter Definition box.

► **To view the Report window**



- From the View menu, choose Report. Or choose the Report button on the toolbar.

If you are switching from another view, the Report window is blank unless you already created or opened a report file during that session or from the command prompt.

► **To open an existing report settings file**

1. From the File menu, choose Open.
2. In the Performance Monitor - File Open dialog box, select or type the path name for the .PMR file containing the selections that you want to reuse.
If you want to select a file that is on another computer, choose the Network button to display and select from the Network Connections dialog box.
3. Choose the OK button.

► **To create a new blank report file**

- From the File menu, choose New Report Settings.

Adding to a Report

Creating reports using current activity can help you to gain a better understanding of object behavior. You can create a report on all the counters for a given object and then watch them change under various loads. You can also create reports to reflect the same information that you are charting or to monitor other specific situations. You can then save these selections under a filename and reuse them when you need an update on the same information.

► **To add selections to a report**



1. From the Edit menu, choose Add To Report. Or choose the Add To Report button on the toolbar.

The Add To Report dialog box appears with the default settings and your workstation or server listed in the Computer box. To select a different computer, see the procedure given in the “Working with Information on Current Activity” section.

2. In the Object box, select an object to monitor from the list of those that are available on the chosen computer.

The Counter and Instance boxes change to display the items that are available for that object on the chosen computer.

3. In the Counter box, select one or more counters.

For a definition of the selected counter, choose the Explain button.

4. In the Instance box, select one or more instances if appropriate.
5. Choose the Add button.
6. Repeat the process for any additional objects or computers that you want to monitor.
7. When you finish adding selections, choose the Done button.

A list of your selections by computer and object appears in the report area, and Performance Monitor displays the changing values of your selections in the report.

► **To save report selections in a settings file**

1. From the File menu, choose Save Report Settings As.
2. In the Performance Monitor - Save As dialog box, select or type a path name for the file that will contain the selections that you want to reuse.
3. Choose the OK button.

Changing the Report Option

The Report window shows a blank screen until you add information to it by selecting objects, counters, and instances to be monitored with the Add To Report command from the Edit menu. The Options menu enables you to update manually the information on the screen. You can use the Update Now command between automatic data updates to get a current snapshot of the situation. Choosing the Report command from the Options menu enables you to select either an automatic updating frequency or only manual updates.

► **To change the report updating method**



1. From the Options menu, choose Report. Or choose the Options button on the toolbar.
2. In the Update Time box, select either Manual Update or Periodic Update and then type a number in the Interval box, or open the list and select a number, to determine the time, in seconds, between updates of the report.
3. Choose the OK button.

Working with Existing Log Files

Existing log files can provide a wealth of information for troubleshooting or planning. Whereas charting, setting alerts, and creating reports on current activity provide instant feedback, working with existing log files enables you to change the way you look at that feedback and gain a different perspective on the information.

You can examine the information much more thoroughly in a log file than you can while it is happening. You can move around in a log file (that is, change the start and stop times) by using the Time Window command from the view's Edit menu. The times selected will apply to all four views.

Changing the times is easiest to do in the Chart window. Add your selections to the chart first. You can then move the Input Log File Timeframe dialog box out of the way so you can see the gray vertical lines move on the chart as you move the ends of the slide bar. Set up a time window with this method that is appropriate for your needs and then set your alerts, create reports, or relog the data.

► To select an existing log file

1. From the Options menu, choose Data From.
2. In the Data Values Displayed From box, select Log File.
3. In the Log File box, type the log's filename. Or click the gray button at the end of the box to display the Open Input Log File dialog box from which you can select a file.

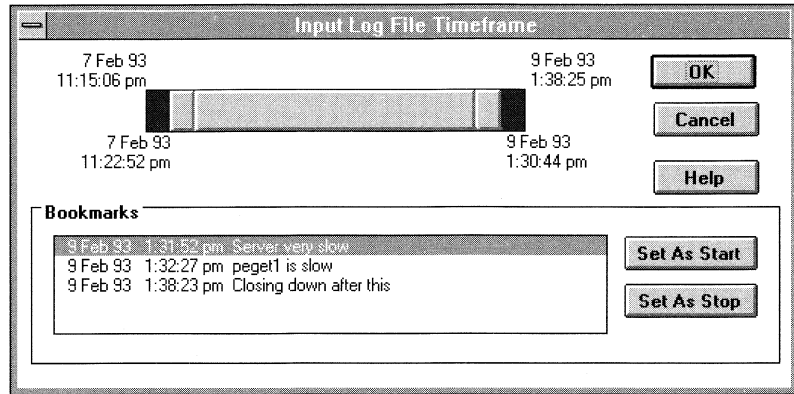
If you want to select a file that is on another computer, choose the Network button to display and select from the Network Connections dialog box.

4. Choose the OK button.

This also activates the Time Window command in the Edit menu.

► To change the time window for the logged information

1. From the Edit menu, choose Time Window.



2. In the Input Log File Timeframe dialog box, use one or a combination of both of the following methods to specify how much information you want to display.
 - To change the starting and stopping points to be used, drag the corresponding end of the time interval slide bar.
Notice that in charting, as you drag the ends of the slide bar, you are also moving two gray vertical lines on the chart.
 - To use bookmarks as starting or stopping points, select the appropriate bookmark and choose either the Set As Start button or the Set As Stop button.
3. Choose the OK button.
The screen display changes to reflect the selected timeframe.

Charting Input Log Files

When you need a graphical view of a log file, you can open an existing one in Chart view to see how the values changed over a defined period of time. You can also change the time intervals displayed, choose which counters to chart, edit the chart, print a snapshot, and export the data to a spreadsheet or database program for further manipulation and printing.

► To chart an input log file

1. From the Options menu in the Chart view window, choose Data From.
2. Select a log file name from either your own computer or another one on the network.
3. From the Edit menu, choose any of the following commands:
 - Add To Chart, to choose which counters from which computers to chart.
 - Edit Chart Line, to change any of the selection settings.

- Delete From Chart, to remove any counters that are not interesting or needed.
 - Time Window, to change the displayed starting and stopping points.
4. From the Options menu, choose Chart to hide or display any items, change the vertical maximum, or change from a graph format to a histogram.
 5. From the File menu, choose any of the following commands:
 - Save Chart Settings As, to update changes made to the current chart settings file or to create a new file for these setting selections.
 - Export Chart, to export the data from the displayed chart to a spreadsheet or database program.

Setting Alerts on Input Log Files

You can take an existing log file and set alerts in the Alert Log to see where values exceeded or went below various alert values. All the counters for those objects that you chose to log will appear in the Add To Alert dialog box. You can now define your Alert Log by selecting only those computers and counters that you need.

► To set alerts on an input log file

1. From the Options menu in the Alert view window, choose Data From.
2. Select a log file name from either your own computer or another one on the network.
3. From the Edit menu, choose any of the following commands:
 - Add To Alert, to choose which counters from which computers to relog with alerts.
 - Edit Alert Entry, to change any of the selection settings.
 - Delete Alert, to remove any counters that are not interesting or needed.
 - Time Window, to change the displayed starting and stopping points.
4. From the Options menu, choose Alert to select the update-time interval.
5. From the File menu, choose any of the following commands:
 - Save Alert Settings As, to update changes made to the current alert settings file or to create a new file for these setting selections.
 - Export Alert, to export the data from the alert log to a spreadsheet or database program.

Relogging Input Log Files

By changing certain options when relogging, you can significantly condense large log files. You can relog with a longer time interval either all or only selected objects in an existing log file. You can also change the start and stop times and relog only the data within that timeframe.

When you direct the output to an existing log file, that output is appended to the end of the file, thus creating a single, smaller archive file.

► To relog an input log file

1. From the Options menu in the Log view window, choose Data From.
2. Select a log file name from either your own computer or another one on the network.
3. From the Edit menu, choose any of the following commands:
 - Add To Log, to choose which objects from which computers to relog.
 - Delete From Log, to remove any objects that are not needed.
 - Time Window, to change the displayed starting and stopping points.
4. From the Options menu, choose Log to change the log file name, the logging interval, and to start relogging.

If you select an existing log file for output, the data will be appended. To enable the Relog File button, you must first provide a filename and select some objects to log.

5. From the File menu, choose any of the following commands:
 - Save Log Settings As, to update changes made to the current log settings file or to create a new file for these setting selections.
 - Export Log, to export the log setting to a spreadsheet or database program.

Reporting Based on Input Log Files

You can create simple reports from existing log files the same as you would with current activity values. However, here the values shown represent the counter values over the selected time frame.

► **To create a report from an input log file**

1. From the Options menu in the Report view window, choose Data From.
2. Select a log file name from either your own computer or another one on the network.
3. From the Edit menu, choose any of the following commands:
 - Add To Report, to choose which counters from which computers to display in the report.
 - Delete From Report, to remove any counters that are not interesting or needed.
 - Time Window, to change the displayed starting and stopping points.
4. From the File menu, choose any of the following commands:
 - Save Report Settings As, to update changes made to the current report settings file or to create a new file for these setting selections.
 - Export Report, to export the data from the report to a spreadsheet or database program.

Installing Windows NT

This chapter describes Windows NT Setup, the program you must use to install Windows NT on your computer. Setup copies the appropriate files to your computer's hard disk, and then configures the software you need to run applications and use the network with Windows NT.

Topics in this chapter include the following:

- Things you should know before running Setup
- How to start Setup on an x86-based and on a RISC-based computer
- Choosing Express or Custom Setup
- Using Setup to prepare your computer for Windows NT, including creating disk partitions and formatting the partition that will contain the Windows NT files
- How to create a sharepoint for network installations of Windows NT

Things You Need to Know Before Running Setup

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Whatever kind of computer you have, you should know the following before you start installing Windows NT. If you do not know these items, ask your network administrator.

- If your computer will use a network, the name of your computer and the name for the workgroup or domain that this computer will join.

A computer name can be any name you invent as long as it is not the same as any other computer, workgroup, or domain name on the network. For more information on selecting a workgroup or domain name, see “Joining a Workgroup or Domain” later in this chapter.

- If you have a printer connected directly to your computer, the printer model and port(s) used by the printer.
- The type of network adapter in your computer, the card's interrupt request (IRQ) number, base I/O address, and other settings. Windows NT Setup suggests default values for these settings. See the documentation for your network adapter card to confirm these default settings.

You also need to set aside a high-density floppy disk of the correct size for disk drive A. This disk, which does not need to be formatted in advance, should be labeled Emergency Repair disk and set aside until Setup prompts you to insert it.

For information about using the Emergency Repair disk, see “Repairing Your System” in Chapter 12, “System Maintenance with Windows NT Setup.”

Unless you are installing Windows NT on a new computer, you are upgrading an existing system to use Windows NT. You can preserve your existing operating system and install Windows NT, provided you make certain decisions about partitioning and formatting your disk while running Setup. For information on maintaining your existing operating system, see “Preparing the Computer for Windows NT” later in this chapter.

Upgrading from Windows NT to Windows NT Advanced Server requires reinstalling the operating system.

Starting Setup on an x86-based Computer

How you start Windows NT Setup for an x86-based computer depends on the source media you are using to install Windows NT. The options include installing from floppy disks or installing from a compact disc drive.

For an x86-based workstation, you can also install Windows NT over the network or from an CD-ROM device that is supported under MS-DOS, but not under Windows NT. Check the hardware compatibility list in your Windows NT package to see whether your CD-ROM device is supported.

You cannot place Windows NT on a partition configured with any disk compression products.

► To install Windows NT from floppy disks

1. With your computer turned off, insert Windows NT Setup Disk #1 of the Microsoft Windows NT disk set in drive A, and then turn on your computer.
2. Follow the instructions on screen to complete Setup.

If you are using a CD-ROM to run Setup, make sure that your SCSI CD-ROM drive is not set to ID 0 or 1. For information, see your hardware documentation.

► **To install Windows NT from a SCSI CD-ROM drive**

1. Insert the Windows NT Setup floppy disk in drive A, and then turn on your computer.
2. When Setup asks for the Windows NT compact disc, insert it in the CD-ROM drive.
3. Follow the instructions on screen to complete Setup.

You perform the following procedures from the local computer where you want to install Windows NT.

► **To install Windows NT from the network or an unsupported CD-ROM device**

You can install Windows NT on multiple x86-based computers by first installing the Windows NT files in a shared directory on a network server, and then installing Windows NT on each workstation using WINNT.EXE.

You can also use this method to install Windows NT on x86-based computers with SCSI or CD-ROM devices that are supported under MS-DOS but are not supported by Windows NT. You cannot use this method to set up Windows NT on RISC-based computers.

1. Use your existing MS-DOS-based network software to connect to the shared network directory that contains the WINNT.EXE program.

Or, if you have an unsupported local CD-ROM device, insert the Windows NT compact disc in the drive, and then change to the \I386 directory on the CD-ROM drive. For example, if the CD-ROM is drive E, change to the E:\I386 directory.

2. Insert a blank formatted high-density floppy disk into drive A.
3. At the MS-DOS command prompt, type **winnt** and press ENTER.
4. When you are asked to confirm the Windows NT source directory, where the WINNT.EXE program is stored, press ENTER. This is the same directory you specified in step 2.
5. When prompted, insert a blank formatted high-density floppy disk into drive A.

After the necessary files are transferred, a message asks you to press ENTER to restart the computer.

6. Follow the instructions on screen to complete Setup.

For complete details about setting up a network sharepoint to install Windows NT, see “Setting Up Windows NT Master Files on a Server” later in this chapter.

Note When you install Windows NT using a remote sharepoint, Setup stores temporary files during the installation process. Setup puts these files on the first available drive with enough space on it. It may choose a drive that is not supported by Windows NT Setup, such as a drive on a secondary IDE or ESDI controller or on an unsupported SCSI disk. If this happens, the following message appears: “Setup is unable to locate the hard drive partition prepared by the MS-DOS portion of Setup.” In this case, run WINNT.EXE again and specify a supported drive using the /t switch. For example, type: **winnt /t x:** to force Setup to use the X drive.

Starting Setup on a RISC-based Computer

Before you can run Windows NT Setup on an ARC-compliant RISC-based computer, you must first read the manufacturer-supplied instructions for starting programs from CD-ROM or disk. How you start Windows NT Setup depends on the type of RISC-based computer you are installing on. Once Windows NT Setup starts, you can follow the instructions on screen.

The following sample procedure for starting Windows NT Setup is typical of many (but not all) RISC-based computers.

1. Insert the Windows NT compact disc in the CD-ROM drive.
2. Restart your computer.
3. At the ARC screen, choose Run A Program from the menu.
4. At the prompt, type **cd:\mips\setupldr** and press ENTER.

For some systems, you might need to supply a full device name instead of typing **cd:**. See your hardware documentation for details.

5. Follow the instructions on screen.

These instructions assume that your hard disk has been initialized and at least partially partitioned. The *system partition*—the partition that has the hardware-specific files needed to load Windows NT—must be a FAT partition of at least 2 MB. On a RISC-based computer, the system partition is the disk partition that contains the files OSLOADER.EXE and HAL.DLL in the subdirectory \OSNT. If the system partition is large enough, it can also contain Windows NT, or you may choose to use a separate partition. If your hard disk does not include a system partition, refer to your manufacturer-supplied instructions for creating one.

Choosing Express vs. Custom Setup

Early in the Setup process you must choose to use Express or Custom Setup. Express Setup is the easiest way to install Windows NT and is recommended for most standard installations. Express Setup asks you the minimum number of questions and installs all optional Windows NT components. It automatically configures your mouse, display adapter, and other components.

Custom Setup is designed for experienced users who want or need more control over how Windows NT is installed on their computers. With Custom Setup, you can override default values or accept recommended settings for the following:

- The display adapter, mouse, keyboard, and keyboard layout
- The specific Windows NT components you want to install, and the existing applications you want to set up to run with Windows NT
- The virtual memory settings and local printer connections for your computer
- Any additional network adapters or other network components you want to install and configure during Windows NT Setup

If you want to make changes to your hardware after running Setup, use Control Panel or the Windows NT Setup icon in Program Manager to change the system configuration. For information, see Chapter 12, “System Maintenance with Windows NT Setup.”

Preparing the Computer for Windows NT

After you choose Express or Custom Setup, you must make some basic decisions to prepare your computer for Windows NT.

If Setup finds a previous version of Windows 3.1 or Windows for Workgroups on your disk, it asks you whether you want to install into the Windows directory. With both Windows NT and an MS-DOS–based version of Windows in the same directory, you can easily run your Windows–based applications under either operating system. Note that this option installs Windows NT on a FAT partition which does not provide the security of the NTFS file system.

If you do not install into an existing Windows directory, Setup asks you to choose one of the following options:

- Install Windows NT on an existing partition.
- Create or delete disk partitions, and then select the partition that will contain the Windows NT system files.

After you choose the partition on which to install Windows NT, Setup asks whether you want to convert that partition to the Windows NT file system (NTFS) or keep the existing file system.

The choices you make may depend on whether you want to preserve an existing operating system and whether you want to take advantage of the security features available with NTFS. The rest of this section guides you through making these decisions.

Specifying the Disk Partitions

Important If you plan to use more than one partition on your computer's hard disk, you should create these partitions during Setup. But remember, you cannot divide a partition without losing the data on that partition. Also, you cannot place Windows NT on a partition on which you have run disk compression products.

A partition can be any size from 1 MB to the entire hard disk. But the partition where you plan to store Windows NT files must be on a permanently attached hard disk and must have at least 66 MB of unused space.

The system partition is the partition that has the hardware-specific files needed to load Windows NT. On an x86-based computer, the operating system starts from the active system partition on the first internal hard disk. This means that Windows NT looks for certain files in the root directory of the C drive (Disk 0) when you start your computer. This partition must be formatted with either the NTFS, FAT, or HPFS file system for Windows NT to start. It must be formatted with the FAT file system if you want to run both Windows NT and MS-DOS.

RISC

A RISC-based computer can have several system partitions that are configurable by the manufacturer's configuration program, and each system partition must be formatted for the FAT file system. If you want to use NTFS, you need to create at least one FAT system partition of at least 2 MB plus a second partition large enough to contain all the files you want to protect with NTFS. For information about setting up more than one system partition on a RISC-based computer, see your hardware documentation.

Caution If your hard disk contains stripe sets, volume sets, or mirrors, these elements appear on the Setup screen as "Windows NT Fault Tolerance." Be careful not to delete any of these elements. (For more information, see Chapter 16, "Disk Administrator.") Also, do not delete partitions which contain data you want to keep.

The following are guidelines for making decisions about your hard disk partitions.

If you will use only the Windows NT operating system:

- On a new x86-based computer, make a single partition and format it with NTFS, as described in the following section.
- On an existing system that contains files you want to keep, maintain all existing partitions. You can place the Windows NT files on any partition with sufficient free space.

If you want to use another operating system such as MS-DOS in addition to Windows NT:

- Make sure the system partition (the C drive) is formatted with the appropriate file system. For example, if you already have MS-DOS installed and want to keep it, preserve the C partition and keep the file system as FAT. You can place the Windows NT files on any partition with sufficient free space.
- To use NTFS and have access to another operating system, you must have at least two disk partitions. Format the C drive with a file system that Windows NT and your other operating system can use, such as FAT. Format the other partition for NTFS. You can place the Windows NT files on any partition with sufficient free space.

Note If you are installing Windows NT on a computer currently configured to start either OS/2 or MS-DOS using the **boot** command, Windows NT Setup sets up your system so that you can run Windows NT or whichever of the two operating systems (MS-DOS or OS/2) you last started before running Windows NT Setup.

Selecting a File System for the Windows NT Partition

Windows NT can use any one of three file systems: the Windows NT File System (NTFS), the File Allocation Table (FAT), or the High Performance File System (HPFS). You can set up Windows NT on a partition with an existing file system, or you can choose to use a new file system. You can format a partition for NTFS or FAT during Setup. Setup cannot format an HPFS partition.

Note The choices you make at this step are not final. After running Setup, you can change file systems on any partitions. However, to preserve data, you cannot convert an NTFS partition to any other file system without backing up all the files, reformatting the partition (which erases all files), and then restoring the files from the backup. You must also back up data before repartitioning a hard disk.

Also, if you choose to convert the file system on an existing partition to NTFS, the conversion does not take place until all of Setup is complete and you first start your computer with Windows NT. So if you quit Setup before it is finished running, the file system on that partition is not converted.

The following notes will help you choose how to format or convert the partition where the Windows NT files will be stored:

- For an unformatted partition, you can choose to format it with either the NTFS or FAT file system. Choose the FAT option if you want to access files on that partition when running MS-DOS or OS/2. Choose the NTFS option if you will use only Windows NT to access files on that partition.
- For an existing partition, you probably want to choose the default option, which is to keep the current file systems intact, preserving all existing files on that partition. You can convert FAT or HPFS partitions to NTFS after running Setup.
 - You can choose to convert an existing partition to NTFS so you can use Windows NT security. This preserves existing files, but only Windows NT has access to files on that partition.
 - You can choose to reformat an existing partition to either the NTFS or FAT file system, which erases all existing files on that partition. If you choose to reformat the partition as NTFS, only Windows NT will have access to files created on that partition.

The following table summarizes the advantages and disadvantages of each of the three file systems that Windows NT can use.

Advantages	Disadvantages
Windows NT File System (NTFS): Supports complete Windows NT security, so you can specify who is allowed various kinds of access to a file or directory. Keeps a log of activities to restore the disk in the event of power failure or other problems. Supports file and directory names of up to 256 characters, and supports extended file attributes. Automatically generates correct MS-DOS filenames so that files can be shared with MS-DOS users. Allows a program designed to run under other operating systems such as MS-DOS access to NTFS files when it runs under Windows NT.	 Recognized only by Windows NT. When the computer is running another operating system (such as MS-DOS or OS/2), that operating system cannot access files on an NTFS partition. If drive C is formatted for NTFS, you cannot run MS-DOS from your hard disk. (But you can still run MS-DOS-based applications using Windows NT.)
File Allocation Table (FAT): Allows access to files when your computer is running another operating system, such as MS-DOS or OS/2. FAT is the most widely used file system for PCs. Enables you to run MS-DOS from the hard disk.	 Files are not protected by the security features of Windows NT. Files are restricted to 8-character filenames with 3-character filename extensions. Cannot support extremely large files. Less robust than NTFS; for example, no automatic disk restore features.
High Performance File System (HPFS): Ensures file compatibility if you want to switch between Windows NT and OS/2 on your hard disk. Supports long filenames. Provides better error correction than does the FAT file system.	 Has not been widely adopted. Files are not protected by the security features of Windows NT. MS-DOS and Windows 3.1-based applications cannot access files with long filenames or with long directory names in their paths.

Selecting a Directory for Windows NT Files

Setup next proposes to install the Windows NT files in the \WINNT directory. You can accept the directory name that Setup suggests or type the directory name you prefer. We recommend that you accept the proposed directory.

If Setup detects a version of Windows NT in the directory where you choose to place the new Windows NT files, it asks if you wish to choose another directory. Then Setup automatically configures your computer so that you can run either version of Windows NT. If you install Windows NT into a directory which contains a previous installation of Windows NT, Setup overwrites the earlier version.

Configuring Windows NT

After Setup copies several basic files, you will see the Windows NT logo for the first time, and then all subsequent requests for information will appear in Windows NT dialog boxes. You can use standard Windows keyboard and mouse techniques for all actions during this part of Setup, as described in Chapter 2, “Windows NT Basics.” You can also press F1 for context-sensitive Help at any time.

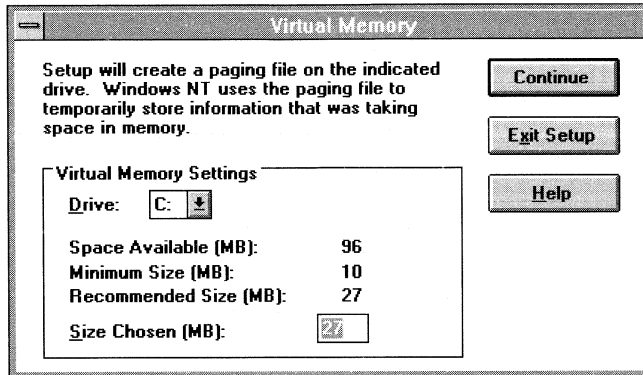
For either Express or Custom Setup, you must next supply the following information:

- A name that Windows NT will use to identify you for various operations. You must type in a response and verify your response for Setup to continue.
- A name that will identify your computer on the network. This name must be 15 characters or fewer and must not be the same as any other computer name, domain name, or workgroup name on the network. You can invent a computer name, or ask your network administrator if a specific name has been assigned for your computer. If you need to change the computer name after Setup is completed, choose the Network icon in Control Panel.
- The local language, or locale, that you want to use. This setting affects, for example, the format Windows NT uses to display the date, time and currency. If you want to change the language after Setup is complete, choose the International icon in Control Panel. For information, see Chapter 5, “Control Panel.”

Setting Up Virtual Memory

Windows NT creates a special file on your hard disk called a paging file. The paging file makes it seem like your computer has more memory to run programs, because Windows NT can temporarily swap the contents of memory used by one program to the hard disk so that another program can use that memory.

For Express Setup, all virtual-memory settings are configured automatically. For Custom Setup, you can change the size of the virtual-memory paging file or the drive where the file is stored. We recommend that you accept the proposed settings unless you are an experienced Windows NT user. If you want to change the location or size of this file or create other paging files after Setup is complete, choose the System icon in Control Panel. For more information, see “Defining Options for the Operating System” in Chapter 5, “Control Panel.”



Setting Up a Local Printer

For both Express and Custom Setup, you can set up a printer that is connected directly to your computer.

If you don't have a printer connected to your computer, choose Cancel when the Printer Setup dialog box appears. After you install Windows NT, you can choose the Print Manager icon in Program Manager to set up network printers or change the printer configuration after completing Setup. For information about configuring and using printers, see Chapter 6, “Print Manager.”

Setting Up a Network Adapter Card

For Express Setup, Windows NT Setup automatically checks for a network adapter card in your computer and installs the first one it recognizes. Some types of network cards may not be recognizable by Setup. If Express Setup cannot identify your adapter card, it displays the Network Adapter Setup dialog box and asks you to select from a list the name of the card you wish to install.

Express Setup installs only one network adapter card. If you have additional adapter cards, you can install them after running Setup by choosing the Network icon in Control Panel.

Custom Setup uses the following steps to install a network adapter card:

1. Setup asks if you want it to detect the network card in your computer.
If you choose detection, Setup searches for a recognizable network adapter card (see step 2). If you reject detection, Setup displays the Network Adapter Setup dialog box and asks you to choose an adapter card name from a list.
2. If you choose detection, Setup looks for a network adapter card and stops at the first one it finds. It identifies the card and asks you to choose one of three options:
 - You can accept the identified network card, in which case Setup installs it for you (see step 3).
 - You can select Find Next, which causes Setup to search for another network adapter card.
 - You can choose Do Not Detect, which causes Setup to discontinue detection and display the Network Adapter Setup dialog.If Custom Setup cannot identify an adapter card to install, it informs you of this and asks you to choose Find Next or Do Not Detect.
3. If you accept the card that Setup detects, Setup installs and configures it and then displays a dialog box with the adapter card settings. We recommend that you accept these settings unless you are absolutely sure they are incorrect, in which case you can change them and then choose OK.

After Custom Setup installs your adapter card and other system software, the Network Settings dialog box appears so that you can install additional network cards and software.

Both Express and Custom Setup detect only one network adapter card.

If Setup cannot detect your network adapter card, or if you choose to bypass detection with Custom Setup, Setup allows you to select a specific network adapter card to install.

Configuring the Network Adapter Card

After Setup installs a network adapter card, it may display an Adapter Card Setup dialog box, so you can select the correct interrupt request (IRQ) number, I/O base port address, memory buffer address, and other settings. For many adapter cards, the settings are configured automatically so you don't have to identify settings.

If you are an experienced user and know that you need to change adapter card settings, see the documentation for your network adapter card or ask your network administrator for the correct values.

For Custom Setup, the Network Settings dialog box appears so that you can install additional network cards and supporting software. If you choose to install additional network components, you might be asked to insert additional disks supplied by the component manufacturer. For information about completing the options in the Network Settings dialog box, choose the Help button.

Joining a Workgroup or Domain

After you enter choices for the network configuration settings, Setup copies a large set of files and attempts to start the network. Then Setup displays the Domain Settings dialog box.

- If Setup successfully started the network, you can specify whether this computer is a member of a workgroup or a Windows NT Advanced Server domain.
- If the network did not start, you can accept or change the Workgroup entry in this dialog box, and then choose OK to continue Setup.

In Windows NT, a *workgroup* is a collection of computers that appears, for convenience, under the same workgroup name when you browse network resources. Any computer can join any single workgroup.

Belonging to a common workgroup is a way for co-workers to quickly find each other's computers on the network. When you browse the network, the names of all the computers in your workgroup appear first in the browsing directory.

You can join an existing workgroup, or create a new one simply by typing in another name. Windows NT Setup will accept any workgroup name you choose, including the default WORKGROUP.

A *domain* is a collection of computers defined by the administrator of a Windows NT Advanced Server network. A domain provides the same convenience for network browsing and also provides access to the centralized user accounts and group accounts maintained by the domain administrator.

Unlike a workgroup, a domain must already exist for you to join it. Joining a domain also requires that the domain administrator add your computer account to the domain.

If you do not know the precise domain name for your computer and you want to finish running Setup without this information, you can select the Workgroup option and then type any workgroup name. After running Setup, you can choose the Network option in Control Panel to join a domain or to change the workgroup name.

Setting Up a Local Account

For both Express and Custom Setup, you are asked to provide a unique name for setting up a local user account if your computer is not a member of a Windows NT Advanced Server domain. This information is used for identification every time you log on to Windows NT. You can choose to cancel this dialog box and then set up a local account later using User Manager.

If you set up a local account, this account automatically becomes a member of the Administrators group. For information on setting up groups, see Chapter 13, “User Manager.”

► To set up a local account

1. In the User Name box, type a unique name of 20 or fewer characters that does not include spaces.

This name is used to identify your user account whenever you log on to Windows NT. For example, if your name is Jean Beard, you might want to choose “JeanBe” or some other derivative of your full name. This name should be unique on the network so as to avoid addressing conflicts.

2. In the Password box, type a unique name of 14 or fewer characters that does not include spaces, and then retype the password in the Confirm Password box.

For security, neither the original nor the confirmation you type appear in the dialog box.

If you do not want a password for this user account, leave the Password and Confirm Password boxes blank.

3. Choose the Continue button.

Note Passwords are case-sensitive. This means that Windows NT identifies “mypassword” and “MyPassWord” as different passwords.

Setting Up Applications to Run from Program Manager

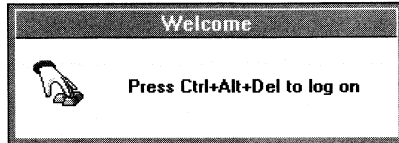
The easiest way to run programs in Windows NT is to choose program-item icons in Program Manager. The easiest way to create the program-item icons is to have Windows NT Setup create them for you.

If you are installing Windows NT in a directory containing a version of MS-DOS-based Windows, Setup automatically installs all of your existing Windows groups, and you do not have to make choices during this part of Setup.

Completing Setup and Starting Windows NT

► To complete Setup and start Windows NT

1. When Setup is finished running and the message asks you to restart your computer, remove any disks from the floppy disk drives and choose the Reboot button.
2. When the boot loader menu appears, press ENTER.
3. When the Welcome logon message appears, press CTRL+ALT+DEL to log on.



4. In the Welcome dialog box, type and confirm your password, and then choose the OK button.

Passwords are case-sensitive, which means that Windows NT identifies “mypassword” and “MyPassWord” as two different entries.

Caution For an x86-based computer, the following files are copied to the root directory on the C drive: BOOT.INI, BOOTSECT.DOS (if another operating system is on your computer), NTLDR, and NTDETECT.COM. Also, the NTBOOTDD.SYS file is copied if you install Windows NT onto a SCSI disk. These files should never be deleted because your system will not start without them.

For a RISC-based computer, HAL.DLL and OSLOADER.EXE are copied to the \OS\NT directory on your system partition. These files should never be deleted.

Setting Up Windows NT Master Files on a Server

Note This section is written for the administrator responsible for installing Windows NT on multiple computers. This section assumes that you have already installed Windows NT on a single computer and are familiar with Windows NT commands and procedures.

You can install Windows NT on multiple x86-based computers by first installing the Windows NT files in a shared directory on a network server, and then installing Windows NT on each workstation using WINNT.EXE.

You can also use this method to install Windows NT on x86-based computers with SCSI or CD-ROM devices that are supported under MS-DOS but are not supported by Windows NT. You cannot use this method to set up Windows NT on RISC-based computers.

Important Every Windows NT user must have a Windows NT license, which is obtained by buying a retail package or a Microsoft License Pack. For more information on restrictions, see your Windows NT license agreement.

To use WINNT.EXE, you must first install the Windows NT master files in a shared directory on the network. You can set up the sharepoint using any type of network, such as Microsoft LAN Manager 2.1, Novell NetWare, Banyan VINES, or others. The directory containing the Windows NT files must be accessible from MS-DOS to all users who will be using WINNT.EXE.

Before you can install the master Windows NT files on a network:

- You must already be running Windows NT on the computer from which you are installing the master files.
- The network must be operational.
- You must have read-write permission to the network directory where you want to install the Windows NT files, and other users must have read access to that directory. For more information, see your network software documentation.

Important Do not use the MS-DOS or OS/2 **copy** command, the MS-DOS **xcopy** command, or the Copy command in File Manager to install Windows NT files on a network server. You must use the Windows NT **setup** command.

► **To install the master Windows NT files on a network server**

1. From either a workstation or a server, log on to Windows NT and connect to the drive where you want to install the Windows NT master files.
2. Create the directory on the network drive that will contain the Windows NT master files.
3. In Program Manager, choose the Command Prompt icon to open a Windows NT command prompt window.

4. At the MS-DOS command prompt, type **setup -n -i initial.inf -s *source* -d *destination*** and press ENTER.

The switches for the **setup** command are described in the following table.

Setup command switch	Meaning
-n	Specifies that the files are copied to a network sharepoint
-i <i>filename</i>	Specifies the .INF file to be used from the Windows NT Setup working directory
-s <i>source</i>	Indicates the drive and directory that contains the original Windows NT Setup disks
-d <i>destination</i>	Indicates the network drive and directory where you want to copy the Windows NT master files

For example, type:

setup -n -i initial.inf -s f:\i386 -d x:\ntadmin

to install the Windows NT files from CD-ROM drive F to network drive X, which contains the directory \NTADMIN.

5. In the Group Information dialog box, type the workgroup name and the name of your company, and then choose the Continue button.
Each name can be no longer than 31 characters.
6. In the next Setup screen, verify the information, and then choose the Continue button.

Glossary

>> button Displays the next topic in a series of topics. Use this button to move forward from topic to topic in the order they are organized in Help. It is in the Help button bar near the top of the Help window.

<< button Displays the previous topic in a series of topics. Use this button to move backward from topic to topic in the order they are organized in Help. It is in the Help button bar near the top of the Help window.

A

ASCII file *See text file.*

associate To identify a filename extension as “belonging” to a certain application, so that when you open any file with that extension, the application starts automatically.

attributes Information that indicates whether a file is a read-only, hidden, or system file, and whether the file has been changed since a backup copy of it was made.

B

batch program An ASCII file (text file) that contains one or more Windows NT commands. A batch program’s filename has a .BAT extension. When you run a batch program, the commands are processed sequentially.

binary A base-2 number system, in which values are expressed as combinations of two digits, 0 and 1.

binary-file transfer A method of transferring binary files from Windows NT Terminal to a remote computer. Binary files consist of ASCII characters plus the extended ASCII character set.

These files are not converted or translated during the transfer process.

boot partition The volume that has the Windows NT operating system and its support files. The boot partition can be (but does not have to be) the same as the system partition. It also cannot be part of a stripe set or volume set.

branch A segment of the directory tree, representing a directory and any subdirectories it contains.

browse To look through files and directories. When using some dialog boxes, you can use the Browse button to view a list of files and directories and select the file you want.

buffer A temporary storage place for information.

C

check box A small, square box that appears in a dialog box and that can be selected or cleared. When the check box is selected, an X appears in the box. A check box represents an option that you can turn on or off.

choose To use the keyboard or a mouse to pick an item that begins an action in Windows NT. You often choose a command on a menu to perform a task, and you choose an icon to start an application.

click To press and release a mouse button quickly.

client application A Windows NT application that can accept linked or embedded objects.

Clipboard A temporary storage area in memory, used to transfer information. You can cut or copy

information onto the Clipboard and then paste it into another document or application.

ClipBook page A piece of information you have pasted onto your local ClipBook. The piece of information (called a page) is permanently saved. Information on a ClipBook page can be copied back onto the Clipboard and then pasted into documents. You can share ClipBook pages with others so that they can link to the page or embed the page in another document.

communications settings Settings that specify how information is transferred from your computer to a device (usually a printer or modem).

Control menu A menu that contains commands you can use to manipulate a window. To open the Control menu, choose the Control-menu box at the left of the title bar in a window, or select an application icon at the bottom of the desktop. Every application that runs in a window and some non-Windows NT applications have a Control menu. Document windows, icons, and some dialog boxes also have Control menus.

Control-menu box The icon at the left of the title bar. This icon opens the Control menu for a window.

conventional memory Up to the first 640K of memory in your computer. MS-DOS uses this memory to run applications.

D

default printer The printer that is used if you choose the Print command without first specifying which printer you want to use with an application. You can have only one default printer; it should be the printer you use most often.

desktop The background of your screen, on

which windows, icons, and dialog boxes appear.

desktop pattern A design that appears across your desktop. You can create your own pattern or select a pattern provided by Windows NT.

destination directory The directory to which you intend to copy or move one or more files.

destination document The document into which a package or a linked or embedded object is being inserted.

device contention The way Windows NT allocates access to peripheral devices, such as a modem or a printer, when more than one application is trying to use the same device.

device driver A program that enables a specific piece of hardware (device) to communicate with Windows NT. Although a device may be installed on your system, Windows NT cannot recognize the device until you have installed and configured the appropriate driver. Device drivers usually have a .DRV extension.

dimmed Unavailable, disabled, or grayed. A dimmed button or command is displayed in light gray instead of black, and it cannot be chosen.

directory Part of a structure for organizing your files on a disk. A directory can contain files and other directories (called subdirectories). The structure of directories and subdirectories on a disk is called a directory tree.

directory tree A graphical display of a disk's directory structure. The directories on the disk are shown as a branching structure. The top-level directory is the root directory.

directory window A File Manager window that displays the contents of a disk. The window shows both the directory tree and the contents of the current directory. A directory window is a

document window that you can move, reduce, or enlarge.

drive icon An icon in a directory window in File Manager that represents a disk drive on your system. Different icons depict floppy disk drives, hard disk drives, network drives, RAM drives, and CD-ROM drives.

disk configuration information The Windows NT Registry includes the following information on the configuration of your disk(s):

Assigned drive letters	Volume sets
Stripe sets	Stripe sets with parity
Mirror sets	

double-click To rapidly press and release a mouse button twice without moving the mouse. Double-clicking carries out an action, such as starting an application.

downloaded fonts Fonts that you send to your printer either before or during the printing of your documents. When you send a font to your printer, it is stored in printer memory until it is needed for printing.

Some PostScript printers do not support downloaded fonts. Instead, they use the fonts that are permanently stored in their read-only memory.

E

embedded object Information in a document that is a copy of information created in another application. By choosing an embedded object, you can start the application that was used to create it, while remaining in the document you're working in.

encapsulated PostScript (EPS) file

Files that print at the highest possible resolution for your printer. EPS files may print faster than other graphical representations. Some Windows NT and non-Windows NT graphical applications can import EPS files. Refer to your application's

documentation to determine whether this capability is supported.

environment variable A string consisting of environment information, such as a drive, path, or filename, associated with a symbolic name that can be used by Windows NT. You use the **set** command from the Windows NT command prompt or with the System application in Control Panel to define environment variables.

extended partition An extended partition is created from free space on a hard disk and can be subpartitioned into zero or more logical drives.

extension The period and up to three characters at the end of a filename. An extension usually indicates the type of file or directory. For example, program files have default extensions of .COM or .EXE.

Many applications use a default extension when you save a file the first time. For example, Windows NT Notepad adds .TXT to all filenames unless you specify otherwise.

F

font set A collection of font sizes for one font, customized for a particular display and printer. Font sets determine what text looks like on the screen and when printed.

free space Free space is an unused portion of a hard disk that can be partitioned or subpartitioned. Free space within an extended partition is available for the creation of logical drives. Free space that is not within an extended partition is available for the creation of a partition, with a maximum of four partitions allowed.

G

group A collection of applications within

Program Manager. Grouping your applications makes them easier to find when you want to start them.

group icon The icon that represents a group in Program Manager when the group window is minimized (reduced). To open a group and view its contents, choose the group icon.

group window A window that displays the items in a group within Program Manager. These items can be applications, files associated with applications, or a combination of both.

H

hexadecimal A base-16 number system that consists of the digits 0 through 9 and the uppercase and lowercase letters A (equivalent to decimal 10) through F (equivalent to decimal 15).

high memory area The first 64K of extended memory (often referred to as HMA).

I

import To create a package by inserting an existing file into Object Packager. When you import a file, the icon of the application you used to create the file appears in the Appearance window, and the name of the file appears in the Contents window.

input/output activity Read or write actions that your computer performs. Your computer performs a read when you type information on your keyboard or you select and choose items by using your mouse. Also, when you open a file, your computer reads the disk on which the file is located to find and open it.

Your computer performs a write whenever it stores, sends, prints, or displays information. For example, your computer performs a write when it stores information on a disk, displays information on your screen, or sends information through a modem.

insertion point The place where text will be inserted when you type. The insertion point usually appears as a flashing vertical bar in an application's window or in a dialog box.

interrupt request lines (IRQ) Hardware lines over which devices can send signals to get the attention of the processor when the device is ready to accept or send information. Typically, each device connected to the computer uses a separate IRQ.

i/o addresses Locations within the input/output address space of your computer, used by a device, such as a printer or modem.

L

linked object A representation or placeholder for an object that is inserted into a destination document. The object still exists in the source file and, when it is changed, the linked object is updated to reflect these changes.

list box In a dialog box, a type of box that lists available choices—for example, a list of all files in a directory. If all the choices do not fit in the list box, there is a scroll bar.

local printer A printer that is directly connected to one of the ports on your computer.

logical drive A subpartition of an extended partition on a hard disk.

Logical Unit (LU) A preset unit containing all the configuration information needed for a user or a program to establish a session with a host or peer computer.

M

memory A temporary storage area for information and applications.

MS-DOS-based application An application that is designed to run with

MS-DOS, and therefore will not be able to take full advantage of all Windows NT features, such as security and memory management. Also known as non-Windows NT application.

N

non-Windows NT application Shorthand term to refer to an application that is designed to run with Windows 3.x, MS-DOS, OS/2, and POSIX, but not specifically with Windows NT and that may not be able to take full advantage of all Windows NT features (such as memory management).

O

object Any piece of information, created by using a Windows-based application, that can be linked or embedded into another document.

object linking and embedding A way to transfer and share information between applications.

option button A small, round button that appears in a dialog box. Within a group of related option buttons, you can select only one button.

orphaned member A member of a mirror set or a stripe set with parity that has failed in a severe manner, such as a loss of power or a complete head crash. When this happens, the fault-tolerance driver determines that it can no longer use the orphaned member and directs all new reads and writes to the remaining members of the fault-tolerance volume.

P

package A small drawing (or icon) that represents an embedded or linked object. When you choose the package, the application used to create the object either plays the object (for example, a sound file) or opens and displays the object.

partition A portion of a physical disk that

functions as though it were a physically separate unit.

path Specifies the location of a file within the directory tree. For example, to specify the path of a file named README.WRI located in the WINDOWS directory on drive C, you would type `c:\windows\readme.wri`.

pel Also known as a pixel. The smallest graphic unit that can be displayed on the screen. Pel is the abbreviation for picture element.

personal groups Icons that you have put into groups are stored with your logon information. Each time you log on, your personal groups appear.

Physical Unit (PU) A network-addressable unit that provides the services needed to use and manage a particular device, such as a communications link device. A PU is implemented with a combination of hardware, software, and microcode.

plotter font A font created by a series of dots connected by lines. Plotter fonts can be scaled to any size and are most often printed on plotters. Some dot-matrix printers also support plotter fonts.

port A connection or socket used to connect a device, such as a printer, monitor, or modem, to your computer. Information is sent from your computer to the device through a cable.

The most common ports are serial (COM) and parallel (LPT). Serial ports are used for devices that accept information one bit at a time. Parallel ports are used for devices that accept information eight bits at a time and are generally faster than serial ports. You can assign network paths to a port; for example, if you are printing to a network printer.

primary partition A portion of a physical disk that can be marked for use by an operating system.

There can be up to four primary partitions (or up to three, if there is an extended partition) per physical disk. A primary partition cannot be subpartitioned.

printer driver A program that controls how your computer and printer interact.

printer fonts Fonts that are built into your printer. These fonts are usually located in the printer's read-only memory (ROM).

program file A file that starts an application or program. A program file has an .EXE, .PIF, .COM, or .BAT filename extension.

program information file (PIF) A file that provides information about how Windows NT should run a non-Windows NT application. PIFs contain such items as the name of the file, a start-up directory, and multitasking options for applications running in 386 enhanced mode.

program item An application or document represented as an icon in a group window.

Q

queue A list of documents that have been sent to a printer for printing.

quick format Deletes the file allocation table and root directory of a disk but does not scan the disk for bad areas.

R

RAM An acronym for random-access memory. RAM can be read from or written to by the computer or other devices. Information stored in RAM is lost when you turn off the computer.

S

screen fonts Fonts displayed on your screen. Soft-font manufacturers often provide screen fonts that closely match the soft fonts for your

printer. This ensures that your documents look the same on the screen as they do when printed.

screen saver A moving picture or pattern that appears on your screen when you have not used the mouse or the keyboard for a specified period of time.

scroll To move through text or graphics (up, down, left, or right) in order to see parts of the file that cannot fit on the screen.

scroll bar A bar that appears at the right and/or bottom edge of a window or list box whose contents are not completely visible. Each scroll bar contains two scroll arrows and a scroll box, which enable you to scroll through the contents of the window or list box.

selection cursor The marking device that shows where you are in a window, menu, or dialog box and what you have selected. The selection cursor can appear as a highlight or as a dotted rectangle around text.

server application A Windows NT application that can create objects for linking or embedding into other documents.

shared pages A page on the ClipBook that has been made available for others to use.

share To make resources, such as directories, printers, and ClipBook pages, available to other workgroup members for their use.

shortcut key A key or key combination, available for some commands, that you can press to carry out a command without first selecting a menu. Shortcut keys are listed to the right of commands on a menu.

source directory The directory that contains the file or files you intend to copy or move.

source document The document from which a

linked or embedded object originates.

split bar Divides a directory window in two parts: The directory tree is displayed on the left, and the contents of the current directory are on the right.

static object Information that has been pasted into a document. Unlike embedded or linked objects, static objects cannot be changed from within the document. The only way you can change a static object is to delete it from the document, change it in the application used to create it, and paste it into the document again.

status bar A line of information usually located at the bottom of a window. In File Manager, the status bar shows the number of bytes available on the disk and the total disk capacity. Not all windows have a status bar.

string A data structure composed of a sequence of characters, usually representing human-readable text.

swap file A hidden file on a hard disk or network drive that Windows NT uses for swapping information from memory to the disk or drive.

system partition The volume that has the hardware-specific files needed to load Windows NT. On x86-based computers, it must be a primary partition that has been marked as active for startup purposes and must be located on the disk that the computer accesses when starting up the system. There can only be one active system partition, which is denoted on the screen by an asterisk.

Partitions on a RISC-based computer are not marked active. Instead, they are configured by a hardware configuration program supplied by the manufacturer. On RISC-based computers, the system partition must be formatted for the FAT file system. On either type of computer, the system partition can never be part of a stripe set or volume set.

system disk A disk that contains the MS-DOS system files necessary to start MS-DOS.

T

Task List A window that shows all running applications and that enables you to switch between them. You can open Task List by choosing Switch To from the Control menu or by pressing CTRL+ESC.

text file A file containing only letters, numbers, and symbols. A text file contains no formatting information, except possibly linefeeds and carriage returns. A text file is an ASCII file.

text-file transfer A method for transferring files from Terminal to a remote computer. With this method, files are transferred as ASCII files with minimal formatting characters, such as linefeeds and carriage returns. All font-formatting information is removed.

text-only An ASCII file that contains no formatting.

timeout If a device is not performing a task, the amount of time the computer should wait before detecting it as an error.

time slice The amount of processor time allocated to an application, usually measured in milliseconds.

toolbar A series of shortcut buttons usually located directly below the menu bar. For example, in File Manager, the toolbar contains buttons to connect to a shared directory and share a local directory. Not all windows have a toolbar.

TrueType fonts Fonts that are scalable and sometimes generated as bitmaps or soft fonts, depending on the capabilities of your printer. TrueType fonts can be sized to any height, and they print exactly as they appear on the screen.

V

value entry The string of data that appears in the right pane of a Registry window and which defines the value of the currently selected key.

virtual memory The space on your hard disk that Windows NT uses as if it were actually memory. Windows NT does this through the use of swap files. The benefit of using virtual memory is that you can run more applications at one time than your system's physical memory would otherwise allow. The drawbacks are the disk space required for the virtual-memory swap file and the decreased execution speed when swapping is required.

virtual printer memory In a PostScript printer, a part of memory that stores font information. The memory in PostScript printers is divided into two areas: banded memory and virtual memory. The banded memory contains graphics and page-layout information needed to print your documents. The virtual memory contains any font information that is sent to your printer either when you print a document or when you download fonts.

volume A volume is a partition or collection of partitions that have been formatted for use by a file system. A Windows NT volume can be assigned a drive letter and used to organize directories and files.

W

wildcard A character that represents one or more characters. The question mark (?) wildcard can be used to represent any single character, and the asterisk (*) wildcard can be used to represent any character or group of characters that might match that position in other filenames. For example, *.EXE represents all files that end with the .EXE filename extension.

workgroup A collection of computers that belong to a common group. Each workgroup is identified

by a unique name. Computers in workgroups can share printers, directories, and ClipBook pages. In the connect dialog boxes, computers are listed by their workgroup name.

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