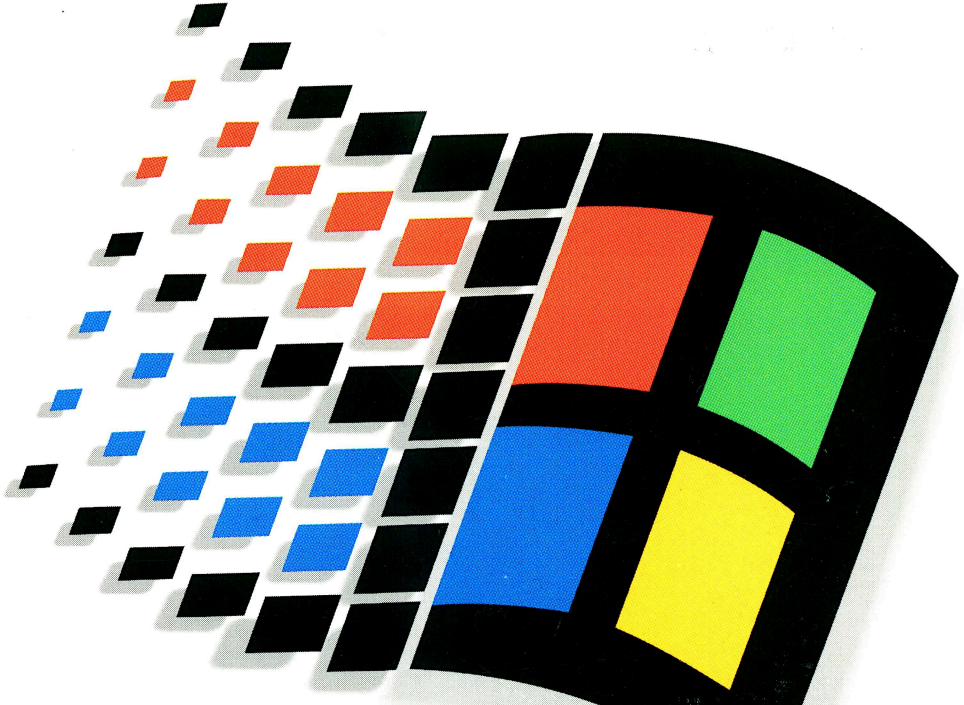
User's Guide



Microsoft® WINDOWS™

User's Guide

Microsoft® Windows™

Operating System
Version 3.1

Microsoft Corporation

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Welcome

Welcome to the Microsoft® Windows™ operating system, software that makes your computer easier and more fun to use. Windows is easy to learn because its graphical interface is consistent from one application to the next. When you've learned to use one application, such as Write, you've learned the essentials for using any other application with Windows. You can run your existing MS-DOS–based applications beside Windows applications and share information between them. And now, Windows is easier and faster to set up on your system.

If you are new to Windows, you may want to go to Chapter 3 after setting up Windows. Chapter 3, "A Guided Tour of Microsoft Windows," offers a visual introduction to Windows so that you can become familiar with the graphical interface before you start to use it.

If you prefer to preview Windows on the screen, you can use the Microsoft Windows Tutorial during the Setup program. To use the Windows Tutorial, you must have a mouse and a VGA (or better) monitor. If Windows is already set up on your computer, you can start the Tutorial from within Windows. Choose the Windows Tutorial command from the Help menu in Program Manager. For more information, see "Running the Microsoft Windows Tutorial" at the end of Chapter 3, "A Guided Tour of Microsoft Windows."

About Your Windows User's Guide

This book is only one part of the Windows version 3.1 documentation set. Also included are an online Tutorial and an extensive online Help system. In addition, several online documents (formatted for use with Write, an application included with Windows) are copied to your hard disk when you set up Windows.

The first part of the *Windows User's Guide* is a setup guide and introduction to Microsoft Windows version 3.1. The rest of the book, in conjunction with online Help, provides a comprehensive guide to using Windows. Procedures for the tasks you perform most often are provided in this book. Procedures for other tasks are provided in Help. For more information about using Help, see Chapter 6, "Online Help."

This book is arranged as follows:

Part 1, "Getting Started"—Chapters in this part introduce you to Windows and guide you through setting up Windows.

- "Welcome"

  An overview of this book and other documentation, a list of system requirements, and information about registering your copy of Windows.
- Chapter 1, "Setting Up Windows"

  Instructions for setting up Windows, tips for previous Windows users on upgrading to Windows version 3.1, instructions for setting up Windows from a network, and options for starting Windows (for advanced users).
- Chapter 2, "New in This Version"

  A summary of the new and enhanced features in Windows version 3.1.
- Chapter 3, "A Guided Tour of Microsoft Windows"

  A look at Windows, introducing the basic concepts, some essential Windows techniques, and the main applications included with Windows.

Part 2, "Windows Fundamentals"—Chapters in this part describe the basic structure of Windows and the skills you need to work with Windows.

- Chapter 4, "Windows Basics"

  An explanation of the basic elements of Windows and instruction in the skills you need to work with Windows.
- Chapter 5, "Application Basics"

  Techniques for using your applications with Windows, including how to easily switch from one application to another.
- Chapter 6, "Online Help"

  Instructions on how to use online Help to find information about tasks and features.
- Chapter 7, "File Manager"

  Procedures for using File Manager to organize and manage the files and directories on your disks.
- Chapter 8, "Print Manager"

  Procedures for printing files and setting up your printer for use with Windows.

- Chapter 9, "Accessories"

  Descriptions of the accessory applications included with Windows. There are three full-featured accessory applications: Write, a word processor; Paintbrush, a color painting and drawing application; and Terminal, a communications application.

  There are also two new multimedia applications, Media Player and Sound Recorder, in addition to several applications that add convenient capabilities to Windows, including Calculator, Calendar, Cardfile, Character Map, Clock, Notepad, and Recorder.

Part 3, "Getting the Most Out of Windows"—One chapter in this part describes how to run MS-DOS–based applications with Windows. The other chapters provide information for advanced users.

- Chapter 10, "Object Linking and Embedding"

  Instructions for transferring and sharing information between applications.

- Chapter 11, "MS-DOS Applications"

  Procedures for running MS-DOS–based applications (applications not designed for Windows).

- Chapter 12, "Customizing Windows"

  Procedures for changing screen colors, desktop settings, and other system settings, such as those affecting fonts and sounds.

- Chapter 13, "Configuring Hardware"

  Instructions for installing and changing device drivers for system hardware, such as your mouse, display adapter, and multimedia devices.

- Chapter 14, "Managing Memory and Performance"

  Methods for improving system speed while keeping adequate memory for applications.

Appendixes—The appendixes provide reference material on the following topics:

- Appendix A, "Keyboard Shortcuts"

  Keyboard shortcuts for performing various Windows tasks.

- Appendix B, "Windows and Networks"

  Instructions for using Windows with a network.

- Appendix C, "Troubleshooting"

  Questions you might have when setting up and using Windows, and possible solutions.

What You Need to Run Windows

The minimum software and hardware requirements your computer system needs to run Windows successfully are shown in the following list.

Windows requires:

- Microsoft MS-DOS ® version 3.1 or later. (To check your version, type **ver** at the command prompt.)
- For *386 enhanced mode,* a personal computer with a 386 processor (or higher) and 640 kilobytes (K) of conventional memory plus 1024K of extended memory, 8 megabytes (MB) of free disk space (10 MB is recommended), and at least one floppy disk drive.

  For *standard mode,* a personal computer with a 286 processor (or higher) and 640K of conventional memory plus 256K of extended memory, 6 MB of free disk space (9 MB is recommended), and at least one floppy disk drive.

  Note Minimum disk-space requirements are based on your having no optional components, network, or printers. Recommended requirements are based on your having all components installed, including a network and printer.

- A display adapter that is supported by Windows.
- A printer that is supported by Windows, if you want to print with Windows.
- A Hayes, Multi-Tech, Trail Blazer, or compatible modem, if you want to use Terminal, the Windows communications application.
- A mouse that is supported by Windows. Though it is not required, a mouse is highly recommended so that you can take full advantage of the easy-to-use Windows graphical interface.

Note To get the best performance from Windows, you should configure memory above 640K as extended memory. Memory is discussed in Chapter 14, "Managing Memory and Performance."

Windows runs in one of two operating modes, standard or 386 enhanced, depending on your hardware configuration. For information about starting Windows in a specific mode, see Chapter 1, "Setting Up Windows."

About Your Windows Documentation

The Windows version 3.1 documentation set consists of the *Microsoft Windows User's Guide,* an online Tutorial, an extensive online Help system, and several online documents (formatted for use with Write) that are copied to your hard disk when you set up Windows.

The following list outlines the various pieces of the Windows documentation:

- The *Microsoft Windows User's Guide* (this book) includes a guide to setting up Windows on your system and a brief introduction to Windows. In conjunction with online Help, this book also provides a comprehensive guide to using Windows. It includes explanations and procedures for first-time users, in addition to topics for advanced users.
- The Microsoft Windows Tutorial provides online instructions for using a mouse and for performing some basic tasks in Windows.
- Online Help provides a quick reference to procedures and commands you need when using Windows. *Context-sensitive* Help is now available in the main Windows-based applications. To obtain specific information about how to complete a dialog box, just press F1 or choose the Help button while using the dialog box.
- Several online documents are copied to your hard disk when you set up Windows. You can read (and print) the files by using Write. These files include:
  - SETUP.TXT—Information about software and hardware configurations that require special handling in order for you to successfully set up and start Windows. (You can view this file by using any text editor.)
  - README.WRI—Information updated after the *User's Guide* was printed.
  - PRINTERS.WRI—Information about configuring particular printers and fonts.
  - NETWORKS.WRI—Information about operating Windows with specific networks.
  - SYSINI.WRI—Procedures for modifying settings in the SYSTEM.INI file (for advanced users only).
  - WININI.WRI—Procedures for modifying settings in the WIN.INI file (for advanced users only).

Conventions

To help you locate and interpret information easily, *Microsoft Windows User's Guide* uses consistent visual cues and a few standard text formats.

Visual Cues

You will find the following typographic conventions throughout this guide.

This	Represents
bold	Characters that you must type exactly as they appear. For example, if you are directed to type **dir \windows**, you should type all the bold characters exactly as they are printed.
italic	Placeholders for information you must provide. For example, if you are directed to type *filename,* you should type the actual name for a file instead of the word shown in italic type. Italic type also signals a new term. An explanation generally follows the italicized term.
ALL CAPITALS	Directory names, filenames, and acronyms.
	A section that is specific to running Windows in 386 enhanced mode.

Keyboard Formats

Key combinations and key sequences appear in the following formats.

Format	Meaning
KEY1+KEY2	A plus sign (+) between key names means to press and hold down the first key while you press the second key. For example, "press ALT+ESC" means to press and hold down the ALT key and press the ESC key, and then release both keys.
KEY1, KEY2	A comma (,) between key names means to press and release the keys one after the other. For example, "press ALT, F" means to press and release the ALT key, and then press and release the F key.

Registering Your Copy of Windows

Please take a moment to fill out and mail the registration card you received with Windows. Registering Windows entitles you to the following additional benefits:

- Automatic notification of upgrades or revisions to Windows. By receiving timely notices directly from Microsoft, you'll be among the first to know about upgrades.
- Automatic notification when new Windows-related products are released. You'll receive up-to-date information about new Windows-based applications as soon as they become available.

PART 1

Getting Started

CHAPTER 1

Setting Up Windows

Setup Designed with Users in Mind

Setting up the Microsoft Windows version 3.1 operating system on your computer is simple. You can choose between two methods: Express Setup and Custom Setup.

Express Setup

Express Setup is the method recommended for most users.

When you use Express Setup, the Setup program identifies your hardware and software, configures Windows to run with your system, and updates necessary files. All you do is type your name, answer a few simple questions (such as what type of printer you have), and insert disks when requested.

If you have applications already on your system, Express Setup sets them up so that you can easily use them with Windows. Setup may be unable to set up some less common applications. You can set these up later from within Windows. Also, if you want to make changes to your system after Windows has been set up, you can do so by running Windows Setup from within Windows.

Note If your system does not have enough disk space to set up all of Windows, Express Setup proposes a partial setup, which excludes some or all of the optional Windows components (for example, screen savers and additional accessory applications).

To set up Windows by using Express Setup, you need to know two things:

- What type of printer you have, if any
- Which port your printer is connected to

Note Most computers are equipped with one or more parallel ports, such as LPT1, and one or more serial ports, such as COM1. You can use these ports to connect your computer to external devices, such as a printer.

A *physical* port is a socket located on the front or back of your computer, into which you plug a mouse, printer, or other hardware. A *virtual* port is an internal connection, such as a connection to a network printer. Your computer may have one or both types of ports. See your hardware documentation for information about the ports on your computer.

Express Setup sets up Windows in the C:\WINDOWS directory. If you are updating from Windows version 3.0, Express Setup prompts you for a directory name, giving your previous Windows directory as the default choice.

Custom Setup

Custom Setup is for experienced computer users who want to alter the standard Windows configuration. For example, to control how your CONFIG.SYS and AUTOEXEC.BAT files are modified, you should use Custom Setup rather than Express Setup.

If you have limited space on your hard disk, you can use Custom Setup to choose which optional Windows components or files you want to set up.

During Custom Setup, you are prompted to verify and provide information about the following:

- The directory where you want to store Windows files.
- The type (brand and processor) of computer you are using (for example, COMPAQ 386).
- Your display (monitor) type.
- Your mouse, if you are using one.
- Your keyboard and keyboard layout.
- The language you will work in.
- Any network driver you are using.
- The printer and printer port you use, if any.
- Applications on your hard disk that you want to run with Windows.

- Changes that may need to be made to your AUTOEXEC.BAT and CONFIG.SYS files.
- Which optional Windows components to install (including the Microsoft Windows Tutorial).
- Your virtual-memory settings (if Windows will be running in 386 enhanced mode).

Running Setup

Setup detects minimum system requirements (listed in "Welcome") and warns you if your system does not meet the requirements. Also, Setup notifies you if it detects system features that are incompatible with Setup or Windows.

Caution Before running Setup, turn off any automatic message service, such as a network pop-up or a printing notification, that prints directly to your screen. These are incompatible with Setup.

▶ To set up Windows

1. Insert the Windows version 3.1 disk 1 in a floppy disk drive, and close the drive door.
2. At the command prompt, type the drive letter of the drive you're using, followed by a colon (**:**), and then press ENTER.
3. Type **setup**, and then press ENTER.
4. Follow the instructions on the screen.

   You can choose Express Setup or Custom Setup. It is recommended that you use Express Setup; however, you can use Custom Setup if you are an experienced user. Both methods are described earlier in this chapter.

Windows Tutorial

You can choose to go through the brief, online Microsoft Windows Tutorial as part of the Setup program. The first Tutorial lesson guides you through basic mouse techniques and gives you a chance to practice them before you start working with Windows. The second lesson introduces you to basic Windows techniques.

If you choose not to take the Tutorial from within the Setup program, you can run it later from within Windows by choosing the Windows Tutorial command from the Help menu in Program Manager. For complete instructions, see "Running the Microsoft Windows Tutorial" at the end of Chapter 3, "A Guided Tour of Microsoft Windows."

Upgrading from Windows Version 3.0

Although you can keep your existing Windows version 3.0 in a separate directory, it is strongly recommended that you upgrade your copy of Windows version 3.0. You can then take full advantage of the many new features and enhancements in Windows version 3.1. Before upgrading, make backup copies of any data files and applications you have added to your system.

If you have Windows version 3.0, upgrading to Windows version 3.1 preserves existing Windows settings, such as groups you might have created or desktop settings you've chosen. Also, applications, fonts, and certain drivers are preserved. Only the Windows system files, upgraded device drivers, and accessories are replaced with the new versions.

Upgrading does the following:

- **Maintains existing Program Manager groups**

  If you have created new groups in Program Manager or added program-item icons to existing groups, Setup preserves them.

- **Preserves existing system-information settings**

  Settings for your computer, display adapter (monitor), mouse, keyboard and keyboard layout, language, network, and the associated drivers are preserved.

- **Updates existing device drivers that were supplied with Windows version 3.0**

  If you have a Windows version 3.0 driver installed for which there is an available updated version, Setup installs the updated driver.

- **Maintains all installed drivers that were not supplied with Windows**

  If you have a device driver installed that was supplied by another manufacturer, Setup leaves the driver unchanged. In some cases, Windows version 3.1 has a new driver that you can use in place of your existing driver. For example, if you have a Super VGA (video graphics adapter), you may want to update to the Windows version 3.1 Super VGA driver by using Custom Setup or by running Setup from within Windows later.

- **Preserves settings relating to the upper memory area**

  The order in which drivers are loaded is critical in optimizing the use of the upper memory area. Setup preserves the **loadhigh=** line and its placement in your AUTOEXEC.BAT file. Setup also preserves the **devicehigh=** line in your CONFIG.SYS file.

Note Although you are strongly advised against it, you can keep your existing Windows version 3.0 and add version 3.1 in a separate directory. When Setup asks whether you want to upgrade, specify a new directory for Windows version 3.1. Version 3.1 will not incorporate the custom settings you specified for version 3.0, such as new groups, colors, and desktop settings. After setting up Windows version 3.1, remove Windows version 3.0 from your PATH setting in your AUTOEXEC.BAT file. Some parts of Windows version 3.0 cause serious problems if Windows version 3.1 is running.

More Information About Upgrading

If you are upgrading, please note the following information:

- If you are using an English version of Windows version 3.1 to upgrade a non-English version of Windows version 3.0, Setup will upgrade all the necessary Windows device drivers, using the English driver names.

  However, some of your installed device drivers that were not originally supplied with Windows may not be upgraded. After setup, you may need to obtain new third-party drivers (such as those supplied by hardware manufacturers) and update them by running Setup from within Windows or from the MS-DOS prompt. For more information, see Chapter 13, "Configuring Hardware."

- Microsoft also provides the Windows Driver Library (WDL), which contains device drivers made available after Windows version 3.1 was released. Device drivers are added to the WDL as they become available. If you have a modem, you can download WDL device drivers from network services, including CompuServe, GEnie, Microsoft OnLine, various user-group bulletin-board services (BBSs on the Association of PC User Groups, or APCUG, network), and the electronic downloading service maintained by Microsoft (phone 206-936-6735). If you do not have a modem, you may purchase disks by calling Microsoft Customer Support Services at 1-800-426-9400.

Note If your copy of Windows was acquired outside the United States, the package contains a subsidiary information card listing bulletin-board services (BBSs) from which you can obtain updated device drivers. The card also lists local subsidiary telephone numbers you can call to obtain drivers if no BBS is available or you cannot access a BBS.

Network Setup

The Setup program has options that enable you to put Windows files on a network server or set up Windows for an individual network user to run. This section describes both procedures.

Setting Up Windows from a Network

If a network system administrator has put the Microsoft Windows files on a network server, you can set up Windows on your system from the network. Check with your system administrator for any special instructions before setting up Windows from a network.

Note For information about copying Windows files to a network server, see the next section, "Placing Windows Files on a Network Server."

You can set up Windows from a network in three ways:

- **All Windows files are copied to your computer.**

  In this situation, you create your own copy of Windows on your computer. All Windows files are copied to your hard disk.

  To set up Windows, you connect to the network server and type **setup** (do not use the **/n** network option). Follow the instructions on the screen. It is recommended that you use Express Setup instead of Custom Setup. Both methods are described earlier in this chapter.

- **Personal Windows files are copied to your computer; shared Windows files are located on the server.**

  You can set up your system to access a *shared* copy of Windows. In this case, most Windows files are located on a network server and are shared by you and others. During Setup, a few Windows files are copied to your personal Windows directory on your hard disk. By maintaining your own copies of these files, you can customize Windows according to your preferences.

  To set up Windows this way, use the **setup /n** option, described in the procedure following this list.

- **No Windows files are copied to your computer.**

  If your computer is a *diskless workstation* (that is, it does not have a hard disk), no files can be copied to your computer. When running Windows, you use shared Windows files located in a network Windows directory. During Setup, a few Windows files are copied to your personal Windows directory on the server hard disk and modified for your use.

To set up Windows this way, use **setup /n**, described in the following procedure. When Setup asks you where it should put your Windows files, specify the name of your personal Windows directory, located on the server hard disk. If you are not sure which network directory you should use as your personal Windows directory, ask your network system administrator.

▶ To set up a personal copy of Windows from a shared network directory

1. Connect to the network.
2. Change to the directory where Windows is located on the network (for example, W:\WINSHARE).
3. At the MS-DOS prompt, type **setup /n**
4. Follow the instructions on the screen.

   It is recommended that you use Express Setup instead of Custom Setup. Both methods are described earlier in this chapter.

   Setup will ask where it should put your Windows files. Type the path of your personal Windows directory—for example, **c:\windows** (or **u:\winuser**, for a diskless workstation).

Note If you have a set of Windows disks, do not attempt to set up a network copy of Windows from the disks (by typing **setup /n**). You can run **setup /n** only if you are setting up Windows from a network server.

If you are using an English version of Windows version 3.1 to upgrade a non-English version of Windows version 3.0, you need to use Custom Setup. In the System Information screen, choose the English names of drivers you previously installed in your non-English version of Windows.

In addition, some of your installed device drivers that were not originally supplied with Windows might not be upgraded. After setup, you may need to obtain new third-party drivers (such as those supplied by hardware manufacturers) and update them by running Setup from within Windows.

Placing Windows Files on a Network Server

Windows has an administrative setup option you can use to place Windows files on a network server. The administrative option does not set up a usable copy of Windows that you can run, but transfers the files from the Windows Setup disks to a network drive. The files are expanded, renamed, and marked as read-only when they are copied to the network drive. After the Windows files are copied to a directory on the network, users may connect to this directory and run the Setup program to set up Windows for their own workstations.

To place Windows files on a network server

1. Insert the Windows version 3.1 disk 1 in a drive.
2. At the MS-DOS prompt, type the drive letter of the drive.
3. Type **setup /a**
4. Follow the instructions on your screen.

   Setup prompts you to specify the network drive and directory to which you want the Windows files copied. You're also prompted to specify group registration information (group name and company name), which is stored and used when individual workstations are set up.

Windows requires the following disk space for network files:

- Shared network directory—16 MB
- Personal network directory—300K

Setup Summary

The Windows Setup program:

- Determines what hardware you are using.
- Expands files from the Windows disk set and copies them to your hard disk.
- Configures the SYSTEM.INI and WIN.INI files, which are used to customize your copy of Windows.
- Searches your hard disk for applications to set up for use with Windows and creates program-item icons for these applications. You can then start an application simply by choosing its icon.
- Creates program information files (PIFs) and program-item icons for any known MS-DOS–based applications you currently have on your system. PIFs supply Windows with essential information about how to run the applications with Windows.
- Modifies your AUTOEXEC.BAT and CONFIG.SYS files as described in the following section. (Express Setup does this automatically. During Custom Setup, you can choose whether or not to have Setup modify these files.)
- Restarts your system (if you want), so that all changes that were made to your system during Setup take effect immediately.

Note If you quit Setup before Windows has been completely set up (by pressing F3, for example), Windows will not be properly set up on your system. You will need to run Setup again before you can use Windows.

Changes to the AUTOEXEC.BAT and CONFIG.SYS Files

Setup makes the following changes to your AUTOEXEC.BAT file:

- Adds to your PATH setting the directory where you are setting up Windows.
- Adds the SMARTDRV.EXE command line, if appropriate for your system configuration.
- Creates a TEMP directory in the Windows directory and sets the TEMP variable to it (if you have not already set the variable).

Setup makes the following changes to your CONFIG.SYS file:

- Adds the HIMEM.SYS line. For example:

```
device=c:\windows\himem.sys
```

- Adds the SMARTDRV.EXE /double_buffer line, if needed. For example:

```
device=c:\windows\smartdrv.exe /double_buffer
```

- Updates RAMDRIVE.SYS, if it is in use.
- Updates EMM386.EXE, if appropriate.
- Updates your Microsoft or Hewlett-Packard mouse driver.
- Deletes any commands that load incompatible device drivers.
- Adds or updates your EGA.SYS device driver if you are using an enhanced graphics adapter (EGA) or a Mouse Systems mouse.
- Adds the appropriate parameter to the 386MAX line, if it is present.

Note If you have problems setting up Windows, see Appendix C, "Troubleshooting."

Starting Windows

At the end of the Setup program, you can choose whether to restart Windows or return to the command (MS-DOS) prompt. You can start Windows from the MS-DOS prompt at any time.

▶ To start Windows

- At the command prompt, type **win** and then press ENTER.

Note To have Windows start whenever you turn on your computer, add the **win** command to the end of your AUTOEXEC.BAT file. For more information about the AUTOEXEC.BAT file, see your MS-DOS documentation.

When you start Windows, you can specify which mode (386 enhanced or standard) you want Windows to run in. Windows modes are described in the next section.

You can also specify the name of an application or an MS-DOS command that you want to run when Windows is started.

Windows Modes

Windows can run in two modes: 386 enhanced mode and standard mode. When you type **win**, Windows starts in the most appropriate mode for your system. You can find out which mode Windows is running in by choosing the About command from the Help menu in Program Manager.

Windows uses the following criteria when determining which mode to use:

- Windows runs in 386 enhanced mode if you have a 386 computer (or higher) with at least 640K of conventional memory plus 1024K of extended memory.
- Windows runs in standard mode if you have a 286 computer (or higher) with at least 640K of conventional memory plus 256K of extended memory. Windows also runs in standard mode on 386 computers that have less than 2 MB of free memory.

Starting Windows in a Specific Mode

At times you might want to run Windows in a specific mode, even if it is not the most efficient one for your system. For example, if your system is a 386 computer with between 2 and 3 MB of memory and you do not want to run MS-DOS–based applications in Windows, you may decide to run Windows version 3.1 in standard mode to speed up performance. For more information about improving performance, see Chapter 14, "Managing Memory and Performance."

To ensure that Windows runs in a particular mode, specify one of the following options after the **win** command. For example, type **win /s** to start Windows in standard mode.

You can specify one of the following options.

Use	To
/s	Run Windows in standard mode. You might want to use this option if you have a 386 computer with 640K of conventional memory plus 1024K to 2096K of extended memory and do not use MS-DOS–based applications with Windows. On such systems, Windows runs faster in standard mode than in 386 enhanced mode. You might also want to use this option if you are having hardware compatibility problems when Windows is running in 386 enhanced mode.
/3	Run Windows in 386 enhanced mode. You might want to use this option if you want to run Windows in 386 enhanced mode even though your 386 (or higher) computer has less than the 2 MB of memory that 386 enhanced mode normally requires. This option works only with 386 systems with at least 1 MB of memory (640K conventional, 384K extended). If your system has less than 2 MB of memory, Windows probably runs slower in 386 enhanced mode than in standard mode. However, you may be able to run more Windows-based applications at once in 386 enhanced mode.

Specifying a mode is optional. If you do not specify a mode, Windows starts in the mode most appropriate for your system.

Specifying an Application or an MS-DOS Command

When you start Windows, you can also run an application or MS-DOS command. For example, the following commands start Windows and then Microsoft Excel:

```
win c:\excel\excel.exe
```

If you specify an application or MS-DOS command, it must come after an option that specifies a mode. For example, the following commands start Windows in standard mode and then run the application MYEDITOR.EXE:

```
win /s myeditor.exe
```

Some Samples for Starting Windows

The following samples show how to specify modes, applications, and MS-DOS commands when starting Windows.

Sample One: Starting Windows and an Application

The following commands start Windows and then run the application TEXTEDIT.COM, which is in the EDITORS directory on drive D:

```
win d:\editors\textedit.com
```

Sample Two: Starting Windows and Opening a Document

The following commands start Windows in standard mode and then open the document AGENDA.TXT in Notepad:

```
win /s agenda.txt
```

Notepad starts because Windows associates all files that have the .TXT filename extension with Notepad. You can change such file associations in File Manager by choosing the Associate command from the File menu. For information, see Chapter 7, "File Manager."

Sample Three: Starting Windows and an Application, and Opening a Document

The following commands start Windows, run Microsoft Word, and then open the Word document LETTER.DOC:

```
win c:\word\word.exe letter.doc
```

CHAPTER 2

New in This Version

This chapter highlights some of the new and enhanced features and many of the performance improvements in Windows version 3.1.

TrueType Fonts

One of the most dramatic features in Windows version 3.1 is the addition of TrueType fonts. TrueType provides you with a full set of fonts, with enough variety to meet virtually all your printing needs.

TrueType fonts are scalable, so you can choose the exact font size you need for your documents. For example, you can use a font at 12 points for the main text of a report and at 16 points for topic heads. If you use a dot-matrix or laser printer, the page you print will appear exactly as you see it on the screen, without your having to obtain special screen, cartridge, or soft fonts.

Windows version 3.1 supplies several families of TrueType fonts, including Arial, Courier New, Symbol, and Times New Roman. You can easily add other TrueType fonts from a font manufacturer to enhance your Windows–based applications.

For more information about using TrueType fonts, see Chapter 12, "Customizing Windows."

Object Linking and Embedding

Object linking and embedding is now available in Paintbrush, Write, Cardfile, and Sound Recorder (included with Windows version 3.1) and in applications such as

Microsoft Excel, Ami Professional, and WordPerfect. Object linking and embedding enables you to transfer and share information in a powerful new way.

- Object embedding

  With object embedding, you can create a drawing, sound file, or other object by using an application such as Paintbrush or Sound Recorder and then insert (embed) it in another document. You can edit the embedded information from within your document.

  For example, suppose you are working on a report in which you have embedded a drawing. To make changes to the drawing, you choose it, and Paintbrush opens. You can then make changes to the drawing, save it, and return to your report. You don't have to remember where the drawing is: Windows finds it for you.

- Object linking

  With object linking, you can use the same information (the object) in several documents. An object can be any kind of information, including text, a drawing, or a sound file. You create the object and then connect (link) it to as many documents as you want.

  When you edit the information in any of the documents, your changes are reflected in all the other documents that contain the same linked information. You save time and effort because you don't have to perform a cut-and-paste operation for each document every time you change the information. You save disk space because only one copy of the information exists—the documents contain only the links.

For more information about object linking and embedding, see Chapter 10, "Object Linking and Embedding."

A New File Manager

File Manager has a new look: a split window with a directory list on the left and the contents of the "open" directory on the right. You can browse through the file system easily without having to open separate windows.

File Manager has several other enhancements, including:

- The ability to display the contents of more than one drive or directory at once. This makes it easy to copy and move files and subdirectories from one directory or drive to another.
- More clearly labeled windows, disk drives, and network connections, making it easier to use File Manager.

- A variety of fonts that you can use to display information in the File Manager window. This enables you to control how much file information is displayed in the File Manager window at a time.
- Enhanced network support that makes it easy to connect to and disconnect from network drives. (The specific commands that appear on menus depend on the network you are using.)
- A Quick Format option so that you can format a floppy disk and then copy files to it without having to start MS-DOS Prompt or quit Windows.
- A *status bar* that displays information about disk-space usage and availability.

For more information about using File Manager, see Chapter 7, "File Manager."

Drag and Drop

The new "drag and drop" feature makes it easy to print, copy, or move a file in File Manager. You simply drag a file icon from one location to another by using the mouse. For example, you can print a file by dragging its file icon from File Manager and dropping it onto the minimized Print Manager window.

If you want to create a new program item to use to start an application, you can drag the application's file icon from File Manager and drop it onto a group icon or window in Program Manager.

For more information about dragging and dropping files, see Chapter 7, "File Manager."

A New Print Manager

Installing printers and connecting to network printers are now easier and smoother —you can perform these tasks by using either Print Manager or Control Panel.

In addition, several of the Windows printer drivers have been improved, making it quicker and easier to print files. For example, support has been added for printing at a baud rate of 19200 on a Hewlett-Packard LaserJet Series II or III printer. If you are using this type of printer, you can take full advantage of this feature and increase printing speed dramatically. For more information, see your HP LaserJet documentation.

Print Manager now is faster and more efficient, returning control to your applications sooner. This enables you to quickly return to working on your documents while other documents or files are being printed. And remember—you can print most files just by dragging their file icons from File Manager onto the minimized Print Manager window.

For more information about printing, see Chapter 8, "Print Manager."

Online Tutorial

Windows version 3.1 offers an online Tutorial in which you can practice working with a mouse and performing basic Windows tasks. To run the Microsoft Windows Tutorial, you need a mouse and a VGA (or better) monitor.

You can run the Tutorial when you run Windows Setup or at any time afterward. To run the Tutorial after you have set up Windows, choose the Windows Tutorial command from the Help menu in Program Manager.

New Multimedia Features

Windows version 3.1 has several new multimedia features, including sound, graphics, animation, and video capabilities. Many popular sound devices are supported, such as sound cards and devices with Musical Instrument Digital Interface (MIDI) capabilities.

The following are among the new multimedia features:

- **Media Player**

  You can use Media Player to control the playing of media files on hardware such as sound cards, CD-ROM drives, and videodisc players. Media Player can play animation, sound, and MIDI sequencer files. For more information about using Media Player, see Chapter 9, "Accessories," and Media Player online Help.

- **Sound Recorder**

  You can use Sound Recorder to play, record, and edit sound files that have the WAVE format. You can assign the sounds that you record to system or application events, or use the sounds in applications that support object linking and embedding.

  The Sound Recorder window displays the sound wave as if it were being shown on an oscilloscope. For more information about using Sound Recorder, see Chapter 9, "Accessories," and Sound Recorder online Help.

- **Enhancements to Control Panel**

  Control Panel has a new Drivers option, so you can set up drivers for almost any device you want to use. Although most devices include the appropriate driver, Windows also supplies sound drivers for common sound devices.

  Also, you can now assign unique sounds to different system and application events by using the enhanced Sound option. For example, you can select a sound to play every time you start or quit Windows, when an application displays a message, or in place of your computer's warning beep.

Control Panel has a new MIDI Mapper option, which you can use with sound devices that have MIDI capabilities, such as a synthesizer. MIDI Mapper is available only if you have a driver installed that supports a MIDI device.

For more information about the new sound support in Control Panel, see Chapter 12, "Customizing Windows."

Additional Features and Enhancements

There are additional features and enhancements in Windows version 3.1:

- **Setup enhancements**

  Setup has been greatly simplified. If you choose Express Setup, Windows is set up for you. You just type your name and answer a few simple questions, such as what type of printer you have.

  If you are an advanced user and need more control over how Windows is set up—for example, if you want to set any special printer options or choose not to set up some Windows components—you can use Custom Setup. Chapter 1, "Setting Up Windows," provides detailed instructions on how to set up Windows on your computer, using both methods.

- **Improved support for MS-DOS–based applications**

  Windows now includes program information files (PIFs) for even more MS-DOS–based applications. PIFs are set up when you create program items for your MS-DOS–based applications in Program Manager, making it easier to run these applications from within Windows.

  Note An MS-DOS–based application is designed to run with MS-DOS but not specifically with Windows.

  When you run Windows in 386 enhanced mode, improved virtual-memory functions make it smoother to run several MS-DOS–based applications in the background and to switch between them.

  Full mouse support has been added to MS-DOS–based applications running in a window. You can now use your mouse to move around in and select items in these applications.

  Different font sizes are available for your MS-DOS–based applications, so you can pick the font size that best suits your needs.

  Also included is a collection of icons (in the MORICONS.DLL file) that represent many of the most popular MS-DOS–based applications. You can now use these icons when adding MS-DOS–based applications to Program Manager.

  For more information about running MS-DOS–based applications in Windows, see Chapter 11, "MS-DOS Applications."

- **Network enhancements**

  When you restart Windows, your system is reconnected to all the printers and network drives you were previously connected to.

- **Character Map**

  Character Map is a new accessory application that you can use to insert special characters not found on your keyboard into your application. These characters include accented characters and characters in the Symbol fonts. For more information about using Character Map, see Chapter 9, "Accessories," and Character Map online Help.

- **Object Packager**

  Windows Object Packager is a new accessory application you can use when linking and embedding information. For more information about Object Packager, see Chapter 10, "Object Linking and Embedding."

- **Online Help enhancements**

  In addition to a complete, indexed Help system for all of Windows, you can now get context-sensitive Help for the task you are performing. Context-sensitive Help is available in all dialog boxes in the following Windows applications: Windows Setup, Program Manager, File Manager, Print Manager, PIF Editor, and Control Panel. Now, you can get Help on a dialog box by simply choosing the Help button or pressing F1. For more information about using Help, see Chapter 6, "Online Help."

- **Improved startup configuration**

  When Windows starts, it runs (or loads) any applications whose program-item icons you placed in the new StartUp group in Program Manager.

  In Program Manager and File Manager, you can preserve the contents and positions of windows and icons, and any menu settings you change, from one Windows session to the next. For more information about using the StartUp group, see Chapter 5, "Application Basics."

- **More ways to customize your desktop**

  Windows version 3.1 now has more desktop color schemes to choose from, including three designed for use with liquid crystal display (LCD) monitors.

  Also included are screen savers, which display moving graphics or text on your screen while you are not actively working with Windows. Screen savers reduce the wear on your screen and can be password-protected so that your work remains private. For more information about the new desktop features, see Chapter 12, "Customizing Windows."

- **Serial-port enhancements**

  Windows now includes additional communications settings for your serial ports. You can use serial ports that were not previously recognized by Windows and set separate interrupts for ports 1 and 3, in addition to ports 2 and 4, so that you can use these ports simultaneously. For more information about this feature, see Chapter 13, "Configuring Hardware."

- **Standardized dialog boxes**

  Many of the common dialog boxes, such as those that appear when you choose the Open, Save As, Browse, or Print Setup command, now look the same throughout Windows.

- **New collection of application icons**

  Program Manager now offers a collection of icons that you can choose from to represent your applications. Whether you are adding an application to a group or changing application information, you can choose the most suitable icon. Also included is a file (MORICONS.DLL) that contains icons used to represent MS-DOS–based applications.

Performance Improvements

Windows version 3.1 includes many significant improvements to overall performance. For example:

- Program Manager now requires less system memory, so you can create more groups without using up memory.
- File Manager is much faster: Your screen updates faster when you move and copy files and when you search through drives and directories.
- Running an MS-DOS–based application in a window is now much faster in 386 enhanced mode. Also, switching between Windows and an MS-DOS–based application is smoother and faster.
- Printing is faster and more efficient: Your documents print faster, and control is returned to your applications sooner.
- Disk-caching is improved with SMARTDrive. Opening, saving, and managing files when using MS-DOS–based applications is now smoother and faster.

CHAPTER 3

A Guided Tour of Microsoft Windows

Introduction

This chapter introduces you to the Microsoft Windows operating system version 3.1—what it is, what it looks like, and how it works. You may want to try out some of the Windows features as you read this chapter.

This tour is designed for mouse users. If you don't have a mouse, the tour can still provide a good overview of Windows. To learn about specific keyboard procedures, see Chapter 4, "Windows Basics," Chapter 5, "Application Basics," and Appendix A, "Keyboard Shortcuts."

If you are new to using a mouse, you can use the online Microsoft Windows Tutorial either during the Setup program or later from within Windows. The first Tutorial lesson introduces you to basic mouse procedures. For more information, see "Running the Microsoft Windows Tutorial" at the end of this chapter.

If Windows is not yet set up on your system, read Chapter 1, "Setting Up Windows," before continuing.

Starting Windows

After Windows is set up on your computer, it is easy to start:

- At the command prompt (for example, C>), type **win** and then press ENTER.

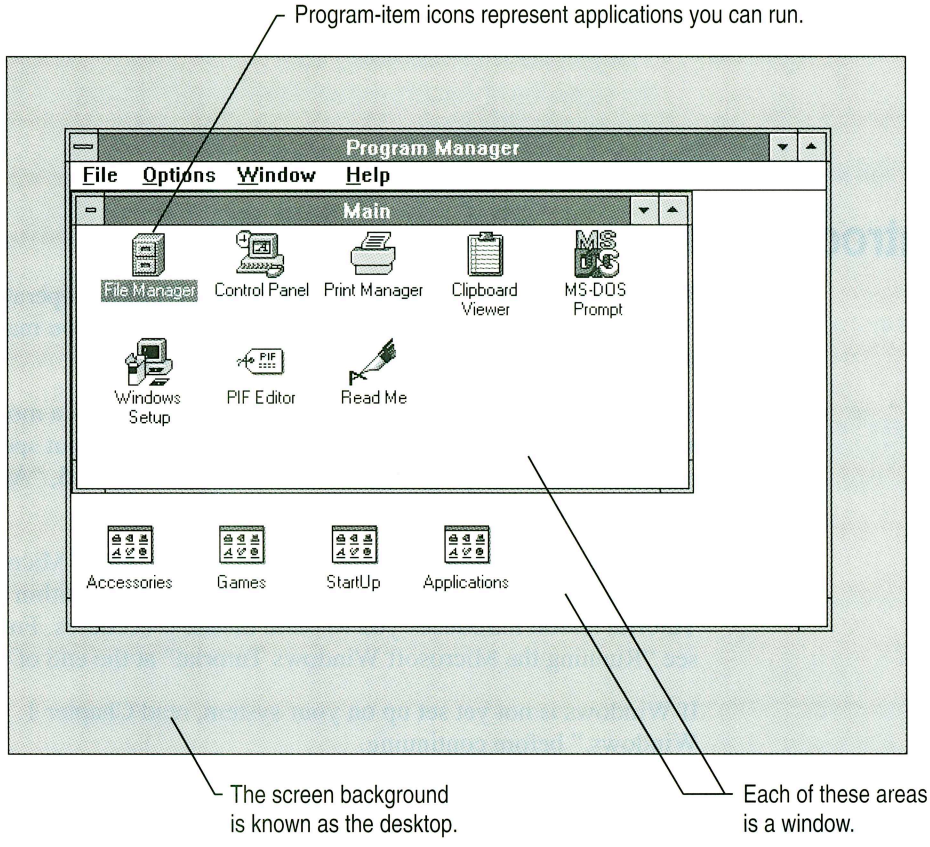
Windows Basics

As you work with Windows, there are a few basic terms you need to become familiar with.

You do your work in rectangular areas of the screen called *windows.* These windows appear on a background called the *desktop.* The *applications* you work

with (such as your word-processing or spreadsheet applications) are represented in Windows by small graphical symbols called *icons.*

You often carry out an action in Windows by *choosing* an item: For example, choosing an icon can start an application. You choose an icon by double-clicking it with the mouse.



Program Manager

When you start Windows, the first thing you see is Program Manager, which continues to run as long as you are using Windows. Initially, the Program Manager window displays the contents of the Main group. A *group* is a collection of applications you can run. The names and icons for the applications in the group are displayed in the *group window.*

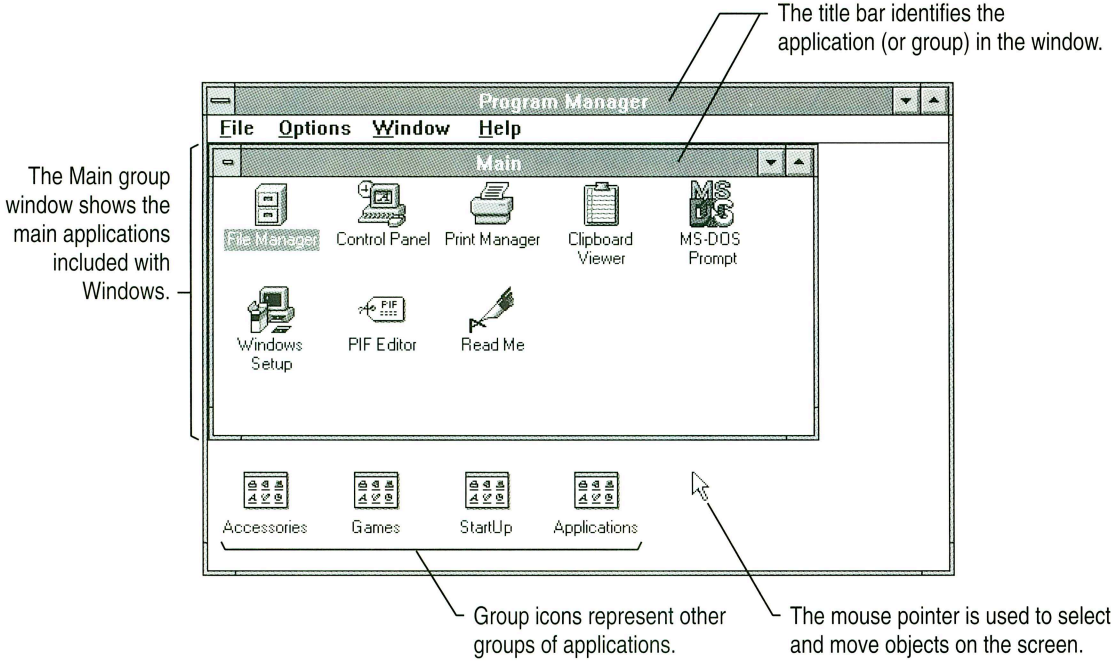
Program Manager also displays icons for other groups of applications: Accessories, Games, and StartUp.

Note Your Program Manager window may contain another group icon called Applications. During Windows Setup, applications already installed on your computer can be set up for you to use with Windows. The Applications group window contains icons for those applications.

You can perform many important tasks by using Program Manager. For example, you can:

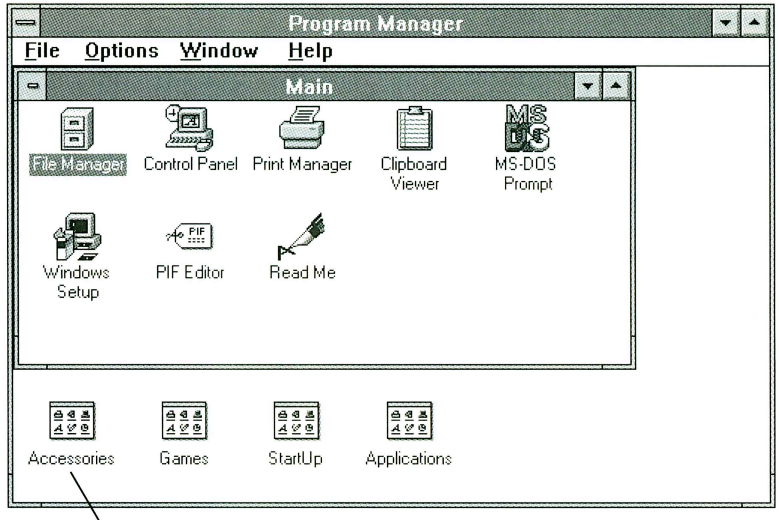
- Start applications.
- Organize your applications into groups for easy access.
- Quit Windows.

The following illustration points out some of the Windows features displayed when you first start Windows.

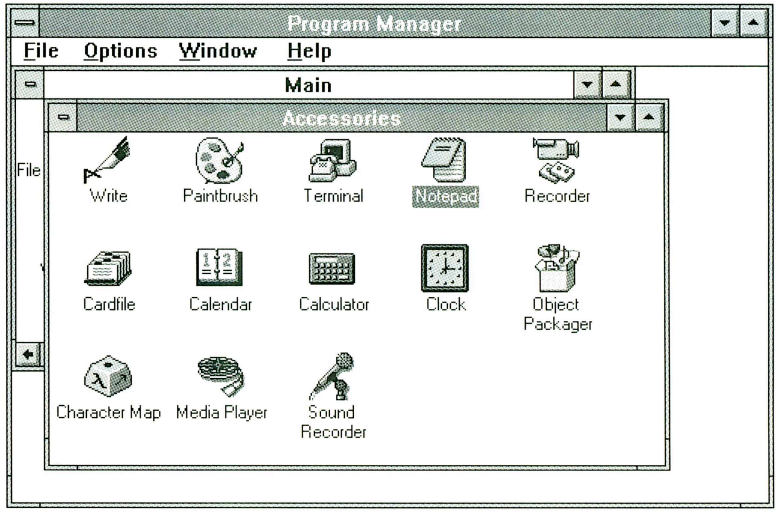


Starting an Application

From Program Manager, you can easily start an application by using the mouse to double-click (or "choose") its icon, called a *program-item icon.* You may need to open another group window to find the icon representing the application you want to use. For example, you need to open the Accessories group to start Notepad.

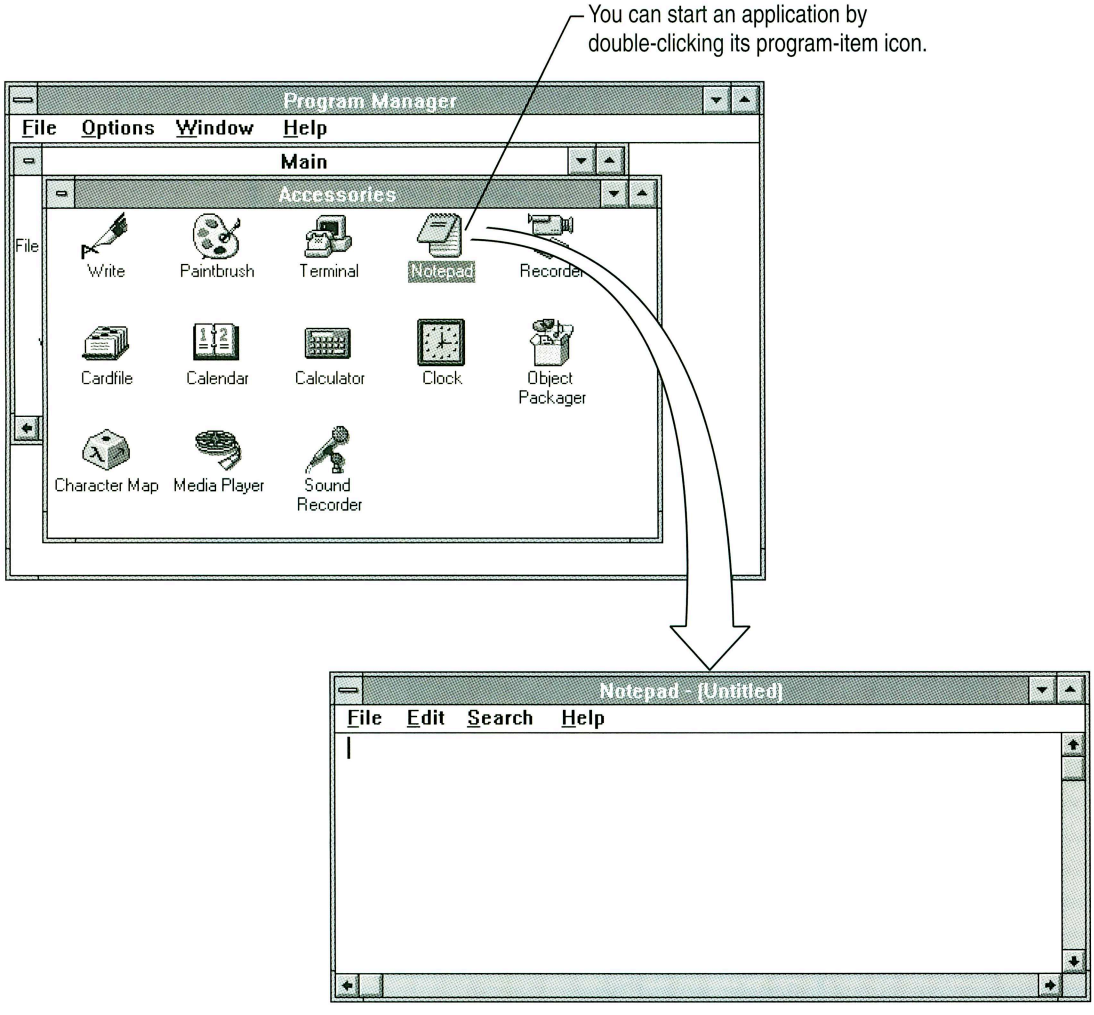


The Accessories group window displays icons for additional applications you can run.



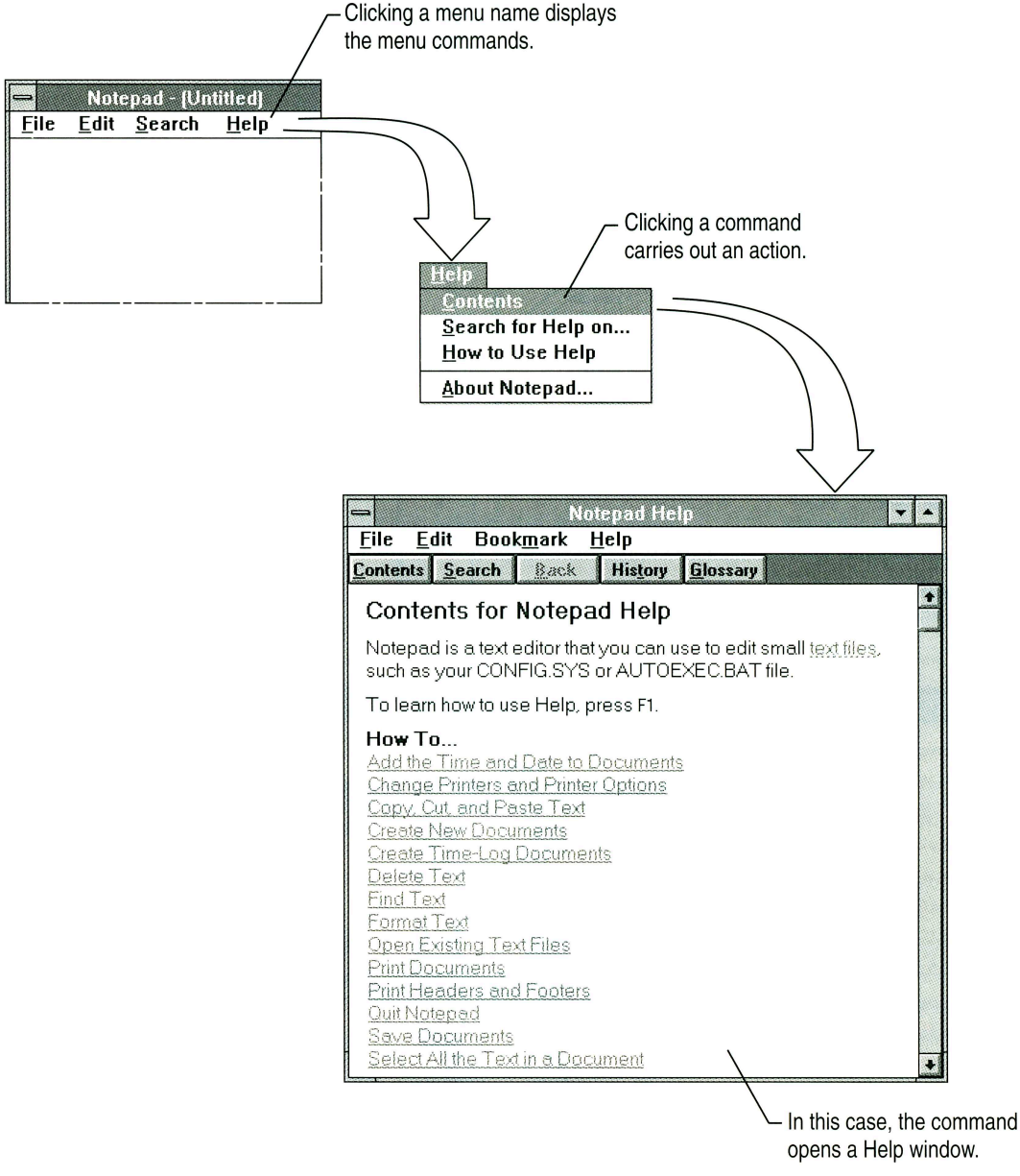
When you double-click ("choose") the icon, in this case Notepad, the application appears in an *application window,* ready for you to use.

The Notepad window is now the *active window.* The active window is generally the window in the foreground. To make another window active, you click anywhere in the window.



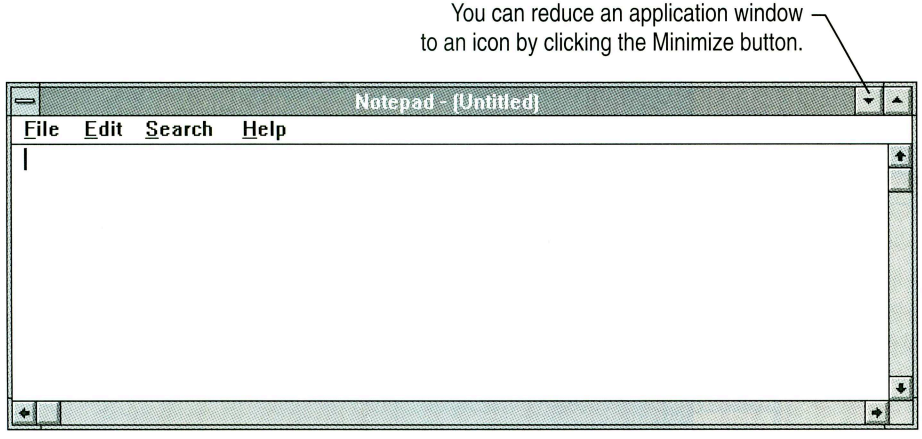
Using a Menu

Each application window, and other windows as well, has menu names located on a *menu bar* (beneath the title bar). A *menu* contains a list of *commands,* which are actions you can carry out in Windows. To choose a menu name or command, you click it once.

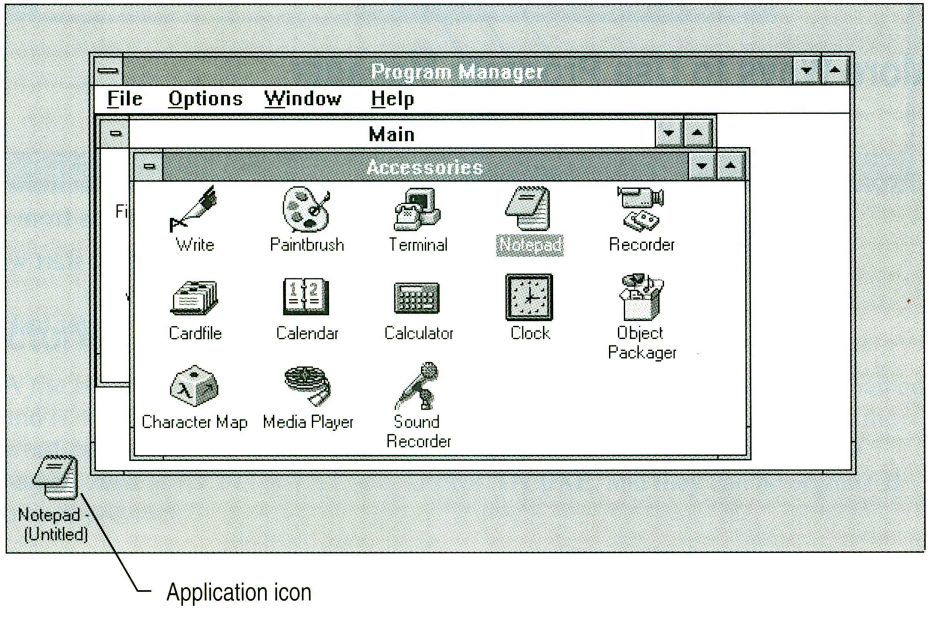


Reducing an Application Window to an Icon

As you work with Windows, you may want to temporarily put aside an application but keep it running and easily available to use later. You can avoid clutter on your screen if you reduce the application window to an icon by clicking its Minimize button; the icon stays on the Windows desktop until you need to use the application again.

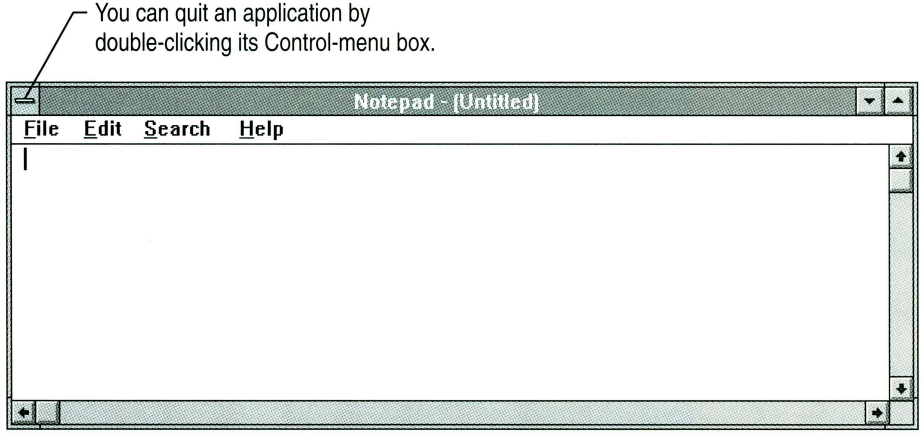


The application is running, but it takes up less space as an *application icon.*



Quitting an Application

When you finish using an application, you may want to quit it to free memory for other tasks. Using a mouse, you can quit an application as easily as starting it. The quickest way to quit is to double-click the application's *Control-menu box.* (You can also press ALT+F4. Or you can click the Control-menu box once to display the Control menu, and then click the Close command.)



If you have any unsaved work, Windows prompts you to save it before the application window closes.

More Ways to Use Program Manager

You can also use Program Manager to:

- Create and delete groups.
- Add applications to a group and delete applications from a group.
- Add applications to the StartUp group so that they start when Windows starts.

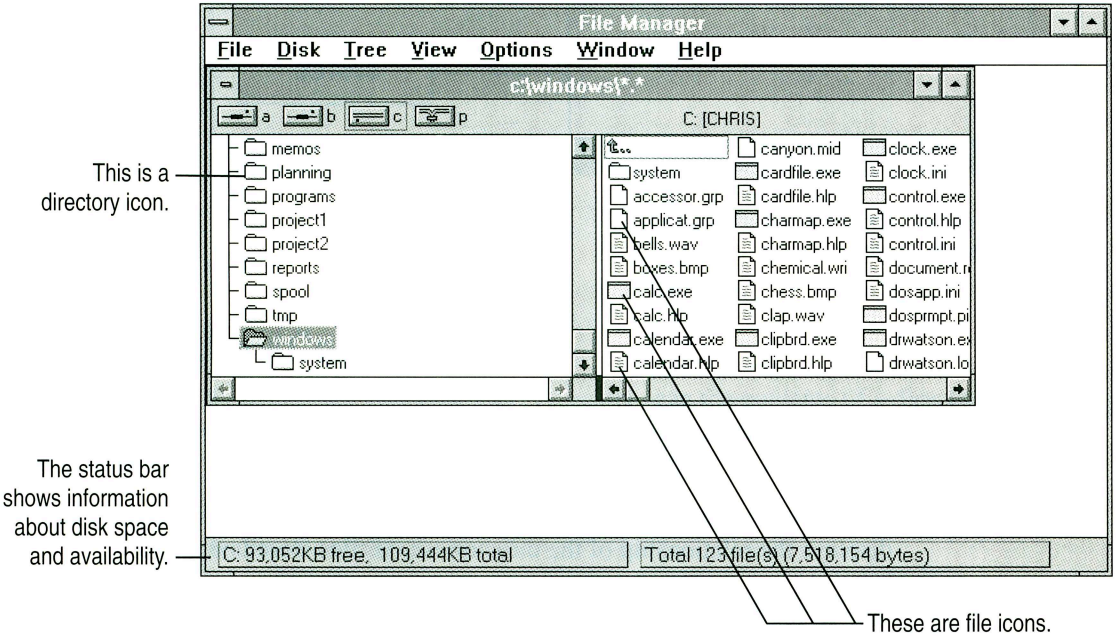
For information about these and other Program Manager tasks, see Chapter 5, "Application Basics."

File Manager

File Manager provides a graphical representation of files and directories to help you organize them and simplify file maintenance. You can start File Manager by double-clicking its icon in the Main group window.

You can perform many tasks by using File Manager. For example, you can:

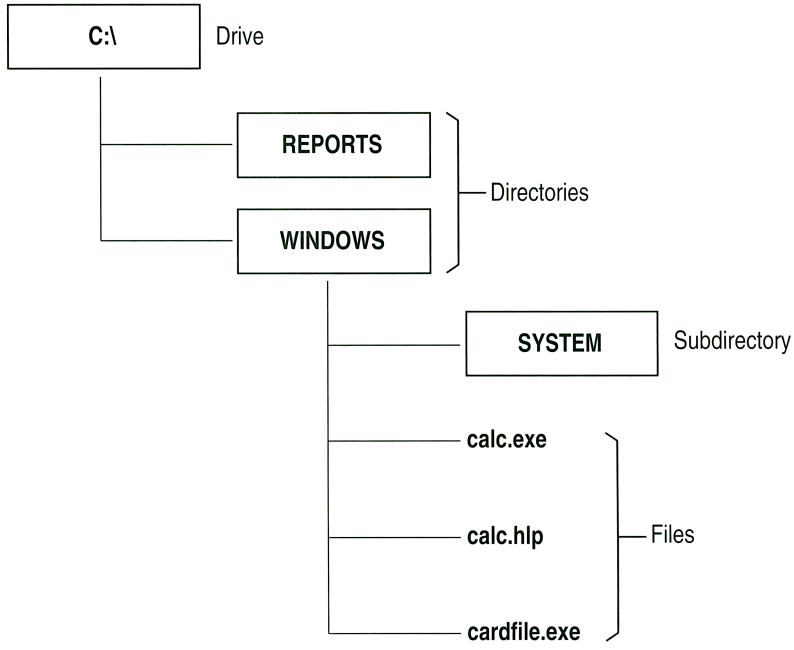
- View the contents of your directories.
- Move, copy, and delete files and directories.
- Change to other disk drives, including network drives.



Files and Directories

A *file* is an electronic document or an application or program that has been named and is stored on your computer. A file could be a memo you have written or the word-processing application you used to create the memo. Files have unique names, such as LETTER.TXT and APPLICTN.EXE, and they can be organized into *directories.*

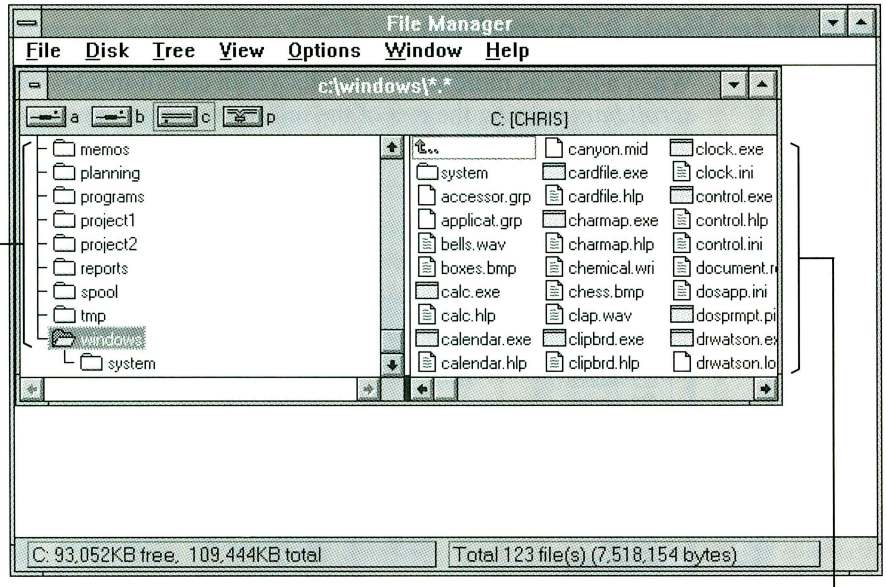
A directory is a collection of files and/or other directories (sometimes called *subdirectories*). Two directories that are likely to be on your computer are WINDOWS and SYSTEM.



The WINDOWS directory contains the SYSTEM subdirectory, in addition to many of the Windows files. The SYSTEM directory contains additional files.

A *directory window* appears in the main File Manager window. It graphically displays the relationship of the directories and files stored on a disk drive.

The left side of the window displays the directory tree, and the right side displays the contents of the current directory.



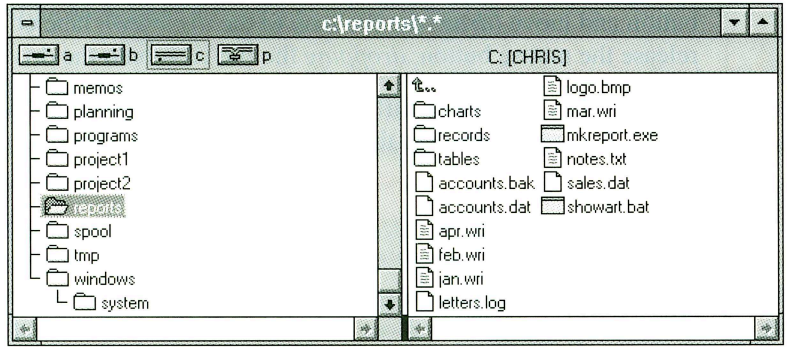
The directory tree displays directories on the drive you are using. The selected directory (WINDOWS) is "open."

The files and subdirectories in the open directory are displayed.

Viewing Directory Contents

By using File Manager, you can easily scan the contents of a directory. Just open the directory by clicking (selecting) its name or icon on the left side of the window.

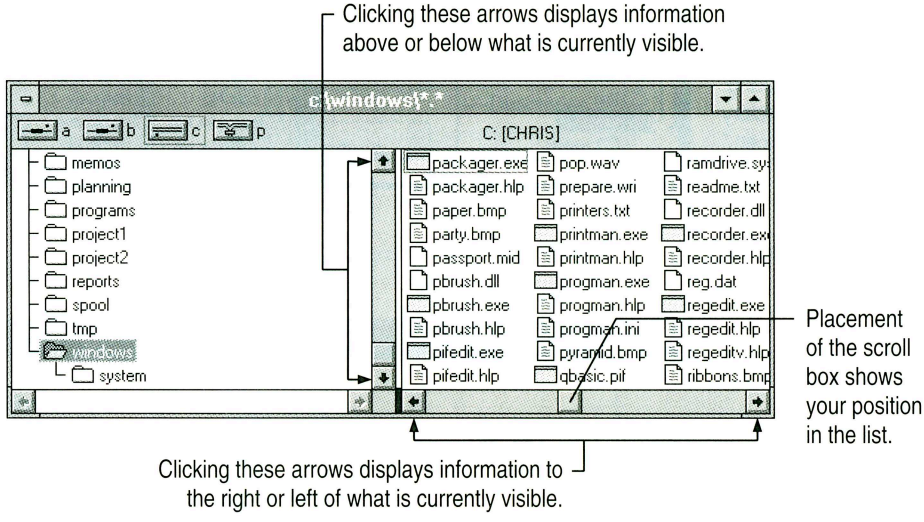
In the following illustration, the REPORTS directory is open, with its contents displayed at the right.



Scrolling to View Information

When a file has more text or graphics than can fit inside a window, you can use *scroll bars* to bring the rest of the information into view.

These scrolling techniques will be useful in much of your work with Windows.



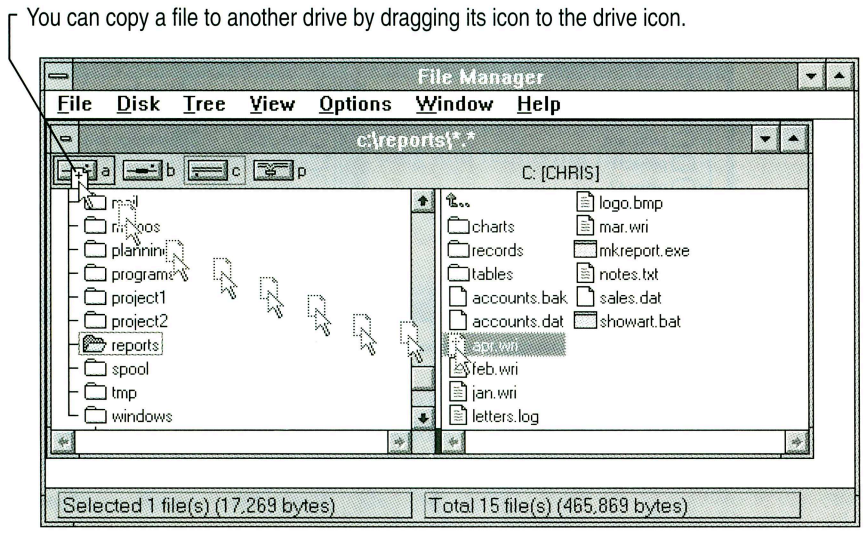
Moving and Copying Files

With the "drag and drop" feature available in File Manager, you can use your mouse to move or copy files quickly.

For example, to copy a file from your hard disk to a disk in drive A, first position the mouse pointer on the *file icon*. Then press and hold down the left mouse button and move (*drag*) the file icon to the *drive icon* labeled "a." Finally, release the mouse button, *dropping* the file icon onto the drive icon.

You can move a file to a different drive by pressing and holding down the SHIFT or ALT key while you drag the file icon to the drive icon.

When you move or copy files in File Manager, your mouse pointer appears as in the following illustration.



You can also move and copy files from one directory to another by dragging file icons.

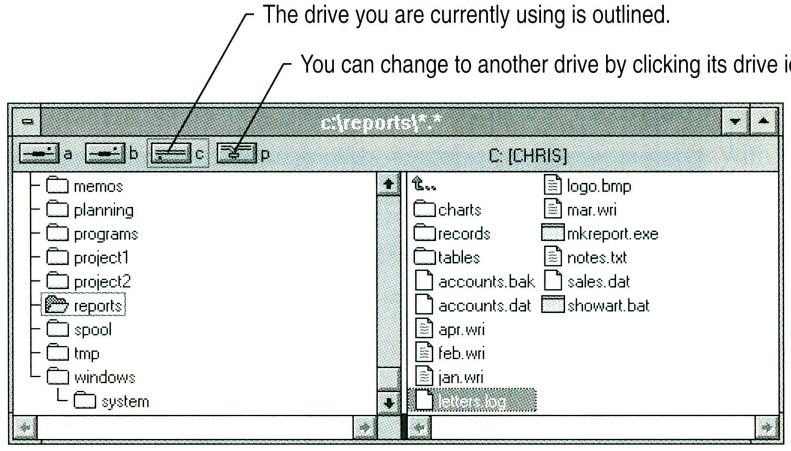
- You can move a file to another directory on the same drive by dragging the file icon to the destination directory icon or window.
- You can copy a file to another directory on the same drive by pressing and holding down the CTRL key while you drag the file icon to the destination directory icon or window.

For more information about moving and copying files, see Chapter 7, "File Manager."

Changing Disk Drives

In File Manager, all of your disk drives are readily available, even any network drives you are connected to.

Each File Manager directory window displays icons for all drives on your system—floppy disk drives, hard disk drives, and network drives—in the space beneath the window title. The icon of the current drive is outlined. The files and directories on the current drive are those displayed in the directory window.



When you click another drive icon, the directory window changes to display the contents of that drive. Double-click the drive icon to open an additional directory window rather than replace the contents of the current directory window.

More Ways to Use File Manager

You can also use File Manager to:

- Connect to network drives.
- Format and maintain disks.
- Print documents.
- Start applications.
- Rename and delete files.
- Change the kind and amount of information displayed about each file.
- Create directories and subdirectories.

For information about these and other File Manager tasks, see Chapter 7, "File Manager," and Help for File Manager.

Control Panel

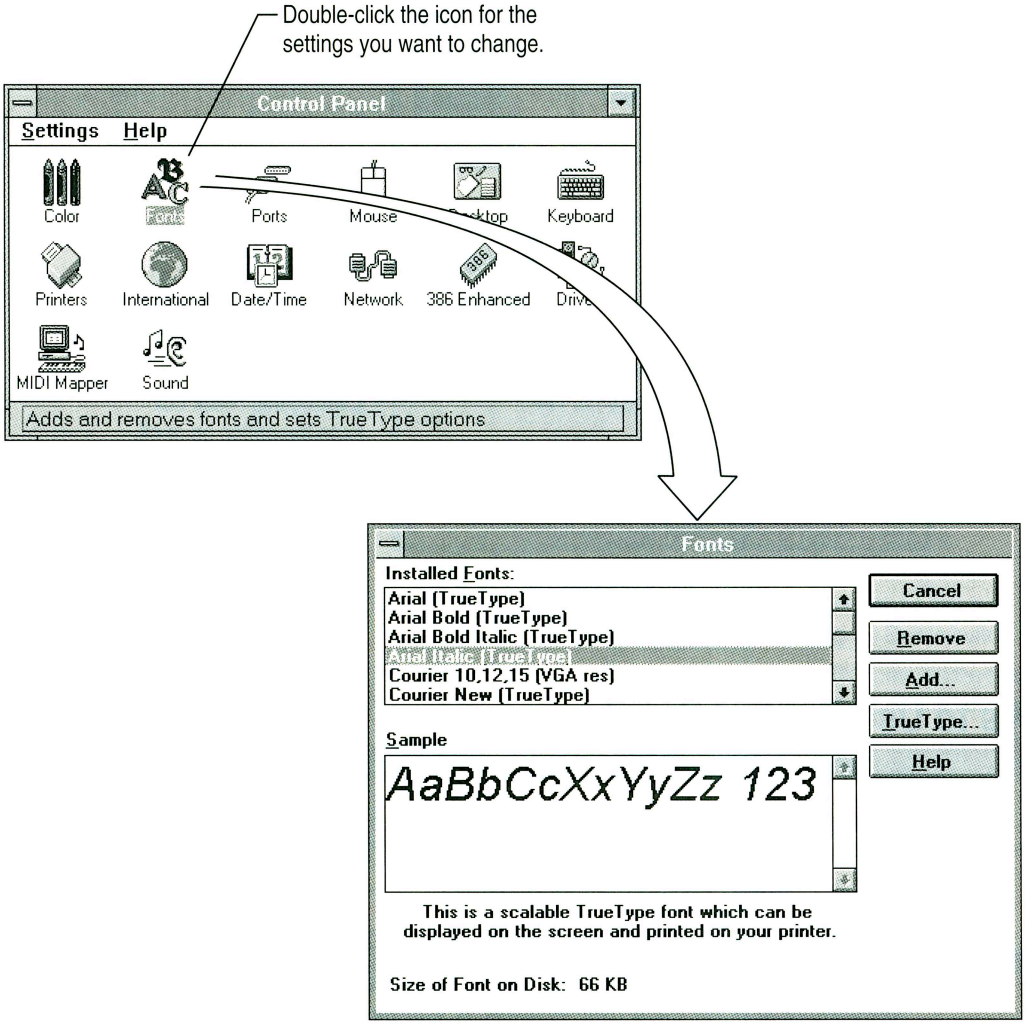
You can use Control Panel to adjust settings on your system, such as changing the look of your desktop and configuring hardware.

You can start Control Panel by double-clicking its icon in the Main group window.

You can perform many tasks by using Control Panel. For example, you can:

- Change screen colors and desktop settings.
- Set options for your printer.
- Add, configure, and remove device drivers.

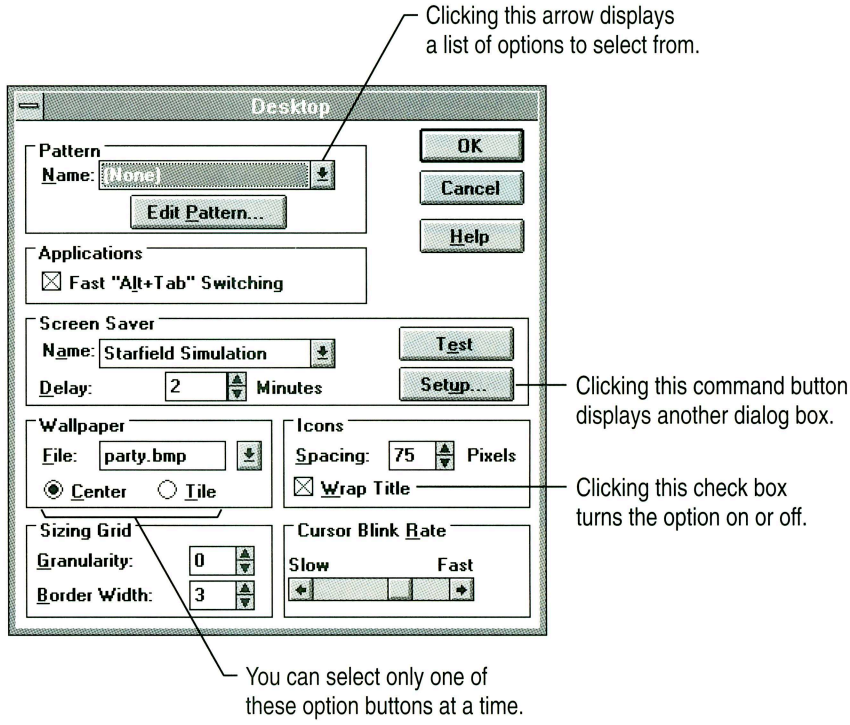
By using the dialog box that appears when you choose a Control Panel icon, you can make changes, such as adding and removing fonts.



Note Your fonts may be different from those shown here.

Using Dialog Boxes

Sometimes Windows requires additional information from you in order to complete a task. You provide this information in a *dialog box*. Depending on the task you are performing, you might need to select certain options, type some text, or specify settings.



More Ways to Use Control Panel

You can also use Control Panel to:

- Change options for your mouse or other pointing device, such as the double-click rate.
- Change settings for network connections.
- Specify international settings for applications that use them.
- Assign unique sounds to system events. For example, you can have Windows play musical notes each time it starts, if you have a sound card.
- Add, configure, or remove sound and Musical Instrument Digital Interface (MIDI) device drivers, if you have a sound card or MIDI device.
- Set printer options.

For information about these and other Control Panel tasks, see Chapter 12, "Customizing Windows," Chapter 13, "Configuring Hardware," and Help for Control Panel.

Print Manager

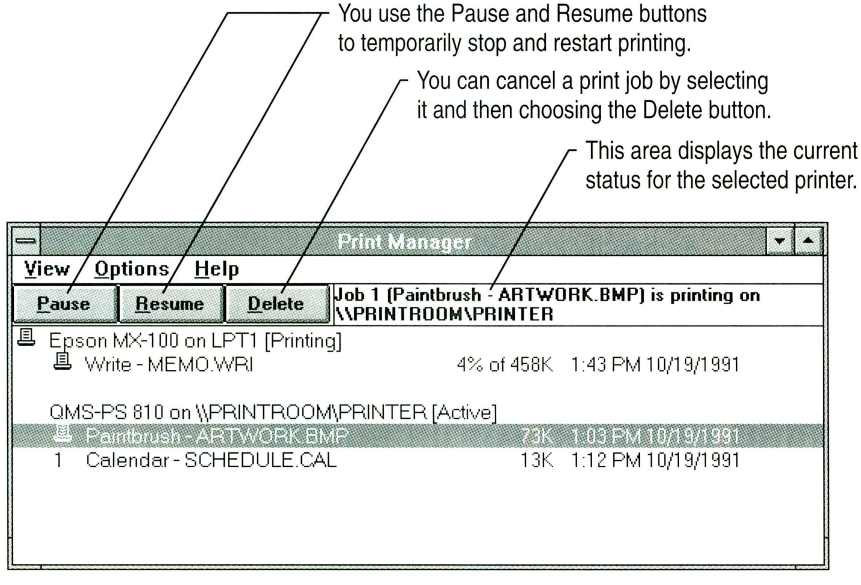
Print Manager controls printing for Windows-based applications and helps you keep track of documents sent to your printer. The Print Manager window displays the status of your printer(s) and the documents that are printing or waiting to be printed.

You can view the Print Manager window by double-clicking its icon in the Main group window.

You can use Print Manager to:

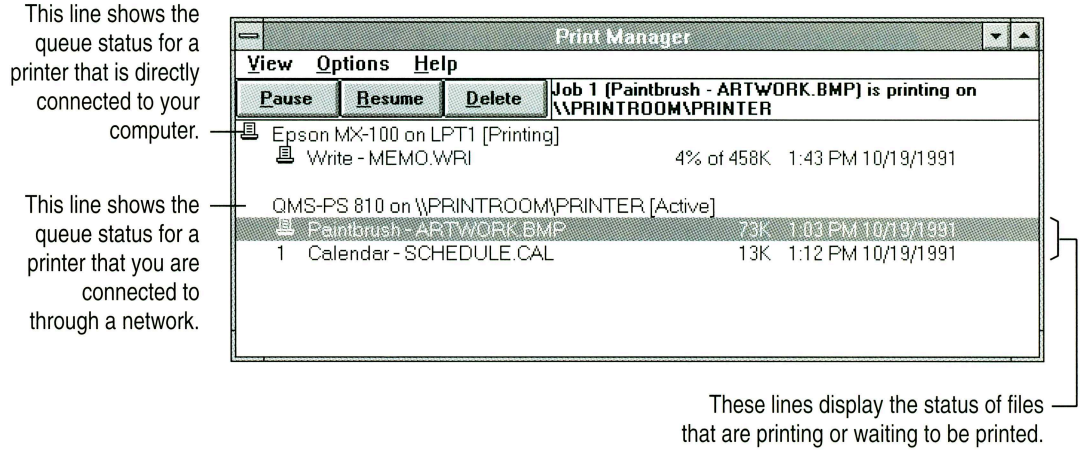
- Check the print status of a document.
- Pause and restart a printer or the printing of a document.
- Cancel the printing of a document.
- Set up a printer.

In Windows, you often need to *select* (highlight) an item before you carry out an action on it. For example, in Print Manager you click a print job to select it; then you can pause, restart, or cancel printing by clicking the appropriate button.



Checking Printer Status

By using Print Manager, you can monitor the status of your printer and the documents being printed. This can be particularly useful when you are printing more than one document or printing on a network printer that is located where you can't see it.



More Ways to Use Print Manager

You can also use Print Manager to:

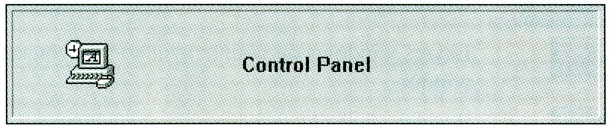
- Set up a printer.
- Change the order of documents waiting to be printed.
- Specify how print messages are displayed.
- Connect to and disconnect from network printers.
- Use separator pages between documents.
- Specify your default printer.

For information about these and other Print Manager tasks, see Chapter 8, "Print Manager," and Help for Print Manager.

Switching Between Applications

Using Windows to run more than one application at a time can make your job much easier. But when several windows are open, it may become difficult to find applications beneath overlapping windows.

An easy way to keep track of your applications is to use the Windows fast application-switching feature. You can switch quickly to another application by pressing and holding down the ALT key and then pressing the TAB key repeatedly. As you continue to press TAB, the title of each application currently running in Windows appears in the center of your screen.



When you see the application you want to use, release ALT+TAB. The application window appears in the foreground.

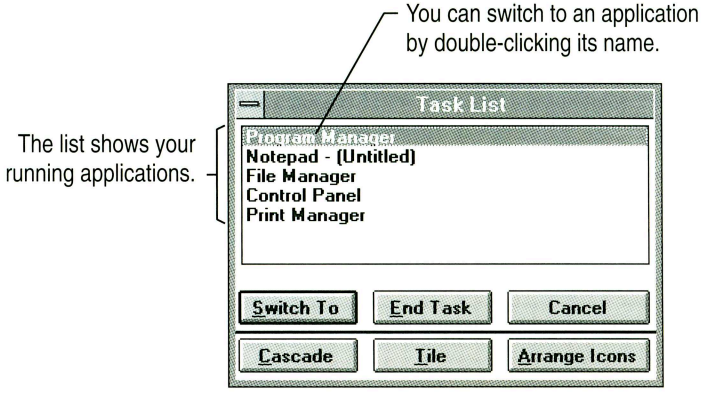
Task List

Another method of managing your applications is to use Task List.

Using Task List, you can:

- Display a list of all the applications you are currently running.
- Switch quickly to any running application.
- Rearrange windows and icons on your desktop.
- Quit an application.

You can display Task List by double-clicking anywhere on the desktop. Another method is to press CTRL+ESC. (If a menu is displayed, you need to press ESC first.) Or you can choose the Switch To command from any application's Control menu.



The Task List buttons can be used to perform several functions:

Switch To	Switches you to the selected application.
End Task	Quits the selected application.
Cancel	Closes Task List. Or you can close it by pressing ESC.
Cascade	Layers windows on your screen so that you can see the title of each window.
Tile	Resizes windows and arranges them side by side.
Arrange Icons	Rearranges application icons along the bottom of your desktop.

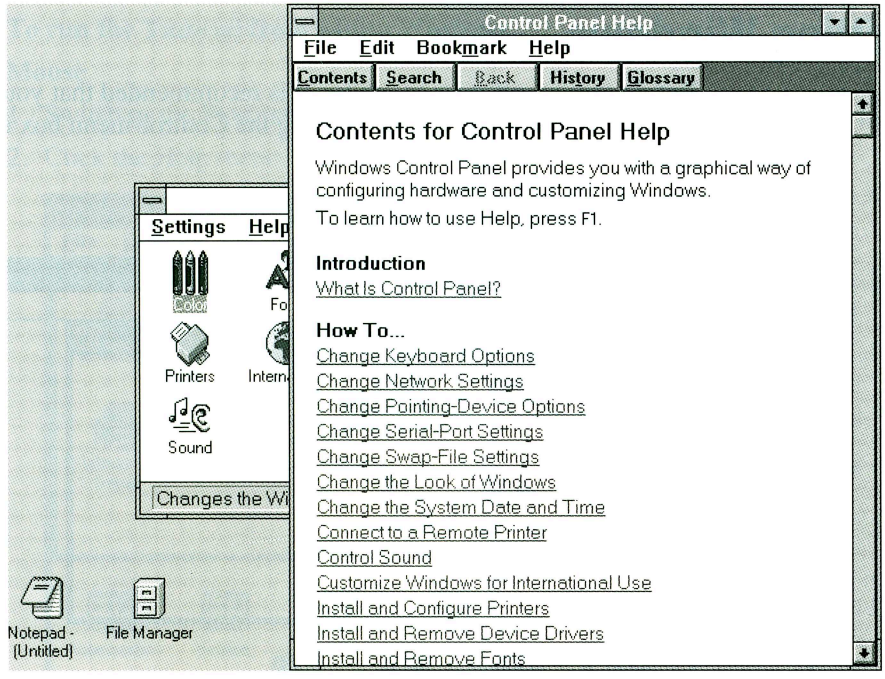
For more information about switching between applications, see Chapter 5, "Application Basics."

Online Help

Windows provides online Help to assist you in working with Windows. Following are some of the ways you can obtain Help:

- Press the F1 key to view a list of Help topics for the application you are working with.
- When you are using a dialog box that has a Help button, click the Help button (or press F1) to display information about working with the dialog box.
- Choose the Help menu in any application to display a list of Help commands.

The buttons near the top of the Help window can help you find the information you need.

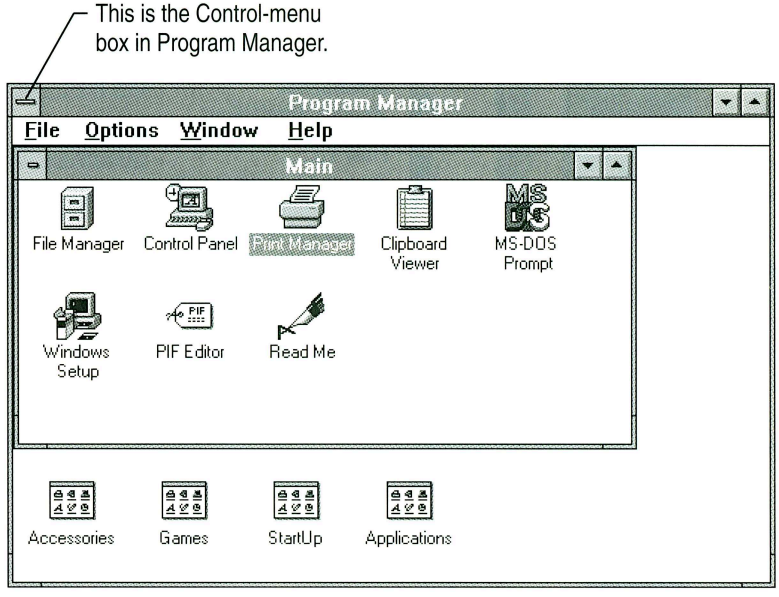


Contents	Displays a list of Help topics for an application.
Search	Displays a dialog box where you specify a topic to search for.
Back	Displays the previously viewed topic.
History	Displays a chronological list of all Help topics viewed during your current Windows session.
Glossary	Displays a list of Windows terms and their definitions.

If you need to learn how to use Help, press F1 while the Help window is open. Or choose How To Use Help from your application's Help menu. For more information about using Help, see Chapter 6, "Online Help."

Quitting Windows

Before turning off your computer, it is recommended that you quit Windows. You can quit Windows by double-clicking the Control-menu box in Program Manager.



The Next Step

This chapter has provided a brief introduction to Windows. The rest of this book, along with online Help, provides details on the features presented in this chapter. Also, you may want to use the Windows Tutorial that is available on your system. Instructions for running the Tutorial follow.

Running the Microsoft Windows Tutorial

The Windows Tutorial is an interactive, online application that teaches you the basics of using a mouse and Windows. To use the Tutorial, you need a mouse and a VGA (or better) monitor.

To run the Tutorial from within Windows

Mouse

1. Switch to the Program Manager window by clicking it or by using Task List.
2. Click the Help menu, and then click the Windows Tutorial command.



Keyboard

1. Switch to the Program Manager window: Press and hold down ALT, and then press TAB repeatedly until "Program Manager" appears in the small window in the middle of your screen. Then release both keys. The Program Manager window appears.
2. Press ALT and then H to display the Help menu.
3. Press W. Or press the DOWN ARROW key to select the Windows Tutorial command, and then press ENTER.

PART 2

Windows Fundamentals

CHAPTER 4

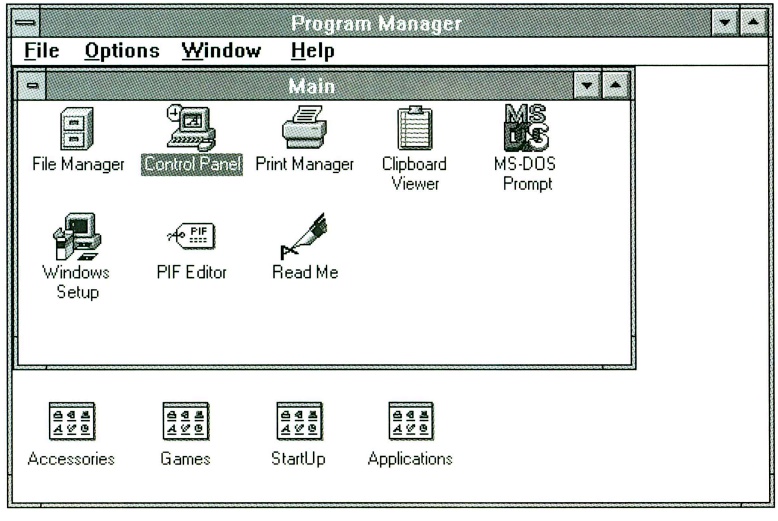
Windows Basics

If you are new to Windows, this chapter may be the most important one to read. It explains the basic skills you need to work with Windows. You may want to return to this chapter often as a reference.

Another way to become familiar with Windows is to read Chapter 3, "A Guided Tour of Microsoft Windows." The tour introduces you to all the parts of Windows and gives you a brief overview of the main applications included with Windows.

Basic Elements of Windows

Windows provides everything you need to manage your applications and files easily and efficiently. The following illustration shows the graphical environment of Windows.

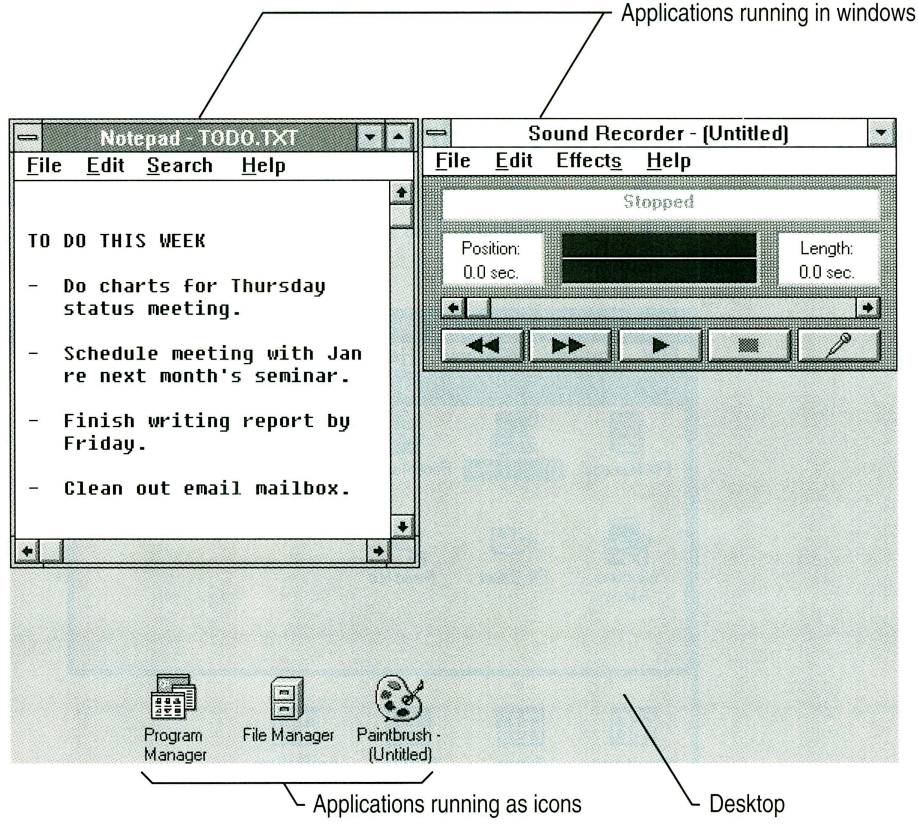


When working in Windows, your main work area is the *desktop*. You can move items around on the desktop, add new ones to it, and remove those you do not need.

The first time you start Windows, the Program Manager window appears on your screen. You can use Program Manager to organize your applications and start them.

After you start an application, it runs in an *application window* on the desktop. You can reduce any open application window to an *application icon.* An application icon is a small picture representing an application. By reducing application windows to icons, you can free space on your desktop without quitting the applications. For more information about icons, see "Types of Icons" later in this chapter.

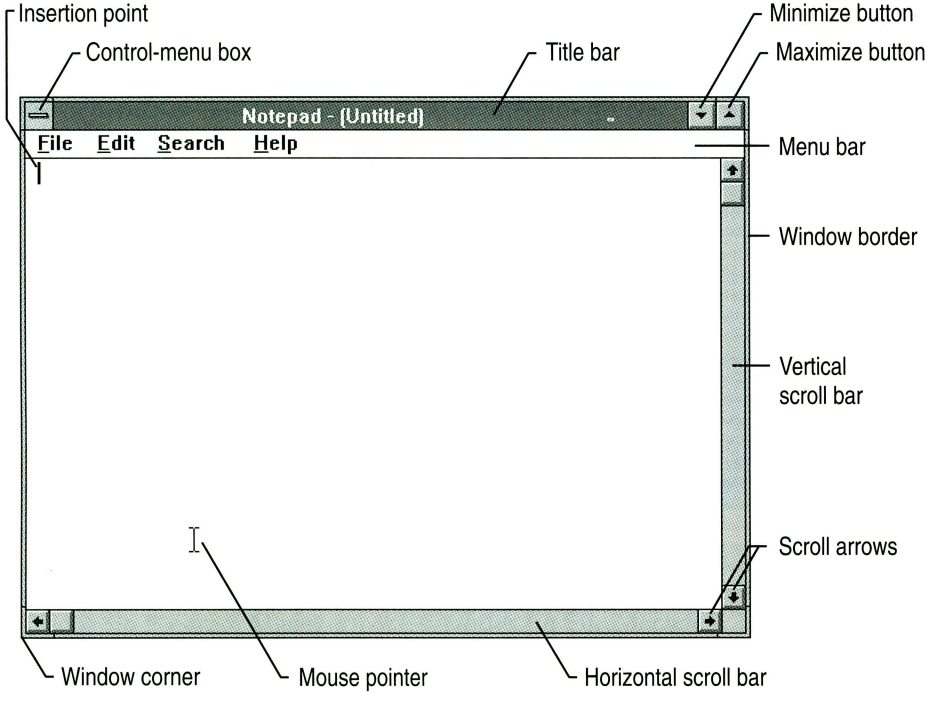
The following illustration shows applications running in windows and applications running as icons on the desktop.



For more information about how to start, run, switch between, and quit applications, see Chapter 5, "Application Basics."

Parts of a Window

Most windows have certain elements in common, such as a title bar and a menu bar. Not all windows, however, have every element.



You'll learn more about how to use window elements throughout this chapter.

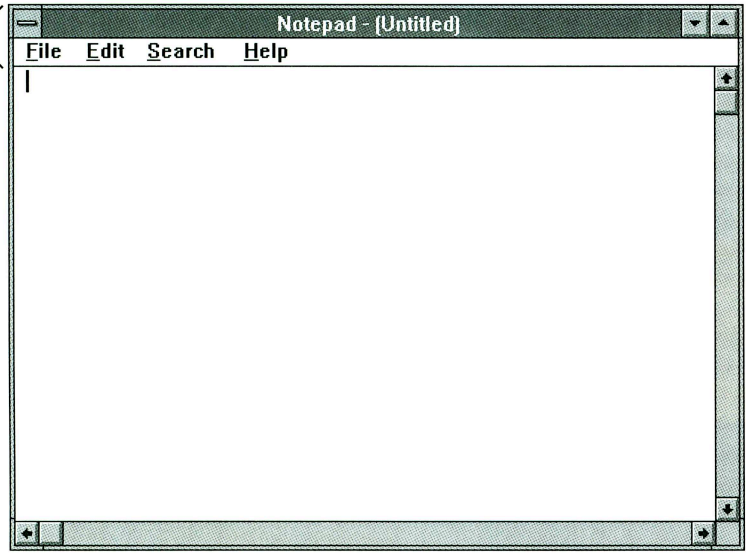
- The *Control-menu box* is in the upper-left corner of each window. Click the Control-menu box to open the *Control menu*. The Control menu is most useful if you use your keyboard (rather than a mouse) to move, size, and close a window.
- The *title bar* shows the name of the application, document, group, directory, or file. If more than one window is open, the title bar for the *active* window (the one in which you are working) has a color or intensity different from other title bars.

- The *menu bar* contains the available menus from which you can choose commands.
- The *scroll bars* enable you to move through a document or a list when the entire document or list does not fit in the window or the allotted space. Click the *scroll arrows* with the mouse to move through the document or list one line at a time.
- Clicking the *Maximize button* with the mouse enlarges the active window so that it fills the entire desktop; clicking the *Minimize button* reduces the window to an icon. You can also use the Maximize and Minimize commands on the Control menu.
- The *Restore button* replaces the *Maximize button* after you enlarge a window. Clicking the Restore button returns the window to its previous size. You can also use the Restore command on the Control menu.
- The *window border* is the outside edge of a window. You can change the window size by lengthening or shortening the border on each side of a window.
- Moving the *window corner* shortens or lengthens two adjoining sides of a window border at the same time.
- The *insertion point* shows where you are in a document. It marks the place where text and graphics appear when you begin typing or drawing. (The shape of the insertion point may vary among applications.)
- The *mouse pointer* appears if you have a mouse installed. When you move the mouse, the position of the pointer changes on the screen. (The shape of the mouse pointer may vary among applications and even among documents within the same application.)

Types of Windows

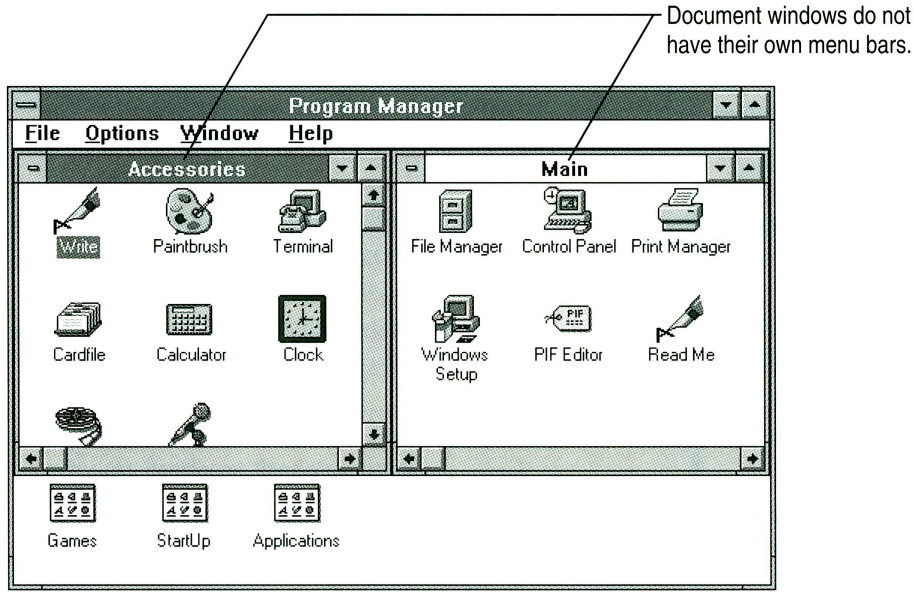
As you work with applications, two kinds of windows appear on your desktop: application windows and windows inside the application window.

An *application window* contains a running application. The following is an example of an application window.



Another window, sometimes called a *document window,* may appear inside an application window. This type of window may contain documents, data files, groups (in Program Manager), or directories (in File Manager). In certain applications, more than one of these windows can be open at a time. For example, with File Manager (one of the main applications included with Windows), you can view several directories at a time. Each directory appears inside its own window.

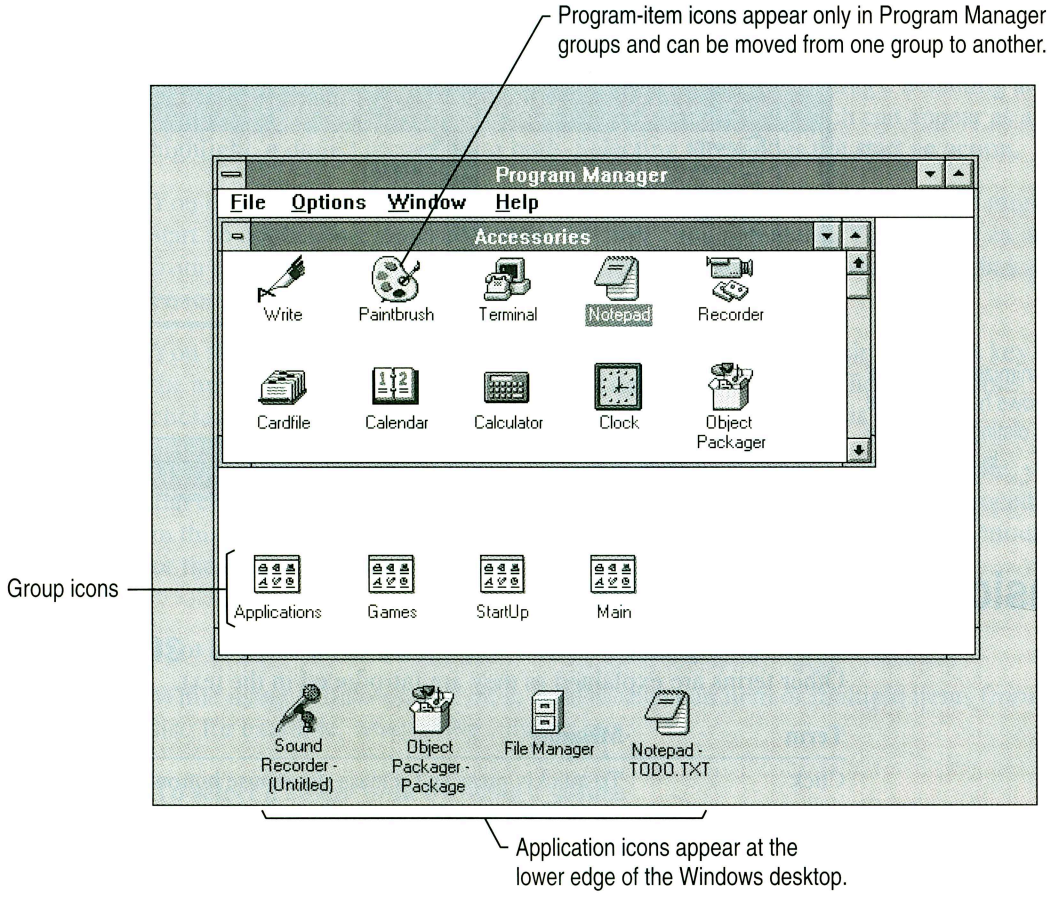
As the following illustration shows, document windows share the application-window menu bar but not the title bar. When a document window is open, commands that you choose from the application's menus affect the document window and the information contained in it.



If you use a mouse, you move and size application windows and document windows in the same way. If you use the keyboard, however, you use different keystrokes to manipulate each type of window. For more information, see "Working with a Window" later in this chapter.

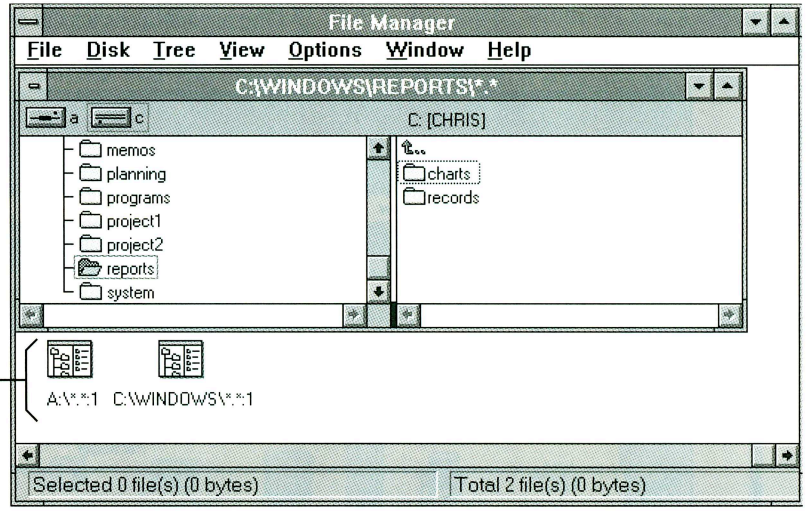
Types of Icons

Icons are small pictures that represent various types of applications and files.



The following table describes the three types of icons found on the desktop.

Icon type	Description
Program-item icon	Represents an application you can start from Windows. Most program-item icons look unique. However, icons for many MS-DOS–based applications are identical. A group might contain several MS-DOS–based applications. The icon label is the only way to distinguish which application the icon represents.
Application icon	Represents a program-item icon (an application) that was started and then reduced to an icon.
Group or document icon	Generally appears along the lower edge of the application window and represents a group or document window that was reduced to an icon. This icon can be moved anywhere within the application window.



Minimized document windows have identical icons distinguished only by their labels.

Basic Mouse Techniques

The following table describes some of the terms referred to throughout this guide. Other terms are explained as they are introduced in the text.

Term	Meaning
Click	To quickly press and release the mouse button.
Double-click	To click the mouse button twice in rapid succession.
Drag	To press and hold down the mouse button while you move the mouse.
Point	To move the mouse until the mouse pointer on the screen points to the item of choice.

Note The mouse has more than one button. In Windows, use the left mouse button, which is the default. You can change the default by using Control Panel. For more information, see Help for Control Panel.

Basic Keyboard Techniques

Using a mouse is usually easier and faster than using the keyboard. Therefore, in most cases the procedures in this guide show you mouse techniques for completing tasks. If you prefer using the keyboard, see Appendix A, "Keyboard Shortcuts."

Choosing and Selecting

In Windows, the terms *choose* and *select* have different meanings. Selecting an item usually means marking it with the selection cursor, which can appear as a highlight, a dotted rectangle, or both. Selecting alone does not start an action.

You choose an item to carry out an action. For example, choosing an icon might start an application, open a window, or carry out a command. You choose an item from a menu and choose a command button in a dialog box. (Menus and dialog boxes are discussed later in this chapter.)

You select an item by clicking it once with the mouse or by using the TAB key or the arrow keys to move the cursor to the item. You choose an item by double-clicking it or by pressing a key (such as ENTER) after the item is selected.

You can use a combination of mouse and keyboard techniques. For example, you can click an item to select it and then press ENTER to choose it. When a procedure in this guide directs you to choose an item, generally you can use either a mouse or the keyboard, whichever method you prefer.

Selecting Items

While using Windows, you often need to select an item or multiple items from a list; for example, when using a dialog box.

▶ To select a single item by using a mouse

1. If necessary, click the scroll arrows until the item you want appears.
2. Click the item.

▶ To select a single item by using the keyboard

1. If necessary, use the arrow keys until the item you want appears.
2. Press ENTER.

Sometimes you may want to select multiple items that may or may not be in sequential order. In these cases, you can select or cancel items.

▶ To select or cancel multiple sequential items by using a mouse

- To select items, click the first item you want to select, and then drag the cursor to the last item you want. To cancel the selection, click any item in the list.

  Or click the first item you want to select, press and hold down SHIFT, and then click the last item you want. Both items and all items in between are selected. To cancel the selection, release SHIFT, and then click any item.

▶ To select or cancel multiple sequential items by using the keyboard

1. To select items, use the arrow keys to highlight the first item you want.
2. Press and hold down SHIFT, and press the arrow key to continue to select items. To cancel the selection, press the appropriate arrow key.

▶ To select or cancel multiple nonsequential items

- To select, press and hold down CTRL, and then click each item you want. To cancel, press and hold down CTRL, and then click the item to cancel the selection.

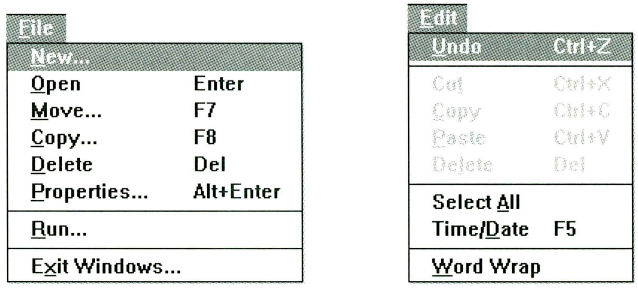
For more information about using the keyboard to select items, see "Selecting Items" in Appendix A, "Keyboard Shortcuts."

Using a Menu

Commands are listed on *menus*. Most applications have their own menus, which are listed on the menu bar along the top of the application window.

Note Some applications, such as Clock, can hide their menu bar. To display a hidden menu, double-click anywhere in the application window.

The following are typical Windows menus.



Choosing Commands from Menus

To open a menu, you select it. When a menu is open, you can choose an item from it. Menu items are most often commands. However, they can also be characteristics (such as bold or centered) that you assign to graphics or text, a list of open windows or files, or the names of other menus (*cascading menus*) that list additional commands.

▶ To open a menu and choose an item

1. Move the mouse pointer so that it points to the name of the menu on the menu bar, and then click the left mouse button.
2. Click the menu item you want. Or drag the selection cursor down the menu until the menu item is highlighted, and then release the mouse button.

Tip To move directly to a command on a menu, type the letter that is underlined in the item name.

The following menu conventions are used in Windows.

Menu convention	Meaning
Dimmed (or not visible) command	You cannot use the command with your application at the current time. (For example, you may need to select another item before you can use this command.)
An ellipsis (...) following a command	A dialog box appears when you choose the command. The dialog box contains options you need to select before the command can be carried out.
A check mark (√) to the left of a command	The command is in effect. When you remove the check mark (by choosing the command again), the command is no longer in effect.
A key combination to the right of a command	The key combination is a *shortcut* for choosing the command. You can press the keys listed to choose the command without first opening the menu.
A triangle (▶) to the right of a command	When you choose this command, a cascading menu appears.

▶ To close a menu without choosing an item

- Click the menu name, or click anywhere outside the menu.

Using the Control Menu

Application windows and their icons, document windows and their icons, and some dialog boxes have a Control menu.

You open the Control menu for windows and dialog boxes by selecting the Control-menu box in the upper-left corner of the window or dialog box. You open the Control menu for an icon by selecting the icon.

The commands on the Control menu and the way you open this menu vary. The following section describes how to use the Control menu in different environments.

Opening the Control Menu in a Windows Application

How you open the Control menu depends on whether you are working with an application window, a document window, a dialog box, or an icon.

Note In an application window that contains document windows, there may be more than one Control-menu box. The Control-menu box to the left of the application title bar controls the application. The others control the document windows inside the application window.

▶ **To open the Control menu**

- Click the Control-menu box in the upper-left corner of the dialog box, application window, or document window. Or, if the application or document window has been reduced to an icon, click the icon.

  Do not double-click; if you do, you close the window or application or restore the icon to a window.

You can also use the keyboard to open the Control menu. Use one of the following key combinations after the window or icon is selected.

To open the Control menu	Press
In an application window	ALT+SPACEBAR
In a document window	ALT+HYPHEN (-)
In a dialog box	ALT+SPACEBAR

Tip When you are using the keyboard, you must first cycle through the windows and icons to select the one whose Control menu you want to open. Press ALT+ESC (to cycle through application windows and icons) or CTRL+TAB (to cycle through document windows and icons).

Opening the Control Menu in an MS-DOS Application

An MS-DOS–based application is designed to run with Microsoft MS-DOS rather than with Windows. You can use most MS-DOS–based applications with Windows.

Windows can run in one of two modes: standard or 386 enhanced. An MS-DOS–based application running in standard mode does not have an application window; it occupies the entire screen. Before you can open its

Control menu, you must switch back to Windows so that the application is reduced to an icon.

To find out which mode Windows is running in, choose the About command on the Help menu in Program Manager.

▶ To open the Control menu for an MS-DOS–based application running in a full screen

1. Press ALT+ESC to switch from the application to Windows.

   The application is reduced to an icon at the bottom of the screen.

2. Click the icon. Or press ALT+ESC to select the icon you want, and then press ALT+SPACEBAR to open the Control menu.

386

▶ To open the Control menu for an MS-DOS–based application running in a window in 386 enhanced mode

- Click the Control-menu box in the upper-left corner of the application window. Or, if the application window has been reduced to an icon, click the icon.

  Do not double-click; if you do, you close the window or restore the icon to a window.

Control-Menu Commands

The following table describes the commands on the Control menu. Some applications do not have all these commands.

Use	To
Restore	Restore the window to its former size after you have enlarged (maximized) it or reduced (minimized) it to an icon.
Move	Move the window to another position by using the keyboard.
Size	Change the size of the window by using the keyboard.
Minimize	Reduce the window to an icon.
Maximize	Enlarge the window to its maximum size.
Close	Close the window or dialog box. (From an application window, you can use this command to quit the application.)
Switch To	Open Task List, which enables you to switch between running applications and to rearrange windows and icons on your desktop.
Next	Switch between open document windows and icons (available for document windows only).
Edit	Display a cascading menu with additional commands (available for MS-DOS–based applications running in 386 enhanced mode only).

Use	To
Settings	Display a dialog box that requests information about multitasking options (available for MS-DOS–based applications running in 386 enhanced mode only).
Fonts	Display a dialog box that you can use to specify font information (available for MS-DOS–based applications running in 386 enhanced mode only).
Always On Top	Ensure that a particular window is not covered by any other window.

Choosing the Edit command opens a menu with four additional commands, as follows.

Use	To
Mark	Select text and move it onto the Clipboard by using the keyboard.
Copy	Copy the selected text onto the Clipboard.
Paste	Copy text from the Clipboard to the active window.
Scroll	View information not currently visible in the window.

Working with a Window

When you work with applications and documents, you often have a number of windows open. This section explains how to move and resize windows, scroll through their contents, and arrange them on the desktop.

Moving a Window

You can move any window to a different location on your desktop.

▶ **To move a window**

1. Drag the title bar of the window to the new location.

   As you move the mouse pointer, an outline of the window moves with it.

2. Release the mouse button.

Tip To cancel the move, press ESC before you release the mouse button.

Changing the Size of a Window

You can change the size and shape of a window so you can view the contents of two or more windows simultaneously.

Note Some application windows cannot be resized.

▶ **To change the size of a window**

1. Select the window you want to resize.
2. Point to a border or corner of the window.

   The pointer changes to a two-headed arrow.
3. Drag the corner or border until the window is the size you want.

   If you drag a corner, the two sides that form the corner are sized at the same time.
4. Release the mouse button.

Tip To cancel the resizing, press ESC before you release the mouse button.

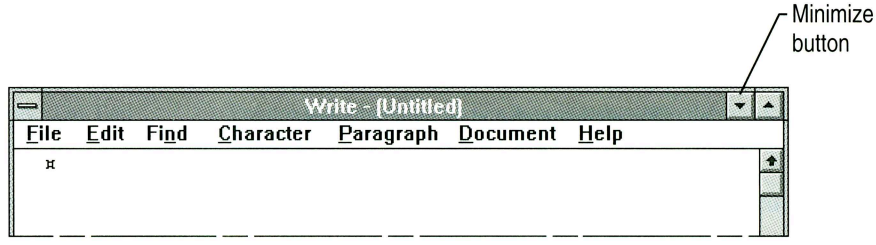
Reducing a Window to an Icon

You may want to reduce an application window to an icon if you want the application available for later use. When reduced to icons, Windows-based applications continue to run but their windows do not take up space on the desktop. You may also be able to reduce a document window to an icon. These icons appear in the application window, not at the bottom of the desktop.

After a window is reduced to an icon, you can select and move the icon in the same way you select and move a window.

To reduce a window to an icon

1. Select the window you want to reduce.
2. Click the Minimize button in the upper-right corner of the window.



Tip When a document window is maximized, the Minimize and Maximize buttons are replaced by the Restore button. If you want to minimize the document window, you can either choose Minimize from the window's Control menu, or you can first use the Restore button to restore the window and then click the Minimize button.

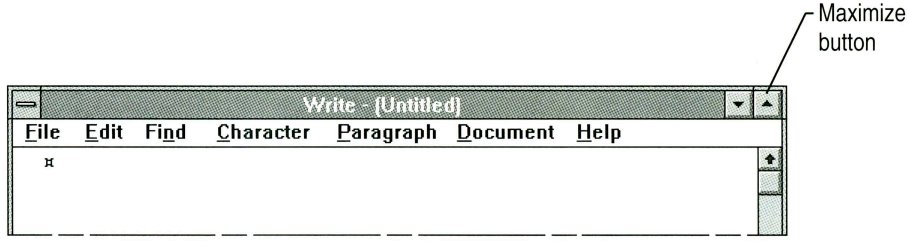
Enlarging a Window

In most cases, you can enlarge an application window to fill a larger portion of the desktop or even the entire desktop. A document window can be enlarged to fill the application window.

To enlarge a window to its maximum size

- Click the Maximize button in the upper-right corner of the window.

  The Maximize button is replaced by the Restore button.



Tip You can also maximize a window by double-clicking its title bar. To restore an application window to its previous size, double-click the title bar again. To restore a document window, click the Restore button in the upper-right corner of the window.

A maximized document window shares the application window's title bar. The Minimize and Maximize buttons affect the application window, not any windows inside it. Only the Restore button affects the document window alone.

Tip When two or more windows are open inside an application window and you enlarge one of them, all the others are covered up by the enlarged window. If you want the other windows displayed, choose the Restore button to return the enlarged window to its previous size, or choose Minimize from the document window's Control menu to reduce the window to an icon.

Restoring an Icon or Window

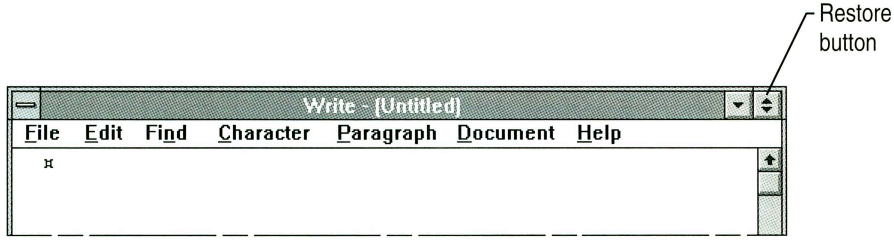
You can restore an icon or window to its original size.

▶ To restore an icon to a window

- Double-click the icon.

▶ To restore an enlarged window to its previous size

- Click the Restore button in the upper-right corner of the window.



Moving an Icon

You can move an application icon anywhere on your desktop except into another application window. (An application icon may appear to be in another application window, but if you close the window, the icon remains on the desktop.) You can move a document icon to a different location in its application window but not outside the application window.

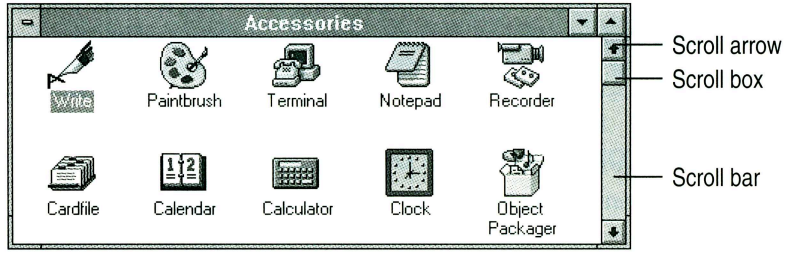
▶ To move an icon

1. Drag the icon to a new location. The mouse pointer changes to an outline of the icon, which moves as you move the mouse.
2. Release the mouse button.

Tip To cancel the move, press ESC before you release the mouse button.

Using Scroll Bars

Some windows and dialog boxes have scroll bars you can use to view information that does not fit inside the window. When you can view all the contents of a window or dialog box without scrolling, scroll bars may be absent or dimmed to indicate they cannot be used.



▶ To scroll through information displayed in a window or dialog box

- Drag the scroll box to scroll through all the information in a list or document.

  You can also use the following techniques to scroll.

To scroll	Do this
One line up or down	Click the up or down scroll arrow.
One screen	Click the scroll bar above or below the scroll box on vertical scroll bars to scroll vertically. Click to the left or right of the scroll box on the horizontal scroll bar to scroll horizontally.
Continuously	Point to one of the scroll arrows, and press and hold down the mouse button until the information comes into view.
To any position	Drag the scroll box in the scroll bar to the position you want. The section of the document or list that moves into view depends on where you position the scroll box. For example, if you position the scroll box halfway down the vertical scroll bar, the text halfway through the document or list appears.

For information about using the keyboard to scroll, see Appendix A, "Keyboard Shortcuts."

Closing a Window

One way to quit an application is to close the application window. Similarly, you can close a document by closing the document window. If you made changes to your document since you last saved it, a message prompts you to save the document before closing the window.

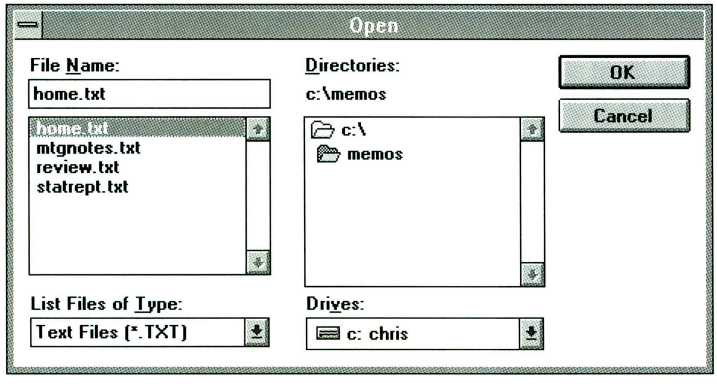
▶ **To close a window, use one of the following methods**

- From the File menu, choose Exit.
- From the Control menu, choose Close.
- Double-click the Control-menu box.
- Press ALT+F4.

Using a Dialog Box

A *dialog box* appears when you need to supply additional information to complete a task.

An ellipsis (...) after a menu command indicates that a dialog box will appear when you choose that command. For example, if you choose the Open command on the File menu in Notepad, the Open dialog box appears. In this dialog box, you specify the name of the file you want to open.



Most dialog boxes contain options you can select. After you specify options, you can choose a command button to carry out the command. Some dialog boxes may display information, warnings, or messages indicating why a requested task cannot be accomplished.

If a dialog box has a title bar, you can move the dialog box to another location on your desktop. Moving a dialog box is just like moving a window—you drag the title bar or use the Move command on the Control menu. For more information, see "Moving a Window" earlier in this chapter.

Moving Within a Dialog Box

Often you need to move within a dialog box to select one or more options. The currently selected option is marked by the selection cursor, which appears as a dotted rectangle, a highlight, or both.

▶ To move within a dialog box

- Click the option or area you want to move to. Or press TAB to move clockwise or SHIFT+TAB to move counterclockwise through the options or areas.

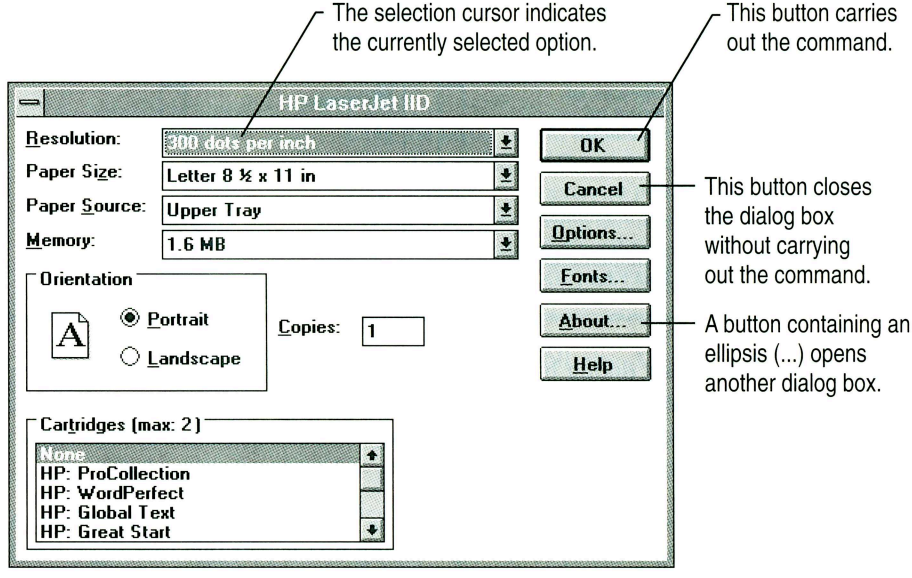
Tip If the option, box, or button has an underlined letter in its name, you can choose that item by pressing and holding down ALT while typing the underlined letter.

Types of Options

Several types of dialog box options are described in the following sections.

Command Buttons

You choose a *command button* to initiate an action, such as carrying out or canceling a command. The OK, Cancel, and Help buttons are common command buttons. They are often located along the bottom or on the right side of the dialog box.



Some dialog boxes contain a command button marked with greater-than signs (>>). This button expands the active dialog box.

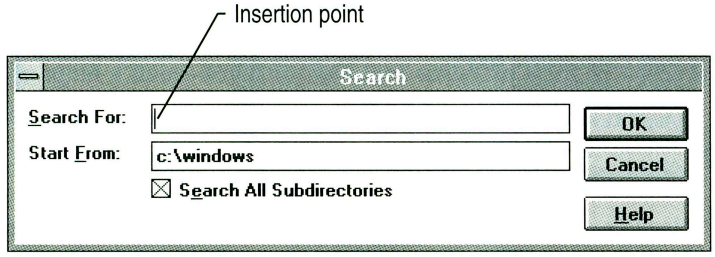
Unavailable buttons appear dimmed. The currently selected button has a border that is darker than that of other buttons. You can choose the selected button simply by pressing ENTER.

▶ To choose a command button

- Click the command button. Or press TAB until the button you want is selected, and then press ENTER.

Text Boxes

You type information into a *text box*. When you move to an empty text box, an *insertion point* (a flashing vertical bar) appears. The text you type starts at the insertion point.



If the box you move to contains text, and the text is highlighted, any text you type will replace it. You can also delete the existing text by pressing DEL or BACKSPACE. For information about editing text, see "Working with Text" in Chapter 5, "Application Basics."

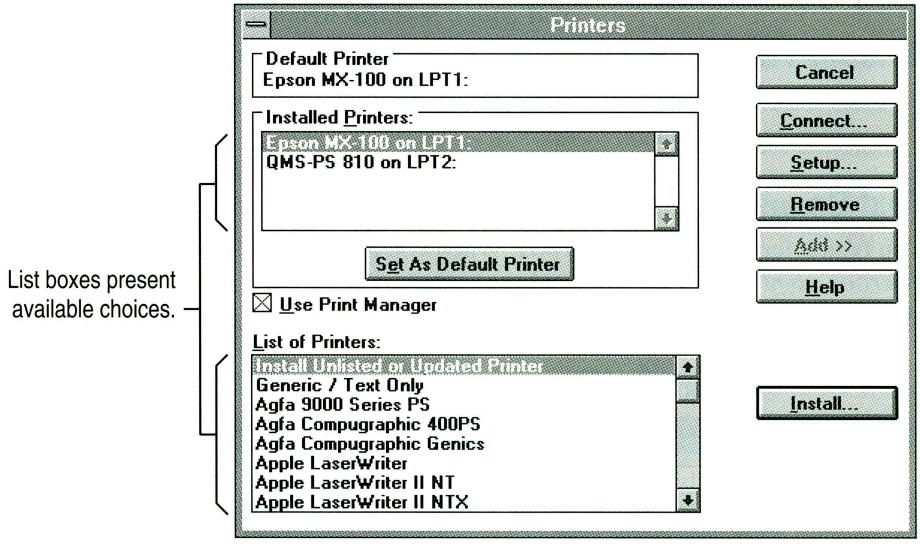
▶ To select text in a text box

- Drag the pointer across the text, or double-click a word to select one word at a time. Or press and hold down ALT while pressing an arrow key.

For more information about selection methods, see "Selecting Text" in Chapter 5, "Application Basics."

List Boxes

A *list box* displays a list of choices. If there are more choices than can fit in the box, scroll bars are provided so you can move quickly through the list. For information about scrolling, see "Using Scroll Bars" earlier in this chapter.

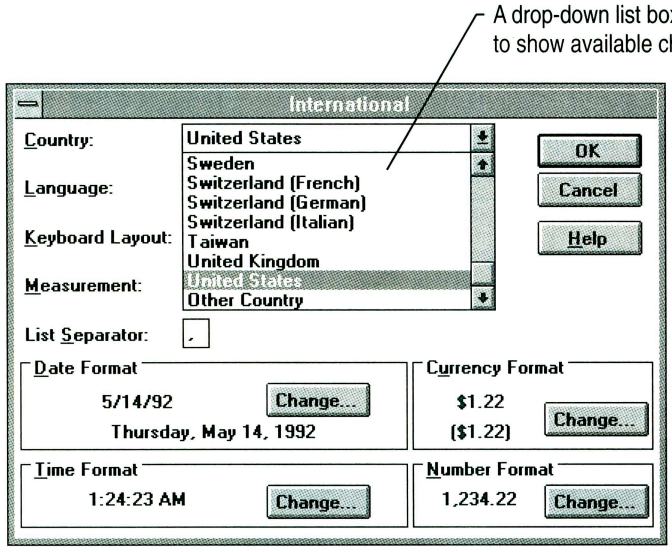


Usually, you can select only one item in a list box. In some cases, you can select more than one item, as in the Disconnect Drive dialog box in File Manager.

For more information about selecting items in a list box, see "Selecting Items" earlier in this chapter.

Drop-Down List Boxes

A *drop-down list box* appears initially as a rectangular box containing the current selection. When you select the down arrow in the square box at the right, a list of available choices appears. If there are more items than can fit in the box, scroll bars are provided.



▶ To open a drop-down list box and select an item by using a mouse

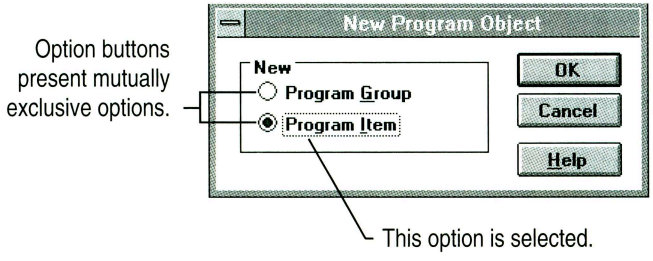
1. Click the arrow at the right of the box to open the box.
2. Click the up or down scroll arrow. Or drag the scroll box until the item you want to select is displayed.
3. Click the item.

▶ To select an item from a drop-down list by using the keyboard

- Press the UP ARROW or DOWN ARROW key to move through the available options until you reach the one you want.

Option Buttons

Option buttons represent a group of mutually exclusive options. You can select only one option at a time. If you already have one option selected, your current selection replaces it. The selected option button contains a black dot. Names of unavailable options appear dimmed.



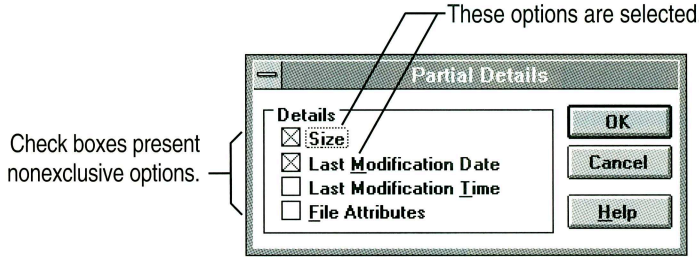
▶ To select an option button

- Click the option button, or press the SPACEBAR.

Tip If the option name has an underlined letter, you can select the option button by pressing and holding down ALT while typing the underlined letter.

Check Boxes

A *check box* presents nonexclusive options; you can select as many check-box options as needed. When a check box is selected, it contains an X. Names of unavailable options appear dimmed.



▶ To select or clear a check box

- Click the check box, or press the SPACEBAR.

Tip If the option name has an underlined letter, you can select or clear the check box by pressing and holding down ALT while typing the underlined letter.

Closing a Dialog Box

When you choose a command button, the dialog box closes and the command is carried out. You can also close the dialog box to cancel a command.

▶ To close a dialog box without carrying out a command

- Choose the Cancel button, double-click the Control-menu box, or press ESC.

Note You can also choose the Close command on the Control menu (or press ALT+F4) to close a dialog box. If a dialog box does not have a Control menu, choose the appropriate button.

CHAPTER 5

Application Basics

A major advantage of using Windows is that you can run two or more applications at the same time. For example, you can have a spreadsheet calculating complex formulas while you are using a word-processing application to prepare an annual report. At the same time, your computer can be receiving the latest information about industry sales trends that you can use in the introduction of your report.

Types of Applications

Various types of applications run with Windows. Some are specifically designed to run with Windows. Others are designed to run with Microsoft MS-DOS rather than Windows. The following table lists the types of applications you can run.

Type of application	Description
Windows-based	Windows-based applications require Windows version 3.0 or later in order to run. These programs are generally highly graphical and designed to share your computer's memory among applications as efficiently as possible.
Older Windows-based	Some Windows-based applications were designed for previous versions of Windows and do not work correctly with Windows version 3.0 and later. If you have an older Windows-based application, it is best to obtain an updated version of it.
MS-DOS–based	MS-DOS–based applications are designed to run with the MS-DOS operating system but not specifically with Windows. They do not take advantage of the Windows graphical interface, they may not have menus or dialog boxes, and they may not make use of the mouse. However, you can still use most of these applications with Windows. For more information, see Chapter 11, "MS-DOS Applications."

Type of application	Description
Memory-resident program	Memory-resident programs are MS-DOS–based applications; however, they run differently than other applications. When started from MS-DOS, a memory-resident program is loaded into memory and is available even when another application is running. A common type of memory-resident program is a *pop-up program,* which is loaded into memory but is not visible until you type a certain key combination. Memory-resident programs are sometimes referred to as *terminate-and-stay-resident programs,* or *TSRs.* For more information, see Chapter 11, "MS-DOS Applications."

Organizing Your Applications into Groups

Windows has several predefined groups of applications, described in the following table. You can control how the groups are arranged on your desktop, and you can define and add new groups.

Group	Contains
Main	Windows system applications: File Manager, Control Panel, Print Manager, Clipboard Viewer, MS-DOS Prompt, Windows Setup, and PIF Editor. This group also contains an item named Read Me that includes information you should have before you start working with Windows.
Applications	Applications found on your hard disk during Setup. If, during Setup, you chose the Custom Setup option and chose not to have Windows set up applications from your hard disk, your Program Manager window will not contain an Applications group.
Accessories	Windows-based applications for word processing, drawing, and communications.
Games	Games included with Windows. You can use these games to practice basic Windows skills.
StartUp	Applications that start when you start Windows. You can add any application to this group. The group is empty until you add applications to it.

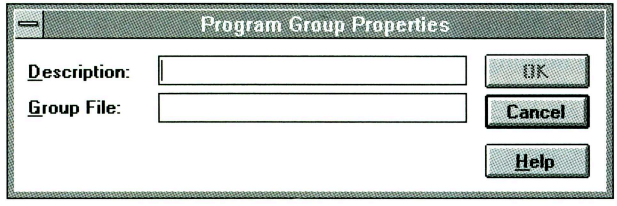
Creating and Deleting a Group

You can add any number of groups to Program Manager to organize your applications and documents. If you no longer need a group, you can delete it. You do not have to delete the contents of the group before you delete it.

To create a new group

1. From the File menu in Program Manager, choose New.
2. Select the Program Group option button, and then choose the OK button.
3. In the Program Group Properties dialog box, type a description for the group you want to create, and then choose the OK button.

   The Group File box contains information about the contents of the group. You can leave this box blank, because Program Manager automatically assigns a name to this file.



After creating a group, you can add program items (icons that represent applications) to it.

To delete a group

1. Select the group icon for the group you want to delete.
2. From the File menu, choose Delete. Or press DEL.

Creating a Program Item

When you create a program item for an application, you specify the program item's properties, such as a description (label) for the item, a working directory where any files the application creates are stored, and the icon that represents the application. You can change these properties at any time. For information about changing properties, see Help for Program Manager.

A group can contain a maximum of 40 program items.

You can create a program item by using any of the following methods:

- Choose the New command from the File menu in Program Manager to create a program item for an application or document.
- Drag files from File Manager to a Program Manager group.
- Run Windows Setup to create program items for one or more applications.

The following sections describe these methods in detail.

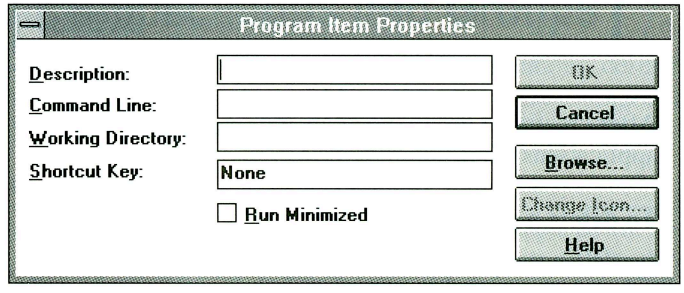
Using the New Command to Create a Program Item

You can create a program item for an application or document. When you choose a program item for a document, the application opens, displaying the document.

▶ To create a program item for an application

1. Open the group that you want to add an item to, and then choose New from the File menu in Program Manager.
2. Select the Program Item option button, and then choose the OK button.

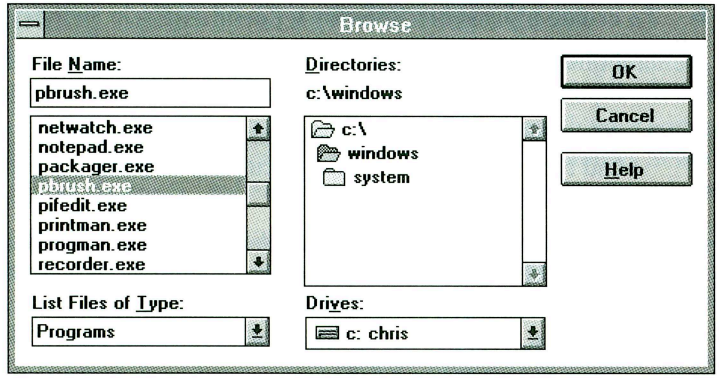
Tip You can quickly open the Program Item Properties dialog box by pressing and holding down ALT while double-clicking in a blank area of the group window.



3. In the Program Item Properties dialog box, type a description for the application. The 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.
4. In the Command Line box, type the name of the program file, including the path (if there is one) and extension.

   For example, to add Microsoft Excel, located in a directory named C:\EXCEL, type **c:\excel\excel.exe**.

   If you don't know the name of the program file, choose the Browse button in the Program Item Properties dialog box to display a list of files and directories. Select the appropriate filename from the list, and then choose the OK button. (You can use the directory listing to change to a different directory.)



5. In the Working Directory box, type the name of the directory where the program files for this application are located and where new files will be stored.
6. To reserve a shortcut key for use with the application, type the key combination in the Shortcut Key box. You use a shortcut key to switch to the application when it is running or to start an application when the Program Manager window is active.

   Valid shortcut-key sequences are:

   - CTRL+ALT+*character*
   - CTRL+SHIFT+*character*
   - SHIFT+ALT+*character*
   - CTRL+SHIFT+ALT+*character*

   Character can be any letter, number, or special character. When you type only 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.

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

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7. If you want this application to be reduced to an icon when it starts, select the Run Minimized check box.
8. Choose the Change Icon button to see the default icon for this program item. Scroll through the list, select the icon you want to use, and then choose the OK button.
9. Choose the OK button in the Program Item Properties dialog box. The new program item appears in the group.

▶ To create a program item for a document

1. Follow the first four steps in the procedure describing how to create a program item for an application, in the preceding section.
2. After the program filename in the Command Line box, press the SPACEBAR, and type the filename of the document. Include the path required to locate the document.

   For example, to specify a spreadsheet named 93BUDGET.XLS, located in the C:\ADMIN\FY93 directory, as the document to be opened when you start Microsoft Excel, you would type the following:

   c:\excel\excel.exe c:\admin\fy93\93budget.xls

   Note If the document is in the same directory as the application, you do not have to repeat the path when you type the filename of the document. If you have specified a working directory that is different from the application directory, you must specify a path with the document filename.

3. Complete the other areas in the dialog box, and then choose the OK button.

Dragging Files from File Manager to Create a Program Item

You can also use File Manager to create program items by moving applications and associated documents from File Manager directories to Program Manager group windows. You can do this even if a group window is minimized. The following procedure requires a mouse.

▶ To create a program item by using File Manager

1. Locate the Program Manager group where you want to create a new program item. The destination group can be either a window or an icon.
2. Open File Manager and select the program or document file that you want to add as a program item. (You can also select multiple items and add them to a group at the same time.)
3. If necessary, reposition the File Manager window so that you can see both File Manager and the Program Manager group icon or window where you want to place the new program item.

   Tip If no other application windows are open except for File Manager and Program Manager, you can press CTRL+ESC to open Task List, and then choose the Tile button to arrange the File Manager and Program Manager windows.

4. Drag the file icon from File Manager to Program Manager, and drop it in the group window or onto the group icon.

   As you drag the file icon, the mouse pointer turns into a replica of a file icon. If you select multiple items, you can drag them all at the same time.

Running Setup to Create Program Items

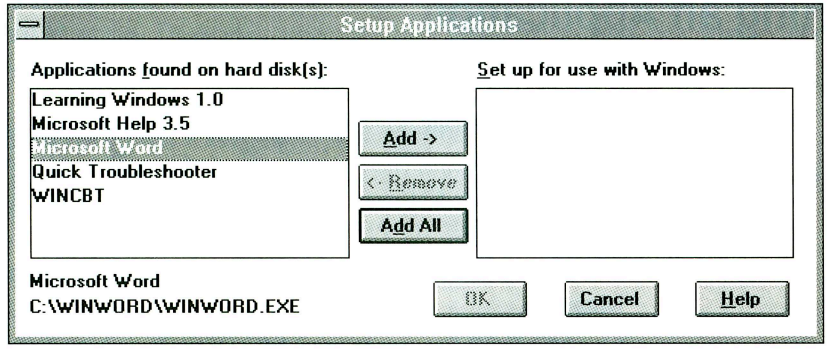
By using the Windows Setup icon, you can create a program item for one or more applications already on your hard disk. Instead of adding each application to a group separately, you can have Windows Setup search your computer's drive(s) and set up multiple applications at the same time. Windows Setup creates an Applications group, and each application found appears as an icon in that group.

Caution Before running a setup program for any other Microsoft application that is not yet on your hard disk, you must quit Windows Setup. Otherwise, the application's setup program may fail.

Note If Setup finds an MS-DOS–based application on your hard disk, it uses a program information file (PIF) to set up the application. Setup will set up only those MS-DOS–based applications that have a PIF. If Setup detects a naming conflict or multiple PIFs for one application, it displays a dialog box prompting you to specify the name of the application or PIF you want to use. For more information, see Chapter 11, "MS-DOS Applications."

▶ To have Setup search for and set up applications

1. In the Main group, choose the Windows Setup icon.
2. From the Options menu, choose Set Up Applications.
3. Select the Search For Applications option button, and then choose the OK button. Setup displays a dialog box where you specify that Setup search for applications on one or more specific drives, and/or the current path.
4. Click the search options you want, and then choose the Search Now button. When the search is completed, Setup displays a list of the applications found.



In the Applications Found On Hard Disk(s) box, Setup lists the names of all the applications it found. (If you cancel the search, Setup lists the names of applications found before you canceled.)

5. Click each application you want. (You can cancel the selection by clicking it again.)
6. After you select all the applications you want, choose the Add button to move them to the Set Up For Use With Windows box. To add all the listed applications, choose the Add All button.

   To delete an application after you add it, select the application name, and then choose the Remove button.
7. After you have selected the applications you want to set up, choose the OK button.

Changing a Program-Item Icon

If you don't like the icon assigned to a program item, you can choose one of the many icons provided with Program Manager.

▶ **To change the program-item icon**

1. Select the program-item icon that you want to change.
2. Choose Properties from the File menu, and then choose Change Icon in the Program Item Properties dialog box.
3. In the File Name box, type the path for either the PROGMAN.EXE file or the MORICONS.DLL file (in your Windows directory).

   You can now select from these icons by scrolling through the Current Icon box.
4. After you select the new icon, choose the OK button.
5. Choose the OK button in the Program Item Properties dialog box. The icon you selected appears.

Starting an Application

With Windows, you can start an application in a number of ways:

- Choose a program-item icon from a group in Program Manager.
- Choose a program file or a program information file (PIF) from a directory window in File Manager. (For information about starting an application from its PIF, see Help for PIF Editor.)
- Choose the Run command from the File menu in Program Manager or File Manager.
- Use MS-DOS Prompt to start MS-DOS–based applications.

Note In the following procedures, remember that when using a mouse, you click to choose menu commands and command buttons, and you double-click to choose icons.

Starting an Application from Program Manager

The easiest way to start an application in a group is to choose the program-item icon for the application from the group window. If a document is associated with this program-item icon, the application opens, displaying the document.

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

1. If necessary, double-click the group icon to open the group window that contains the application you want to run.
2. Double-click the icon for the application.

Tip You can choose the Minimize On Use command from the Options menu in Program Manager to reduce Program Manager to an icon whenever you start an application.

Starting an Application When You Start Windows

When you install Windows by using the Setup program, Windows creates a StartUp group. Each application in this group starts when you start Windows.

For example, if you want File Manager to start whenever you start Windows, copy the File Manager icon from the Main group to the StartUp group. (For more information, see Chapter 4, "Windows Basics.")

You can also have Windows automatically reduce an application to an icon in the StartUp group. To do this, select the Run Minimized check box when you create the program item, or choose the Properties command on the File menu.

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**

- Click the Program Manager window. Or double-click anywhere on the Windows desktop or press CTRL+ESC to display Task List, and then choose Program Manager from the list of running applications.

Tip Press and hold down ALT, and then press TAB repeatedly. As you continue to press TAB, the title of each running application is displayed. When "Program Manager" appears in the center of your screen, release ALT. The Program Manager window appears in the foreground.

Starting an Application by Using File Manager

You can start an application from File Manager by choosing the application program file from a directory window. A program file has a .COM, .EXE, .PIF, or .BAT filename extension. If you start an application that can run in a window, the window appears in front of the File Manager window. If the application is a full-screen application, such as MS-DOS Prompt, it replaces the Windows desktop on your screen.

▶ **To start an application by using File Manager**

1. In the Main group, double-click the File Manager icon.
2. Click the drive icon for the drive you want.
3. Click the directory icon for the directory you want.
4. Double-click the name of the application's program file.

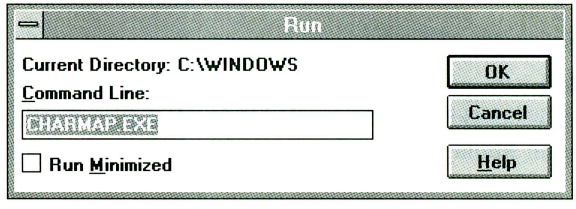
Tip You can choose the Minimize On Use command from the Options menu in File Manager to reduce File Manager to an icon whenever you start an application.

Starting an Application by Using the Run Command

You can use the Run command to start an application that you run only occasionally or have not yet added to a group. You can also specify that a particular document open when you start the application.

▶ **To start an application by using the Run command**

1. From the File menu in Program Manager or File Manager, choose Run. The Run dialog box appears.



2. In the Command Line box, type the path and the name of the program file, including the extension, if there is one. (In File Manager, you do not need to type the path if the program file is in the current directory. In Program Manager, you can choose the Browse button to display a list of program files to select from.)

   For example, if you want to start Aldus PageMaker and it is in the directory C:\PAGEMKR, you would type the following in the Command Line box:

   c:\pagemkr\pm.exe

   In most cases, you can open a document at the same time you start an application by typing a space and the document filename (including the path where the document is located) after the program filename.

   For example, to open a document named NEWSLTR.PM3 in the AUGUST subdirectory of C:\PAGEMKR, you would type the following:

   c:\pagemkr\pm.exe c:\pagemkr\august\newsltr.pm3

3. If you want the application to be reduced to an icon as soon as it starts, select the Run Minimized check box.
4. Choose the OK button or press ENTER.

Starting an Application by Using the MS-DOS Command Prompt

Generally, you can set up your MS-DOS–based applications to run from Program Manager. (For more information, see Chapter 11, "MS-DOS Applications.") For MS-DOS–based applications that aren't set up, such as memory-resident programs, you can start them by using MS-DOS commands.

MS-DOS Prompt appears as a program item in the Main group in Program Manager. You can use it to gain access to the MS-DOS command prompt without leaving Windows.

▶ **To start an application by using MS-DOS Prompt**

1. In Program Manager, choose the Main group icon.
2. In the Main group, choose the MS-DOS Prompt icon.
3. When the command prompt appears, type the necessary MS-DOS commands to start your MS-DOS–based application.

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▶ **To run MS-DOS Prompt in a window (in 386 enhanced mode only)**

- After MS-DOS Prompt is running (follow steps 1 and 2 from the previous procedure), press ALT+ENTER. MS-DOS Prompt appears in a window so you can use the commands on the Control menu.
- To return to a full screen, press ALT+ENTER again.

Tip If you want MS-DOS Prompt to always start in a window, you can change the DOSPRMPT.PIF file located in the Windows directory. Using PIF Editor, open the file and select the Windowed option under Display Usage. Then save the file. Running MS-DOS Prompt in a window uses more memory.

▶ To quit MS-DOS Prompt

1. At the command prompt, type the following:

   exit

2. Press ENTER.

You can also leave MS-DOS running and switch to Windows to work with applications. For more information, see "Switching Between Applications and Documents" later in this chapter.

Caution Some MS-DOS commands do not work properly when Windows is running. For example, when you use the **chkdsk** command with the **/f** option, **chkdsk** tries to modify part of the operating system that cannot be modified while Windows is running. You should also avoid using the **undelete** command; the **chcp (change codepage)** command; and disk-compaction or optimization programs, such as the Norton SD.EXE program, when Windows is running. If you need to run such programs or such commands, quit Windows first.

Running Two or More Applications

With Windows, you can start an application and then keep it running while you start one or more additional applications.

When applications run at the same time, they share computer resources. The way they share resources depends on the type of computer you have, the type and amount of available memory, whether the applications are Windows-based or MS-DOS–based, and which mode Windows is running in.

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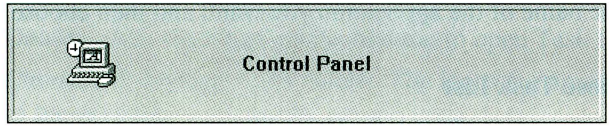
Note When Windows is running in 386 enhanced mode rather than in standard mode, more applications can run simultaneously. To find out which mode Windows is running in, choose the About command from the Help menu in Program Manager.

Switching Between Applications and Documents

When you have more than one application window open at once, the window you are currently working with is the *active window*. The active window always appears in the foreground, so it might overlap or completely obscure other windows. To work with another application, you must select its window to make it active.

▶ **To switch to an application, use one of the following methods**

- If the application is visible, click anywhere in the application window. If the application is running as an icon, double-click the icon.
- To return to the application you last used, press ALT+TAB.
- To switch quickly to another application, press and hold down ALT, and then press TAB repeatedly. As you continue to press TAB, the title of each running application appears.



When the title of the application you want appears, release ALT. The application then appears in the foreground.

- Press ALT+ESC repeatedly to cycle through open application windows and application icons until you reach the application you want.
- Display Task List, and use it to switch to the application you want. For more information, see the following section, "Using Task List to Switch Between Applications."

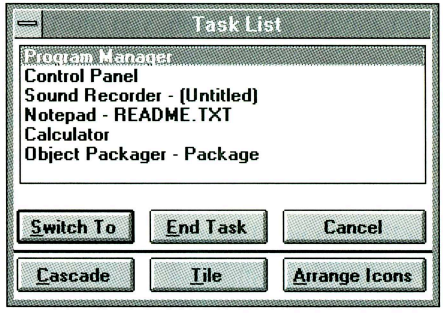
Tip If you use an application frequently, you may want to create a shortcut key to use when switching to it. You can define a shortcut key in the Program Item Properties dialog box in Program Manager. For more information, see "Using the New Command to Create a Program Item" earlier in this chapter.

Using Task List to Switch Between Applications

Task List is a window that displays a list of all the applications you are currently running. You can use Task List to switch to another application.

▶ To switch to an application by using Task List

1. Double-click anywhere on the desktop (that is, not inside an open window) to display Task List, or choose Switch To from the Control menu in Program Manager, or press CTRL+ESC.



2. In Task List, double-click the name of the application to switch to. Or select the name of the application you want, and then choose the Switch To button.

▶ To close Task List

- Press ESC, or choose the Cancel button.

For more information about displaying and using Task List, see "Arranging Application Windows and Icons" later in this chapter.

Switching Between Documents

With some applications, you can open more than one document at a time, each in its own window. If you have more than one document window open, you can easily switch between them.

For example, you can switch between directory windows in File Manager.

▶ To switch to another document window in an application

- Click anywhere in the document window you want to switch to. Or open the application's Window menu, and then choose the document you want.

Tip You can also press CTRL+F6 or CTRL+TAB repeatedly until the document window you want is selected. (This is a shortcut for using the Next command on the Control menu.)

Arranging Application Windows and Icons

You can use the Cascade and Tile buttons in Task List to rearrange application windows so that all running applications are visible on your desktop. The Cascade command causes the windows to overlap so that each title bar is visible. The Tile command arranges the open windows in smaller sizes to fit next to each other on the desktop.

▶ To arrange application windows on your desktop

1. Double-click anywhere on the desktop to open Task List. Or press CTRL+ESC.
2. Choose the Cascade or Tile button.

If you have a number of applications running as icons and they are scattered across your desktop, follow the next procedure to rearrange them evenly.

▶ To rearrange application icons

1. Double-click anywhere on the desktop to open Task List. Or press CTRL+ESC.
2. Choose the Arrange Icons button. The icons are arranged along the lower edge of the desktop.

Dragging Files to Perform Tasks

When using File Manager, Program Manager, Print Manager, and certain other Windows-based applications, you can perform some essential tasks by dragging File Manager files from one place to another with the mouse. This is known as *dragging and dropping*.

For example, you can print a file on your default printer by dragging a File Manager file onto the Print Manager icon (the minimized Print Manager window) and then releasing the mouse button. Or you can set up an application to run with Windows by dragging a File Manager file onto a group window or icon in Program Manager.

Note Dragging File Manager files can only be done by using a mouse. There is no keyboard equivalent.

▶ To drag and drop a file

1. In the Main group, double-click the File Manager icon to start File Manager.
2. Select the drive and directory containing the file you want to drag.
3. Make sure the application that you want to drag the file to is running either as a window or an icon.

4. Arrange the windows on your screen so that both the File Manager file you want to drag and the application window or icon you want to move the file onto are visible.
5. Select the file you want.
6. Press and hold down the left mouse button, drag the file onto the application window or icon, and then release the mouse button.

You can perform the following tasks by dragging File Manager files.

To	Drag the file onto
Create a Program Manager group item	A Program Manager group window or icon.
Open a file in an application	The application's icon or title bar.
Move or copy a file to a different drive	A File Manager drive icon.
Move or copy a file to a File Manager directory	A File Manager directory window or directory icon.
Print a file on your default printer with the default settings	The minimized Print Manager window (Print Manager running as an icon).

Note The ability to print and open files by dragging and dropping icons depends on the application. Some applications may not support this feature. Check your application's documentation to find out whether dragging and dropping are supported.

Receiving a Message from an Inactive Application

When an inactive application issues a status or error message, the application title bar or icon flashes, and you may hear a beep.

▶ **To receive a status or error message**

- Select the application window or icon. The message appears.

Quitting an Application

There are various ways to quit an application. If you are working on a document and you haven't saved your changes, you are prompted to save them.

▶ **To quit a Windows-based application, use one of the following methods**

- From the application's File menu, choose Exit.
- From the Control menu, choose Close.

- Press ALT+F4.
- Double-click the Control-menu box.

▶ To quit an MS-DOS–based application

- Choose the application's exit or quit command. If you are using MS-DOS Prompt, type **exit** at the command prompt. The application closes, and you return to Windows.

When you quit an MS-DOS–based application that is running in a full screen, you usually return to the Windows desktop just as you left it. If you return to an MS-DOS prompt, type **exit**.

Opening and Saving Documents

This section explains some basic tasks, such as opening, editing, and saving files, that are common to many Windows-based applications.

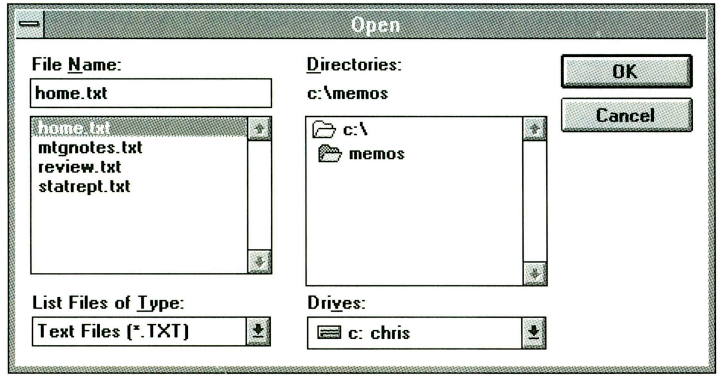
Note The procedures in this section apply to the applications supplied with Windows. Other applications may work differently.

Opening Files

Choosing the Open command from an application's File menu opens a dialog box that is often the same regardless of which application you are using. This dialog box is designed to save you time because you can select the drive, directory, file, and file type from the ones displayed in the list boxes.

▶ To open a file

1. From the application's File menu, choose Open. The Open dialog box appears.



2. If the file you want to open is on a different drive, select the drive you want from the Drives list.
3. In the Directories box, choose the directory you want to open. (Double-click the directory.)

   Windows displays the names of all files in that directory that are the type selected in the List Files Of Type box. To display a different type of file, select the type you want from the List Files Of Type box.
4. Type the filename, and then choose the OK button. Or double-click the filename in the File Name box.

Saving Files

In many applications, the File menu contains two commands for saving files: Save and Save As. You use the Save command to save changes to an existing file. You use the Save As command to name and save a new file or to save an existing file under a new name. For example, you may want to make changes to a file, yet also keep the original file without the changes. By using the Save As command, you can save a copy of the original file with a different name.

▶ To save an existing file

- From the application's File menu, choose Save.

▶ To save a new file or an existing file under a new name

1. From the application's File menu, choose Save As.
2. If you want to save the file on a different drive, select the drive you want from the Drives list.
3. In the Directories box, choose the directory in which you want to save the file.
4. In the File Name box, type a name for the file.

   If you don't specify a filename extension, the application may add one. For example, Notepad adds the extension .TXT to a filename.

   The default extension is shown in the Save File As Type box. To use a different extension, select an extension from the Save File As Type list, or type an extension.
5. Choose the OK button.

Working with Text

With many applications, you type text from time to time. The procedures for typing text, correcting errors, and editing text are the same for most Windows-based applications.

Typing Text

When you start typing text, an insertion point marks the place where the text appears.

▶ To type text in a new document

- Begin typing the text. Press ENTER to move the insertion point to the next line. Press the SPACEBAR to move the insertion point one space to the right.

▶ To type text in an existing document

- Move the mouse pointer to where you want text to appear, click once, and then start typing. Or use the arrow keys to move the insertion point to where you want text to appear.

Note To create a blank line and move the insertion point along that line, use ENTER and the SPACEBAR. For example, to type a report title 10 lines from the top of a new page and 20 spaces from the left margin, press ENTER 10 times, and then press the SPACEBAR 20 times before you type the title.

Moving Within Text

You can easily move the insertion point wherever you want within text.

To move to the	Press
Next line	DOWN ARROW
Previous line	UP ARROW
End of the line	END
Beginning of the line	HOME
Next screen	PAGE DOWN
Previous screen	PAGE UP
Next word	CTRL+RIGHT ARROW
Previous word	CTRL+LEFT ARROW
End of the document	CTRL+END
Beginning of the document	CTRL+HOME

Correcting Typing Mistakes

If you make a mistake while typing, you can correct it by using one of the methods in the following table. Or, if you need to change more than a few characters, you can select the text and edit it.

To	Do this
Delete the character (or selected text) to the left of the insertion point	Press BACKSPACE.
Delete the character (or selected text) to the right of the insertion point	Press DEL.
Insert characters at the insertion point	Type the characters.

Selecting Text

You can make changes to blocks of text by selecting (highlighting) the text you want to change, and then choosing one of the commands from the application's Edit menu.

▶ To select text

1. Point to the first character you want to select.
2. Press and hold down the mouse button, and then drag the insertion point to the last character you want to select.
3. Release the mouse button.

Tip With some applications, you can select a single word by double-clicking it. Or you can select all the text in your file by choosing Select All from the Edit menu.

▶ To cancel the selection

- Click anywhere in the document.

The following table shows ways to select text by using the keyboard. Not all applications offer all options. In most cases, you can select an area of text by pressing and holding down SHIFT while you use standard keystrokes. For information about valid key combinations, see your application's documentation.

To extend the selection to the	Press
Next word	CTRL+SHIFT+RIGHT ARROW
Previous word	CTRL+SHIFT+LEFT ARROW
Next line	SHIFT+DOWN ARROW
Previous line	SHIFT+UP ARROW
End of the line	SHIFT+END
Beginning of the line	SHIFT+HOME
Next screen	SHIFT+PAGE DOWN
Previous screen	SHIFT+PAGE UP
End of the document	CTRL+SHIFT+END
Beginning of the document	CTRL+SHIFT+HOME

Editing Selected Text

The following table describes ways you can edit selected text.

To	Do this
Delete the selected text and place it onto the Clipboard	From the Edit menu, choose Cut.
Make a copy of the selected text and place it onto the Clipboard	From the Edit menu, choose Copy.
Replace the text with new text	Type the new text.
Delete the text (not place it onto the Clipboard)	Press DEL or BACKSPACE.
Cancel the previous editing operation	From the Edit menu, choose Undo.
Paste text from the Clipboard into the active window	Place the insertion point where you want the text to appear, and then choose Paste from the Edit menu.

Transferring Information Between Applications by Using the Clipboard

Information you cut or copy onto the Clipboard remains there until you clear it or cut or copy another piece of information onto it, or until you quit Windows. Because the information remains on the Clipboard, you can paste the information into a document as often as you like.

Cutting or Copying Information onto the Clipboard

The method you use to transfer information onto the Clipboard depends on whether you are using a Windows-based or MS-DOS–based application and whether it is running in a window or a full screen. For more information about cutting or copying information onto the Clipboard from an MS-DOS–based application, see Chapter 11, "MS-DOS Applications."

If you are using a Windows-based application, you can cut or copy selected information onto the Clipboard. You can also copy an image of the entire desktop or a single window.

▶ To cut or copy information onto the Clipboard

1. Select the information you want to cut or copy. (For information about selecting text in Windows, see "Selecting Text" earlier in this chapter.)

   You can cut or copy text, graphics, or a combination of text and graphics.

2. From the application's Edit menu, choose Cut or Copy.

   Use the Cut command to remove information from a file and place it onto the Clipboard.

   Use the Copy command to place a copy of the information onto the Clipboard, leaving the information in its original location as well.

Copying the Desktop

Whether Windows is running in 386 enhanced mode or in standard mode, you can copy the contents of the desktop onto the Clipboard. When Windows is running in standard mode, however, graphics from an MS-DOS–based application are not copied onto the Clipboard.

▶ To copy an image of the desktop onto the Clipboard

- Press PRINT SCREEN.

Note If pressing PRINT SCREEN does not copy the screen onto the Clipboard, you may not have an enhanced keyboard. Try pressing ALT+PRINT SCREEN or SHIFT+PRINT SCREEN to copy the screen.

Copying the Contents of the Active Window

386 To use the following procedure, Windows must be running in 386 enhanced mode.

▶ To copy the contents of the active window onto the Clipboard

- Press ALT+PRINT SCREEN. If you are copying from a Windows-based application, a bitmap of the window is placed onto the Clipboard. If you are copying from an MS-DOS–based application, the information is placed onto the Clipboard as text. The application you want to transfer the information to must be able to read bitmap (.BMP) files. See the documentation supplied with your application to determine this.

▶ To copy from an MS-DOS–based application running in a window

Mouse

1. Drag the mouse pointer across the information you want to copy.
2. Click the Control-menu box, and the choose Edit from the Control menu. The Edit drop-down menu appears.
3. Choose Copy to transfer the selected information onto the Clipboard.

Keyboard

1. Press ALT+SPACEBAR to open the Control menu for the application, and then choose Edit from the Control menu. The Edit cascading menu appears.
2. Choose Mark. A rectangular cursor appears at the upper-left corner of the window.
3. Move the cursor to the first character you want to select.
4. Press SHIFT and an arrow key to mark the information you want to copy.
5. From the Control menu, choose Edit. The Edit menu appears
6. Choose Copy to transfer the selected information onto the Clipboard.

Viewing the Contents of the Clipboard

When you copy or cut information, it is placed on the Clipboard. You can view the contents of the Clipboard by starting Clipboard Viewer.

▶ **To view the contents of the Clipboard**

1. Switch to Program Manager.
2. In the Main group, choose the Clipboard Viewer icon.

Note Sometimes Windows changes the line length of the information you copy or cut so that all of it can be seen in the Clipboard window. When you paste the information from the Clipboard into the destination application, however, the information is intact.

The Clipboard accepts a number of text and graphics formats. When you transfer information from one application to another, the original application places the information onto the Clipboard in all the formats the Clipboard recognizes. The application you paste the information into then selects the format that is most compatible. To view a list of all the available formats on the Clipboard and to view the information in a different format, use the Display menu in Clipboard Viewer.

Pasting Information from the Clipboard

You can paste information from the Clipboard into an application at any time. Make sure the application you want to paste the information into accepts the bitmap format if you copied the desktop or a window onto the Clipboard. Information you cut or copy onto the Clipboard remains there until you cut or copy something else, clear it, or quit Windows. The method you use to paste information depends on whether you are pasting into a Windows-based or MS-DOS–based application. For information about MS-DOS–based applications, see Chapter 11, "MS-DOS Applications."

▶ **To paste information into a Windows-based application**

1. Make sure the information you want to paste is on the Clipboard. (For information about viewing the Clipboard contents, see the preceding section, "Viewing the Contents of the Clipboard.")
2. Start the application.
3. Place the insertion point where you want to paste the information.
4. From the application's Edit menu, choose Paste.

Saving the Contents of the Clipboard

You can save the contents of the Clipboard in a file. You can later retrieve the file and paste its contents into an application. You can view the file you save by using Clipboard Viewer.

▶ To save the contents of the Clipboard to a file

1. Switch to Program Manager.
2. In the Main group, choose the Clipboard Viewer icon, and then choose Save As from the File menu. The Save As dialog box appears.
3. Type a filename for the contents of the Clipboard. The default extension for a Clipboard file is .CLP.

   You can also type a path if you want to store the Clipboard file in a different directory.
4. Choose the OK button.

You can open a Clipboard file and then paste it into any application. Only files with a .CLP extension can be opened in Clipboard Viewer.

▶ To retrieve a Clipboard file

1. Switch to Program Manager.
2. In the Main group, choose the Clipboard Viewer icon, and then choose Open from the File menu. The Open dialog box appears.
3. Select the .CLP file you want to retrieve, and then choose the OK button.

Note If the Clipboard already contains information, you are prompted to clear it. If you choose the OK button, the current contents of the Clipboard are replaced by the contents of the file you specified.

If you need more memory to run an application, you can clear the Clipboard. Since the Clipboard stores information in multiple formats, clearing it might free some memory.

▶ To clear the Clipboard

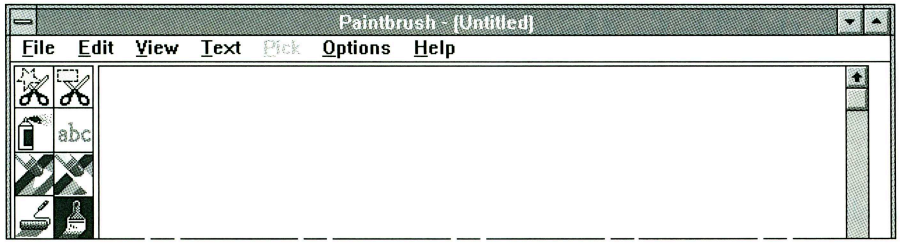
1. Switch to Program Manager.
2. In the Main group, choose the Clipboard Viewer icon, and then choose Delete from the Edit menu or press DEL.
3. Choose the OK button.

CHAPTER 6

Online Help

Online Help in Windows 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.

Help is available whenever you see a Help command button in a dialog box or Help as an item on a menu bar.



The applications and accessories (except Clock) you received with Windows include Help, as described in this section. Other Windows-based applications and MS-DOS–based applications might also have Help. For information, see the documentation for your application.

Starting Help

Because Help may be displayed differently, depending on which application you are using and what kind of information you need, you can request Help in several ways. Not all methods can be used with every application.

▶ **To request Help, use one of the following methods**

- From the Help menu, choose a Help command.
- Press F1. Then choose a topic from the Help Contents for the application you are using, or search for a topic by using the Search button.
- Choose the Help button available in many dialog boxes. This method gives you quick access to specific information about the dialog box.
- Use the keyboard to select an item on a menu, and then press F1 to see a description of the item (available in certain applications).
- Select a dialog box option or command, and then press F1 or choose the Help button to move directly to an explanation of the option (available in PIF Editor, an application included with Windows).

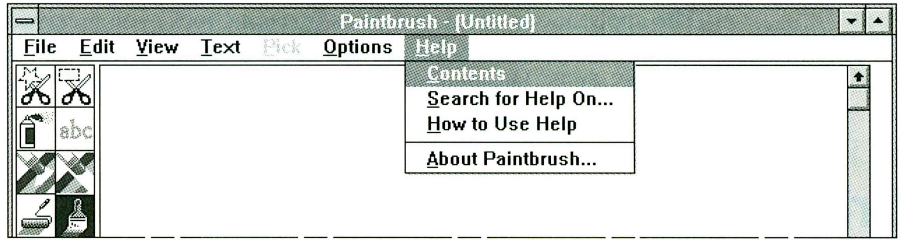
Tip You can keep Help readily available by resizing the Help window and moving it next to the running application. For information about moving and sizing windows, see "Working with a Window" in Chapter 4, "Windows Basics."

Using the Help Menu

When you choose Help from the menu bar, a list of Help menu commands appears.

▶ **To get Help by using the Help menu**

1. Choose the Help menu from the menu bar.



2. Choose the menu command you want to use.

You can find the following standard commands on most Help menus in Windows. If this is the first time you've used Help, you may want to choose How To Use Help to get started.

Menu item	Description
Contents	An alphabetic list of all Help topics available for the active application.
Search For Help On	A dialog box for locating information about a specific topic.
How To Use Help	Information about how to use Help.
Always On Top	When selected, ensures that no other open window on the desktop overlaps the Help window. (This command appears only on the Help menu in a Help window.)
About *application*	Information about the active application, such as copyright, version, and application name. Generally, this also includes a user name and company name, the mode Windows is running in, and the amount of memory available on your computer.

Note The Help menu in Program Manager also contains a command named Windows Tutorial. Choose this command to start an online Tutorial that teaches basic mouse and Windows techniques. To use the Windows Tutorial, you need a mouse and a VGA (or better) monitor. For information about how to use the Tutorial, see "Running the Microsoft Windows Tutorial" in Chapter 3, "A Guided Tour of Microsoft Windows."

Finding Information in Help

You can find information in Help by using Help Contents or Search For Help On, two commands on the Help menu.

Finding Information by Using Help Contents

If you are using an application that has Help on the menu bar, you can view all the available Help topics. Each application has a unique Help file, so the Help topics displayed are for the application you are currently using.

▶ To display Help Contents and choose a topic

1. From the Help menu, choose Contents or press F1.
2. Scroll to the topic you want information about.
3. Click the topic. Or press TAB until you reach the topic you want, and then press ENTER.

Finding Information by Using Search

The Search feature is an efficient way to find the information you need. When you have a topic that you want help with, you can use Search to find the information.

▶ **To search for a Help topic**

1. From the Help menu in your application, choose Search For Help On. Or press F1 to open Help, and then choose the Search button.

   The Search dialog box appears.

2. Select the word or phrase you want to search for. Or type a word in the text box. You do not have to type an entire word; Help matches the characters you type as closely as possible with the available keywords.
3. Double-click the word or phrase, or choose the Show Topics button. A list of topics is displayed at the bottom of the dialog box.
4. Double-click the topic. Or select the topic you want to view, and then choose the Go To button.

   Information about the topic you selected appears on your screen.

Getting Help for a Dialog Box

Many dialog boxes contain a Help button.

▶ **To request Help on a dialog box**

1. While using the dialog box, choose the Help button or press F1.

   A new window opens that contains a description of the dialog box. If the dialog box contains only a few areas, procedural information for the entire dialog box is included. More complex dialog boxes have a list of areas to select from.

2. Select the area you want information about.

   A pop-up window displaying procedural information appears. (If the window has no Control menu, you can close it by pressing any key or clicking anywhere on your screen.)

Tip It may be helpful to resize and arrange the Help window so that it does not overlap the dialog box. In some cases, the smaller the Help window is, the smaller the pop-up window is. If you cannot read all the information in a pop-up window, enlarge the Help window. For more information, see "Working with a Window" in Chapter 4, "Windows Basics."

Additional Methods

When you finish reading about a topic, you have several choices. If a list of related topics follows the information, you can choose from the list. Or you can choose one of the buttons along the top of the Help window.

Use this button	To
Contents	View the Help Contents for your application.
Search	Locate information about a topic (keyword or phrase) you select from a list or that you type in the Search For box.
Back	Retrace your path through the Help topics you've already viewed.
History	View a complete, sequential list of every Help topic you have viewed during the current Windows session.
Glossary	View an alphabetic listing of terms used in Help.

The following buttons may appear in Help for some applications.

Use this button	To
<<	View the previous topic in a series of related topics. When you reach the first topic in the series, the button appears dimmed.
>>	View the next topic in a series of related topics. When you reach the last topic in the series, the button appears dimmed.
Index	View an alphabetic list of all Help topics.

Displaying Glossary Definitions

In Help, glossary terms have a dotted underline. If you choose a glossary term, a definition of that term appears.

▶ **To display a glossary definition**

- Choose the term.

  A definition appears.

▶ **To remove the definition from your screen**

- Click anywhere on your screen. Or press ESC.

You can also view the entire list of available glossary terms. This list is organized alphabetically.

▶ **To view the list of glossary terms**

1. From the Help window, choose the Glossary button.
2. Scroll through the list until you find the term you want to learn about.
3. Choose the term.

Quitting Help

You can quit Help at any time.

▶ **To quit Help**

- From the File menu, choose Exit.

CHAPTER 7

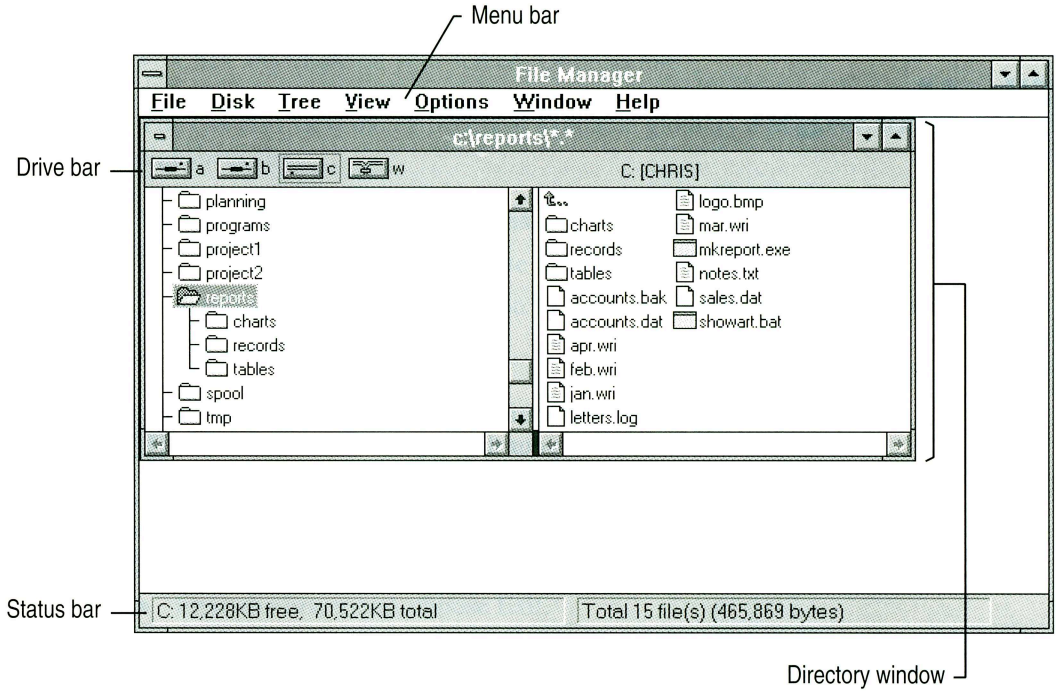
File Manager

File Manager is an application included with Windows that can help you organize files and directories on your disk drives.

This chapter describes how you can use File Manager to perform some common tasks, including managing drives, directories, and files and connecting to network directories. For a more complete list, see Help for File Manager.

The File Manager Window

When you start File Manager from the Main group, the window shown on the following page appears.



- The *directory window* is divided by the *split bar*. The left side of the window displays the structure of the current drive, or the *directory tree*. The right side of the window displays a list of files in the selected directory.

  The following table describes the various icons used in the directory window.

Icon	Description
	Displays the contents of the directory one level up in the directory tree.
	Represents a directory.
	Represents an application file. These files start applications or run programs.
	Represents a document file associated with an application. When you open this file, the application associated with it starts.
	Represents a system or hidden file. These files have system or hidden attributes.
	Represents other document files.

- You can use the *drive icons* on the *drive bar* to choose what drive is displayed in a directory window. You can choose to hide the drive bar.
- The *status bar* displays information about the current drive and directory and other information that helps explain the task you are performing with File Manager. You can choose to hide the status bar.
- The *menu bar* contains menus listing File Manager commands.

Viewing Information in a Directory Window

File Manager provides many ways to display files. Often, if you are looking for a particular file or group of files, it helps to change the way the files are listed or to display only the files that fit particular criteria. Also, when you are preparing to copy or move a file, it may be useful to display both the file and the directory that you will move or copy the file to.

Opening a New Directory Window

You can open more than one directory window to display more than one drive or directory at a time. Among other things, opening more than one directory window enables you to move and copy files by dragging them from one directory window to another. For more information about moving and copying files, see "Moving and Copying Files and Directories" later in this chapter.

▶ **To open a new directory window**

- From the Window menu, choose New Window.

  If you want to open a new window displaying the contents of a different drive, you can double-click the drive icon.

The new window initially has the same display characteristics as the original window, but you can change its characteristics independently of other windows.

Changing the Information Displayed for Each File

You can change the way files are displayed in the directory window. For example, if you want to know when each file was created, you can display all the details about each file (including the date) and then sort the files by creation date. Or, if you want to see as many files as will fit in the window, you can display only the name of each file. The following table describes how you can use the many display options.

Use the following commands on the View menu to determine what information is displayed for each file.

Use this command	To
Name	Display only the names of files.
All File Details	Display the names, sizes, dates and times of creation, and attributes of files.
Partial Details	Display specific information about each file.
Sort By Name	Display files in alphabetic order, based on the filename.
Sort By Type	Display files in alphabetic order, based on the filename extension.
Sort By Size	Display files in order of size, from largest to smallest.
Sort By Date	Display files in chronological order.
By File Type	Specify which types of files are displayed in a directory window.

To save the new settings when you quit File Manager, choose the Save Settings On Exit command from the Options menu. A check mark next to the command means it is in effect.

Note These commands affect only the list of files in the active directory window. If the directory window is displaying only the directory tree, the commands do not affect the window.

Updating a Directory Window

In most cases, File Manager updates open directory windows automatically. Sometimes, however, File Manager cannot do this, especially if you are using network drives or if you change floppy disks.

▶ To update a directory window

- Click the icon for the current drive, or choose Refresh from the Window menu. You can also press F5.

More Ways to View Information in a Directory Window

For information about the following additional tasks, see "Changing the Look of File Manager" in Help for File Manager:

- Arranging windows and icons
- Changing views in a directory window

Looking at Drives, Directories, and Files

In order to perform tasks with File Manager, you must be able to locate the file or directory you want to work with. This section describes how to locate and select files and directories.

Selecting Files and Directories

You can select one or more files or directories in the list of files when you want to copy, move, or delete files or perform other related tasks. You use the same methods for selecting files and directories as you do for selecting items in a list box. For more information about selecting items in a list box, see Chapter 4, "Windows Basics."

▶ To select a file or directory

- Click the icon. Or press TAB to move to the list of files, and then use the arrow keys.

▶ To select consecutive items

- Click the first item, press and hold down SHIFT, and then click the last item in the group. Or select the first item by using the arrow keys, press and hold down SHIFT, and then use the arrow keys to extend the selection to the last item in the group.

▶ To select or cancel selection of nonconsecutive items

- Press and hold down CTRL, and click each item. Or press SHIFT+F8, use the arrow keys to move to each item, press the SPACEBAR to select it or to cancel selection, and then press SHIFT+F8 again.

▶ To select files with similar filenames

1. From the File menu, choose Select Files.
2. In the Files box, specify the type of files you want to select. For example, type ***.txt** to select all files that have a .TXT extension.
3. Choose the Select button.

   You can repeat steps 2 and 3 to select more groups of files, if you want.

   You can choose the Deselect button at any time to remove from a selection the file type currently specified in the Files box.

Tip You can select all files in a directory by pressing CTRL+SLASH (/). You can cancel all selections by clicking any item (without pressing CTRL), or by pressing CTRL+BACKSLASH (\).

Changing Drives and Directories

The files you want to work with may be on a different drive or in a different directory. File Manager enables you to easily view and work with them.

▶ To change the current drive

- In the drive bar, click the drive icon for the drive you want, or double-click it to create a new directory window displaying information for the new drive. You can also press and hold down CTRL while typing the letter of the drive you want to select. The last method works even if the drive bar is not displayed.

Note When you change drives, File Manager searches the drive to display its contents. You can press ESC at any time to stop the search. If you stop the search, only a partial directory tree may be displayed, as indicated in the status bar.

▶ To change to another directory

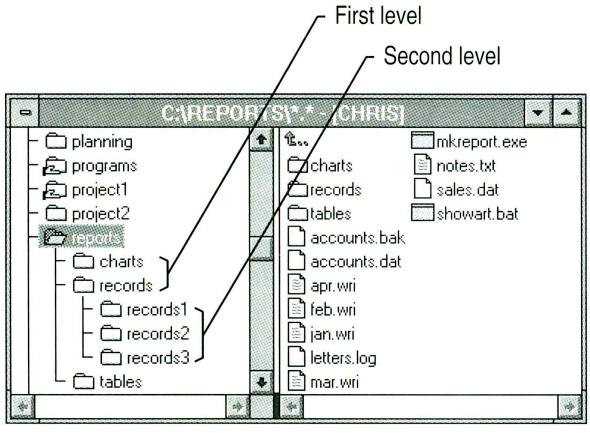
- Select the directory in the directory tree (or select the directory in the list of files) by using the mouse or the arrow keys.

  In the list of files, you can move up one level in the directory structure by clicking the Up icon.

Viewing Different Directory Levels

In the directory tree, you can view the subdirectories in a directory by *expanding* the directory. You can also choose not to view subdirectories by *collapsing* the directory.

When you expand a directory, the names of its subdirectories are displayed in the directory tree, as shown in the following example.



You can expand an entire branch (all levels of subdirectories in a directory), a single level of the branch, or all branches on the drive.

You can collapse a directory so that subdirectories are not shown in the directory tree. All directories except the root directory are collapsed the first time you start File Manager.

▶ To expand one level of a directory

- In the directory tree, double-click the icon of the directory you want to expand. Or select it by using the arrow keys, and then press ENTER.

You can also use the following commands on the Tree menu to expand directories.

Use	To
Expand One Level	Display the immediate subdirectories of the selected directory. Or you can press the PLUS (+) key.
Expand Branch	Display all the subdirectory levels below the selected directory. Or you can press the ASTERISK (*) key.
Expand All	Display all the directories and subdirectories on the drive. Or you can press CTRL+ASTERISK (*) on the numeric keypad.

▶ **To collapse a directory**

- In the directory tree, double-click the icon of the directory you want to collapse. Or select the icon by using the arrow keys, and then press ENTER. You can also use the Collapse Branch command on the Tree menu.

Using Network Directories

If you are using a network, you can use File Manager to connect to a network directory if you know its location (and password, if there is one). With some networks, you can browse through all the network directories to find the one you want to connect to. You can also disconnect from network directories that you are no longer using. If you are not using a network, the network commands are not available.

You should always start the network before you start Windows. If you made network connections before you started Windows, the network drive icons for these connections appear on the File Manager drive bar. Windows saves any new network connections you make and, if you do not disconnect from them, sets up the same network connections the next time you start Windows.

With some networks, you can change settings so that your connections are not reestablished each time you start Windows. To change network settings, choose the Network icon in Control Panel. For more information, see Help for Control Panel.

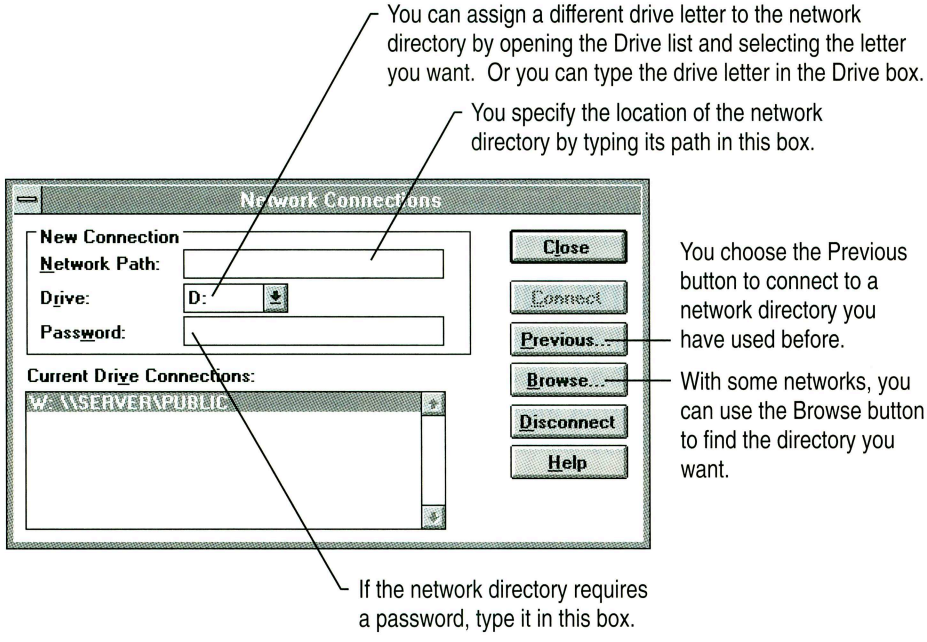
Connecting to and Disconnecting from Network Directories

When you connect to a network directory, File Manager assigns the directory the next available drive letter (or you can assign a letter of your choice). This creates a *network drive*, which appears as a drive icon on the File Manager drive bar. After you are connected to a network directory, you can use the resulting network drive as you would any other drive.

Note Depending on your network, you may have different commands and dialog boxes available to connect to and disconnect from network directories. The following procedures are based on your having the Network Connections command available. If you have different network commands, such as Connect Network Drive and Disconnect Network Drive, substitute those commands for Network Connections in the following procedures. If the dialog box for connecting to a network directory is different from the one shown in this procedure, choose the Help button in the dialog box for more information.

To connect to a network directory

1. From the Disk menu, choose Network Connections.
2. In the Network Connections dialog box, specify the network path, drive letter, and password, if any, for the connection. For help with the Network Connections dialog box, choose the Help button or press F1 while using the dialog box.



3. Choose the Connect button.
4. Repeat steps 1 through 3 for each connection you want to make. When you are finished, choose the Close button.

Note The Browse button may appear dimmed if your network does not support browsing.

▶ **To disconnect from a network directory**

1. In the Network Connections dialog box, select the directory you want to disconnect from in the Current Drive Connections box.
2. Choose the Disconnect button, and then choose the Close button.

Note If Windows is running in 386 enhanced mode, you may not be able to disconnect from network drives that were active before you started Windows.

Working with Files and Directories

You can use File Manager to move, copy, create, delete, rename, and search for files or directories. You can also print files from File Manager.

Moving and Copying Files and Directories

You can move and copy files and directories from one location (called the *source*) to another (called the *destination*) either by the drag-and-drop method or by using the Copy or Move command. The destination can be a directory window, directory icon, or drive icon.

▶ **To move or copy a file or directory**

- To move a file or directory to a destination on a different drive, press and hold down SHIFT while you drag the item. To move a file or directory to a destination on the same drive, drag the item.
- To copy to a different drive, drag the item to the appropriate drive icon. To copy to the same drive, press and hold down CTRL while you drag the item.
- You can also select the file or directory and then choose Move or Copy from the File menu. Then complete the appropriate dialog box.

Creating Directories

You can create a directory by using the Create Directory command.

▶ **To create a directory**

- From the File menu, choose Create Directory. Then type the new directory's path in the Name box.

Tip To quickly create a subdirectory of an existing directory, select the existing directory before you choose the Create Directory command. Then type only the new directory's name instead of its path in the Name box.

Deleting Files and Directories

You can delete a file or an entire directory, including all the files and subdirectories contained in it.

▶ To delete a file or directory

- Select the file or directory you want to delete (you can extend the selection to include more than one file or directory). Then choose Delete from the File menu, or press DEL.

Renaming Files and Directories

You can change the names of files, but you must be careful when working with system or hidden files. A *system file* contains information required for running the Microsoft MS-DOS operating system. A *hidden file* is a file not intended to be viewed in a directory listing. For example, your Windows swap file is a hidden file. If you change the name of a system file, your Windows directory, or any initialization (.INI) file used by Windows, your system may not run correctly.

▶ To rename a file or directory

1. Select the file(s) or directory you want to rename, and then choose Rename from the File menu.
2. The From box contains the name(s) you selected. In the To box, type a filename to rename a single file, or use wildcards (* or ?) to rename a group of files. For example, type ***.bak** to affect all files that have the .BAK extension. For more information about wildcards, see your MS-DOS documentation.

Searching for Files and Directories

If you know a particular file is on your disk, but you don't remember where, you can use the Search command to find it.

▶ To search for a file or directory

1. Select the directory that you want to start the search from, and then choose Search from the File menu.
2. Type a filename, or use wildcards (* or ?) in the Search For box to search for a group of files or directories that have related filenames or extensions. The Search Results window displays a list of all the files that meet the criteria.

You can work with the files that appear in the Search Results window in the same way you work with files in the directory window.

To cancel the search, press ESC. To close the Search Results window, choose Close from the Control menu.

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

Printing Files

You can print files by dragging the file icons onto the Print Manager application icon or window. 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 appropriate application and then print the file from there.

▶ To print a file by using File Manager

- Make sure Print Manager is activated, and then drag the document-file icon onto the Print Manager application icon or window.

  Or, in the directory window, select the file you want to print, and then choose Print from the File menu.

  For information about activating Print Manager, see Help for Print Manager.

Note Printing by using File Manager prints the file on the default printer.

Working with Floppy Disks

You can use commands on the Disk menu to format floppy disks and copy the contents of one disk to another.

▶ To format a floppy disk

1. Insert a disk in a drive.
2. From the Disk menu, choose Format Disk.
3. In the Disk In list, select the letter for the drive you want to format. The other parameters are adjusted to match that drive.
4. Complete the other areas of the dialog box, and then choose the OK button.

   In the Format Disk dialog box, you can use the following options.

Use	To
Label	Specify the disk label.
Make System Disk	Make the disk a startup disk.
Quick Format	Format the disk quickly (the disk is not scanned for bad sectors). This works only for disks that have been previously formatted.

For more information about formatting a disk, choose the Help button or press F1 while using the Format Disk dialog box.

Caution Be sure you format the correct disk. Unless you are running MS-DOS version 5.0 or later, or you have a disk-recovery program, you cannot recover information on a disk that is accidentally formatted.

▶ **To copy a floppy disk to another floppy disk**

- 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. Then choose Copy Disk from the Disk menu.

Both disks must have the same storage capacity, but you do not need two drives of the same storage capacity. If you have only one floppy disk drive of the right capacity, Windows prompts you to switch source and destination disks as needed.

For information about the following additional tasks, see "Managing Floppy Disks" in Help for File Manager:

- Labeling a disk
- Making a system disk

More Ways to Use File Manager

There are many other features that you can use to customize File Manager to fit your needs and to perform various tasks. For example, you can start applications from File Manager (for more information, see Chapter 5, "Application Basics").

For information about the following tasks, see Help for File Manager:

- Associating files with applications
- Changing the look of File Manager
- Managing floppy disks
- Moving around in File Manager
- Starting applications
- Turning off confirmation messages
- Working with files and directories

CHAPTER 8

Print Manager

Print Manager is an application included with Windows that you can use to manage documents sent to a printer. You can also use Print Manager to install and configure printers and to connect to network printers.

If you print from a Windows-based application, the application creates a *print file* and sends it to Print Manager. Print Manager works in the background, sending your documents to the printer while you continue working. You can check the status of the document at any time and change its status until it starts printing.

This chapter describes some of the common tasks you can perform by using Print Manager. For a more complete list, see Help for Print Manager.

Before You Print

You must do the following before you can print:

1. Make sure the appropriate *printer driver* is installed. This is a program that enables your printer to communicate with Windows. For each type of printer you plan to use, whether it is your own or a printer on the network, you must install the appropriate printer driver.

   Generally, you specify a printer when you set up Windows, and the Setup program installs the printer driver for that printer. However, if you skipped this step during Setup, or if you want to use an additional or different printer, you need to perform this step again. For information about how to set up a printer, see "Setting Up a Printer" later in this chapter.
2. If you plan to use a printer on the network, you must connect to that printer. For information about how to connect to a network printer, see "Connecting to a Network Printer" later in this chapter.

Managing Documents

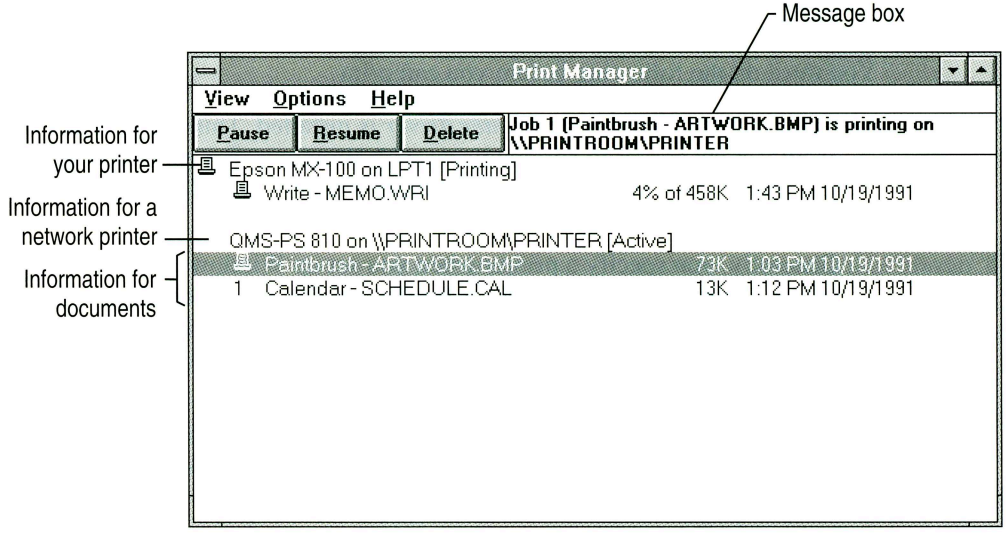
Most Windows-based applications include a Print command on the File menu that you can use to print documents. You can also print a document from File Manager by dragging the file's icon onto the Print Manager application icon or window. For information about this procedure, see Chapter 7, "File Manager."

When you print a document from a Windows-based application on your own printer (a printer physically connected by a printer cable to your computer), Print Manager starts and appears on the desktop as an icon, if it is not already running. The icon does not appear when you print on a *network printer* (a central printer that anyone who is using a network can use).

MS-DOS–based applications that run in Windows print the same way they would from MS-DOS. They do not use Windows printer drivers and do not route print files through Print Manager, but they can still print on network printers.

Looking at the Print Queue

As you send documents to Print Manager, a *print queue* forms. Print queues list information about the printers that are installed on your system and about the documents that are printing or waiting to print. You can view this information by enlarging the Print Manager icon to a window or by choosing Print Manager from the Main group.



The print queue displays the following printer information:

- The name of the printer.
- The port your printer is connected to and, if it is a network printer, the network path.
- The current status of the printer (such as active or idle).

Beneath the printer information, the print queue displays the following document information:

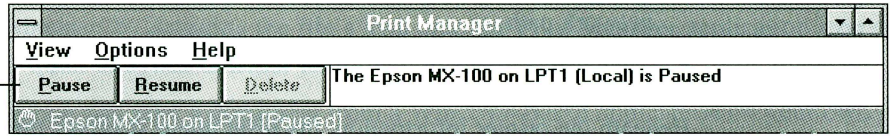
- The title of the document (some network software may not support this feature).
- The document's position in the queue, or a printer icon if the document is printing.
- The size of the document in kilobytes (if the Print File Size command has a check mark next to it).
- The time and date you sent the document to Print Manager (if the Time/Date Sent command has a check mark next to it). If you are connected to a network printer, the network time and date are shown, which may differ from your computer's time and date.
- If a document is currently printing, the amount (as a percentage) of the document printed so far.

If you are printing on a network printer from a Windows-based application, Print Manager only reports the status of your documents in the network queue. For information about viewing every document in a network queue, see "Viewing Network Print Queues" in Help for Print Manager.

Pausing and Resuming Printing

You can pause your printer or your individual documents on a network printer. Pausing your printer stops every document in its queue from printing. Pausing a single document stops only that document from printing—other documents in the queue will print. After a document has actually started to print, you cannot pause it.

Most networks allow you to pause only the documents you send to a network printer. However, your ability to pause the entire network queue depends on the features your network supports.



▶ To pause printing

1. In the Print Manager window, select the document or the name of the printer you want to pause.
2. Choose the Pause button. Or press ALT+P.

▶ To resume printing

1. In the Print Manager window, select the document or the name of the printer you want to resume printing.
2. Choose the Resume button. Or press ALT+R.

Canceling the Printing of a Document

You can cancel the printing of your document on your own printer or on a network printer by deleting it from the print queue. Whether you can cancel the printing of other documents on a network printer depends on the capabilities of the network.

▶ To cancel the printing of a document

1. In the Print Manager window, select the document you want to cancel.
2. Choose the Delete button. Or press ALT+D. A dialog box appears, prompting you to confirm the deletion.

▶ To cancel the printing of all documents on your printer

- From the File menu, choose Exit to quit Print Manager. A dialog box appears, prompting you to confirm the deletion.

Note If you quit Print Manager while a document is printing in graphics mode, you might need to turn your printer off and on or use the reset option on your printer.

Choosing the Default Printer

Many Windows-based applications use the default printer when you choose the Print command.

▶ **To choose a default printer**

1. From the Options menu, choose Printer Setup.
2. In the Installed Printers list, select the printer you want.
3. Choose the Set As Default Printer button, and then choose the Close button.

Tip You can also double-click the printer in the Installed Printers list.

Note Some Windows-based applications may have a Print Setup command that you can use to print to any installed printer. In most cases, selecting a different printer does not make it the default printer for all Windows-based applications. However, with some applications, the setting for the default printer does change. For more information, see the documentation that comes with your application.

Printing to a File

If you are planning to merge two files or to print a document at a later time or different location, you may want to print a document to a file rather than directly to a printer.

Some applications have an area in their Print dialog box in which you can specify printing to a file. If your application does not support this feature, you can print your document to a file by specifying FILE as the port in Print Manager. For more information, see "Setting Up a Printer" later in this chapter.

Printing Through MS-DOS

When you print in Windows, documents are sent directly to the port your printer is connected to, bypassing MS-DOS printing interrupts. This speeds up printing and is the recommended method to use.

However, in the following situations you may want to print by using MS-DOS interrupts:

- You are using additional printer software that relies on MS-DOS interrupts (such as software that accompanies switch boxes).
- You are trying to print on a network not supported by Windows.
- You are trying to print to a serial printer and are using a terminate-and-stay-resident (TSR) program that takes direct control of the COM port.

Printing through MS-DOS may slow down printing, but it ensures that in these cases your files print correctly.

▶ **To print through MS-DOS**

1. From the Options menu, choose Printer Setup.
2. In the Printers dialog box, choose the Connect button.
3. In the Connect dialog box, clear the Fast Printing Direct To Port check box, and then choose the OK button to return to the Printers dialog box.
4. Choose the Close button.

Connecting to a Network Printer

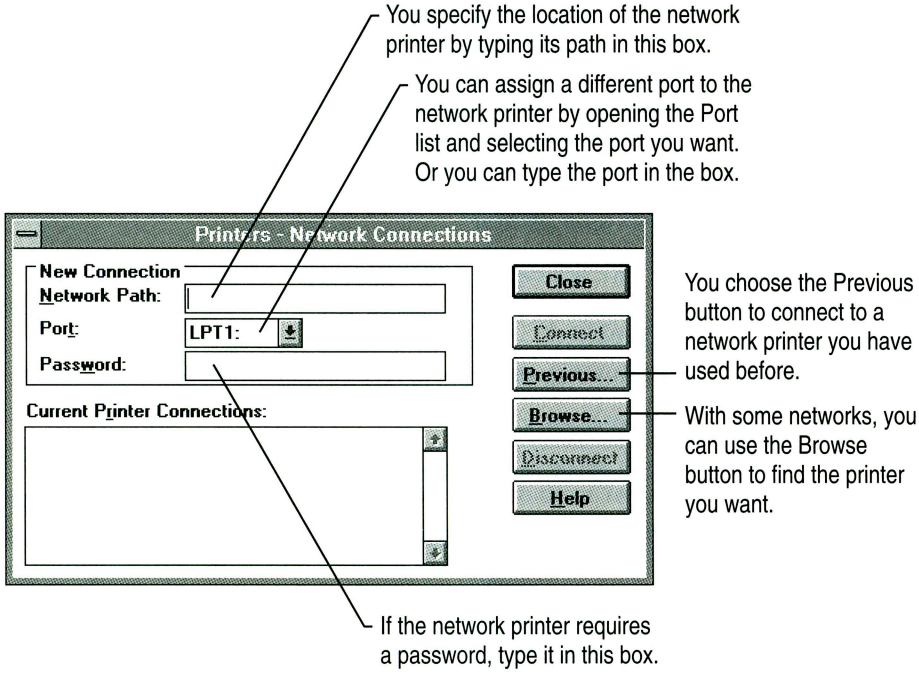
If you are using a network and want to print to a network printer, you can use Print Manager to connect to the printer.

When you connect to a network printer, you specify the location of the printer, a password, if one is required, and a port name, such as LPT2 or LPT3. Before connecting to a network printer, make sure that you have installed the printer driver for the network printer and that the printer is assigned to the port that you want to use for the network connection. For more information about installing a printer driver, see "Setting Up a Printer" later in this chapter.

Note Depending on your network, you may use different commands and dialog boxes to connect to and disconnect from network printers. The following procedures are based on your having the Network Connections command and dialog box available. If your network provides different commands, such as Connect Network Printer and Disconnect Network Printer, substitute those commands for Network Connections in the following procedures. If the dialog box for connecting to or disconnecting from a network printer is different from the one shown in this procedure, choose the Help button in the dialog box for more information.

To connect to a network printer

1. From the Options menu, choose Network Connections.
2. In the Network Connections dialog box, specify the network path, port, and password, if any, for the connection. For help with the Network Connections dialog box, choose the Help button or press F1 while using the dialog box.



3. Choose the Connect button.
4. Repeat steps 1 through 3 for each connection you want to make. When you are finished, choose the Close button.

Note The Browse button may appear dimmed if your network does not support browsing.

To disconnect from a network printer

1. In the Network Connections dialog box, select the printer you want to disconnect from in the Current Printer Connections box.
2. Choose the Disconnect button, and then choose the Close button.

Setting Up a Printer

If you did not set up a printer when you set up Windows, the Print Manager window is empty and you cannot print. You can set up printers by using Control Panel or Print Manager.

It is recommended that you read the PRINTERS.WRI online document, which contains information about specific printers, before you set up a printer.

Note The Printers option in Control Panel provides the same method for setting up a printer as the Print Manager method described in the following sections.

▶ To set up a printer

1. From the Options menu, choose Printer Setup.
2. Choose the Add button to display the List Of Printers box if it is not already displayed.
3. In the List Of Printers box, do the following.

Double-click	If
The model name of your printer	Your printer is listed and does not emulate another printer.
The PostScript version of your printer	Your printer uses a PostScript cartridge that does not emulate another printer.
The printer that your printer emulates	Your printer is not listed but emulates a listed printer.
The printer that your PostScript cartridge emulates	Your printer uses a PostScript cartridge that emulates a listed printer.
PostScript Printer	Your printer is not listed, does not emulate a listed printer, but is PostScript-compatible.
Install Unlisted or Updated Printer	You have a disk from your printer manufacturer that contains a Windows printer driver for your printer.
Generic/Text Only	Your printer is not listed and is a daisy-wheel printer or a text-only printer.

Depending on the choice you make, you may be required to insert one of the installation disks contained in the Windows package, a disk provided by your printer manufacturer, or, if you are not a United States customer, the additional Non-USA Printer Drivers disk that comes with your Windows package.

Note If you choose the name of a printer that your printer emulates, your printer must be set to operate in the appropriate emulation mode. Make sure that you set the proper DIP-switch settings or menu settings on your printer. For more information, see your printer documentation.

4. If you want to change the port that is assigned to your printer, select the printer in the Installed Printers list, and then choose the Connect button. In the dialog box that appears, select the port that you want to assign to your printer.

   Following is a description of the types of ports available.

Port	Description
LPT	A parallel port.
COM	A serial port.
EPT	Used for the IBM Personal Pageprinter. This port requires that a special card be installed in your computer.
FILE	Prints to a file instead of to a printer. If the application you are working with supports this feature, you can print to a file even if you don't select this option.

   If you select a COM port, you might want to make sure that the communications settings for the port match those required by your printer. You can choose the Settings button to determine this. For help with the Settings dialog box, choose the Help button or press F1 while using the dialog box.

   If the printer is a network printer, choose the Network button to connect to it. For more information about connecting to network printers, see "Connecting to a Network Printer" earlier in this chapter.

   Choose the OK button to close the Connect dialog box.

5. If you want to make this printer the default printer, double-click the printer in the Installed Printers list. Or select the printer, and then choose the Set As Default Printer button.
6. Choose the Close button.

If none of the printers listed in the Printers dialog box is appropriate for your printer, you have two choices:

- Contact your printer manufacturer for a printer driver that works with Windows.
- Request information about additional drivers included on the Windows Driver Library (WDL) disk. Microsoft adds drivers as they become available. For more information, see "The Windows Driver Library" in Chapter 13, "Configuring Hardware."

386

If you are using MS-DOS–based applications in 386 enhanced mode, you can use the 386 Enhanced option in Control Panel to control what happens when several applications compete for access to a printer port. For more information, see Help for Control Panel.

There are more procedures to help you set up printers. For information about the following additional tasks, see "Setting Up a Printer" in Help for Print Manager:

- Selecting timeout options
- Selecting printer settings

Removing an Installed Printer

If you are no longer using a printer, you can remove it from the Installed Printers list in the Printers dialog box.

▶ **To remove an installed printer**

1. From the Options menu, choose Printer Setup.
2. From the Installed Printers list, select the printer you want to remove.
3. Choose the Remove button. A dialog box appears, prompting you to confirm the removal.
4. Choose the Close button.

Removing a printer from the Installed Printers list does not remove the printer driver from your hard disk. This is because another printer may use the same driver. Similarly, removing the printer does not remove any associated fonts from memory. For information about removing fonts, see Chapter 12, "Customizing Windows."

More Ways to Use Print Manager

There are many other features that you can use to customize Print Manager to fit your needs and to perform various tasks. For information about the following tasks, see Help for Print Manager:

- Changing the print order
- Deactivating Print Manager
- Displaying Print Manager messages
- Giving Print Manager priority
- Printing on a network

CHAPTER 9

Accessories

Windows includes accessories that you can use to perform many everyday tasks. The following list briefly describes how to use the accessories:

- Use Media Player and Sound Recorder to play or record sound files and work with other multimedia devices.
- Use Calculator, Calendar, Cardfile, and Clock to manage personal information.
- Use Write, Notepad, Paintbrush, and Character Map for publishing or writing tasks.
- Use Terminal to communicate with another computer through a modem.
- Use Recorder to record keystrokes or mouse actions to play back later.

This chapter introduces the accessories (in alphabetic order). Procedures for performing tasks are provided in online Help. To view Help, choose the Contents command from the Help menu.

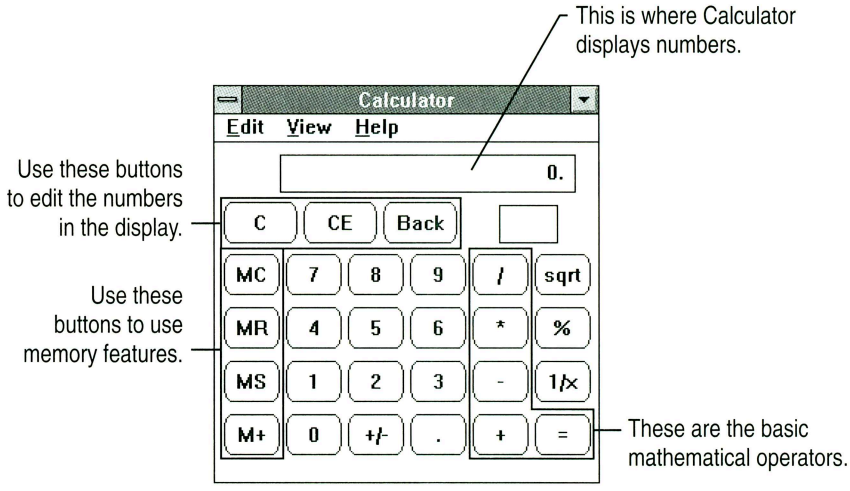
To start an accessory, choose an icon in the Accessories group. For information about starting accessories, see Chapter 4, "Windows Basics."

Calculator



Calculator includes both a standard and scientific calculator. You can use the standard calculator to do simple calculations and then store them in memory. You use the scientific calculator to do advanced scientific and statistical calculations.

When you start Calculator for the first time, the standard calculator appears.

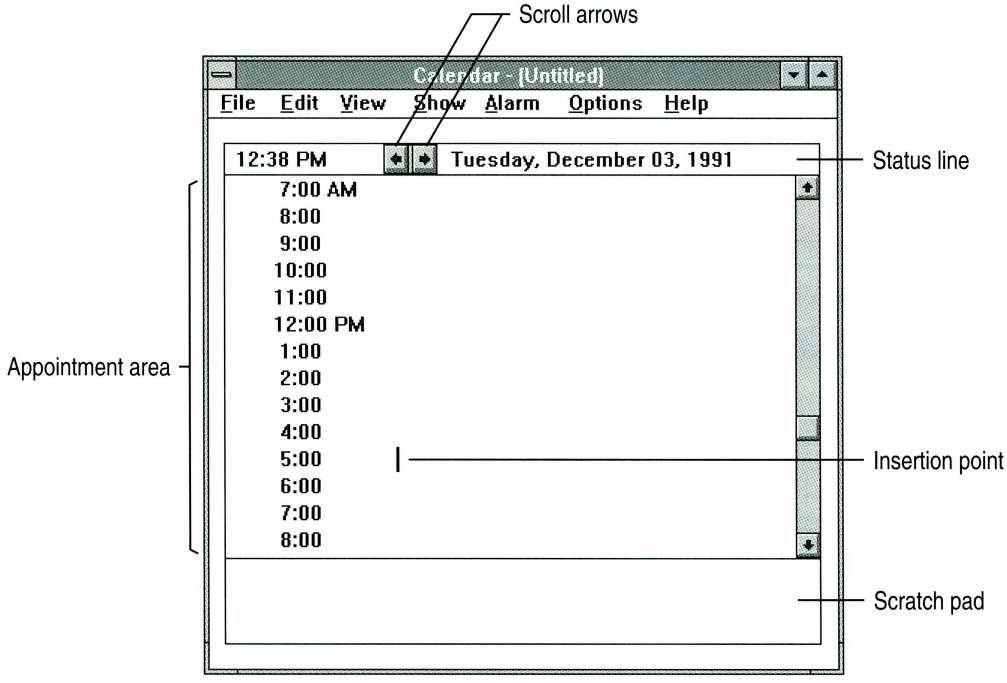


For information about the following tasks, see Help for Calculator:

- Performing calculations
- Using Calculator memory
- Using Calculator with the Clipboard
- Using the scientific calculator
- Working with different number systems
- Using advanced functions (operators, number-base functions, advanced statistical functions)

Calendar

Calendar combines a month-at-a-glance calendar and a daily appointment book.



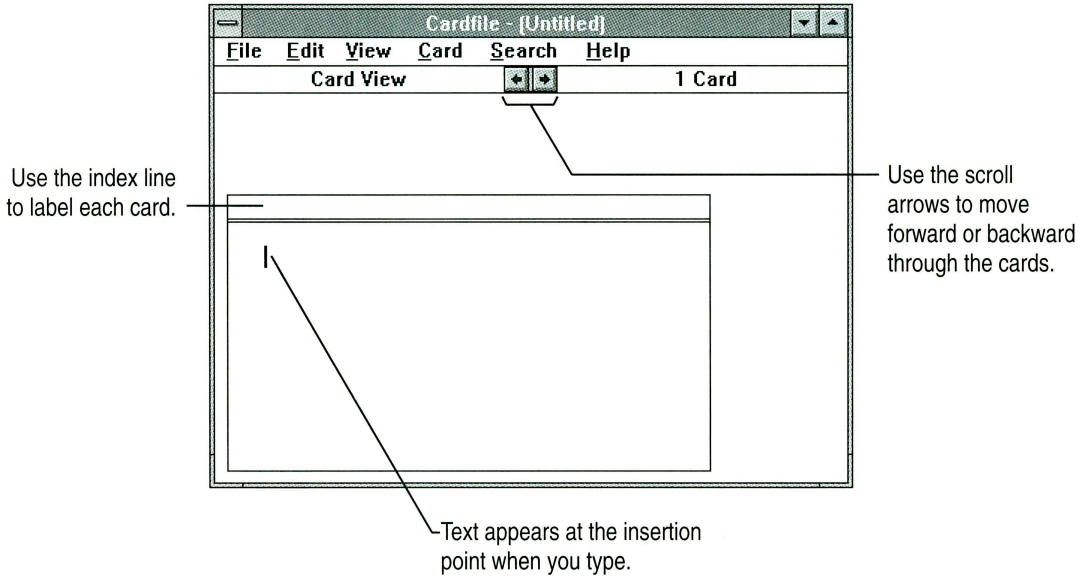
For information about the following tasks, see Help for Calendar:

- Entering appointments
- Moving to appointments
- Printing appointments
- Setting and removing appointments

Cardfile

Cardfile is similar to a set of index cards. You can use it to keep track of names, addresses, phone numbers, directions, or anything else you want quick access to. If you have a modem, you can dial a telephone number that is typed on a Cardfile card.

You can also copy, link, or embed information into Cardfile. For example, on a card that shows a client's name, address, and telephone number, you could add a picture (a bitmap image) of the client. Or you could add an icon that, when chosen, opens and displays the picture. For more information about linking and embedding objects, see Chapter 10, "Object Linking and Embedding."



For information about the following tasks, see Help for Cardfile:

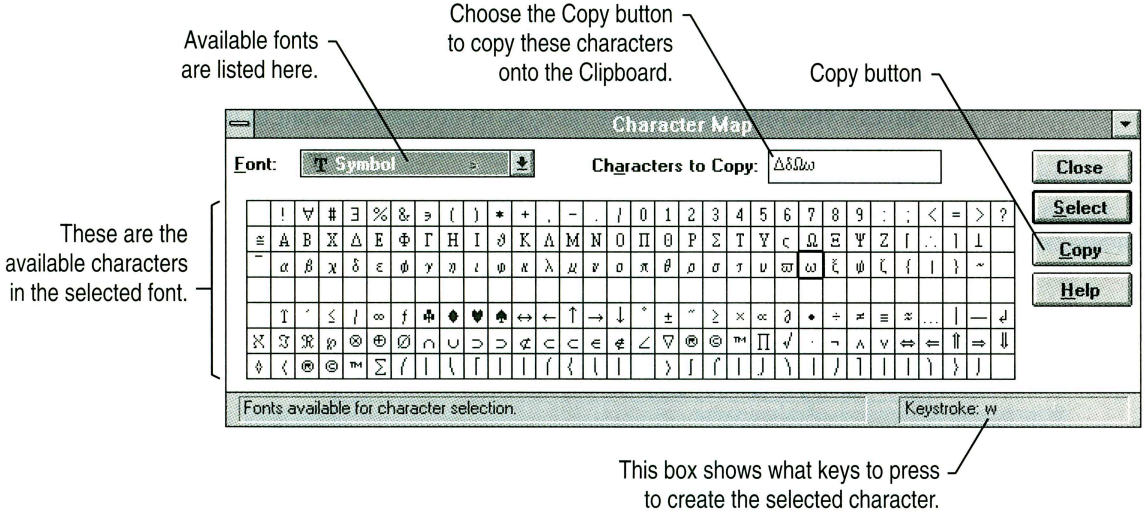
- Filling in and adding cards
- Viewing cards as a list
- Moving through your cards
- Editing text on cards
- Embedding or linking an object
- Restoring or deleting a card
- Duplicating a card
- Printing a Cardfile file
- Using automatic dialing

Character Map



Character Map displays all the characters, including extended and special characters, that you can use with the selected font in your Windows-based application. Character Map also displays the keystrokes you can use to create a selected character within your application.

You can use Character Map only with Windows-based applications. If you are running an MS-DOS–based application, check its documentation to find out how to insert special characters.



For information about the following tasks, see Help for Character Map:

- Selecting a font
- Inserting a character into a document
- Using keystrokes to create selected characters

Clock



Clock helps you keep track of time. You can display an analog or digital clock. You might find it useful to add Clock to your StartUp group, so that Clock is running every time you start Windows.

Media Player

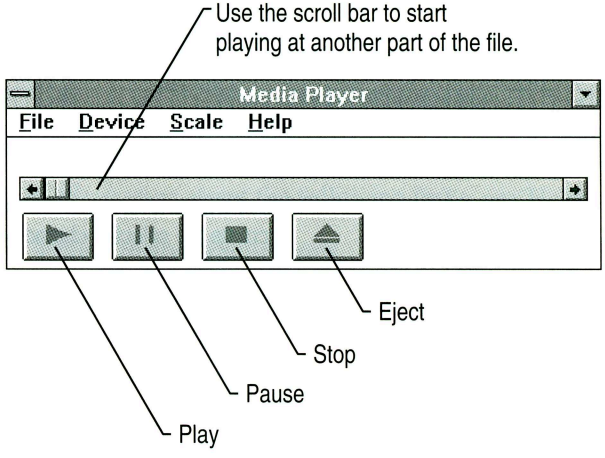


Using Media Player, you can play multimedia files and control hardware devices. For example, you can use Media Player to play sound files through a sound card. If you have an audio compact-disc player or videodisc player connected to your computer, you can use Media Player to start and stop them.

Media Player can play digitized sounds created by Sound Recorder or Musical Instrument Digital Interface (MIDI) devices.

Before Media Player can play a file, you must have the sound hardware and its driver installed and configured. For information about installing hardware drivers, choose the Drivers icon from Control Panel, and then choose the Help button.

To play a multimedia file (sound or animation) or device (such as a videodisc player), you must first choose the type of device you want to use. For information about setting up your device, see Chapter 13, "Configuring Hardware." If the device requires a file to play, you must also open the file. Some devices, such as audio compact-disc players, do not require a file.



For information about the following tasks, see Help for Media Player:

- Specifying a media device
- Playing a media file
- Changing and positioning the scale

Notepad



Notepad is a text editor. You can use Notepad to create notes, write short memos, and create and edit batch files. Notepad creates files by using the ASCII format and has none of the features used for formatting a document.

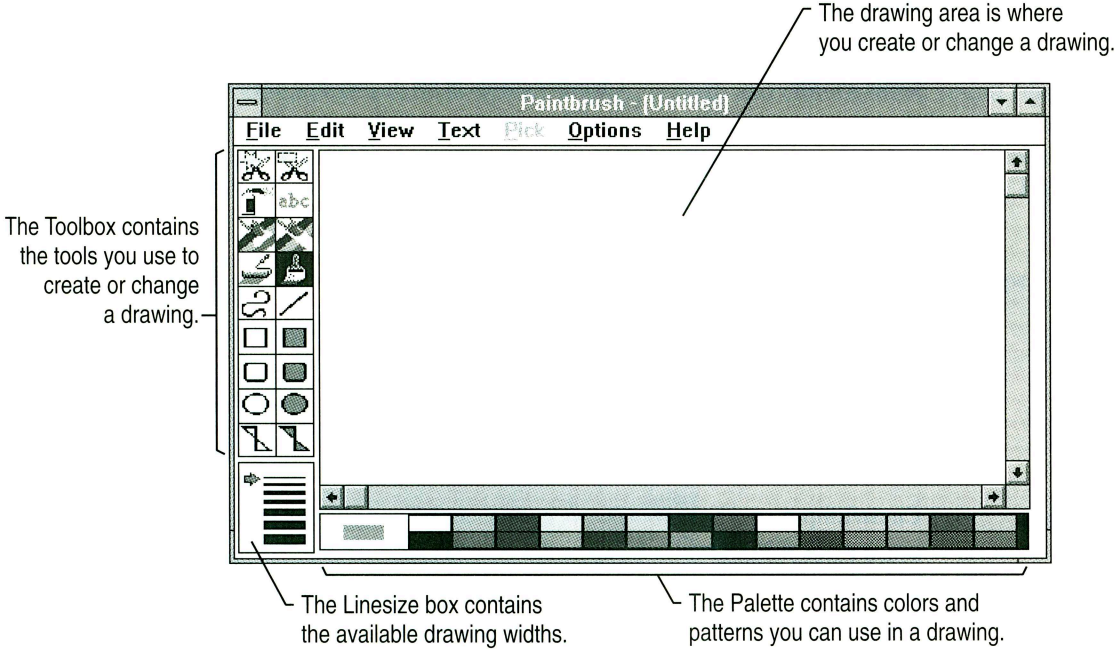
For information about the following tasks, see Help for Notepad:

- Setting word wrap
- Searching for text in Notepad
- Managing Notepad files
- Printing a Notepad document

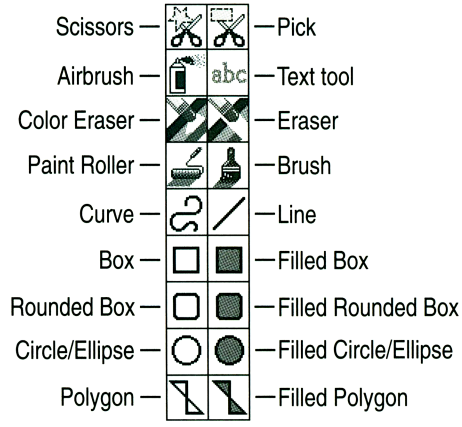
Paintbrush



Using Paintbrush, you can create simple or elaborate, black-and-white or color drawings. After you've created a drawing, you can print it or use it in another document. For information about using Paintbrush drawings in other documents, see Chapter 10, "Object Linking and Embedding."



You use the tools in the Paintbrush Toolbox to create and change drawings. The following list provides a brief description of each tool's function.



This tool	Does this
Scissors	Defines an area to cut, copy, or change.
Pick tool	Defines a rectangular area to cut, copy, or change.
Airbrush	Creates a circular spray of dots.
Text tool	Adds text to your drawing.
Color Eraser	Changes colors in all or part of a drawing.
Eraser	Changes foreground colors to the selected background color.
Paint Roller	Fills any closed shape or area with color.
Brush	Draws freehand shapes and lines.
Curve	Draws curved lines.
Line	Draws straight lines.
Box	Draws hollow squares and rectangles.
Filled Box	Draws squares and rectangles filled with color.
Rounded Box	Draws hollow round-cornered squares and rectangles.
Filled Rounded Box	Draws round-cornered squares and rectangles filled with color.
Circle/Ellipse	Draws hollow circles and ellipses.
Filled Circle/Ellipse	Draws circles and ellipses filled with color.
Polygon	Draws polygons from connected straight lines.
Filled Polygon	Draws polygons filled with color.

Unlike the other accessories, Paintbrush makes use of both mouse buttons. Help for Paintbrush specifies when to use the right mouse button. If no button is

specified, use the left mouse button. For information about performing tasks with Paintbrush, see Help for Paintbrush.

Recorder



Using Recorder, you can record a sequence of keystrokes and mouse actions—called a *macro*—to play back at a later time. You can use macros to automatically type a special phrase or code that you use frequently or to automate the steps of a task you routinely perform. For example, you could record the steps you go through to switch to the Main group in Program Manager, choose the MS-DOS Prompt icon, change to the MS-DOS directory, and start a text editor. When you run this macro, it performs these steps for you.

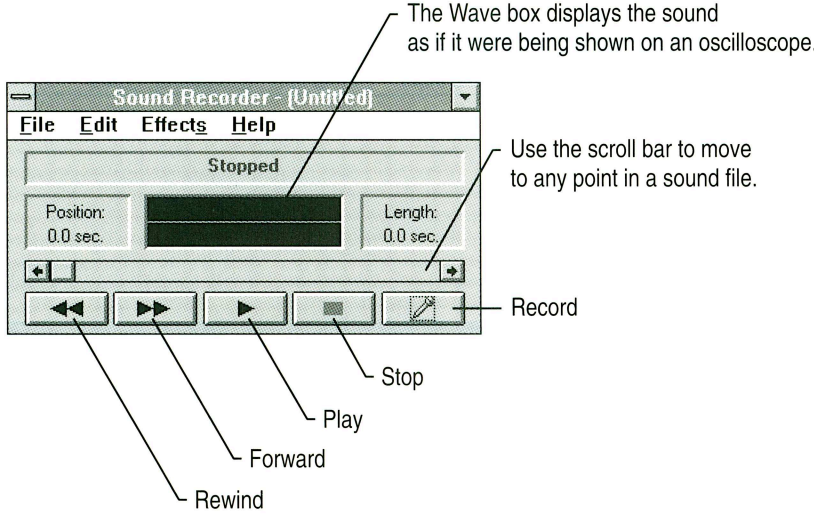
For information about the following tasks, see Help for Recorder:

- Recording a simple macro
- Playing back a macro
- Setting permanent preferences
- Creating macros to use as demos

Sound Recorder



You can use Sound Recorder to play, record, and edit digitized sound files. To play sound files, you must have a sound card and its driver installed and configured. To record sound files, you must also have a microphone installed. For information about hardware drivers, see Chapter 13, "Configuring Hardware."



For information about the following tasks, see Help for Sound Recorder:

- Creating and editing a sound file
- Playing a sound file
- Linking and embedding sound files

Terminal



Using Terminal, you can connect your computer to other computers and exchange information through a modem. For example, you can connect to online information services, such as Dow Jones News/Retrieval, and to online bulletin boards, such as CompuServe.

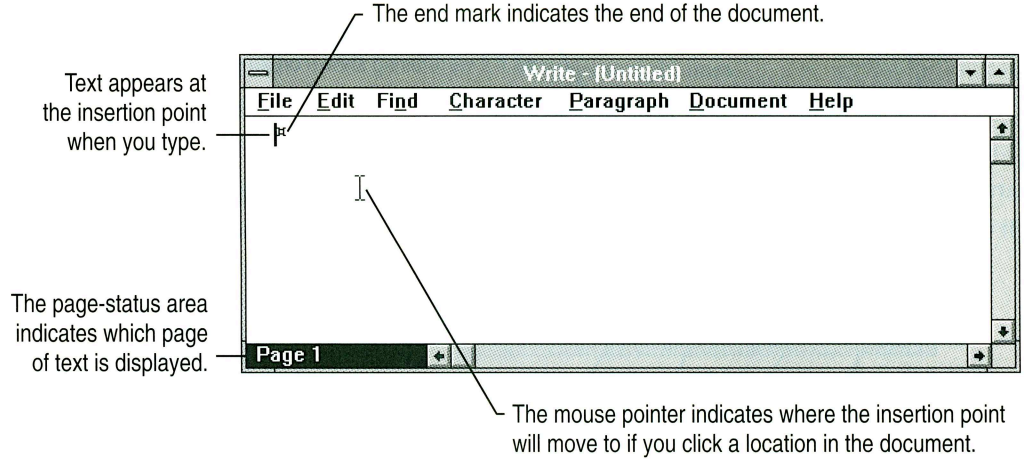
To run Terminal, you must have a Hayes or Hayes-compatible modem installed on your computer. For information about performing tasks with Terminal, see Help for Terminal.

Write



Write is a word-processing application that you can use to create and print documents for business and personal use. When you create Write documents, you can type, edit, and format text in the Write window; insert graphics; save the text and graphics as a file; and print your documents.

Write also supports object linking and embedding (OLE). For more information, see Chapter 10, "Object Linking and Embedding."



For information about performing tasks with Write, see Help for Write.

PART 3

Getting the Most Out of Windows

CHAPTER 10

Object Linking and Embedding

In Windows, you can use a feature called *object linking and embedding (OLE)* to transfer and share information between Windows-based applications and accessories. When you use OLE, you can view and use different forms of information in a single document. For example, rather than switching between applications, you can view and even work on a Microsoft Excel spreadsheet or a Paintbrush bitmap right from a Microsoft Word for Windows document.

Paintbrush, Sound Recorder, Write, Cardfile, and Object Packager all support OLE and are included with Windows. Many other Windows-based applications support OLE. Check the documentation supplied with your applications to determine whether they support OLE and how to use their OLE features.

This chapter provides an introduction to OLE. Some procedures are provided as examples, using the Paintbrush and Write applications. For more comprehensive information about using the OLE features of Paintbrush and Write, see Help for each of these applications.

What Is Object Linking and Embedding?

To understand object linking and embedding, you need to be familiar with the following terms and concepts:

- An *object* is a piece of information such as a chart, a spreadsheet, a drawing, or text that can be *linked* or *embedded*.
- A *source document* is the document in which the object originates. For example, if you use Microsoft Excel to create a spreadsheet and then use that spreadsheet or part of it in another document, the original spreadsheet is the source document.
- A *destination document* is the document into which you place an object. For example, if you use part of a Microsoft Excel spreadsheet (as in the previous example) in a Word document, the Word document is the destination document.
- An *embedded object* is an object in a destination document that is a copy of information that was created in another application. By choosing an embedded object—for example, by double-clicking it—you start the application that was used to create it, without switching away from the document you're working in.

  For example, suppose you are creating a memo by using Write and you want to use a drawing of your company logo at the top of the memo. The drawing has been created by using Paintbrush, so you can embed the drawing in your Write document. After it is embedded, making changes to it is easy—you choose the embedded object, and Paintbrush starts, displaying the object.

  After it is embedded, an object is no longer connected to the source document. Changes you make to the object do not affect the source document.
- When you create a *linked object,* you establish a link between the destination and source documents. Although the linked object is displayed in the destination document and you can print the object, the data that makes up the object resides only in the source document. When you make changes

to a linked object, you are actually changing the information in the source document. When you make changes in the source document, the changes appear in the destination document (*updating* the linked object).

Note You can control whether a linked object is updated manually or automatically. For more information, see "Maintaining Links" later in this chapter.

By choosing a linked object—for example, by double-clicking it—you start the application that was used to create it, without switching away from the document you're working in.

For example, suppose you are writing a chapter of a book by using Word for Windows. Someone else is creating the artwork for your chapter by using Paintbrush. You can create a link between the Paintbrush artwork and your Word document so that any changes to the artwork are automatically reflected in your document.

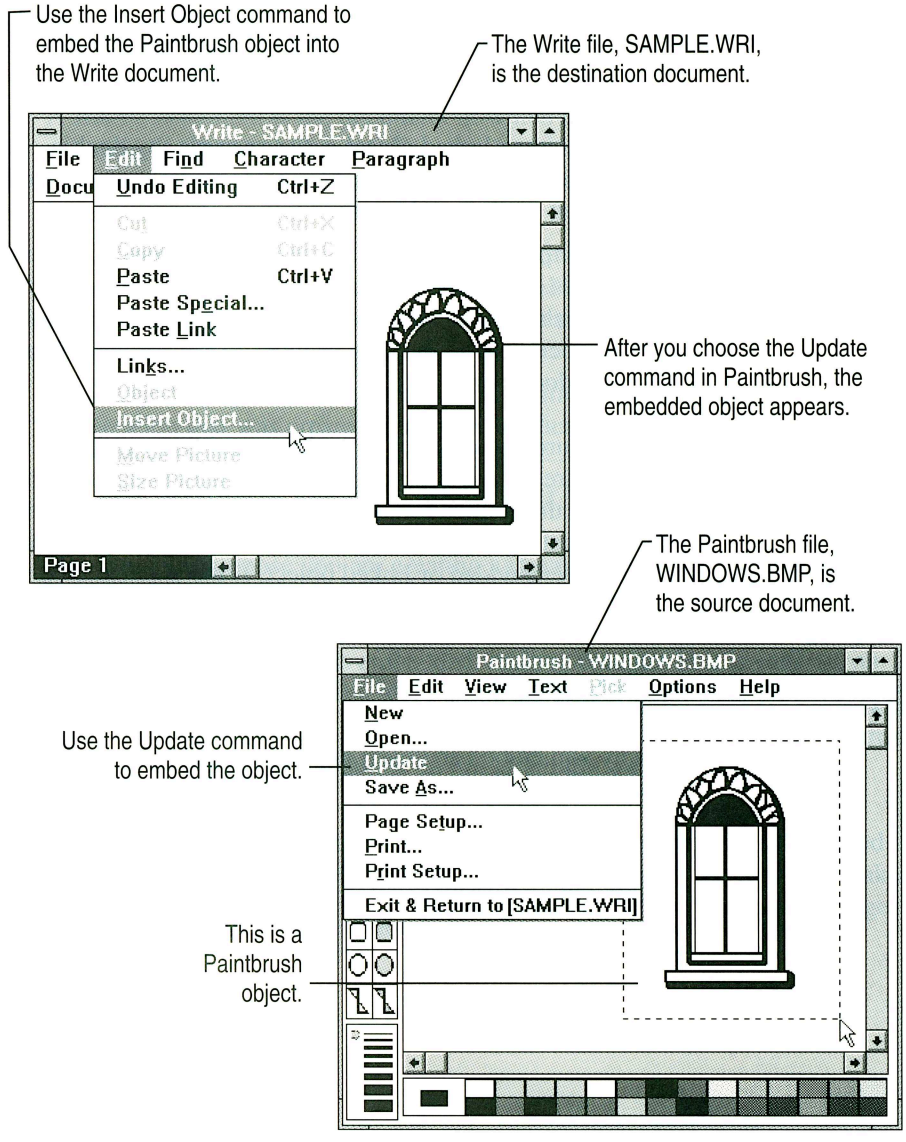
The procedures you use for embedding and linking objects are generally similar to the procedures you use for copying and pasting information. The end result depends on the application that was used to create the information you are using. If the application supports OLE, then following the procedures in this chapter will result in an embedded or linked object. If the application does not support OLE, then following these procedures will result in static copies of the information.

Embedding an Object

The way you embed an object depends on the type of object it is and whether the object has already been created.

Note Different applications may use different menu commands for object linking and embedding. For information about embedding an object by using a specific application, see the documentation supplied with the application.

You can embed an object by starting from either the source or destination document. The following illustration shows an example of both methods of embedding.



The following procedure describes one way of embedding a Paintbrush object in a Write document.

▶ **To embed a Paintbrush object, starting from Write**

1. Open the Write document in which you want to embed the object.
2. Place the insertion point where you want the object to appear.
3. From the Edit menu, choose Insert Object. A dialog box appears, listing all the applications on your computer that support OLE.

Note Some applications have a Paste From command on the Edit menu that you can use to open the document containing the drawing you want to embed as an object.

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4. Select Paintbrush Picture, and then choose the OK button.
5. In the Paintbrush window, create a drawing. Or open the document that contains the drawing you want to embed.
6. From the File menu in Paintbrush, choose Update. This embeds the Paintbrush object into the Write document.
7. From the File menu in Paintbrush, choose Exit & Return To (name of document). Paintbrush closes and you return to the Write document.

Editing an Embedded Object

You can edit an embedded object from within its destination document. The following procedure describes how to edit a Paintbrush object that has been embedded in a Write document.

▶ **To edit an embedded Paintbrush object from within a Write document**

1. In the Write document, choose the embedded object. Paintbrush opens, with the object displayed.
2. Edit the object as needed.
3. From the File menu in Paintbrush, choose Update.

   The embedded object is updated in the Write document.
4. From the File menu in Paintbrush, choose Exit & Return To (name of document). Paintbrush closes and you return to the Write document.

Linking an Object

The way you link an object depends on the type of object it is.

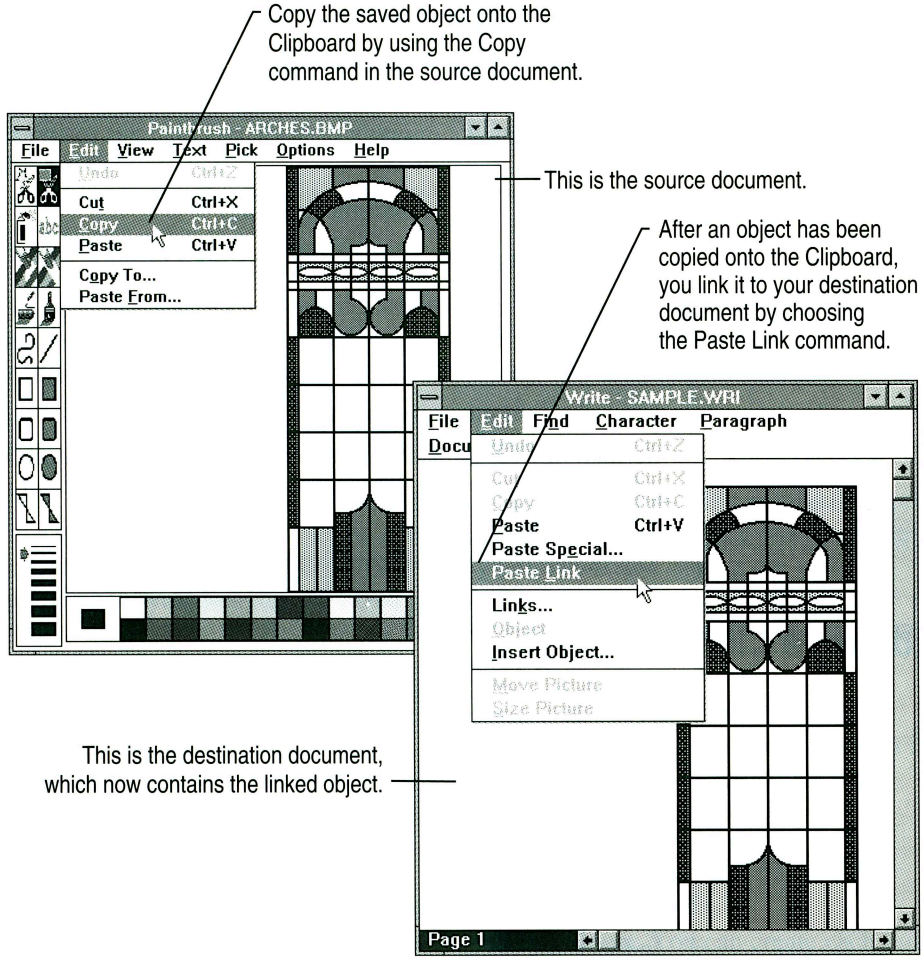
Note Different applications may use different command names for object linking and embedding. For more information about linking an object by using a specific application, see the documentation supplied with the application.

From a single source document, you can create links to more than one destination document. Any changes you make to a linked object in a destination document appear in the source document and in every destination document that contains a link to that object.

Note You can control whether a linked object is updated manually or automatically. For more information, see "Maintaining Links" later in this chapter.

You can link objects only from saved documents. For example, if you open Paintbrush and create a drawing, you must save it as a file before you can link the drawing to another document.

The following illustration shows how to link a Paintbrush object to a Write document.



The following procedure describes how to link a Paintbrush object to a Write document.

▶ To link a Paintbrush object to a Write document

1. In Paintbrush, open the document that contains the drawing you want to link. Or create a drawing.
2. If you've created a drawing or made any changes to an existing drawing, save the drawing.
3. Use the Pick tool to select the drawing.
4. From the Edit menu, choose Copy. A copy of the drawing is placed onto the Clipboard.
5. Start Write and open the document to which you want to link the drawing.
6. Place the insertion point where you want the object to appear.
7. From the Edit menu in Write, choose Paste Link.

   Some applications have a Paste Special command that, when chosen, displays a list of formats. You can choose which format you want the information displayed in.

   The linked object appears in your Write document.

Editing a Linked Object

Any changes you make to a linked object in a destination document appear in the source document and in every destination document that contains a link to that object.

The following procedure describes how to edit a Paintbrush object that is linked to a Write document.

▶ To edit a linked Paintbrush object from within a Write document

1. In the Write document, choose the linked object. Paintbrush opens, with the source document displayed.
2. Edit the object as needed. The linked object in the Write document is updated as you make your changes.
3. In Paintbrush, choose Save from the File menu.
4. From the File menu, choose Exit. Paintbrush closes and you return to the Write document.

Maintaining Links

After you create a linked object in a destination document, you can do the following:

- Control whether the linked object is updated manually or automatically.
- Create multiple links to the same object.
- Cancel or delete a link.
- Restore a broken link.
- Change the format of an object.

The following sections generally describe these tasks. For more information about performing these tasks by using a specific application, see the documentation supplied with the application.

Controlling How Linked Objects Are Updated

You can *update* a linked object either automatically or manually. A linked object in a destination document that is updated automatically is updated whenever the object in the source document changes. By default, linked objects are updated automatically. If you specify that a linked object is to be updated manually, the object in the destination document does not change when the object in the source document changes, but only when you choose to update it.

Some applications have a Links command that, when chosen, displays a dialog box containing a list of existing links; you can then specify how a linked object is updated. Sound and animation objects are always updated automatically when you save changes to the source document.

Creating Multiple Links

There are two ways to create multiple links to an object. You can create each link by using the procedure described earlier in this chapter, or you can copy an existing linked object from a destination document. The result is the same—multiple destination documents will contain links to the object in the source document. You can edit the object from any document that contains a link to the source document, or you can change the source document without opening a destination document. Either way, the changes are reflected in every document that contains a link to the source document.

To copy a linked object, select the object in one destination document, and then copy it onto the Clipboard. Then paste the object from the Clipboard into the document in which you want it to appear.

Canceling or Deleting a Link

Many applications have a Links command that opens a dialog box from which you can cancel or delete existing links.

You can cancel a link so that an object in a destination document no longer retains a link to the object in the source document but exists as a static copy. After you cancel a link, changes made in the source document no longer appear in the destination document, and you can no longer make changes to the source document from the destination document. The object still exists in both the source and other destination documents.

To edit an object in a destination document after you cancel a link, you must cut and paste it into the application that was used to create it, make your changes, and then copy and paste the object back into the destination document.

Deleting a link is different from canceling a link because both the link and the object itself are removed from the destination document. To delete a link, select the linked object in the destination document, and then cut it from the document.

Restoring a Broken Link

If you change the name of a source document that contains linked objects, the links between the destination document and those objects break because they refer to a filename that no longer exists. From the destination document, you must change the name of the document that the object is linked to so that the link will work properly again.

Some applications have a Links command that, when chosen, displays a dialog box containing a list of existing links; you can then specify the name of the source document that the selected object is linked to.

Note If for any other reason a link no longer works, try choosing the object again to open the source document. If the link still does not work, you may need to delete the linked object from the destination document and try linking it again.

Changing the Format of an Object

Because information is stored on the Clipboard in a variety of formats, you can transfer and share information between applications that use different formats. For example, on the Clipboard you can store a Paintbrush picture, unformatted text, or a document in Word for Windows format.

When you use the Copy command to place information onto the Clipboard, the source application sends the information in more than one format. When you paste the information from the Clipboard, the destination application selects a format that it can use.

You can change the format that the destination application selects from the Clipboard by using the Paste Special command. For example, you might select a particular format if you know that people using the destination document have an application that can read only one format. When you choose the Paste Special command, a dialog box appears, listing other available formats for the information currently on the Clipboard, with the default format for the Paste command selected. You can select a different format and then choose the Paste button to paste or embed the object, or the Paste Link button to link it. (With some formats, choosing the Paste button may paste the object rather than embed it.)

Choosing the Paste button from the Paste Special dialog box without selecting a different format is the same as choosing the Paste command directly from the Edit menu.

Note Not all applications provide the Paste Special command. Write and Cardfile, both applications that support object linking and embedding, provide this command as described. Check your application's documentation to see how the Paste Special command is used.

Using Object Packager

There is another way to embed or link objects. Instead of embedding or linking the object in the form in which it was created, you can use Object Packager, an application in the Accessories group, to embed an icon that represents the object. This icon is called a *package*. A package can contain either an embedded object or a link to a document, but a package itself is always embedded.

A package has the same properties as any embedded object. When you choose a package, the object it contains is displayed (as in the case of text or a Paintbrush object) or played (as in the case of a sound object).

For example, suppose you are writing a report that refers to survey results on your topic. You want the survey results to be available to those who are interested, but easy to skip over for those who are not. Placing the results as a package in the context of your report makes the information easily accessible but not actually part of the text. To view the survey results, you simply open the package by choosing it.

Object Packager is also useful if you've embedded or linked a range of spreadsheet cells into a text document. You can package the cells so that they appear as an icon instead of as a range of cells within your text.

You can use Object Packager to:

- Package information into an object so that you can embed it in a destination document.
- Package an MS-DOS command line into an object so that it can be embedded and run from within a destination document.
- Customize the icon and label of the packaged object.

For more information about Object Packager, see Help for Object Packager.

CHAPTER 11

MS-DOS Applications

MS-DOS–based applications are designed to run with MS-DOS but not specifically with Windows. Most MS-DOS–based applications can run with Windows nonetheless. These applications are also sometimes referred to as non-Windows applications.

To run an MS-DOS–based application in the most efficient way, you may need to supply Windows with more information about the application. You do this by using a *program information file* (*PIF*). A PIF contains information about an MS-DOS–based application, such as how much memory it needs and how it uses various system components.

Windows provides PIFs for many common MS-DOS–based applications, in addition to a default PIF with settings that work for most applications. If Windows does not provide a PIF and the settings in the default file do not work with your application, you need to create a PIF. You do this by using PIF Editor, an application in the Main group.

This chapter explains what you need to know about setting up and running MS-DOS–based applications, describes how to use PIFs, and introduces PIF Editor. For more information about PIF Editor and all its options, see Help for PIF Editor.

Setting Up an MS-DOS Application

You set up an MS-DOS–based application to run with Windows just as you would other applications, by using Program Manager, File Manager, or Windows Setup. Regardless of which method you use, Windows sets up a PIF for the application. This section describes using the Setup program. For information about using Program Manager or File Manager to set up an application, see "Creating a Program Item" in Chapter 5, "Application Basics."

When you run the Setup program to install Windows, you can choose to have Setup search your hard disk for applications you have installed and create a PIF and an icon for each application. Setup gets the information it needs for each PIF by using information provided by Windows.

When you set up an MS-DOS–based application after Windows is set up, the Windows Setup program searches your hard disk for a PIF to use with the application. If it finds one, it sets up the application and the PIF to work together. If Setup doesn't find a PIF and there is no information available to create one, Windows uses the default PIF, named _DEFAULT.PIF, when you start the application.

▶ To set up an MS-DOS–based application after Windows is set up

1. In the Main group, choose the Windows Setup icon.
2. From the Options menu, choose Set Up Applications.
3. Select one of the two option buttons, depending on whether you want the Setup program to search your hard disk for applications or whether you want to specify an application. Then choose the OK button.
4. If you selected Search For Applications, a dialog box appears, prompting you to select the MS-DOS path or individual drives that Setup should search. Select Path to search the directories specified by the **path** command in your AUTOEXEC.BAT file. Select a drive letter to search the entire contents of a hard disk. After making your selection, choose the Search Now button.

   At the completion of the search, Setup displays a dialog box listing the applications found. From the list of applications, select those you want to set up, and then select the Add button, or select Add All to set up all applications listed. Then choose the OK button.
5. If you selected to specify an application, a dialog box appears. Type the application's path (the drive letter and directory where the program file is located) and filename, or choose the Browse button to select from a list of applications. Then choose the OK button in the Setup Applications dialog box.

   For each application you select, Setup adds a program-item icon to the Applications group. If there is no Applications group, Setup creates one.
6. If Setup detects a naming conflict or multiple PIFs for one application, it displays a dialog box prompting you to specify the name of the application or PIF you want to use.

   If Setup doesn't find a PIF, it searches for the information it needs to create one. If it finds the information, a dialog box appears, asking whether you want Windows to use the information. When you choose the Yes button, a PIF is created.

Using Program Information Files

After you set up your application, you can start using it with Windows. If the application doesn't perform properly, you probably need to modify the application's PIF. The following procedure describes how to do this. (You can also use this procedure to create a PIF.)

Make sure you are modifying the PIF that Windows is using with your application. Sometimes you can determine this by using the Properties command on the File menu in Program Manager. The PIF is specified in the Command Line box in the Program Item Properties dialog box.

Caution Changing PIF settings can affect how, and even whether, the application runs.

▶ To modify a PIF

1. In the Main group, choose the PIF Editor icon. Depending on which mode Windows is running in, PIF Editor displays an untitled PIF that contains either standard-mode or enhanced-mode settings. (To create a PIF, you can change these options and then name the new file by using the Save As command on the File menu.)
2. From the File menu, choose Open. In the File Name box, type the name of the PIF you want to open, or select a PIF from the list. Then choose the OK button.
3. Change any options that are appropriate for your application. To receive Help for a selected option, press F1 while using PIF Editor.
4. From the File menu, choose Save. Use the same base filename as the application. For example, if the application filename (program file) is WP.EXE, use WP.PIF as the name of the PIF.
5. From the File menu, choose Exit.

Using a Manufacturer-Supplied PIF

Some software manufacturers provide a PIF for an application so that you can run the application with Windows. To determine whether a PIF has been supplied, contact the software manufacturer or search the application disks for a file that uses the same base filename as the application and has a .PIF extension. If you have PIFs from both Windows and the software manufacturer, use the PIF supplied by the manufacturer.

To use a PIF supplied with an application, copy the file to the directory where the application's files are located or the directory where you set up Windows. Then create a program item in Program Manager so that you can run the application from its PIF. For more information, see "Creating a Program Item" in Chapter 5, "Application Basics."

Using the Default PIF

The _DEFAULT.PIF file is located in your Windows directory. This PIF contains settings that work with most MS-DOS–based applications. Windows uses the _DEFAULT.PIF file when there is no other PIF available for your application.

Because Windows might use the default PIF with more than one application, do not modify it; however, you can use the default PIF as a starting point for creating a PIF. Use the procedure for modifying a PIF described earlier in this chapter to open the _DEFAULT.PIF file and modify it. Then save it by using the Save As command and specifying a new filename. Your default PIF remains unchanged.

Using Multiple PIFs for an Application

You can create more than one PIF for an application if you run an application under different circumstances. For example, you can specify in a PIF how much expanded (EMS) 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 are using large data files but limit its use of memory when you are working with smaller files.

To start the application, you choose the program-item icon for the PIF that contains the settings you want.

▶ To set up two PIFs for an application

1. Create two PIFs. For more information, see the procedure for modifying a PIF earlier in this chapter.
2. For each PIF, indicate the appropriate settings. In the example just cited, for one PIF you would set the EMS Memory: KB Limit setting to -1, which allocates as much expanded memory to the application as it requests. For the other PIF, you would set the EMS Memory: KB Limit setting to 1024K. (These options are available only in 386 enhanced mode.)
3. Save each PIF with a unique filename.
4. Create program-item icons for both PIFs in Program Manager, giving each a unique label. For more information, see "Creating a Program Item" in Chapter 5, "Application Basics."

information with other applications by using the Clipboard. For more information about using the Clipboard with MS-DOS–based applications, see "Copying and Pasting Information by Using the Clipboard" later in this chapter.

▶ To switch an MS-DOS–based application between a window and a full screen

- While working with the MS-DOS–based application, press ALT+ENTER.

  If the application was running in a full screen, it now appears in a window. If the application was running in a window, it now appears in a full screen.

Tip You can specify that you want an application to run in a window every time you start it. To do this, select the Windowed option button in the application's PIF.

Changing Settings for a Running Application

You can make temporary changes to the way an MS-DOS–based application runs. Your changes stay in effect until you quit the application.

▶ To change settings for a running application

1. If your MS-DOS–based application is running in a full screen, press CTRL+ESC to reduce it to an icon, or press ALT+ENTER to run it in a window.
2. From the Control menu, choose Settings. A dialog box appears, displaying the settings you can modify.

   Tip To both run the application in a window and open the Control menu in one step, press ALT+SPACEBAR. (If your application uses ALT+SPACEBAR for another function, you cannot open the Control menu by pressing ALT+SPACEBAR.)

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3. Change the appropriate setting(s), and then choose the OK button. The options (Display, Tasking, Priority, and Terminate) are described in the following sections.

For information about using the Control menu, see Chapter 4, "Windows Basics."

Note Because you want to start the application from its PIF in this case, be sure to specify the PIF filename, not the program file, in the Command Line box.

You then can choose either program-item icon to start the application.

Starting an MS-DOS Application

You start an MS-DOS–based application from Program Manager by choosing the application's program-item icon, or from File Manager by choosing its program file, a document associated with a program file, or the application's program information file (PIF). For detailed information about ways to start an application, see Chapter 5, "Application Basics."

When you start an application from Program Manager or File Manager, Windows searches for a PIF with the same base filename. It searches directories in the following order: the directory where the application's files are located, the current working directory, the Windows directory, the SYSTEM subdirectory of the Windows directory, and then the directories specified by the **path** command in the AUTOEXEC.BAT file.

You can also run MS-DOS–based applications, such as memory-resident programs (TSRs), by using MS-DOS Prompt. However, when you start an MS-DOS–based application from the command prompt, the DOSPRMPT.PIF file is used instead of the application's PIF. If your application requires unique PIF settings and has its own PIF, start the application from Program Manager or File Manager.

Working with MS-DOS Applications in 386 Enhanced Mode



This section describes features that you use only when you are running MS-DOS–based applications in 386 enhanced mode. To determine which mode Windows is running in, choose the About command from the Help menu in Program Manager. The mode is displayed near the bottom of the dialog box.

Running an MS-DOS Application in a Window

You can run most MS-DOS–based applications in a window when Windows is running in 386 enhanced mode. You cannot run an MS-DOS–based application in a window if Windows is running in standard mode. When the application is running in a window, you can move and size the window, and you can share

Display Options

Use the Display options to specify whether an application appears in a window or in a full screen.

Use	To
Window	Run the application in a window.
Full Screen	Run the application in a full screen.

Tasking Options

Use the Tasking options to control how an application shares system resources with other applications. You can select one or both of the following check boxes.

Use	To
Exclusive	Suspend other applications while the application is the active one. (If the application is running in a window, Windows-based applications continue to run, but other MS-DOS–based applications are suspended.)
Background	Run the application in the background while you work with other applications. (This application is suspended when an application that has the Exclusive option set is the active application.)

You can also set these options in the application's PIF by using PIF Editor. For more information about these and other PIF Editor options, see Help for PIF Editor.

Priority Options

Use the Priority options to specify how much processor time the application should receive, relative to other applications. Giving the application a high priority makes it run faster than applications with lower priorities; conversely, giving it a lower priority slows it down.

Use	To
Foreground	Control how fast the application runs, relative to other applications, when it is the active application. You can type a value from 0 to 10000; the default foreground priority is 100.
Background	Control how fast the application runs, relative to other applications, when it is not the active application. For this option to take effect, you must also select the Background check box under Tasking Options. You can type a value from 0 to 10000; the default Background priority is 50.

You can also set these options in the application's PIF by using PIF Editor. For more information about these and other PIF Editor options, see Help for PIF Editor.

Terminate Option

Use the Terminate button to quit an MS-DOS–based application when you cannot use the usual methods from within the application—for example, when the application does not respond to the commands you type.

Caution Use the Terminate button only as a last resort, because it can result in lost data. If you cannot open the Control menu in your MS-DOS–based application, you can press CTRL+ALT+DEL to quit the application. Windows displays a message confirming the action. Press ENTER to quit the application.

Changing the Size of the Font

When you are running an MS-DOS–based application in a window, you can change the size of the font displayed in the window by using the Fonts command on the Control menu.

▶ **To change the size of the font**

1. If your MS-DOS–based application is running in a full screen, press CTRL+ESC to reduce it to an icon, or press ALT+ENTER to run it in a window.
2. From the Control menu, choose Fonts.
3. Select a font size. The Selected Font box displays the font size.
4. If you want to use this font size whenever you run this MS-DOS–based application in a window, select the Save Settings On Exit check box.
5. Choose the OK button.

Copying and Pasting Information by Using the Clipboard

The methods you use to copy and paste information between MS-DOS–based applications are different from those you use with Windows-based applications. With MS-DOS–based applications, you use commands on the Control menu.

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

1. If the MS-DOS–based application you want to copy from is running in a full screen, press ALT+ENTER to run it in a window.
2. From the Control menu, choose Edit.
3. From the Edit cascading menu, choose Mark.
4. Select the information you want to copy.
5. Click using the right mouse button, or press ENTER, to copy the selected information onto the Clipboard. You can also choose the Copy command from the Edit menu.

The method you use to paste information into an MS-DOS–based application depends on whether the application is running in a window or in a full screen.

▶ To paste information into an MS-DOS application running in a window

1. Make sure the information you want to paste is on the Clipboard. To view the contents of the Clipboard, choose the Clipboard Viewer icon in the Main group.
2. Switch to the destination application.
3. Place the insertion point where you want the information from the Clipboard to appear.
4. Open the application's Control menu.
5. From the Control menu, choose Edit.
6. From the Edit cascading menu, choose Paste.

The following procedure can be used in either standard or 386 enhanced mode.

▶ To paste information into an MS-DOS application running in a full screen

1. Make sure the information you want to paste is on the Clipboard. To view the contents of the Clipboard, choose the Clipboard Viewer icon in the Main group.
2. Switch to the destination application.
3. Place the insertion point where you want the information from the Clipboard to appear.
4. Press ALT+SPACEBAR to open the application's Control menu.

Note If Windows is running in standard mode, or if your application uses ALT+SPACEBAR for another function, you cannot open the Control menu by pressing ALT+SPACEBAR. Press CTRL+ESC. The application will then appear as an icon near the bottom of the Windows desktop. (Task List will also appear.) Click the icon to open the application's Control menu.

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5. From the Control menu, choose Edit.
6. From the Edit cascading menu, choose Paste.

Giving an Application Exclusive Use of Resources

You can specify that an application has exclusive use of system resources when it is the active application. For example, you might want to do this to ensure that an application runs as quickly as possible, without being slowed down by applications running in the background. Also, some applications use hardware in such a way that they cannot run at the same time as other applications.

There are two ways to give an application exclusive use of resources:

- Use PIF Editor to open the application's PIF, and then select the Exclusive check box. When you use this setting, no other applications can run when that application is active. This setting takes effect every time you start the application.
- If the application is running in a window or as an icon, use the Settings command on the application's Control menu. Select the Exclusive check box (under Tasking Options). The application gets exclusive use of resources only until you quit the application. The next time you start the application, the setting is not in effect.

Running an Application in the Background

You can run an application in the background (calculating numbers or reading a large file, for example) while another application is in the foreground.

There are two ways to run an application in the background:

- Use PIF Editor to open the application's PIF, and then select the Background check box. This setting takes effect every time you run the application.
- If the application is running in a window or as an icon, use the Settings command on the application's Control menu. Select the Background check box (under Tasking Options). The application runs in the background only until you quit the application.

Note If an MS-DOS–based application is running in the foreground and the Exclusive check box is selected in its PIF, other applications cannot run in the background (even if the Background check box is selected in their PIFs).

Using Memory-Resident Programs

If you want a memory-resident program (TSR) to be available to all Windows-based and MS-DOS–based applications, start it before you run Windows. The program is then available to all applications you run with Windows; however, the memory it uses is not available to other applications. In general, most memory-resident programs are started from your CONFIG.SYS or AUTOEXEC.BAT file. (These files are located in the root directory of your startup drive.) The files indicate to MS-DOS which commands and programs to run when you start your computer.

If only one application requires a memory-resident program, you might not want to start the program from the CONFIG.SYS or AUTOEXEC.BAT file. Instead, you can create an MS-DOS batch program that starts the memory-resident

program and then the application. You can run that batch program from Windows. For more information about using batch programs with Windows, see your MS-DOS documentation.

Running Pop-up Programs

A pop-up program is a memory-resident program that is loaded into memory but isn't visible until you press a certain key combination. You should start pop-up programs, such as Borland SideKick, only after starting Windows. By doing so, you can switch to and from that program as you would any MS-DOS–based application (rather than by using its "pop-up" shortcut key), and the pop-up program can share memory with Windows and other applications.

▶ To use a pop-up program with Windows

1. If necessary, create a PIF for the pop-up program.
2. Start the pop-up program as you would any application—for example, by setting it up as a program item in Program Manager and then double-clicking its icon. When you start the pop-up program, Windows displays a message confirming that the program is loaded.

   For information about setting up and starting applications, see Chapter 5, "Application Basics."
3. Press the appropriate key combination to make the program appear on your screen.

   A few pop-up programs require a key combination that is usually reserved for Windows (for example, ALT+ESC). In this case, you can edit the PIF for the pop-up program, selecting the appropriate key-combination check box in the Reserve Shortcut Keys area in the Advanced Options window. When you press the key combination, the pop-up program appears instead of the usual Windows function being performed.

Note You can switch to and from a pop-up program by using Task List (press CTRL+ESC) rather than by pressing the key combination that usually displays the program.

CHAPTER 12

Customizing Windows

After setting up Windows, you may want to change some of your system settings. For example, you may want to use a different color scheme or add some fonts. This chapter describes the following tasks that you can perform to customize Windows:

- Changing your desktop colors, pattern, or wallpaper
- Using a screen saver
- Adding and removing fonts
- Changing your network settings
- Using sounds and setting MIDI options
- Changing your code page

For information about other customization tasks, see "More Ways to Customize Windows" at the end of this chapter.

Customizing Desktop Colors

By using the Colors option in Control Panel, you can customize the colors used for your *desktop,* the area of the screen in which windows, icons, and dialog boxes appear. You can change the color of an individual screen element or several elements at once. You can also create your own colors.

Choosing a Color Scheme

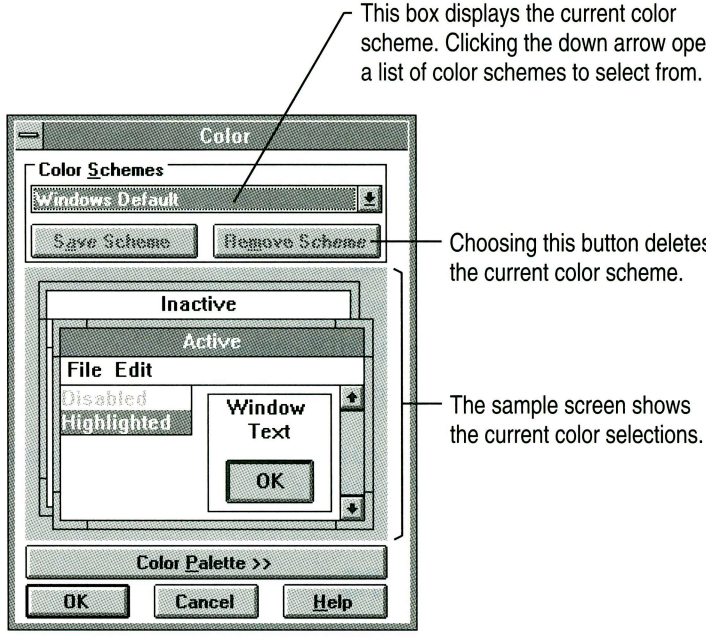
Windows provides several predefined *color schemes.* A color scheme is a collection of complementary colors. Some color schemes include only *solid colors*; others also include *nonsolid colors.*

A solid color is directly supported by your display adapter. Video graphics adapters (VGAs) support 16 solid colors, and 256-color adapters support 20 solid colors. Both types of adapters support hundreds of nonsolid colors. A nonsolid color is produced by a pattern of colored dots.

To choose a color scheme

- In the Control Panel window, choose the Color icon. In the Color dialog box, select the color scheme you want to use, and then choose the OK button.

  For help with the Color dialog box, choose the Help button or press F1 while using the dialog box.



When choosing a color scheme, note the following:

- Using a color scheme that has only solid colors (such as Windows Default) may increase the speed at which Windows redraws your screen.
- If you are using a plasma display adapter, you might want to use the Plasma Power Saver color scheme, which uses darker colors that require less power.
- If you are using a liquid crystal display adapter (LCD), colors may appear in reverse video. In this case, you might want to use one of the color schemes whose names start with LCD.
- Control Panel uses the solid color closest to the selected nonsolid color for several screen elements. This will be reflected in the sample screen.

Note Some LCD monitors have switches you can use to set the screen display so that it does not appear in reverse video. For other computers with LCD monitors, you need to press a key to change the screen display. In this case, you may need to quit Windows before you can change the display.

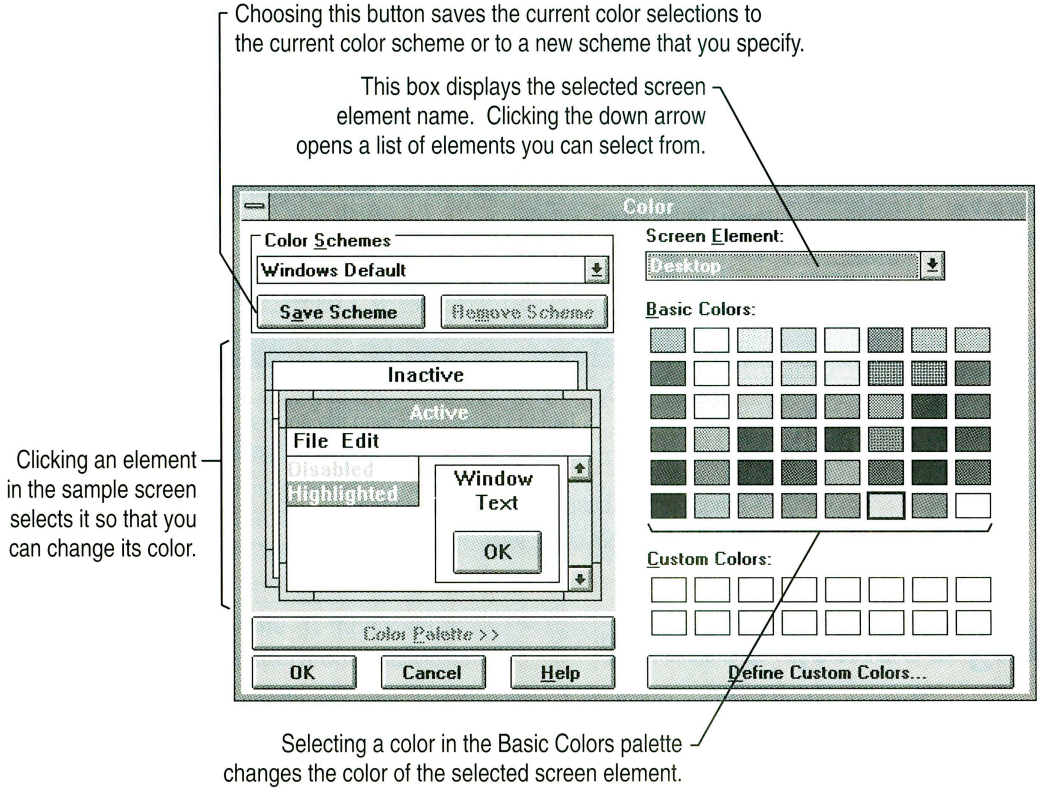
If you use only a few color schemes, you can shorten the list of selections by removing schemes. The only color scheme you cannot remove is Windows Default.

Changing the Color of Screen Elements

You can change the color of one or more *screen elements* (parts of a window) and then save the changes you make.

▶ To change the color of a screen element

- In the Color dialog box, choose the Color Palette button. The dialog box expands as shown. Select the colors you want for particular screen elements, and then choose the OK button.



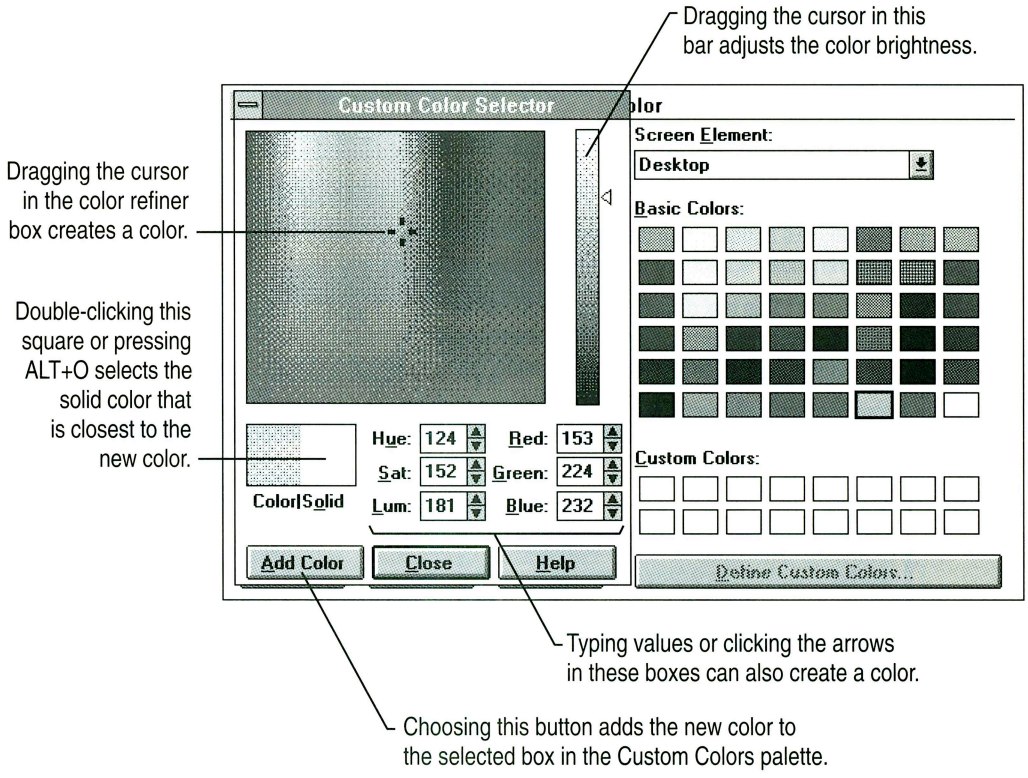
Creating Your Own Colors

You can create up to 16 additional colors at a time and use them in your color schemes.

▶ To create your own color

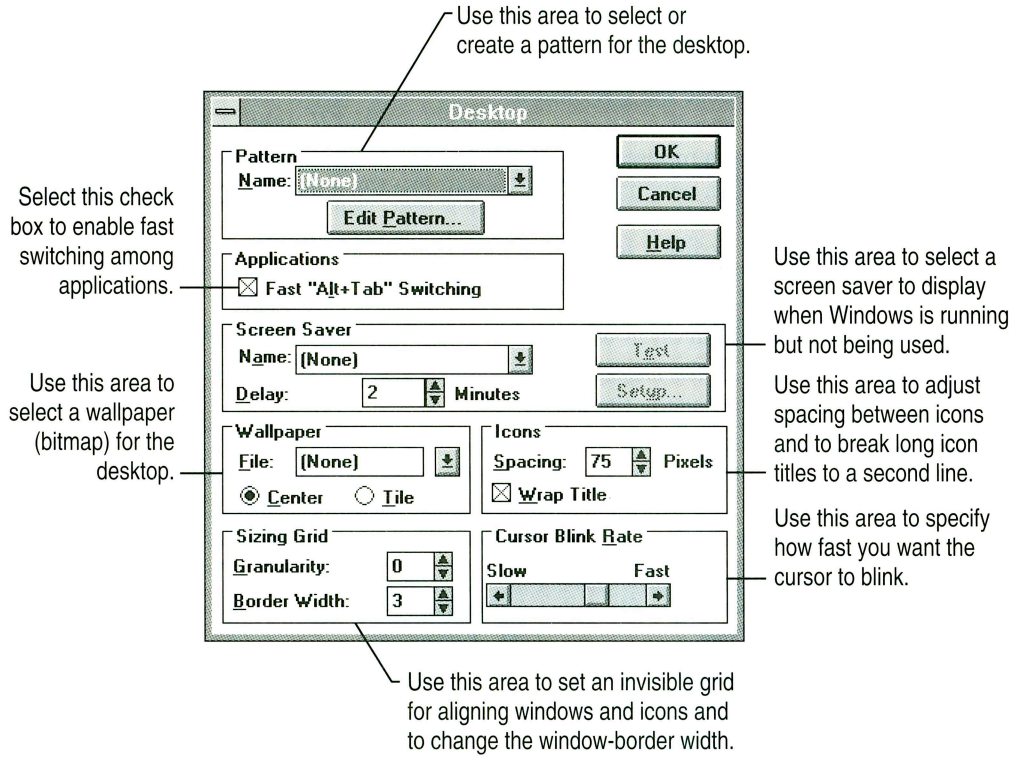
- In the expanded Color dialog box, choose the Define Custom Colors button. In the Custom Color Selector dialog box, create colors, and then choose the Add Color button to add them to the Custom Colors palette. Then choose the Close button.

  For help with the Custom Color Selector dialog box, choose the Help button or press F1 while using the dialog box.



Changing Desktop Settings

By using the Desktop option in Control Panel, you can change the screen background and customize the way that windows and icons appear on your screen. When you choose the Desktop icon, the Desktop dialog box appears.



This section describes procedures for using patterns, wallpaper, and screen savers. For information about the other desktop options, choose the Help button or press F1 while using the Desktop dialog box.

Displaying Desktop Patterns

When you first start Windows, the desktop is a solid color. You can replace the color with a predesigned desktop pattern or, if you are using a mouse, you can create a pattern of your own.

The background color for the pattern is the same as the Desktop color. The foreground color (the dots that make up the pattern) is the same as the color of the Window Text screen element. For information about setting these colors, see "Customizing Desktop Colors" earlier in this chapter.

Note If the Desktop and Window Text colors are the same, you will not see a pattern on your desktop.

To choose a pattern

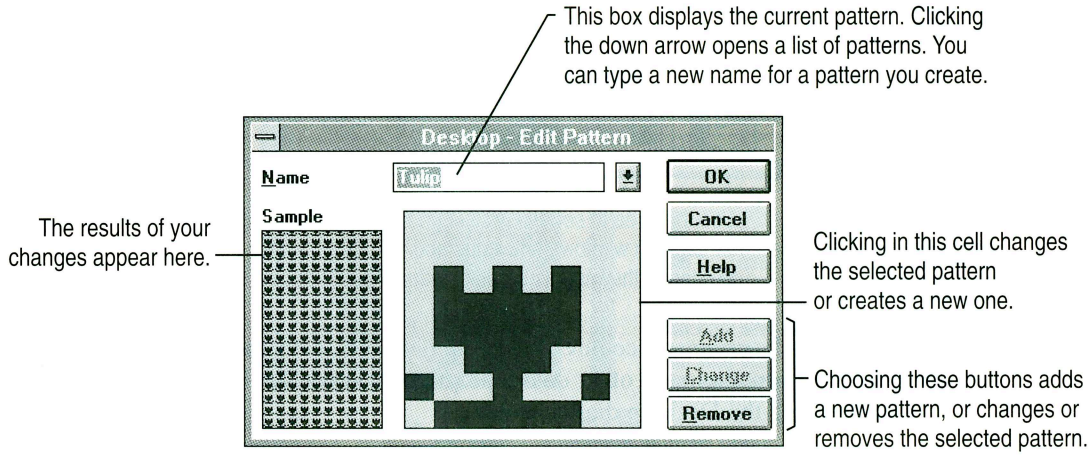
- Under Pattern in the Desktop dialog box, open the Name list, select a pattern, and then choose the OK button.

If you are using a mouse, you can change an existing desktop pattern or create one and save it with a new name. You cannot change a pattern by using the keyboard.

To change or create a pattern

- In the Desktop dialog box, choose the Edit Pattern button. In the Desktop–Edit Pattern dialog box, create or edit a pattern, and then choose the OK button.

  For help with the Desktop–Edit Pattern dialog box, choose the Help button or press F1 while using the dialog box.



The pattern you define is repeated as many times as necessary to completely fill the background.

If you use only one or two patterns, you can shorten the list of selections by removing unneeded patterns.

Displaying Custom Wallpaper

Instead of a desktop color or pattern, you can display a *wallpaper*. You can use any bitmap file that has a .BMP extension, even an elaborate one such as a scanned color photograph. If you select both a wallpaper and a pattern, the wallpaper appears as your desktop background. The pattern appears as the background used to highlight icon titles on your desktop.

You can also use Paintbrush or another drawing application to produce .BMP files.

▶ **To choose a bitmap to display as wallpaper**

1. Under Wallpaper in the Desktop dialog box, open the File list, and then select a bitmap. Or, in the File box, type the full path for the bitmap if it is not in your Windows directory.
2. Select the Center or Tile option button, and then choose the OK button.

   The Center option positions the bitmap at the center of the desktop. The Tile option repeats the bitmap as many times as necessary to cover the desktop. This is useful if you are using small bitmaps.

If the original bitmap is too large to fit on the screen or takes up too much memory, Windows does not display it.

Note Windows uses more memory when displaying wallpaper than when displaying a solid color or a pattern on the desktop. If you receive a memory error when running an application, you can try changing to a color or pattern, or you can select None in the Pattern or Wallpaper box.

▶ **To remove a wallpaper from the list**

- Delete the bitmap file from your Windows directory.

Using a Screen Saver

If you want, you can select a *screen saver*, a moving pattern or bitmap, to appear on your screen after your computer has not been used for a specified amount of time. Screen savers can reduce the wear on your screen and provide some security for your system. Windows provides several screen savers.

▶ **To choose a screen saver**

1. Under Screen Saver in the Desktop dialog box, open the Name list, and then select a screen saver.
2. To see how the screen saver looks, choose the Test button. To end the test, move the mouse or press any key.
3. In the Delay box, click the up or down arrow to increase or decrease the number of minutes of inactivity you want to elapse before the screen saver appears. Or type a number larger than zero.
4. If you want to customize the screen saver, choose the Setup button. (If the screen saver cannot be customized, a message notifies you that there are no options to set.)

5. In the setup dialog box for the screen saver, change any settings you want.

   If you want to specify a password, select the Password Protected check box, and then choose the Set Password button. Complete the Change Password dialog box, and then choose the OK button twice to return to the Desktop dialog box.

   For information about the setup or Change Password dialog box, choose the Help button or press F1 while using the dialog box.

6. Choose the OK button.

▶ **To return to Windows when the screen saver is active**

- Move the mouse or press any key. If you have specified a password, a dialog box appears, in which you must type the password before you can return to Windows. This ensures that unauthorized users do not have access to your work.

Note If an MS-DOS–based application is the active application, the screen saver does not appear, even after the specified number of minutes have elapsed. Windows screen savers will not appear if Windows is not running.

Using Fonts

A *font,* or typeface, is a collection of characters—letters, numerals, symbols, and punctuation marks—that have common characteristics. Fonts have various sizes and styles. Font sizes indicate the height of a character and are measured in points, a point equaling 1/72 of an inch. Font styles include bold and italic.

Choosing the right font, font size, and font style can help you create whatever look you want for a document—professional, highly graphical, or draft quality. The font size and style also determine how much text can fit on a page.

Using Windows Fonts and Printer Fonts

When you set up Windows on your computer, several kinds of fonts are installed. These fonts include:

- Screen fonts, which are used by Windows to display information such as the text that appears in application windows and dialog boxes. Screen fonts come in predefined point sizes. Screen fonts also print on some printers (for example, dot-matrix printers).

- Plotter fonts, which are scalable to any point size and are most often used for displaying information on the screen and for plotting graphics with pen plotters. Plotter fonts can also be used with some dot-matrix printers; however, the print quality may not be as good.
- TrueType fonts, which are scalable to any point size and look the same on the screen as they do printed. For information about TrueType fonts, see "Using TrueType Fonts" later in this chapter.

Printers include built-in fonts for printing. These fonts are known as *printer fonts.* The number of printer fonts that a printer supports varies according to the capabilities of the printer. Dot-matrix and some laser printers include one or two printer fonts; PostScript-compatible printers include several printer fonts. When you install a printer, the printer fonts appear in the Font list of the Fonts dialog box in applications such as Write.

Using Cartridge Fonts and Soft Fonts

You can also use soft fonts and cartridge fonts with your printer. To use soft fonts, you need to install them by using the installation program that comes with your fonts package. If an installation program was not provided with your fonts package and you are using a Hewlett-Packard LaserJet or DeskJet (PCL) printer, you can use the Font Installer program provided with Windows.

To use cartridge fonts, you need to insert one or more font cartridges into the cartridge slots on your printer. You might also need to install them, if support for the fonts is not built into the printer driver for your printer. If you need to use Font Installer, you can do so while setting printing options. For more information about setting printing options and using Font Installer, choose the Help button or press F1 while using the Printer Setup or Font Installer dialog box. For more information about printer drivers, see Chapter 8, "Print Manager."

Viewing Printer, Soft, and Cartridge Fonts on the Screen

Because various printers and screens display information at different resolutions, many printer drivers and cartridge- and soft-font packages include matching screen fonts so that the fonts look the same on your screen as they do printed. If matching screen fonts are not included with your font cartridge or soft-font package, check with your printer or font manufacturer to determine whether they are available.

If you use a cartridge, soft, or printer font to format text, and no matching screen font is available, one of the screen, plotter, or TrueType fonts supplied with Windows is used to display text on the screen. Though the font on the screen may not look exactly like the printed font, the substitute font creates line lengths and page breaks on the screen similar to those in the printed document.

Using TrueType Fonts

If you use TrueType fonts in your documents, Windows and all Windows-based applications display the fonts on the screen exactly as they appear when printed—there is no need to install matching screen fonts. In addition, when you use TrueType fonts, your documents become more portable: The fonts look the same printed on different printers, as long as you use the same application and print at the same resolution.

Note If you print at a different resolution or print a document from an older application, line and page breaks might change.

Several TrueType fonts are installed automatically when you set up Windows. They are immediately available to your printer and to the applications (such as Write and Paintbrush) included with Windows. In these applications, TrueType fonts appear with a TT symbol next to them in the Font list in the Fonts dialog box. If you purchase additional TrueType fonts, you can add them to Windows and your Windows-based applications by using the Fonts option in Control Panel.

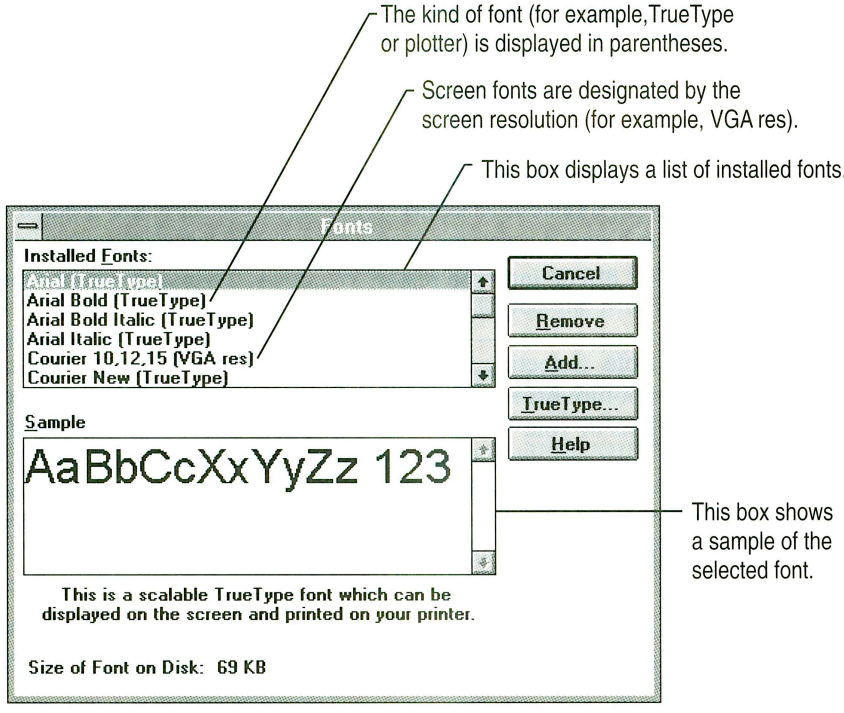
Adding and Removing Fonts

When you install a printer driver, any screen fonts matching the printer fonts that your printer supports are also installed. If you are using cartridge or soft fonts, your font manufacturer usually supplies a program for installing screen fonts. (The program that installs the cartridge or soft fonts may install the screen fonts automatically.) If no program is provided for installing screen fonts, you can use the Fonts option in Control Panel to install them. You can also use the Fonts option in Control Panel to set TrueType font options.

If you find that you use only TrueType fonts in your documents, you can use the Fonts option to prevent all other fonts—screen, plotter, and printer fonts—from appearing in the font lists of your Windows-based applications.

To add a font and set TrueType options

1. In the Control Panel window, choose the Fonts icon. The Fonts dialog box appears.



2. Choose the Add button.
3. Open the Drives list, and then select the drive that contains the fonts you want to add. Then select the directory where the fonts are located.
4. From the List Of Fonts box, select the fonts you want to add. You can extend the selection to add several fonts at once. Or, 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 Directory check box. You can then use the fonts directly from the directory in which they are located, without copying them to your Windows directory. For example, this is useful if you are using a CD-ROM that contains hundreds of TrueType fonts.

If the fonts are located on a network or on a removable disk drive, it is recommended that you select the Copy Fonts To Windows Directory check box. This ensures that the fonts will always be available, even if the source drive is removed or the fonts are removed from the network.

6. Choose the OK button. Then choose the Close button, unless you want to set TrueType options.
7. To set TrueType options, choose the TrueType button in the Fonts dialog box.
8. To turn off TrueType fonts, clear the Enable TrueType Fonts check box. Or, to use TrueType fonts exclusively, select the Show Only TrueType Fonts In Applications check box. Then choose the OK button.
9. Any change you make to the Enable TrueType Fonts option does not take effect until you restart Windows. To restart, choose the Restart Now button.

Note Selecting the Show Only TrueType Fonts In Applications check box does not turn off non-TrueType fonts. It only prevents them from appearing in the fonts lists of your Windows-based applications. You can still use these applications to view and print documents that contain other fonts. Some applications do not support the listing of TrueType fonts exclusively. If you select the Show Only TrueType Fonts In Applications check box and no TrueType fonts appear in your application, do not use this option.

If you are no longer using a font, you can remove it. Removing fonts frees memory for use by your applications.

Caution The MS ® Sans Serif font set is used for most Windows dialog boxes. Do not remove this font; if you do, the text in dialog boxes will be difficult to read.

▶ To remove a font

1. From the Installed Fonts list, select the font you want to remove, and then choose the Remove button.
2. If you want to delete the font files from your disk in addition to removing the fonts from memory, select the Delete Font File From Disk check box. Then choose the Yes button. Or, if you are removing several fonts at once, choose the Yes To All button.

Caution If you chose not to copy the fonts to your Windows directory (if you cleared the Copy Fonts To Windows Directory check box in the Add Fonts dialog box), do not select the Delete Font File From Disk check box. If you do, you may delete the fonts from their source disk, making them unavailable to anyone else.

Using Sound

Control Panel provides several options to control how sound works in Windows. By using these options, you can perform tasks such as assigning different sounds to system and application events. If you are using a sound device that has Musical Instrument Digital Interface (MIDI) capabilities, you can specify MIDI settings for your device. If you are not using such a device, the MIDI Mapper icon does not appear in the Control Panel window.

To use sound in Windows, you should have a sound card installed that conforms to the Multimedia Personal Computer (MPC) specifications. To use MIDI sound capabilities, your sound card should include a built-in MIDI synthesizer, or you should have a synthesizer connected to the MIDI output port of your sound card. You also need to install the sound drivers that control your sound card and your MIDI devices. For information about installing and configuring drivers for your sound devices, see Chapter 13, "Configuring Hardware."

Assigning Sounds to Events

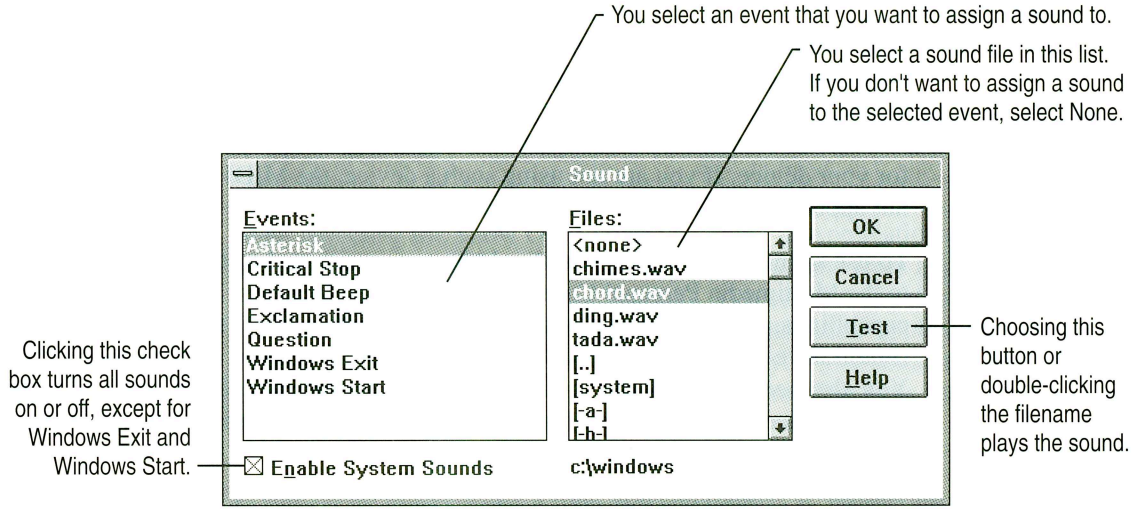
By using the Sound option in Control Panel, you can assign waveform sounds (stored in files that have the .WAV extension) to different application and system events. For example, you can select a sound to play whenever you start Windows. Other sounds play as specified by the application you are using. For example, some applications play the sound assigned to the Exclamation or Asterisk event whenever a warning message is displayed.

If you do not have a sound card that supports the waveform sound format, or if the sound driver is not configured properly, Windows uses only a warning beep when it encounters an error or when you attempt to do something your computer does not recognize.

To assign sounds to events

- In the Control Panel window, choose the Sound icon. In the Sound dialog box, select which sounds you want to use for which events, and then choose the OK button.

  For help with the Sound dialog box, choose the Help button or press F1 while using the dialog box.



Changing MIDI Settings

If you are using a sound device, such as a synthesizer, that has Musical Instrument Digital Interface (MIDI) capabilities, you can specify MIDI settings for your device.

Windows supports two standards for playing MIDI information that is generated by an application or stored in a MIDI file. These standards, the General MIDI guidelines and the Microsoft authoring guidelines for MIDI files, both include certain instrument patch settings and key assignments, as defined by the General MIDI specifications. However, they differ in the channel settings they require.

When you set up Windows, the Setup program installs MIDI setups that support both standards for playing MIDI information on common combinations of sound cards and synthesizers. These setups include key maps, patch maps, and channel settings that ensure that MIDI information plays accurately on your synthesizer. You can use the MIDI Mapper option in Control Panel to select a different MIDI

setup, create a new setup, or edit key assignments, patch maps, or channel mappings for an existing setup. This section describes how to select a MIDI setup. For information about how to edit or create a MIDI setup, see Help for Control Panel.

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.

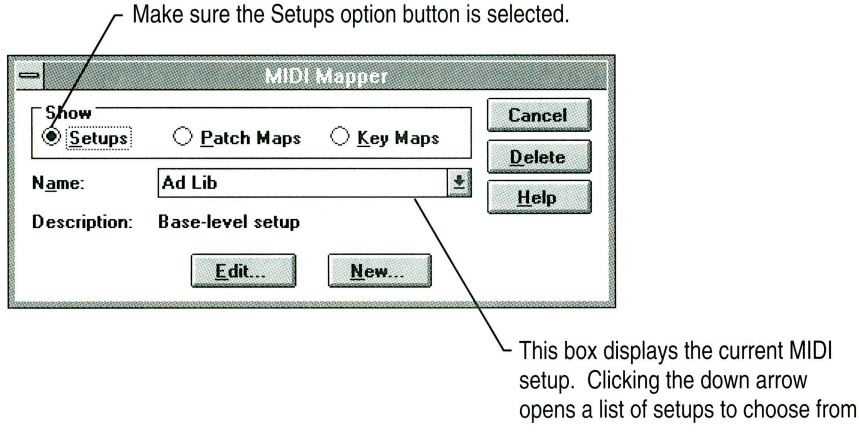
Selecting a MIDI Setup

If you are using an application, such as Media Player, that uses MIDI setups to play MIDI files, you need to select the MIDI setup for the synthesizer that will be playing the file.

▶ To select a MIDI setup

- In the Control Panel window, choose the MIDI Mapper icon. In the MIDI Mapper dialog box, select the name of the setup you want to use, and then choose the Close button.

  For help with the MIDI Mapper dialog box, choose the Help button or press F1 while using the dialog box.



The following table lists the MIDI setups provided with Windows and describes the setups you should use with your synthesizer and MIDI output port.

Use	For
Ad Lib	The Ad Lib or Ad Lib-compatible synthesizer included on your sound card. This setup uses channels 12–16 (base-level channels).
Ad Lib General	Same as for Ad Lib; however, this setup uses all 16 channels.
LAPC1	The Roland synthesizer included on your LAPC1 sound card. This setup uses all available LAPC1 channels.
MT32	Same as for LAPC1; however, this setup uses all available MT32 channels.
Proteus/1	The E-mu Systems Proteus/1 synthesizer connected to the Sound Blaster MIDI output port. This setup uses channels 1–10 (extended-level channels).
Proteus General	Same as for Proteus/1; however, this setup uses all 16 channels.
Extended MIDI	Any General MIDI synthesizer, such as the Roland Sound Canvas (SC-55), connected to the Sound Blaster MIDI output port. This setup uses channels 1–10 (extended-level channels). Use this setup to play MIDI files authored according to Microsoft guidelines.
General MIDI	Same as for Extended MIDI; however, this setup uses all 16 channels. Use this setup to play MIDI files authored according to General MIDI guidelines.

If you plan to play MIDI files authored according to General MIDI guidelines, use a "general" setup for your synthesizer. If you plan to play MIDI files authored according to Microsoft guidelines, use the other setup.

If you are using a synthesizer that is connected to a MIDI output port other than Sound Blaster or a Sound Blaster-compatible port, you need to edit the setup to change the port assignments. If you are using a synthesizer that is not included in the list, you may need to create a MIDI setup for it. For information about editing or creating MIDI setups, see Help for Control Panel.

Setting Network Options

If you installed a network when setting up Windows, the Control Panel window includes a Network icon. You can choose this icon to view information about your network or to specify settings available for your particular network.

When you choose the Network icon, a dialog box specific to your network appears. The following are some of the tasks you might be able to perform by using this dialog box:

- Signing on and off the network
- Changing user ID and password
- Sending messages to other network users
- Restoring network connections when you start Windows

For information about the tasks you can perform by using your network, see your network documentation and Help (if available) in the dialog box.

Changing the Code Page

In Windows, the Codepage setting determines the *character set* (the characters for the language you are using on your system) to use for your keyboard layout, for filenames that include extended characters, and for MS-DOS–based applications running in a window. When Windows is first set up on your system, Setup detects the code page used by MS-DOS and sets up Windows to use the same one. If you subsequently change your MS-DOS code page, you need to update the Codepage setting in Windows to match it.

You update the Codepage setting by using the Windows Setup program.

▶ To change to another code page

1. Quit Windows.
2. Change to your Windows directory, type **setup** at the command prompt, and then press ENTER.
3. In the System Information screen, select the Codepage setting (use the UP ARROW or DOWN ARROW key), and then press ENTER. A list of the available code pages appears.
4. Select the code page you want to use, and then press ENTER.
5. When the System Information screen appears, press ENTER again. Setup asks you to confirm that you want to change code pages. Press F3 to verify the change.
6. Setup prompts you for the disk containing the new code-page file.

   If you are changing to a code page that you have used before, Setup asks you whether you want to use a new code-page driver or the one that is currently on

your computer. If you have an updated driver, press ESC; otherwise, press ENTER. Insert the disk or type the drive and directory where the driver file is located, and then press ENTER.

After Setup copies the file, you return to the command prompt. The new code page takes effect the next time you start Windows.

More Ways to Customize Windows

You can also use Control Panel and Windows Setup when you need to perform the following tasks:

- Setting up a network for use with Windows
- Customizing the mouse and other pointing devices
- Adjusting the keyboard speed
- Setting the system date and time
- Specifying international settings
- Creating and editing MIDI setups
- Adding and removing Windows components

Help for Windows Setup provides information about adding and removing Windows components and setting up a network for use with Windows. Help for Control Panel describes all other tasks in detail. Choose the Help button or press F1 while working in the dialog box for each Control Panel or Setup option.

CHAPTER 13

Configuring Hardware

When you set up Windows, the Setup program installs the appropriate *drivers* for your hardware, based on your system configuration. A driver is a program that enables a specific piece of hardware (or *device*) to communicate with Windows. If you change your system configuration by adding a new device, you need to add a driver for it.

Generally, your device or hardware package includes a disk containing the appropriate Windows device driver. Or Windows may include the driver you need.

Although the device may be installed in or connected to your computer, Windows does not recognize a device until you install and configure the device driver.

This chapter describes how to install and change device drivers for your multimedia devices, display adapter, keyboard, and mouse. It also describes how to configure communications ports.

The Windows Driver Library

If you do not have a driver or if you want an updated driver for your device, contact your device manufacturer or check the Windows Driver Library (WDL), which contains device drivers made available after Windows was released. Device drivers are added to the WDL as they become available. If you have a modem, you can download WDL device drivers from network services, including CompuServe, GEnie, Microsoft OnLine, various user-group bulletin-board services (BBSs on the Association of PC User Groups, or APCUG, network), and the electronic downloading service maintained by Microsoft (206–936–6735). If you do not have a modem and are located in the United States, you can obtain disks by calling Microsoft Customer Support Services at 1–800–426–9400.

Note If your copy of Windows was acquired outside the United States, the package contains a subsidiary information card that lists bulletin-board services

from which you can obtain updated device drivers. In addition, the subsidiary information card lists local subsidiary telephone numbers you can call to obtain drivers if no BBS is available or you cannot use a BBS.

Methods for Installing Device Drivers

You can install device drivers after you have set up Windows, either by running the Setup program or by using Control Panel options. The method you use depends on the type of hardware you are adding or changing. For example, you can add a sound driver to your system by using Control Panel. If you want to change the resolution of your screen, you run Setup.

To install and configure a printer, you can use either the Printers option in Control Panel or the Printer Setup command in Print Manager. For instructions on how to install and configure a printer, see Chapter 8, "Print Manager."

Note Depending on the type of driver that you install or the settings that you change, you need to restart Windows or your computer in order for the new driver or changed settings to take effect.

Installing a Third-Party Device Driver

Windows provides drivers for common display adapters, mice, keyboards, and sound cards. If Windows does not supply a driver for your device, or if you are updating to a newer version of the driver, you may need to install a driver provided by your device manufacturer (*third-party driver*).

The driver disks that you receive from your device manufacturer should include an OEMSETUP.INF file. This file supplies Windows with setup information that specifies the driver files on the disk and any additional files (such as font files) the driver requires.

If your driver disks include an OEMSETUP.INF file, you can use Setup or Control Panel to install the driver. If the driver disks do not include this file, you need to follow the instructions supplied by your device manufacturer to install the driver.

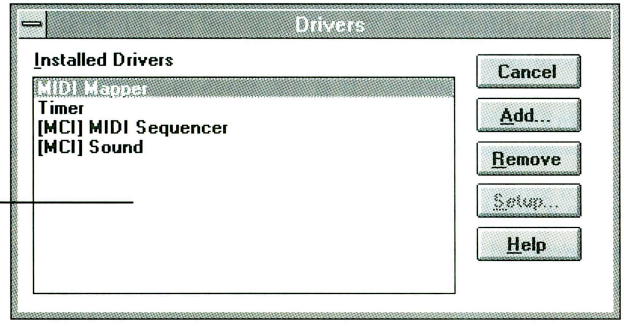
Installing and Configuring Multimedia Drivers

You can use the Drivers option in Control Panel to install, configure, and remove device drivers that support multimedia devices, such as sound cards, synthesizers, audio compact-disc players, and videodisc players.

Note To install an updated version of a multimedia driver, you must first remove the old driver from your system.

▶ To install a multimedia device driver

1. In the Main group, choose the Control Panel icon.
2. In the Control Panel window, choose the Drivers icon. The Drivers dialog box appears.



This box displays a list of multimedia drivers already installed in your computer.

3. Choose the Add button.
4. In the list, select the driver you want to install, and then choose the OK button. (If your device is not listed, select Unlisted Or Updated Driver.)
5. Insert the requested disk in drive A, and then choose the OK button.

   Or type the drive letter and directory name (for example, **d:\drivers**) where the driver is located, and then choose the OK button.

   (You can also use the Browse button to locate and select the drive and directory where the driver is located. When you are finished using the Browse dialog box, choose the OK button.)

   If you selected Unlisted Or Updated Driver, another dialog box appears, listing the drivers on the disk. Select the driver you want to install, and then choose the OK button.

6. When you install a multimedia driver, Windows installs other related multimedia drivers at the same time. If the drivers require additional settings, a setup dialog box appears for each driver. Select the settings required by the driver, and then choose the OK button.

Note Make sure that the settings you specify do not conflict with the settings used by other devices installed in your system, such as a mouse or network adapter. See the documentation for your devices, including your multimedia device, for information about their settings.

7. New or changed multimedia-driver settings do not take effect until you restart Windows. To restart, choose the Restart Now button.

If you are no longer using a device, you can remove its driver.

Caution The multimedia device drivers that are automatically installed during Setup are required by your system (these are the drivers 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 multimedia driver**

1. In the Installed Drivers list, select the driver, and then choose the Remove button.
2. To completely remove the driver from memory, you need to restart Windows. To restart, choose the Restart Now button.

Removing a multimedia driver from the Installed Drivers list does not delete the driver file from your hard disk. If you need to use the same multimedia device later, you can add its driver again.

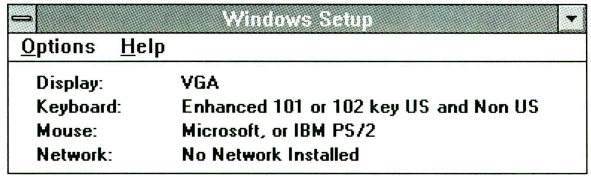
Changing Your Mouse, Keyboard, or Display Driver

You might want to add a mouse to your system, upgrade your display adapter to use a higher resolution, or install a new keyboard driver. You can do so by running Setup from within Windows.

Note If a driver is in use (for example, your display driver), and you want to update it to a newer version of the same driver, you need to quit Windows and then run Setup from MS-DOS. For more information, see the following section, "Updating a Driver Currently in Use."

To change your mouse, keyboard, or display driver from within Windows

1. Be sure your hardware is set up to match the setting to which you are changing. Check the documentation for your device.
2. In the Main group, choose the Windows Setup icon. The Windows Setup window appears, listing your current hardware settings.



3. From the Options menu, choose Change System Settings.
4. Open the list for the device that you want to change, select the driver you want, and then choose the OK button.

   If your hardware is not listed or if you are updating a driver that appears on the list (rather than installing a new one), scroll to the bottom of the list, and then select Other. Remember that a driver you are updating must not currently be in use by Windows.

   If you are installing a new driver or updating to a newer version, Setup requests that you insert in drive A a Windows disk or the disk that comes with your new mouse, display adapter, or keyboard. Insert the disk, or type the drive letter and directory where the device driver is located, and then choose the OK button.

   If you selected Other, Setup displays a list of drivers on the disk. Select the appropriate device driver, and then choose the OK button. You may be prompted for additional disks if more than one disk was provided by the hardware manufacturer. You might also be prompted for specific Windows disks. Setup then copies the appropriate files to your Windows SYSTEM subdirectory and displays the updated list of your hardware.
5. Choose the OK button. A dialog box appears that contains a Restart Windows button and may contain a Reboot button.
6. If no Reboot button appears, choose the Restart Windows button.

   If the Reboot button appears, make sure there are no disks in any drive, and then choose the Reboot button. Your system restarts. Then restart Windows.

Note If the driver you install for your keyboard, display adapter, or mouse prevents Windows from running correctly, you need to run Setup from MS-DOS to install the correct driver. For more information, see the following section, "Updating a Driver Currently in Use."

Updating a Driver Currently in Use

To update a driver that is being used by Windows, you must quit Windows and then run Setup from MS-DOS.

Note Setup will not run from MS-DOS Prompt within Windows.

▶ **To install an updated mouse, keyboard, or display driver**

1. Quit Windows.
2. Change to your Windows directory, type **setup** at the command prompt, and then press ENTER. The System Information screen appears.
3. Select the setting for the driver you want to update (use the UP ARROW or DOWN ARROW key), and then press ENTER. A screen listing the available drivers appears.
4. Scroll to the bottom of the list (use the UP ARROW or DOWN ARROW key), select Other, and then press ENTER.
5. Insert the disk containing the updated driver, or type the path of the driver file, and then press ENTER. You return to the command prompt. The new driver is used the next time you start Windows.

Configuring Communications Ports

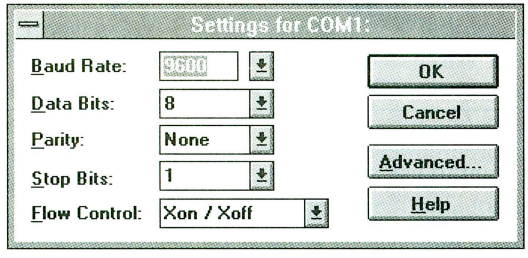
You can specify the communications settings for each *serial port* on your system by using the Ports option in Control Panel. You use serial ports to connect serial pointing devices, modems, scanners, or other serial devices to your computer. Most computers include at least two serial ports: COM1 and COM2. Some devices, such as serial-port adapters, modems, and fax cards, can use COM3 and COM4. The settings you specify determine how information is transferred between your computer and the device.

The communications settings you can specify include standard settings (such as those for baud rate, parity, and flow control) and advanced settings (such as those for the base port address and interrupt request line). If you plan to use serial ports COM1 and COM2 only, you may only need to change the standard settings. If you want to use COM3 and COM4, you may also need to change the advanced settings.

Note Most communications applications that you use to exchange information between computers (such as Terminal, which is included with Windows) require that you specify standard port settings within the application. These settings override the settings you specify by using the Ports option in Control Panel.

▶ To specify standard communications settings

1. In the Main group, choose the Control Panel icon.
2. In the Control Panel window, choose the Ports icon.
3. In the Ports dialog box, double-click the icon for the port whose communications settings you want to specify. Or press TAB to select it, and then press ALT+S to choose the Settings button. The Settings dialog box appears.



4. Open the list for each option, set the option to match the device connected to the port, and then choose the OK button.

   For a description of the options, choose the Help button or press F1 while using the Settings dialog box. For information about the correct settings to use, see the documentation supplied with the device.
5. In the Ports dialog box, choose the Close button.

Setting Advanced Options

The Ports option in Control Panel provides advanced options for specifying the base port address and the interrupt request line (IRQ) for each serial port. Windows often can detect the addresses and IRQs the ports are using. However, if you install additional serial ports, or if a device connected to a serial port does not use the values that Windows detects, you can change the settings so that they match those required by your device.

The table on the following page lists common port-address and IRQ settings. See the documentation that came with your device for information about the IRQ and base port address that your device uses. If you are not sure which settings to use, select Default.

To specify advanced port settings for a serial port

1. In the Settings dialog box, choose the Advanced button.
2. Open the Base I/O Port Address and the Interrupt Request Line (IRQ) lists, and then select an address and IRQ value. Or type values in the boxes. (The IRQ value must be between 2 and 15.) Then choose the OK button.
3. Any changes you make do not take effect until you restart Windows. To restart, choose the Restart Now button.

The following table lists common port-address and IRQ settings you can use if Windows does not provide settings.

Port	Address	IRQ
COM1	03F8	4
COM2	02F8	3
COM3	03E8	4
COM4	02E8	3

Note If you want to use serial ports 1 and 3 or 2 and 4 simultaneously and your computer cannot simultaneously access ports that use the same interrupt, you need to specify a unique IRQ number for each serial port. First, identify which interrupts are not being used by other cards or boards installed in your computer. After you have determined this, you may need to adjust your communications card in order to use the interrupts. For more information, see the documentation supplied with your communications card.

CHAPTER 14

Managing Memory and Performance

This chapter describes ways you can manage memory and configure settings to improve system speed while leaving enough memory for your applications.

When you assess the performance of Windows, take into account how much memory your system has and how much disk space is available. Also consider how many applications you run at one time and whether you use any memory-resident programs (also called terminate-and-stay-resident, or TSRs). Typically, optimizing your system involves improving one or more aspects of system performance but sacrificing something else. For example, you might optimize your system so that more applications can run faster at one time, but you may have less disk space available as a result.

Identifying Your System Memory Configuration

Memory is found on your computer's main system board or on add-in memory boards. Before information on a disk is processed by your computer or displayed on the screen, it is first placed in memory. The following table describes memory types and terminology used throughout this chapter.

Type of memory	Description
Conventional memory	Up to the first 640K of memory on a computer. All personal computers have conventional memory. MS-DOS uses this memory to run applications.
Extended memory	Memory beyond 1 MB on 80286, 80386, and 80486 computers. Extended memory requires an extended-memory manager, such as HIMEM.SYS, to prevent applications from using the same area of extended memory at the same time. Extended memory is required for Windows.

Type of memory	Description
Expanded memory	Memory in addition to conventional memory that some MS-DOS–based applications can use. Expanded memory is installed on an expanded-memory board and comes with an expanded-memory manager. Because an expanded-memory manager gives access to only a limited amount of expanded memory at a time, using expanded memory is slower than using extended memory. Windows and Windows-based applications do not use expanded memory; however, Windows running in 386 enhanced mode can simulate expanded memory for MS-DOS–based applications that require it. For more information, see "Using Memory Managers" later in this chapter.
Virtual memory	Space on your hard disk that Windows running in 386 enhanced mode uses as if it were memory, by temporarily moving information from memory to a file (called a *swap file*). This makes the memory available for other applications. The benefit of using virtual memory is that you can run more applications at one time than your system's physical memory (found on your system boards and any add-in boards) would usually allow. The drawbacks are the disk space required for the virtual-memory swap file, and the slower performance when swapping is required.
Upper memory area	The 384K of memory above the 640K of conventional memory in your system, usually reserved for system hardware, such as your display adapter. Unused parts of the upper memory area are called upper memory blocks (UMBs) and can be used by Windows running in 386 enhanced mode.
High memory area	The first 64K of extended memory. This area is used by some applications and by Windows. If you are using MS-DOS version 5.0 or later, you can run MS-DOS in the high memory area, leaving more conventional memory available for applications. For more information, see your MS-DOS documentation.

It's important to know how much and what type of memory your computer has. On most computers, when you turn on the power, the screen displays a count of how much memory there is. However, this won't show you what type of memory it is. If you have MS-DOS version 4.0 or later, you can find out about your memory configuration by using the MS-DOS **mem** command.

▶ To find out about your system's memory configuration

1. Quit Windows.
2. At the command prompt, type **mem** and then press ENTER.

Managing Memory

Properly configuring your system memory is one of the most important things you can do to improve performance. The following sections describe ways you can free memory for your applications and configure memory so that it is used efficiently.

Streamlining Your CONFIG.SYS and AUTOEXEC.BAT Files

Your CONFIG.SYS and AUTOEXEC.BAT files, located in the root directory of your startup drive, may contain commands that load device drivers and other programs when you start your computer. You can make more memory available by removing unnecessary commands from these files. Be sure to leave intact any command lines that start or enable a network.

Note During Express Setup, the Setup program adds the appropriate memory managers to your AUTOEXEC.BAT and CONFIG.SYS files. For information about these memory managers and how to change command-line options, see "Command Reference" later in this chapter.

When you modify the CONFIG.SYS or AUTOEXEC.BAT file, use the following guidelines:

- First, always make a system disk that you can use to start your computer. Include a backup copy of both your CONFIG.SYS and AUTOEXEC.BAT files and any other startup files your system requires, such as disk-partitioning software. For more information about system disks, see Help for File Manager.
- Use a text editor that can save files in ASCII (text-only) format, such as Notepad, to open and edit the CONFIG.SYS and AUTOEXEC.BAT files.
- If you want to remove a command line, add the **rem** command (for "remark") at the beginning of the line to disable it. This makes it easy to add the command again if you decide you want to put it back in the file.

  For example, to disable the following CONFIG.SYS command line:

  device=c:\device\mouse.sys

  type **rem** in front of it, as follows:

  rem device=c:\device\mouse.sys

Note If you use the **rem** command to disable command lines in your CONFIG.SYS file, and you are using a version of MS-DOS earlier than 5.0, you'll see a message, such as "Unrecognized command in CONFIG.SYS," when you start your computer. Once you are sure that your computer works properly with the command lines disabled, you might want to delete those lines to avoid the message.

- If you are not sure about whether you need a particular command line, do not remove it.

The changes you make do not take effect until you restart your computer. If your system does not start properly after you've modified your CONFIG.SYS or AUTOEXEC.BAT file, insert in drive A the system disk you created, and start your computer again. If you know which command line(s) are causing the problem, edit the appropriate file (CONFIG.SYS or AUTOEXEC.BAT) on your hard disk, and then restart your computer. Or, to start over, copy the backup version of the file(s) from the system disk to the root directory of your hard disk.

▶ To streamline the CONFIG.SYS file

- Disable command lines for any unnecessary device drivers. Your CONFIG.SYS file should define only device drivers that you absolutely need. (Device drivers are defined by using the **device** command.)

Note Do not disable the HIMEM.SYS command line. When you install Windows, the Setup program adds this command line to your CONFIG.SYS file if your system needs this device driver.

- Make sure the **buffers** setting is from 10 to 20.

  The **buffers** command line sets the number of disk buffers that MS-DOS allocates in memory when your computer starts. These buffers enable MS-DOS to improve disk-access time in certain cases. The larger the number you specify for buffers, the more conventional memory is used.

Note Setting **buffers** to a value higher than 20 might improve disk-access time in some cases. However, doing so might also require more memory. If you are using MS-DOS version 5.0 or later, you can set **buffers=30** without using more memory.

- If your CONFIG.SYS file contains a **shell** command line that specifies your environment space, try specifying a smaller environment. The smaller the environment, the fewer environment variables you can define with the **set** command in MS-DOS; however, a large environment could take up more memory. Environment space should always be at least 1024 bytes.

▶ **To streamline the AUTOEXEC.BAT file**

- Disable command lines that start pop-up programs or other memory-resident software. Instead of starting memory-resident programs (TSRs) from the AUTOEXEC.BAT file, you can start them from within Windows. For more information about running memory-resident programs, see the following section.
- If you have a RAM drive, you might want to set your TEMP environment variable to the RAM drive. This can speed up applications that store temporary files in the directory specified by the TEMP variable. For example, if your RAM drive has the drive letter E, you could place the following lines in the AUTOEXEC.BAT file:

  mkdir e:\temp
  set temp=e:\temp

  The first command creates the directory TEMP on the RAM drive. The second command sets the TEMP variable to that directory.

Conserving Memory When Starting Memory-Resident Programs

If you want a memory-resident program (TSR) to be available to all applications that you run with Windows, you must start it before starting Windows. However, this takes memory away from other MS-DOS–based applications.

There are two ways to conserve memory when starting memory-resident programs:

- If a particular MS-DOS–based application needs a memory-resident program, you can start both the program and the application from the same batch file in Windows. This gives the application access to the program and does not take memory away from other applications. For more information about creating and using batch files, see your MS-DOS documentation.
- 386 If only Windows-based applications use the memory-resident program, you can create a batch file called WINSTART.BAT in the Windows directory and then run the memory-resident program from there. Each time you start Windows in 386 enhanced mode, WINSTART.BAT runs.

  When you start a program from WINSTART.BAT, that program is only available to Windows-based applications. This prevents the program from taking memory away from MS-DOS–based applications.

  Some memory-resident programs do not work when started from WINSTART.BAT. For information, see the documentation that came with the program.

Changing Virtual Memory Settings

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When Windows is running in 386 enhanced mode, it frees memory and speeds up performance by swapping information from memory to a swap file on your hard disk (virtual memory).

The Setup program creates a swap file based on the type and amount of available space on your hard disk. The Setup program creates a permanent swap file if it can—a permanent swap file is contiguous and thus improves the speed of Windows. Otherwise, Windows creates a temporary swap file (named WIN386.SWP) whenever you start Windows in 386 enhanced mode. This file can grow and shrink in size and is deleted when you quit Windows.

A permanent swap file consists of two files—SPART.PAR is a read-only file in your Windows directory, and 386SPART.PAR is a hidden file in the root directory of the drive specified for the swap file.

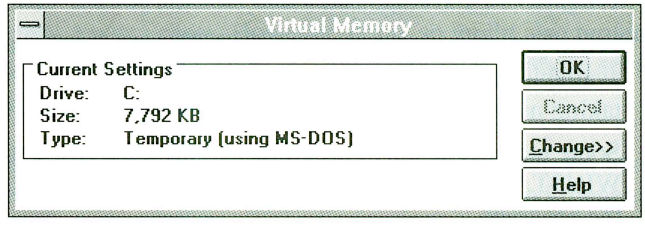
You can determine whether you are using virtual memory, and see the size and type of the swap file, by using Control Panel. (The Windows version 3.1 swap-file functionality replaces the Windows version 3.0 Swapfile application.)

Generally, you should keep the default swap-file settings. However, there may be times when you want to change the settings. For example, if you work with an application that requires a large amount of memory, you might want to create a larger swap file.

Note If you are connected to a network, storing your swap file on your local disk, as opposed to on a network disk, provides better performance and reliability.

▶ To display or change information about your system's virtual memory

1. In the Main group, choose the Control Panel icon.
2. In the Control Panel window, choose the 386 Enhanced icon.
3. Choose the Virtual Memory button. The Virtual Memory dialog box appears, which displays the current swap-file settings.



4. To change the drive location, size, and type of the swap file, choose the Change button. The dialog box expands, enabling you to change the settings.

   If your hard-disk controller is compatible with the 32-bit disk-access feature, the Use 32-Bit Disk Access check box appears in the dialog box. This feature provides increased performance on all disk activities and increased performance when you are using MS-DOS Prompt and running MS-DOS–based applications. Using 32-bit disk access may be unreliable on some battery-powered portable computers when the computer's power-saving features are enabled. To turn this feature on, select the check box.

   For help with the Virtual Memory dialog box, choose the Help button or press F1 while using the dialog box.

Note If Windows is running in 386 enhanced mode, you can conserve disk space by preventing Windows from swapping any information to the disk. Do not prevent swapping unless disk space is at a premium, because swapping increases the number of applications you can run at one time. To prevent swapping, select None in the Type box in the expanded Virtual Memory dialog box.

Working with Application Swap Files (Standard Mode)

When you start an MS-DOS–based application in standard mode, Windows creates a temporary *application swap file* for that application. (It does not use application swap files in 386 enhanced mode.) When you switch from the application, Windows moves some or all of the application from memory to the application swap file. This makes the memory available to other applications. When you quit the application, the application swap file is deleted.

The location Windows uses to store application swap files can affect the time it takes to switch to and from MS-DOS–based applications.

Application swap files are hidden files with names that start with the characters ~WOA. These files are placed in the directory specified by the **swapdisk** setting in the [NonWindowsApp] section of your SYSTEM.INI file. If the **swapdisk** setting is not specified, the files are placed in the directory specified by the TEMP environment variable in your AUTOEXEC.BAT file. If there is no TEMP environment variable specified, swap files are placed in the root directory of the first hard disk (or first floppy disk drive, if you start your system from a floppy disk).

Basic Recommendations

- Usually, it is not a good idea to set **swapdisk** to a RAM drive. If the **swapdisk** setting or the TEMP environment variable specifies a RAM drive, when Windows tries to swap application information from memory to disk, it swaps it to another area of memory instead. This is useful only if you have much more memory than you require for running applications.
- Set the **swapdisk** setting to a hard disk with at least 512K of free disk space. If you have more than one hard disk, set **swapdisk** to the disk with the most free space.

  The more disk space Windows can use for application swap files, the more MS-DOS–based applications you can run at one time.
- If you have more than one hard disk and the disks differ in speed, set the **swapdisk** setting to the fastest disk (provided it has enough free space).

▶ To change the location that Windows uses for application swap files

1. Open your SYSTEM.INI file (located in your Windows directory) by using a text editor such as Notepad. Be sure not to use an application such as Write to edit this file. Such applications can add characters that prevent MS-DOS from correctly processing the file.
2. Find or add the [NonWindowsApp] section of the file. If you're using Notepad, you can find this section quickly by choosing Find from the Search menu, typing **[NonWindowsApp]**, and then choosing the Find Next button.
3. Add or change the **swapdisk** setting. Set **swapdisk** to the directory and drive you want.

   For example, if you want application swap files to be created in the TEMPFILE directory on drive D, type the following:

   swapdisk=d:\tempfile
4. Save your SYSTEM.INI file.
5. Quit and restart Windows to have the change take effect.

For more information about SYSTEM.INI settings, use Write to open the SYSINI.WRI online document located in the Windows directory.

Other Methods for Improving Performance

There are factors other than memory to consider when optimizing your system. This section describes the following ways to speed up your system:

- Improving the efficiency of your hard disk
- Using the SMARTDrive disk-caching program
- Changing multitasking settings for Windows

This section also describes ways you can find out how your system resources are being used and ways you can free those resources to improve the performance of your system.

Improving the Efficiency of Your Hard Disk

Your system's speed can be greatly affected by the amount of free disk space and how efficiently the information on your disk is structured. You can perform the following tasks to improve the efficiency of your hard disk:

- Delete files you don't need. (This section describes how you can find out how much free disk space you have and which files you can delete.)
- Use the MS-DOS **chkdsk** command to recover lost disk space. For information about **chkdsk**, see your MS-DOS documentation.
- Run a disk-compaction program. Over time, the information on your disk can become fragmented (instead of being stored in a single location, files are split into fragments and stored in different locations on the disk). This makes it time-consuming to read the files from the disk. Running a disk-compaction program regroups fragmented files and can significantly reduce the time it takes for Windows and applications to start.

  Before running a disk-compaction program, you should quit Windows, delete any unnecessary files, run the **chkdsk** command, and make sure you are not running any programs that use the hard disk.

Generally, it's a good idea to keep at least 1 MB of free space on your hard disk. Windows and applications use free disk space to temporarily store information and to save documents and other files. Use the procedure on the following page to determine how much disk space is available on your system.

▶ **To check the amount of free disk space when Windows is running**

1. In the Main group, choose the File Manager icon.
2. Choose the drive icon for the drive you want to check.

   The status bar at the bottom of the File Manager window indicates how much disk space is currently available on that disk drive. (If the status bar does not appear, you can display it by choosing Status Bar from the Options menu.)

Often, there is less free disk space when you are running Windows than when you are not. This is because Windows uses swap files that take up some disk space. To determine how much disk space Windows is using, compare the amount of free disk space when it is running to the amount of free disk space when it is not running.

▶ **To check the amount of free disk space when Windows is not running**

1. Quit Windows.
2. At the command prompt, type **dir** and then press ENTER.

   MS-DOS displays information about the files in the current directory. The last line of information shows how many bytes of disk space are free on that drive.

If you need more disk space, you may be able to delete some unnecessary files from your hard disk.

Deleting Unnecessary Files

If your disk is becoming full, you can delete files you don't need or don't use. Depending on how you use Windows, you might also be able to delete certain Windows files. It is particularly important to delete unnecessary files before you run a disk-compaction program. There are three categories of files you may want to delete:

- Windows files (installed by the Setup program) that you do not need or plan to use. For details, see the following procedure.
- Application files, documents, or programs that you no longer need or use.
- Temporary files (files that have a .TMP extension) that are left on your hard disk when your computer fails unexpectedly.

▶ **To delete unnecessary Windows files**

1. If you plan to delete Windows wallpaper or screen-saver files, first use the Desktop option in Control Panel to change these settings to "None."
2. While running Windows, quit all applications except Program Manager.

3. In the Main group, choose the Windows Setup icon.
4. From the Options menu, choose Add/Remove Windows Components.
5. Choose the Files button for the Windows component that contains the files you want to delete.
6. Follow the instructions on the screen to remove files from your hard disk.

Note If you use this method (choosing the Windows Setup icon), Setup will not delete files that are necessary to run Windows. Therefore, it is recommended that you use this method rather than File Manager or MS-DOS Prompt to delete Windows files.

▶ **To delete other unnecessary files**

1. Quit Windows.
2. Delete any files that remain in your TEMP directory, the directory that applications use to store temporary files. If you don't know which directory is set as your TEMP directory, look in your AUTOEXEC.BAT file for the **set temp=** command.
3. Delete any files that start with the characters ~WOA. These files are application swap files that were created in standard mode. Usually, Windows deletes application swap files when you quit the associated applications; however, these files might remain on your hard disk if Windows stops running unexpectedly. You can safely delete application swap files if Windows is not running.
4. Delete any file named WIN386.SWP. This file is a temporary swap file created in 386 enhanced mode. Usually, Windows deletes it when you quit Windows. However, a temporary swap file might be left on your hard disk if your computer stops running unexpectedly. You can safely delete WIN386.SWP if Windows is not running. (Do not delete swap files named 386SPART.PAR or SPART.PAR.)
5. If you want, delete any other unwanted files or documents.

Using SMARTDrive

SMARTDrive is a disk-caching program provided with Windows. SMARTDrive saves information read from your hard disk in a *disk cache* in your computer's extended memory. When an application tries to read that information from the hard disk, SMARTDrive supplies the information directly from memory instead.

SMARTDrive also temporarily stores information to be written to disk in the disk cache. SMARTDrive later writes this information to the hard disk, when system resources are in less demand.

Caution If you turn off your computer before the information in the disk cache is written to your hard disk, the information could be lost. To prevent this, type **smartdrv /c** at the command prompt to write any cached information to the hard disk. For more information, see "Command Reference" later in this chapter.

Windows runs much faster when using a disk cache. The Setup program adds the **smartdrv** command to your AUTOEXEC.BAT file. It is recommended that you use SMARTDrive if your system has a hard disk and at least 2 MB of memory. The way you set up SMARTDrive depends on the applications you run and your system memory configuration, so there is no single "best setting" for SMARTDrive. By default, the size of the SMARTDrive disk cache is based on how much memory your system has. In most cases, this provides the best system performance; however, you can change the cache size and other SMARTDrive settings if needed. For more information, see "Command Reference" later in this chapter.

Setting Multitasking Options

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When Windows is running in 386 enhanced mode, you may need to specify how applications share resources. You can do this by using Control Panel.

You use the Scheduling options in the 386 Enhanced dialog box to determine how Windows performs when running more than one application. These options are described in the Help for the 386 Enhanced dialog box. For information about running more than one MS-DOS–based application, see Chapter 11, "MS-DOS Applications."

Command Reference

This section describes the command-line options for the memory managers and disk-caching program provided with Windows.

Using Memory Managers

Windows provides the following memory managers that provide access to a particular type of memory.

Memory manager	Description
HIMEM	A program that coordinates the use of your system's extended memory so that no two applications use the same memory at the same time.
RAMDrive	A memory-resident program that enables you to use part of your system memory as if it were a hard disk drive. This memory area is called a RAM drive because it exists in random access memory (RAM).
EMM386	A program Windows uses to emulate expanded memory when Windows is running in standard mode. If you use applications that require expanded memory and you don't have any expanded memory installed on your computer, you can use EMM386 to emulate expanded memory. (Windows running in 386 enhanced mode can emulate expanded memory and does not require EMM386.) When used with MS-DOS version 5.0 or later, EMM386 can also provide access to upper memory blocks (UMBs) between 640K and 1MB. For more information, see your MS-DOS documentation.

You install these memory managers by adding a command line to your CONFIG.SYS file. The following sections describe the command-line options you can set for each of the memory managers provided with Windows.

Using the HIMEM Command Line

The HIMEM command line has the following form:

device=[*drive*:][*path*]**himem.sys** [**/hmamin=***m*] [**/numhandles=***n*] [**/int15=***xxxx*] [**/shadowram:on|off**] [**/machine:***name*] [**/a20control:on|off**] [**/cpuclock:on|off**] [**/eisa**]

An explanation of each part of the command line follows. In most cases you won't need to specify command-line options—the default values are designed to work with most hardware.

Use	To
device=	Install a device driver—in this case, HIMEM. You must include this part of the command line.
[*drive*:][*path*]**himem.sys**	Specify the location of the HIMEM program file. For example, if HIMEM.SYS is in the WINDOWS directory on drive C, type **c:\windows\himem.sys**. If the file is in the root directory of your startup drive, you don't need to include a path. However, you must always include the filename (HIMEM.SYS).
/hmamin=*m*	Specify how many kilobytes of memory an application requires for HIMEM to give that application use of the high memory area (HMA). Only one application can use the HMA at a time. HIMEM allocates the HMA to the first application that meets the memory-use requirements set by this option. You can specify a value from 0 to 63. The **/hmamin** option is not required; the default value is zero. Omitting this option (or setting it to zero) specifies that HIMEM allocate the HMA to the first application that requests it, regardless of how much of the HMA the application is going to use. Set **/hmamin** to the amount of memory required by the application that uses the most HMA memory. The **/hmamin** option has no effect when Windows is running in 386 enhanced mode.
/numhandles=*n*	Specify the maximum number of extended-memory block (EMB) handles that can be used simultaneously. You can specify a value from 1 to 128; the default value is 32. Each additional handle requires an additional 6 bytes of memory. The **/numhandles** option has no effect when Windows is running in 386 enhanced mode.
/int15=*xxxx*	Allocate the amount of extended memory (in kilobytes) to be reserved for the Interrupt 15h interface. Some older applications use this interface to allocate extended memory rather than using the XMS (extended-memory specification) method provided by HIMEM. If you use these applications, you can ensure enough memory is available to them by setting *xxxx* to 64K larger than the amount required by the application. You can specify a value from 64 to 65535; however, you cannot specify more memory than your system has available. If you specify a value less than 64, the value becomes 0. The default value is 0.

Use	To
/shadowram:on|off	Specify whether to disable shadow RAM. Some computers make ROM (read-only memory) code run faster by "shadowing" it in RAM—that is, by copying the ROM code into faster RAM memory at startup. However, this uses some extended memory. Usually, on computers that use shadow RAM and have less than 2 MB of RAM, HIMEM attempts to disable shadow RAM to recover additional extended memory for Windows to use (the default value of this setting is **off**). HIMEM can disable shadow RAM only on certain types of systems. When HIMEM disables shadow RAM, the ROM code runs in the slower ROM instead of RAM; therefore, your computer might run slightly slower. To leave the ROM code running from RAM, even on systems with less than 2 MB of memory, include the value **/shadowram:on**. To have HIMEM disable shadow RAM, include the value **/shadowram:off**.
/machine:*name*	Specify what type of computer you are using. Usually, HIMEM can detect your system type successfully; however, there are a few computers that HIMEM cannot detect. On such systems, HIMEM uses the default system type (IBM AT or compatible). You might need to include the **/machine** option if your computer is a type that HIMEM cannot detect and if HIMEM does not work properly on your system by using the default system type. Currently, systems that require this option include Acer 1100, Wyse, and IBM 7552. The value for *name* can be any of the codes or their equivalent numbers listed in the following table.

Code	Number	Computer type
at	1	IBM AT or 100% compatible
ps2	2	IBM PS/2
ptlcascade	3	Phoenix Cascade BIOS
hpvectra	4	HP Vectra (A & A+)
att6300plus	5	AT&T 6300 Plus
acer1100	6	Acer 1100
toshiba	7	Toshiba 1600 & 1200XE
wyse	8	Wyse 12.5 Mhz 286

Use	To		
	Code	**Number**	**Computer type**
	tulip	9	Tulip SX
	zenith	10	Zenith ZBIOS
	at1	11	IBM PC/AT
	at2	12	IBM PC/AT (alternative delay)
	css	12	CSS Labs
	at3	13	IBM PC/AT (alternative delay)
	philips	13	Philips
	fasthp	14	HP Vectra
	ibm7552	15	IBM 7552 Industrial Computer
	bullmicral	16	Bull Micral 60

/a20control:on|off Specify whether HIMEM is to take control of the A20 line even if A20 was on when HIMEM was loaded. The A20 handler gives your computer access to the HMA. If you specify **/a20control:off**, HIMEM takes control of the A20 line only if A20 was off when HIMEM was loaded. The default setting is **/a20control:on**.

/cpuclock:on|off Specify whether HIMEM is to affect the clock speed of your computer. If your computer's clock speed changes when you install HIMEM, specifying **/cpuclock:on** may correct the problem; however, enabling this option slows down HIMEM. The default setting is **/cpuclock:off**.

/eisa Enable HIMEM to use all the Extended Industry Standard Architecture (EISA) memory installed in the computer. This option has no effect on non-EISA computers.

Using the RAMDrive Command Line

The RAMDrive command line has the following form:

device=[*drive*:][*path*]**ramdrive.sys** [*DiskSize* [*SectorSize* [*NumEntries*]]] [**/e**|**/a**]

An explanation of each part of the command line follows. When you set up a RAM drive, it is assigned the next available drive letter.

Use	To
device=	Install a device driver—in this case, RAMDrive. You must include this part of the command line.
[*drive*:][*path*]**ramdrive.sys**	Specify the path of the RAMDrive program file. For example, if RAMDRIVE.SYS is in the WINDOWS directory on drive C, type **c:\windows\ramdrive.sys**. If the file is in the root directory of your startup drive, you don't need to include a path. However, you must always include the filename (RAMDRIVE.SYS).
DiskSize	Specify how many kilobytes of memory you want to use for the RAM drive. For example, to create a 640K RAM drive, specify **640**. If you don't specify an amount, RAMDrive will create a 64K RAM drive. You can specify a value from 4 to 32767. However, you cannot specify more memory than your system has available.
SectorSize	Specify the sector size in bytes. The size can be 128, 256, or 512 bytes. (If you include a *SectorSize* value, you must also include a value for *DiskSize.*) Generally, you should use the default sector size of 512 bytes.
NumEntries	Limit the number of files and directories you can create in the RAM drive root directory. The limit can be from 2 to 1024 entries; the limit you specify is rounded up to the nearest sector size boundary. If you do not specify a limit, you can create up to 64 entries in the RAM drive root directory. (If you include a value for *NumEntries,* you must also include values for *DiskSize* and *SectorSize.*) If there is not enough memory to create the RAM drive as specified, RAMDrive will try to create it with a limit of 16 directory entries. This may result in a RAM drive with a limit different from the one you specified.
/e	Create the RAM drive in extended memory. For RAMDrive to use extended memory, your system must be configured so that it provides extended memory. Also, the command line for the extended-memory manager (such as HIMEM.SYS) must appear in your CONFIG.SYS file *before* the RAMDrive command line. In general, it is best to create a RAM drive in extended memory if your system has extended memory.

Use	To
/a	Create the RAM drive in expanded memory. For RAMDrive to use expanded memory, your system must be configured so that it provides expanded memory. Also, the command line for the expanded-memory manager (such as EMM386, 386MAX, CEMM, or QEMM) must appear in your CONFIG.SYS file *before* the RAMDrive command line.

Although specifying a memory type is optional, it is highly recommended. If you omit both the **/a** and the **/e** options, RAMDrive uses your system's conventional memory. It is not a good idea to use conventional memory for a RAM drive, because doing so affects the performance of Windows.

Using the EMM386 Command Line

The EMM386 command line has the following form in the CONFIG.SYS file:

device=[*drive*:][*path*]**emm386.exe** [**on**|**off**|**auto**] [**/nohigh**] [*memory*] [*MemoryOptions*]

An explanation of each part of the command line follows.

Use	To
device=	Install a device driver—in this case, EMM386. You must include this part of the command line.
[*drive*:][*path*]**emm386.exe**	Specify the location of the EMM386 program file. For example, if EMM386.EXE is in the WINDOWS directory on drive C, type **c:\windows\emm386.exe**. If the file is in the root directory of your startup drive, you don't need to include a path. However, you must always include the filename (EMM386.EXE).
[**on**|**off**|**auto**]	Activate EMM386 if set to **on**, suspend EMM386 if set to **off**, or place EMM386 in auto mode if set to **auto**. Auto mode enables expanded-memory support only when a program calls for it. The default value is **on**. Use the **emm386** command at the command prompt to change this value after EMM386 has started.
/nohigh	Specify that no part of EMM386 is loaded into upper memory blocks (UMBs). By default, a portion of EMM386 is loaded into UMBs. If UMB space is at a premium, use this option to save approximately 3K of UMB space.

Use	To
memory	Specify how many kilobytes of memory you want EMM386 to use. For example, to give EMM386 640K of memory, specify **640**. You can specify a value from 64 to 32768. (EMM386 rounds the value down to the nearest multiple of 16.) However, you cannot specify more extended memory than your system has available. This value is optional; if you don't specify an amount, EMM386 uses 256K of memory.
MemoryOptions	Fine-tune the way EMM386 uses memory. You can use the EMM386 memory options to control the location of the EMS page frame, determine how EMM386 uses certain addresses, and so on. For more information, see the following table.

Under most circumstances, you don't need to specify memory options on the EMM386 command line, because EMM386 usually runs properly by using the default values.

However, in some cases, you may want to control how EMM386 uses memory—for example, where EMM386 puts the EMS page frame, or which addresses it can use for EMS pages. EMM386 provides several command-line options that you can use to fine-tune the way it uses memory. You can use as many of these options as you want, in any order, but they should follow the EMM386 path and memory amount (if any).

An explanation of each EMM386 memory option follows.

Use	To
w=on|w=off	Enable or disable support for the Weitek Coprocessor. To enable support, include the value **w=on** in the **EMM386** command line. To disable support, include the value **w=off** instead. By default, Weitek Coprocessor support is disabled.
frame=*address*	Specify the base address of the 64K EMS page frame. You can specify values in the ranges 8000h through 9000h and C000h through E000h, in increments of 400h. Usually, you do not need to specify a base address; by default, EMM386 uses a contiguous 64K region of memory, and it does not place the page frame below C000:0000. However, sometimes it is not possible to identify adapter memory absolutely. If a conflict occurs, you may need to ensure that EMM386 places the page frame at a particular location.

Use	To
	You can also use the **frame** option to specify a more specific base address. For example, to place the page frame at C800:0000, type **frame=C800** on the **EMM386** command line. If you use the **frame** option, you cannot use the **m** option or the **/p** option.
m*x*	Specify the address of the page frame. You can specify a value from 1 through 14. The following list shows each value and its associated base address in hexadecimal: 1 => C000h 2 => C400h 3 => C800h 4 => CC00h 5 => D000h 6 => D400h 7 => D800h 8 => DC00h 9 => E000h 10 => 8000h 11 => 8400h 12 => 8800h 13 => 8C00h 14 => 9000h Values ranging from 10 through 14 should be used only on computers with 512K of memory. If you use the **m** option, you cannot use the **frame** option or the **/p** option.
/p*mmmm*	Specify the address of the page frame. Valid values for *mmmm* are in the ranges 8000h through 9000h and C000h through E000h, in increments of 400h. If you use the **/p** option, you cannot use the **frame** option or the **m** option.
p*n*=*address*	Define the segment address of a specific page. The **p** option has the form **p***n*=*address,* in which *n* is the number of the page you are specifying and *address* is the segment address. For example, to place page 4 at the address CC00, type **p4=CC00** on the **EMM386** command line. Valid values for *n* are in the range 0 through 255. Valid values for *address* are in the ranges 8000h through 9C00h and C000h through EC00h, in increments of 400h. The addresses for pages 0 through 3 must be contiguous to maintain compatibility with version 3.2 of the LIM EMS. If you use the **frame**, **m**, or **/p** option, you cannot use the **p** option to specify addresses for pages 0 through 3.

Use	To
x=*mmmm-nnnn*	Prevent EMM386 from using a particular range of addresses for an EMS page. To specify the range, include this option on the command line, followed by the range of addresses you want to exclude. Valid values for *mmmm* and *nnnn* are in the range A000h through FFFFh, and are rounded down to the nearest 4K boundary. For example, to prevent EMM386 from using segments A000:0000 through B000:0000, type the value **x=A000-B000** on the **EMM386** command line. The **x** option takes precedence over the **i** option if the two ranges overlap.
i=*mmmm-nnnn*	Specify a range of segment addresses to be used (included) for an EMS page or for RAM. Valid values for *mmmm* and *nnnn* range from A000h through FFFFh, and are rounded down to the nearest 4K boundary. The **x** option takes precedence over the **i** option if the two ranges overlap.
b=*address*	Specify the lowest address available for EMS "banking" (swapping of 16K pages). Valid values are in the range 1000h through 4000h. By default, 4000:0000 is the lowest address. To specify a different low address, include this option on the **EMM386** command line, followed by the address you want. For example, to make 3000:0000 the lowest address, include the value **b=3000**.
L=*minXMS*	Ensure that the specified amount of extended memory will still be available after EMM386 is loaded. Specify the amount of memory in kilobytes. For example, to ensure that 640K of extended memory will be available after loading EMM386, type the value **L=640** on the **EMM386** command line.
a=*altregs*	Specify how many fast alternate register sets you want to allocate to EMM386. For example, to allocate 16 register sets to EMM386, type the value **a=16** on the command line. You can specify a number from 0 to 254; the default setting is 7 sets. Every alternate register set adds about 200 bytes to the size in memory of EMM386.EXE.
h=*handles*	Specify how many handles EMM386 can use. For example, to let EMM386 use 127 handles, type the value **h=127** on the **EMM386** command line. You can specify from 1 to 255 handles; the default setting is 64.
d=*nnn*	Specify how many kilobytes of memory should be reserved for buffered direct memory access (DMA). This value should reflect the largest DMA transfer that will occur while you use EMM386.EXE, not counting floppy disk DMA. You can specify from 16 to 256 kilobytes; the default setting is 16.

Use	To
ram	Provide access to both expanded memory and the upper memory area. This option is valid only if you are running MS-DOS version 5.0 or later.
noems	Provide access to the upper memory area, but prevent access to expanded memory that conforms to the LIM specification version 3.2. This option is valid only if you are running MS-DOS version 5.0 or later.

Excluding Shared Memory Used by a Network Adapter

If you use EMM386.EXE and you have a network adapter installed that uses RAM, you should exclude the memory addresses that the network adapter uses, so that Windows won't use the same area of memory.

For example, if your network adapter uses memory in the address range D800h to D8FFh, you would exclude this range from Windows by specifying the following:

device=c:\windows\emm386.exe x=d800-d8ff

For information about which address space your network adapter uses, see the documentation for the adapter.

Using the SMARTDrive Command Line

If for some reason Setup did not install SMARTDrive on your system, or if you removed SMARTDrive, you can install it by adding the **smartdrv** command to your AUTOEXEC.BAT file. For information about how to modify this file, see "Streamlining Your CONFIG.SYS and AUTOEXEC.BAT Files" earlier in this chapter.

The SMARTDrive command line has the following form:

[*drive*:][*path*]**smartdrv.exe** [[*drive*[+|–]]...] [**/e**:*ElementSize*] [*InitCacheSize* [*WinCacheSize*]] [**/b:***BufferSize*] [**/c**] [**/r**] [**/l**] [**/q**] [**/s**] [**/?**]

An explanation of each part of the command line follows.

Use	To
[*drive*:][*path*] **smartdrv.exe**	Specify the location of the SMARTDrive program file. For example, if SMARTDRV.EXE is in the WINDOWS directory on drive C, type **c:\windows\smartdrv.exe**. If the file is in the root directory of your startup drive, you don't need to include a path. However, you must always include the filename (SMARTDRV.EXE).

Use	To
drive	Specify the letter of the disk drive for which you want to control caching. If you don't specify a drive letter, floppy disk drives are read-cached but not write-cached, hard disk drives are read- and write-cached, and CD-ROM and network drives are ignored.
+|–	Enable (+) or disable (–) caching. Use the plus (+) and minus (–) signs to override the default settings. If you specify a drive letter without a plus or minus sign, read-caching is enabled and write-caching is disabled. If you specify a drive letter followed by a plus sign (+), read- and write-caching are enabled. If you specify a drive letter followed by a minus sign (–), read- and write-caching are disabled.
...	You can specify multiple disk drives.
/e:*ElementSize*	Specify in bytes the amount of the cache that SMARTDrive moves at a time. Valid values are 1024, 2048, 4096, and 8192. The default value is 8192.
InitCacheSize	Specify in kilobytes the size of the cache when SMARTDrive starts (before Windows is running). The size of the disk cache affects how efficiently SMARTDrive runs. In general, the larger the cache, the less often SMARTDrive needs to read information from the disk, which speeds up system performance. If you do not specify an *InitCacheSize* value, SMARTDrive sets the value according to how much memory your system has (see the table following this list).
WinCacheSize	Limit to what amount (in kilobytes) Windows can reduce the cache size. Windows reduces the size of the cache to recover memory for its own use. Windows and SMARTDrive then cooperate to provide optimum use of your system memory. When you quit Windows, it restores the cache to its normal size. The default value depends on how much available memory your system has (see the table following this list). If you specify a value for *InitCacheSize* that is smaller than the value specified for *WinCacheSize, InitCacheSize* is set to the same size as *WinCacheSize.*

Use	To
/b:*BufferSize*	Specify the size of the read-ahead buffer. A read-ahead buffer contains additional information that SMARTDrive reads when an application reads information from the hard disk. For example, if an application reads 512K of information from a file, SMARTDrive then reads the amount of information specified by *BufferSize* and saves it in memory. The next time the application needs to read information from that file, it can read it from memory instead. The default size of the read-ahead buffer is 16K. Its value can be any multiple of the *ElementSize* value.
/c	Write all cached information from memory to the hard disk. SMARTDrive writes information from memory to the hard disk at times when other disk activity has slowed. You might use this option if you are going to turn off your computer and want to make sure all cached information has been written to the hard disk.
/r	Clear the contents of the existing cache and restart SMARTDrive.
/l	Prevent SMARTDrive from loading into upper memory blocks (UMBs), even if there are UMBs available. You can use this option if you are using MS-DOS version 5.0 or later and UMBs are enabled.
/q	Prevent the display of SMARTDrive information on your screen.
/s	Display additional information about the status of SMARTDrive.
/?	Display Help about the SMARTDrive command and options.

The following table shows the default values for *InitCacheSize* and *WinCacheSize,* depending on the amount of available extended memory your computer has.

Extended memory	InitCacheSize	WinCacheSize
Up to 1 MB	All extended memory	Zero (no caching)
Up to 2 MB	1 MB	256K
Up to 4 MB	1 MB	512K
Up to 6 MB	2 MB	1 MB
6 MB or more	2 MB	2 MB

Caution Check that SMARTDrive has completed all write-caching before you turn off your computer. To make sure this has happened, type **smartdrv /c** at the command prompt. After all disk activity has stopped, you can safely turn off your computer.

Using Double Buffering

If you have a SCSI (Small Computer System Interface) hard disk, you may need to use the double-buffering feature of SMARTDrive. Double buffering provides compatibility for hard-disk controllers that cannot work with virtual memory. If necessary, Setup places a **smartdrv** command line in the CONFIG.SYS file in addition to the one in the AUTOEXEC.BAT file. The command line in the CONFIG.SYS file is required for you to use the double-buffering feature of SMARTDrive. The command line in the CONFIG.SYS file has the following form:

device=c:\windows\smartdrv.exe /double_buffer

Most hard-disk controllers do not need to use double buffering. Therefore, Setup does not add the command to the CONFIG.SYS file in most cases. When Setup is unable to determine whether double buffering is required, it adds the command line to the CONFIG.SYS file.

If your computer does not require double buffering, you can remove the command line from the CONFIG.SYS file.

▶ **To determine whether you can remove the SMARTDrive command line from CONFIG.SYS**

1. Make sure that the SMARTDrive driver has been loaded using the CONFIG.SYS command line and that double buffering is enabled.
2. In the Main group, choose the MS-DOS Prompt icon.
3. At the command prompt, type **smartdrv** and then press ENTER. SMARTDrive displays information about your system.
4. Look at the column labeled "Buffering." If every line in this column reads "no," you can remove the **device=c:\windows\smartdrv.exe /double_buffer** command line from your CONFIG.SYS file.

Appendixes

APPENDIX A

Keyboard Shortcuts

This appendix lists keyboard techniques you can use in Windows.

Use the keyboard shortcuts described in "Basic Windows Tasks" to do common Windows tasks, such as choosing commands on menus and moving around in dialog boxes and lists. You can use these basic techniques throughout Windows and in Windows-based applications.

To work with specific applications and accessories included with Windows, use the keyboard shortcuts described in the other sections of this appendix.

Basic Windows Tasks

Using Help

To	Press
Start Help	F1
Move among the jumps in a topic	TAB or SHIFT+TAB
Display all the jumps in a topic or cancel the selection of a jump	CTRL+TAB
Copy a Help screen or annotation onto the Clipboard	ALT+PRINT SCREEN
Quit Help	ALT+F4

Switching Between Applications

To switch	Do this
Between applications	Press and hold down ALT or SHIFT+ALT, and repeatedly press TAB.
To the next application	Press ALT+ESC.
To the previous application	Press SHIFT+ALT+ESC.
To Task List	Press CTRL+ESC.
An MS-DOS–based application from a full screen to a window and back	Press ALT+ENTER.

Using Menus

To	Press
Activate the menu bar	ALT or F10
Select a menu	ALT + the underlined character in the menu name
Choose a menu command	An arrow key, ENTER
	Or the underlined character in a command name

Note Although you can choose any menu command by using this method, many commands have faster keyboard equivalents, which are usually shown next to the command on the menu.

Open the Control menu for an application window	ALT+SPACEBAR
Open the Control menu for a document window or a group window	ALT+HYPHEN

Using Dialog Boxes

To	Do this
Move between items	See "Moving Around" later in this appendix.
Carry out a command	Press ENTER.
Choose a selected item	Press SPACEBAR.
Open or close a selected list	Press ALT+DOWN ARROW.
Move around and select items in a list	See "Moving Around" and "Selecting Items" later in this appendix.
Cancel the dialog box	Press ESC or ALT+F4. (Confirmation dialog boxes cannot be canceled by using these keys.)

Moving Around

To move	Press
Between menu commands, characters in a text box, or items in a list	An arrow key
To the next or previous dialog box item	TAB or SHIFT+TAB
To a dialog box item	ALT + the character underlined in the item name
Right or left one word in a text box	CTRL + an arrow key
To the beginning or end of a line, list, or screen	HOME or END
Up or down one screen	PAGE UP or PAGE DOWN

Selecting Items

In a Document Window

To select	Press
One line of text up or down	SHIFT+UP ARROW or SHIFT+DOWN ARROW
Text to the beginning or end of a document	SHIFT+CTRL+HOME or SHIFT+CTRL+END

In a Document Window, Text Box, or List

To select	Press
Text to the beginning or end of a line	SHIFT+HOME or SHIFT+END
The next or previous word	SHIFT+CTRL+RIGHT ARROW or SHIFT+CTRL+LEFT ARROW
One letter at a time to left or right	SHIFT+LEFT ARROW or SHIFT+RIGHT ARROW

In a Dialog Box

To	Press
Select nonconsecutive items in a list	SHIFT+F8, use the arrow keys to move to each item you want to select, press SPACEBAR to select each item, and press SHIFT+F8 again when done.
Select a list item or check box	SPACEBAR
Select all items in a list (where applicable)	CTRL+SLASH (/)
Cancel all selections in a list except the current one	CTRL+BACKSLASH (\)

Editing Text

In a Text Box or Window

To	Press
Delete the character to the left or right or delete selected text	BACKSPACE or DEL
Copy selected text onto the Clipboard	CTRL+C or CTRL+INS
Move selected text onto the Clipboard	CTRL+X or SHIFT+DEL
Paste text from the Clipboard	CTRL+V or SHIFT+INS
Undo the last editing action	CTRL+Z or ALT+BACKSPACE

Copying onto the Clipboard

To	Do this
Copy an image of the entire screen onto the Clipboard. (This also works for an MS-DOS–based application running in text mode.)	Press PRINT SCREEN.
Copy an image of the active window onto the Clipboard	Press ALT+PRINT SCREEN.
Copy or move selected text onto and from the Clipboard	See "Editing Text" earlier in this appendix.

Quitting an Application and Closing a Window

To	Press
Quit an application (or, in Program Manager, quit Windows)	ALT+F4
Close the active document window or group window	CTRL+F4

Program Manager

To	Press
Move between groups	CTRL+F6 or CTRL+TAB
Move between items in a group window	An arrow key
Start the selected application or restore the selected group icon	ENTER
Tile the group windows	SHIFT+F4
Cascade the group windows	SHIFT+F5
Close an active group window	CTRL+F4

File Manager

To	Do this
Move among the left and right sides of the directory window and the drive bar	Press TAB or F6.
Change the drive displayed in the directory window	Press CTRL + the letter representing the drive.
Move among and select directories or files	See "Moving Around" and "Selecting Items" earlier in this appendix.
Display or hide a selected directory's subdirectories, start a selected application, or open a selected file	Press ENTER.
Open a new window displaying only the contents of the selected directory	Press SHIFT+ENTER.
Select the next file or directory whose name begins with a certain character	Press the first character of the file or directory name.
Move the selected file or directory	Press F7.
Copy the selected file or directory	Press F8.
Update the information displayed	Press F5.
Display the properties of the selected file or directory	Press ALT+ENTER.

Print Manager

To	Press
Move between queues and between documents in each queue	UP ARROW or DOWN ARROW
Move the selected document up or down in a queue	CTRL+UP ARROW or CTRL+DOWN ARROW
Update the information displayed	F5

Control Panel

You can use the keyboard shortcuts described in "Basic Windows Tasks" earlier in this appendix to move among icons in Control Panel, select icons, and work with the dialog boxes displayed when you choose an icon.

Clipboard Viewer

To	Do this
Clear the Clipboard contents	Press DEL.
Copy or move items onto and from the Clipboard	See "Copying onto the Clipboard" and "Editing Text" earlier in this appendix.

PIF Editor

You can use the keyboard shortcuts described in "Basic Windows Tasks" earlier in this appendix to work with the PIF Editor dialog boxes.

Accessories

Calculator

In addition to the keyboard shortcuts described in "Basic Windows Tasks" earlier in this appendix, you can use techniques unique to Calculator. For more information, see Help for Calculator.

Calendar

Use the following keys in Calendar.

Month View Keys

Use the following keys in the Month view.

To	Press
Move to the previous week	UP ARROW
Move to the next week	DOWN ARROW
Move to the previous month	PAGE UP
Move to the next month	PAGE DOWN
Move between a date and the scratch pad	TAB
Change to the Day view	ENTER

Day View Keys

Use the following keys in the Day view.

To	Press
Move to the previous time	UP ARROW
Move to the next time	DOWN ARROW or ENTER
Move to the previous screen	PAGE UP
Move to the next screen	PAGE DOWN
Move to the starting time	CTRL+HOME
Move to 12 entries after the starting time	CTRL+END
Move between the appointment area and the scratch pad	TAB
Move the selection onto the Clipboard	SHIFT+DEL
Copy the selection onto the Clipboard	CTRL+INS
Paste the Clipboard contents into the appointment area or scratch pad	SHIFT+INS
Move to the previous day	CTRL+PAGE UP
Move to the next day	CTRL+PAGE DOWN

Cardfile

To	Press
Scroll forward or backward one card (or one page of index lines in List view)	PAGE DOWN or PAGE UP
Scroll forward or backward one card in List view	DOWN ARROW or UP ARROW
Display the first or last card	CTRL+HOME or CTRL+END
Display the first card whose name begins with a particular character	SHIFT+CTRL + the character

Notepad

You can use the keyboard shortcuts described in "Basic Windows Tasks" earlier in this appendix to work with Notepad.

Object Packager

To	Press
Move between the Content and Appearance windows	TAB

Paintbrush

To move	Press
The cursor	An arrow key
Among the Toolbox, Linesize box, Palette, and drawing area	TAB or SHIFT+TAB

To scroll	Press
To the left or right side of the drawing area	SHIFT+HOME or SHIFT+END
To the top or bottom of the drawing area	HOME or END
Left or right one screen	SHIFT+PAGE UP or SHIFT+PAGE DOWN
Up or down one screen	PAGE UP or PAGE DOWN
Left or right one space	SHIFT+LEFT ARROW or SHIFT+RIGHT ARROW
Up or down one line	SHIFT+UP ARROW or SHIFT+DOWN ARROW

To simulate	Press
Clicking the left mouse button	INS
Clicking the right mouse button	DEL
Double-clicking the left mouse button	F9+INS
Dragging the cursor	INS + an arrow key

To undo	Do this
Part of what you have drawn since selecting a tool	Press BACKSPACE, and then use INS + the arrow keys.
Everything you have drawn since selecting a tool	Press CTRL+Z.

Sound Recorder and Media Player

You can use the same keyboard shortcuts for both Sound Recorder and Media Player.

To	Do this
Move around and select items in the window	See "Moving Around" and "Selecting Items" earlier in this appendix.
Move backward or forward when the scroll bar is selected	Press LEFT ARROW or RIGHT ARROW.
Move backward or forward 1 second when the scroll bar is selected	Press PAGE UP or PAGE DOWN.
Move to the beginning or end of the sound when the scroll bar is selected	Press HOME or END.

Write

In the following table, 5 refers to the 5 key on the numeric keypad only, and will only work as described with the NUM LOCK key turned off.

To move to the	Press
Next or previous sentence	5+LEFT ARROW or 5+RIGHT ARROW
Next or previous paragraph	5+DOWN ARROW or 5+UP ARROW
Next or previous page (if the document has been paginated)	5+PAGE DOWN or 5+PAGE UP

To	Do this
Select text	See "Selecting Items" earlier in this appendix.
Copy or move text onto and from the Clipboard	See "Copying onto the Clipboard" and "Editing Text" earlier in this appendix.
Undo the last typing or editing action	Press CTRL+Z or ALT+BACKSPACE.
Insert a manual page break	Press CTRL+ENTER.
Select a picture or object when the cursor is above the upper-left corner of the picture or object	Press DOWN ARROW.

To	Do this
Move the Size Picture cursor or move a selected picture after choosing Move Picture from the Edit menu	Press an arrow key.
Insert an invisible hyphen (only to be used when a word is wrapped)	Press CTRL+SHIFT+HYPHEN.
Switch between the document and the Find or Replace dialog box, or between the Header and Footer window and the Page Header or Page Footer dialog box	Press ALT+F6.

APPENDIX B

Windows and Networks

Using Windows with Networks

The Microsoft Windows operating system provides many features that make it easier to work with a network's resources. Before you use these features, you should be aware of some basic guidelines for using networks. This appendix outlines Windows network features and lists guidelines for using networks.

For information about setting up Windows from a network, see Chapter 1, "Setting Up Windows."

Windows Network Features

The following list describes what you can do with Windows and networks and where to find information about the Windows network features.

You can do the following:

- Connect your system to a particular network directory. On some networks, you can browse through a list of directories to find the one you want. For information, see Chapter 7, "File Manager."
- Set up a network for use with Windows and set options that are specific to your network. For information, see Help for Windows Setup.
- Set up network printer connections. On some networks, you can browse through a list of printers to find the one you want. For information, see Chapter 8, "Print Manager."
- Take advantage of special features offered by Print Manager when you use a network printer. For information, see Chapter 8, "Print Manager."

Guidelines for Using Networks

You can avoid many problems when using Windows with a network by following these guidelines:

- Read the NETWORKS.WRI online document that is included with this version of Windows to make sure your network software is compatible with Windows. This document contains information about running Windows with your specific network.
- Always start the network before you start Windows.

  You can connect to network directories and printers after you start Windows, but the network software must be running on your computer before you start Windows. If you try to start your network after you have started Windows, your system may not run correctly.
- Some networks fail if you log in or log out at the MS-DOS prompt while running Windows. Some networks support logging in or out by using the Network option in Control Panel. If your network does not support this feature, log in before you start Windows.
- If you are using a shared copy of Windows or a shared copy of another application, use the same letter to designate the network directory on your system every time you connect to that directory.

  For example, if you use the drive letter W when you connect to the network directory to set up a shared copy of Windows, Windows records W as the path it should use in the future to look for the shared Windows files. If the next time you connect to the same network directory you use a letter other than W, you will not be able to start Windows correctly.

  If you do need to specify a different drive letter when you connect to a network directory in order to use a shared application, be sure to change the path that Windows uses to find the application.
- Every time you connect to a network printer, use the same port for that particular printer.

  Control Panel retains the printer settings for a particular port. If you change the port you are using for a printer, the settings for the new port may not be correct for that printer.

  If you do need to change the port your printer is connected to, be sure to use Control Panel to change the printer settings.

APPENDIX C

Troubleshooting

This appendix is designed to help if you encounter problems when using the Microsoft Windows operating system. Each section suggests steps you can take to solve the most common problems.

This appendix has the following sections:

- Setting Up Windows
- Using a Mouse
- Running Applications
- Linking and Embedding Objects
- Printing
- Managing Memory
- Using Serial Communications
- Using Terminal
- Using Windows with a Network
- Using Two Versions of Windows
- Additional Troubleshooting Techniques
- Microsoft Support Services

Setting Up Windows

The following sections describe solutions to problems you might have when setting up Windows.

Your system locks up during the MS-DOS part of Setup.

The first part of the Setup program runs with MS-DOS. (Later, Setup switches to Windows mode.) If the Setup program stops while still using MS-DOS, it may be because Setup was unable to correctly detect your hardware. To solve this

problem, type **setup /i** to run Setup again. This causes Setup to skip hardware detection and run Custom Setup, in which you specify your system settings. In the System Information screen, select descriptions that match the hardware on your system.

Setup stops when switching from MS-DOS to Windows.

The first part of the Setup program runs with MS-DOS. If Setup stops when switching from MS-DOS to Windows, it may be due to one of the following reasons:

- When you started Setup, your system had an application in memory sending output directly to your screen. An example is a network message service that notifies you when printing is complete. Be sure to close any such applications before starting Setup.
- Setup was unable to correctly detect your hardware or software. You need to quit Setup and run it again, choosing the Custom Setup option. If possible, Setup indicates which hardware or software is causing the problem. Make sure the descriptions of hardware and software in the System Information screen match what you have on your system. If not, correct the settings.
- You are running the wrong version of MS-DOS. Windows version 3.1 requires MS-DOS version 3.1 or later. To find out which version you are running, type **ver** at the command prompt. If necessary, install a newer version of MS-DOS, restart your computer, and then run Windows Setup again.
- Your system has a memory-resident program (also known as a terminate-and-stay-resident program, or TSR) that is incompatible with Setup. Setup detects and notifies you about using certain programs. Read the online document SETUP.TXT for information about using specific programs with Setup or Windows.

  SETUP.TXT is a text-only file located on a Windows Setup disk. Programs are listed alphabetically in the file. To look at the file, use a text editor you have on your system, or use the following procedure.

▶ To view the SETUP.TXT file

1. Type the following at the command prompt:

   more < setup.txt

   The file is displayed, one screen at a time.
2. To see the next screen, press the SPACEBAR.
3. To quit viewing the file, press CTRL+C.

You might need to remove from your CONFIG.SYS and AUTOEXEC.BAT files any command lines that specify memory-resident programs and then restart your computer. For more information, see "Additional Troubleshooting Techniques" later in this appendix.

The Setup program keeps prompting you for the same disk.

When you run the Setup program, you are prompted to insert disks one by one. If Setup doesn't recognize that you have inserted the disk you are being prompted for, it might be for one of the following reasons:

- A disk-caching program (such as SMARTDrive) is caching the floppy disk. To correct the problem, use a text editor to open the CONFIG.SYS or AUTOEXEC.BAT file, and then disable or remove the command line that specifies the disk-caching program.

  For this change to take effect, you must restart your computer (remove the Setup disk from the floppy disk drive first). Then run Setup again.

- The system did not recognize that you changed the floppy disk. To correct the problem, add a **drivparm** command to your CONFIG.SYS file, and then restart your computer. For example, if you are setting up Windows from a 5.25-inch, 1.2-MB floppy disk drive labeled A, you would add the following line to the CONFIG.SYS file:

  drivparm = /d:0 /f:1

  For this change to take effect, you must restart your computer (remove the Setup disk from the disk drive first). See your MS-DOS documentation for more information about the **drivparm** command.

You have special hardware to set up with Windows.

To use your hardware with Windows, you install a *device driver.* A device driver is a program that instructs Windows how to communicate with your hardware. Windows includes drivers for most popular types of display adapters, printers, and other devices.

Windows drivers for your hardware may be available from the following sources:

- Microsoft provides the Windows Driver Library (WDL), which contains device drivers made available after this version of Windows was released.
  If you have a modem, you can download the WDL from network services, including CompuServe, GEnie, Microsoft OnLine, various user-group bulletin-board services (BBSs on the Association of PC User Groups, or

APCUG, network), and the electronic downloading service maintained by Microsoft (phone 206–936–6735). Users who do not have a modem and are located in the United States may obtain disks by contacting Microsoft Customer Support Services at 1–800–426–9400.

Note If your copy of Windows was acquired outside the United States, the package contains a subsidiary information card listing bulletin-board services from which you can obtain updated device drivers. The card also lists local subsidiary telephone numbers you can call to obtain drivers if no BBS is available or you cannot access a BBS.

- If the WDL does not include a driver for your hardware, contact your hardware manufacturer to find out whether a device driver is available that is compatible with Windows version 3.1.

Note Color graphics adapter (CGA) display drivers are no longer included with Windows. You can, however, obtain a CGA display driver from the WDL, as previously described in this section. CGA monitors are not fully supported in Windows 3.1 and higher. An enhanced graphics adapter (EGA) or better is recommended.

You receive a message about memory-resident programs.

The Windows Setup program detects and warns you about some memory-resident (TSR) programs that might not be compatible with Windows. For information about setting up and using specific memory-resident programs, see the SETUP.TXT online document. SETUP.TXT is a text-only file located on a Windows Setup disk. The programs are listed alphabetically in the file. To look at the file, use a text editor you have on your system, or use the procedure described in the section "Setup Stops When Switching from MS-DOS to Windows" earlier in this appendix.

Windows won't start after a successful Setup.

If you completed Setup but cannot start Windows, one of the following might be the cause:

- The wrong hardware is specified for your system. This might occur because you ran Express Setup and Setup was unable to correctly detect your hardware; or because during Custom Setup, you specified the wrong hardware settings. In the Windows directory, type **setup** at the command prompt. Make sure the hardware information is correct in the System Information Screen.

- Your system may be running memory-resident (TSR) programs that are incompatible with Windows. Setup detects and warns you about most of these programs; however, your system may have a program that Setup cannot detect.

  For more information about troubleshooting problems with memory-resident programs, see "Streamline the CONFIG.SYS and AUTOEXEC.BAT Files" later in this appendix.

If Windows still won't start, run Setup again from the Windows disks, using the following guidelines:

- Type **setup /i**, which causes Setup to skip hardware detection. This also runs Custom Setup, in which you specify your system settings. In the System Information screen, be sure to choose descriptions that match the hardware on your system. Then restart your system, and type **win** to start Windows.
- Type **win /s** (for standard mode) or **win /3** (for 386 enhanced mode). If you can start Windows in standard mode, see the next section.

Windows runs in standard mode but not in 386 enhanced mode.

If you have an 80386 or 80486 computer and Windows can run only in standard mode, you may be able to correct the problem in one of the following ways:

- Make sure that your computer has at least an 80386 processor and enough memory to run in 386 enhanced mode. You should have at least 200K of free conventional memory, 1024K (1 MB) of free extended memory, and at least 2 MB of free disk space.

  If your system meets these requirements, try to start Windows in 386 enhanced mode by typing **win /3** at the command prompt. Although you can force Windows into 386 enhanced mode if it has less than 1024K of extended memory, it is not recommended, because Windows may run very slowly.
- Use the **EMMExclude** option when you start Windows, by typing **win /d:x** at the command prompt. This excludes the adapter area from areas that Windows searches for unused address space. Typically, this is the area A000-FFFF. The search can cause conflicts with adapters that use this area.

  If using this command successfully starts Windows in 386 enhanced mode, you might want to add the **EMMExclude** command to your SYSTEM.INI file, as described in the procedure following this list.
- Use the **VirtualHDirq** option when you start Windows, by typing **win /d:v** at the command prompt. This gives your hard disk—rather than Windows 386 enhanced mode—control over how hard-disk interrupts are processed.

If using this command successfully starts Windows in 386 enhanced mode, you might want to add the **VirtualHDirq=False** command to your SYSTEM.INI file, as described in the following procedure.

▶ To add an EMMExclude or VirtualHDirq command to SYSTEM.INI

1. Using a text editor, open the SYSTEM.INI file, which is located in your Windows directory.
2. Find the [386Enh] section of the file, and type one of the following lines:

   EMMExclude=A000-FFFF

   VirtualHDirq=FALSE
3. Save your changes to the SYSTEM.INI file.
4. At the command prompt, type **win** to start Windows.

Note When you add the **EMMExclude** command to your SYSTEM.INI file, you are probably excluding more address space than is necessary. To find out a more precise amount of address space to exclude, you can use the Microsoft Diagnostics (MSD) program. To start MSD, type **msd** at the command prompt. From the first screen, choose Memory. You should exclude any address space identified as "RAM" or "ROM." You might also be able to exclude address space identified as "Possibly Available."

You need to copy Windows files directly to your computer.

The files on the Windows Setup disks are compressed and are not usable until expanded. Usually, Setup and Control Panel expand the compressed files as they are copied to your hard disk. In some cases, you may need to copy files directly from a Windows Setup disk without using Setup or Control Panel.

The EXPAND.EXE file is copied to your Windows directory during the setup process.

▶ To copy Windows files to your system and expand them

1. Insert in drive A (or another floppy disk drive) the disk containing the file you want to expand.
2. Type the following command at the command prompt, and then press ENTER:

   expand *x*:*filename1* *y*:*windirectory**filename2*

   where *x* is the floppy disk you are copying from, *filename1* is the name of the compressed file you want to copy, *y* is the hard disk you are copying to, *windirectory* is the name of your Windows directory, and *filename2* is the file you want to appear on your hard disk. The compressed file is expanded as it is copied to your hard disk.

When files are compressed, their extensions are renamed to end with an underscore. System files (.SYS) have the extension .SY_ as compressed files. For example, MOUSE.SYS is named MOUSE.SY_, and HIMEM.SYS is named HIMEM.SY_. When you use the Setup program to install these files, they are expanded and renamed with .SYS extensions.

If you use the **expand** command to copy .SY_ files to your hard disk, you must change their filename extensions to .SYS. You can use the MS-DOS **rename** command, or you can rename each file as you copy it from the Windows Setup disk by using the **expand** command. For more information about the **expand** command, see your MS-DOS documentation.

Using a Mouse

The following sections describe solutions to problems you might have when using a mouse with Windows. If you cannot use your mouse and need to use your keyboard with Windows, see Chapter 4, "Windows Basics."

The mouse won't work with Windows.

If your mouse is not working with Windows, it could be for one of the following reasons:

- If you are using a serial mouse, make sure you are using either the COM1 or COM2 serial port. You cannot use serial port COM3 or COM4 with a mouse in Windows. Examine your hardware to see which port the mouse cable is attached to. Then make sure Windows is set up correctly by using the Ports option in Control Panel.
- Determine which hardware interrupt (IRQ) the mouse port is set to use and whether there is another device set to use the same IRQ. If there is an IRQ conflict with the serial or bus port that the mouse is connected to, the mouse won't work. For information about changing IRQ settings and determining which IRQs the mouse port and other hardware are using, see your mouse and hardware documentation.

The mouse pointer won't move.

If your mouse pointer won't move, it could be for one of the following reasons:

- If the mouse pointer appears on your screen but won't move, choose the Windows Setup icon in the Main group to display a list of settings. Make sure the mouse you are using is listed here. For information about keyboard techniques you can use in Windows, see Appendix A, "Keyboard Shortcuts."

- If you are certain you are using the appropriate mouse driver and the mouse pointer still won't move, see whether there is an interrupt (IRQ) conflict between the mouse port and another device. For information about determining which IRQ your mouse or other hardware is using, see the documentation supplied with your hardware.

The mouse pointer jumps around on the Windows screen.

If the mouse pointer jumps around rather than moving smoothly, you might have one of the following problems:

- There might be a system-hardware interrupt (IRQ) conflict. You need to set up the mouse so that it isn't using an IRQ that is being used by another device. For information about changing mouse IRQ settings, see the documentation supplied with your mouse.
- Your mouse needs to be cleaned. For instructions, see the documentation supplied with your mouse.

The mouse won't work with an MS-DOS application running in a window.

If your mouse works with an MS-DOS–based application running in a full screen but not with an MS-DOS–based application running in a window, you could have one of the following problems:

- To use a mouse with an MS-DOS–based application running in a window, you must set up the mouse driver before starting Windows. For a Microsoft mouse, you need to use either the MOUSE.SYS or MOUSE.COM driver. You set up MOUSE.SYS in the CONFIG.SYS file, or you set up MOUSE.COM in the AUTOEXEC.BAT file. For example, to specify the MOUSE.SYS device driver located in the WINDOWS directory on drive C, add the following command line to your CONFIG.SYS file:

  device = c:\windows\mouse.sys

  The MS-DOS mouse driver you are using might not support the use of a mouse pointer for an MS-DOS–based application running in a window. The MS-DOS mouse drivers MOUSE.SYS and MOUSE.COM do support this.

  If you are copying these files from the Windows disks, you need to use the **expand** command. For more information, see "You Need to Copy Windows Files Directly to Your Computer" earlier in this appendix.
- You might be using a display driver that does not support the use of a mouse pointer for an MS-DOS–based application running in a window.

If you are using a 16-color, 800×600-resolution display adapter with a display driver that was provided with a Windows version earlier than 3.1, you need to update the driver. Display drivers provided with the Windows version 3.0 Supplemental Driver Library should be updated as well. You need to use the standard Super VGA display driver provided with Windows version 3.1. You can install this driver, even after Windows is installed, by using the Setup program.

If you are using a display driver that was provided with your display adapter, you might need to update the driver to one designed to work with MS-DOS–based applications running in a window. Contact your display-adapter manufacturer for an updated display driver. For more information about using specific display adapters, view the README.WRI online document by using Write (in the Accessories group).

- If you are using an IBM mouse with the IBM mouse driver version 1.0, you need to replace this driver. Version 1.0 of this driver was not designed to support MS-DOS–based applications running in a window. Contact your dealer for an updated version of the mouse driver.

Running Applications

Applications usually run without problems. However, you might occasionally receive an error message when starting or running an application, or a key or function might not work properly. The following recommendations cover the most common problems.

You press a key, and the unexpected happens.

If a key combination doesn't work, it is usually because Windows or another running application is using the key combination for another purpose.

The following are some common problems and solutions:

- You use a key combination that should perform a function in an application, but it instead performs a Windows function (for example, you unexpectedly switch to another application).

  You are probably using a Windows shortcut key. You assign a Windows shortcut key to an application by using the Properties command on the File menu in Program Manager or by specifying a key combination in the application's program information file (PIF). Use the Properties command or check the application's PIF to find out whether you have assigned a Windows shortcut key to your application. For more information, see Chapter 5, "Application Basics," and Help for PIF Editor.

- You press a Windows shortcut-key combination, such as ALT+TAB, but the Windows function is not performed.

  The key combination probably is reserved for an MS-DOS–based application and no longer performs the Windows function. Check the PIF of the foreground application to determine whether a Windows key combination is reserved for that application.

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- If Windows is running in 386 enhanced mode and you hear a beep whenever you press a key while using a particular application, Windows might have suspended that application. This might happen, for example, if you try to run the application in a window but it cannot run in a window. If that is the case, press ALT+ENTER to return the application to a full screen. If the application does not respond to ALT+ENTER, you might be able to press CTRL+ALT+DEL to quit the application without having to restart Windows or your computer.

386

- If Windows is running in 386 enhanced mode and you have chosen the Select or Mark command from the Control menu (the application's title bar will contain the word "Select" or "Mark"), Windows is waiting for you to select information to copy onto the Clipboard. To cancel the command, press the ESC key. To copy selected information onto the Clipboard, choose the Copy command from the application's Edit menu, or click using the right mouse button.

386

- If Windows is running in 386 enhanced mode and you have chosen the Scroll command from the Control menu (the application's title bar will contain the word "Scroll"), Windows is waiting for you to use the arrow keys to scroll through the information in the application's window. To cancel the Scroll command, press the ESC key.
- If you are using a language that has accented characters, you might not be able to use those characters when naming files. Before MS-DOS reads a filename, it shifts all the letters in the filename to uppercase. Some accented characters do not have valid uppercase characters.

Your application stops responding to the system.

If an application stops responding to the system, use the following checklist:

386

- You can press CTRL+ALT+DEL to quit an application that has stopped responding to the system. Windows displays a message confirming your action. To continue, follow the instructions in the message.

  When you are using MS-DOS (not MS-DOS Prompt within Windows) and you press CTRL+ALT+DEL, your computer restarts. When you press CTRL+ALT+DEL while using Windows, you can quit the application that has stopped responding without having to restart your computer or Windows.

- You are running an earlier version of a Windows application that is incompatible with Windows version 3.0 or later. Contact the manufacturer for an updated version of the application.

Your application runs too slowly.

If your application runs too slowly, try one of the following solutions:

- Your system might be low on memory. If your hard-disk light blinks frequently, Windows is swapping information to disk to make room in memory for other information or is rereading information from the disk into memory. For information about making more memory available, see Chapter 14, "Managing Memory and Performance."
- You might need to set up a permanent swap file. If Windows is running in 386 enhanced mode and you run more than one application at a time or applications that use very large files, you should set up a permanent swap file. Do this by choosing the 386 Enhanced icon in Control Panel and then choosing the Virtual Memory button. For more information, press the F1 key while using the dialog box, or see Chapter 14, "Managing Memory and Performance."

386

Your Super VGA screen contents are not restored correctly.

If you use a Super VGA and the screen contents aren't restored correctly when you switch between Windows and an MS-DOS–based application, you probably need to update your display driver. The Super VGA display driver provided with Windows version 3.1 supports most 16-color, 800×600-resolution display adapters. If it doesn't work correctly, contact the display-adapter manufacturer to find out whether there is a Windows version 3.1 display driver available for your display adapter.

You cannot take a snapshot of the screen.

If you cannot take a "snapshot" of an application screen, one of the following might be the cause:

- If Windows is running in standard mode and you are trying to take a snapshot of an MS-DOS–based application, open the application's program information file (PIF) by using PIF Editor, and see whether the No Screen Exchange check box is selected in the application's PIF. This option prevents you from copying information onto the Clipboard by using PRINT SCREEN or the ALT+PRINT SCREEN key combination. This option might be set to give the application enough memory to run. Try clearing this check box.
- If you are trying to take a snapshot of an MS-DOS–based application by using the PRINT SCREEN or ALT+PRINT SCREEN key combination (usually Windows shortcut keys), these combinations might be reserved for the active application. Try clearing the corresponding Reserve Shortcut Key check boxes in the active application's PIF.

- If Windows is running in standard mode, the wrong Video Mode option button might be selected in the application's PIF. Try selecting a higher-resolution video mode.
- 386 If Windows is running in 386 enhanced mode, more memory might be required. Quit some applications to free memory. For more information, see "Managing Memory" later in this appendix.

You cannot paste information into an MS-DOS–based application.

If you cannot paste information from the Clipboard into an MS-DOS–based application, one of the following could be the cause:

- The information might not be in text format. Windows cannot paste graphics into an MS-DOS–based application. Try saving the information you want to paste as a separate file and then opening the file by using the application.
- 386 An MS-DOS–based application might not be able to accommodate the fastest pasting method. If Windows is running in 386 enhanced mode, the Allow Fast Paste check box in the application's PIF is usually selected because most applications can accommodate the fastest pasting method. However, if the application cannot use the fastest method, it might not respond when you try to paste into it. Try clearing the Allow Fast Paste check box in the application's PIF. You must restart the application for the changes to a PIF to take effect.

You cannot change the font size for an MS-DOS–based application.

If you cannot change the font size for an MS-DOS–based application running in a window, one of the following could be the cause:

- The application is probably running in graphics mode. You can change font sizes only when the application is running in text mode. With some MS-DOS–based applications, you can choose which mode the application runs in. To find out whether your application can run in text mode, see the documentation included with the application.
- You might be using a display driver that doesn't provide the capability of changing fonts for an MS-DOS–based application running in a window. If you are using a 16-color, 800×600-resolution video graphics adapter (Super VGA), make sure you are using the Super VGA display driver provided with Windows version 3.1. This driver supports most Super VGA display adapters. If this driver doesn't work, contact the display-adapter manufacturer to find out whether a Windows version 3.1 display driver is available.

- If you are using a display driver that doesn't provide the capability of changing fonts for an MS-DOS–based application running in a window, try including the following line in the [NonWindowsApp] section of the SYSTEM.INI file:

  FontChangeEnable=1

  For more information about modifying the SYSTEM.INI file, view the SYSINI.WRI online document by using Write (in the Accessories group).

Note This setting does not work for all display drivers. In some cases, specifying this setting causes the mouse pointer to be displayed incorrectly.

Your system stops responding or quits unexpectedly.

If Windows or your computer stops responding, an application or Windows closes unexpectedly, or your computer restarts unexpectedly, one of the following might be the cause:

- You are running an earlier version of a Windows-based application that is incompatible with Windows version 3.0 or later. Contact the manufacturer for an updated version of the application.
- You are using hardware that is incompatible with Windows. Sometimes you can resolve hardware incompatibility by adjusting settings in your SYSTEM.INI file. For more information about SYSTEM.INI, use Write to view the SYSINI.WRI online document.

You receive a message that the registration database is corrupted.

If you have problems such as the following, your registration database may be corrupted:

- You try to open or print a file that is associated with an application and you receive a message that the association information is incomplete.
- While working with linked or embedded objects, you receive a message that the server is not registering properly.
- In File Manager, you choose the Associate command and there are no entries in the list of files in the Associate dialog box.

If your registration database is corrupted, you must delete the registration database and then recreate it.

▶ To restore your registration database

1. Quit Windows.
2. Delete the REG.DAT file (located in your Windows directory).
3. Restart Windows.
4. Start Registration Info Editor by opening File Manager and then choosing the REGEDIT.EXE file (located in your Windows directory).
5. From the File menu, choose Merge Registration File. The Merge Registration dialog box appears.
6. In the File Name List, select the SETUP.REG file, and then choose the OK button. (The SETUP.REG file is located in the Windows SYSTEM subdirectory.)
7. Search for *.REG files on drive C by using the Search command on the File menu in File Manager.
8. Double-click each .REG file (or select it, and then press ENTER).
9. Repeat steps 6 through 8 for each drive on your system.

Note You may need to contact your software manufacturer if problems still persist when running a Windows-based application.

Linking and Embedding Objects

The following sections describe solutions to problems you might encounter when linking and embedding objects by using Windows-based applications that support object linking and embedding.

You receive a message that the server is unavailable.

The application used to create the object (sometimes referred to as a *server application*) must be available when you try to create, edit, play, or update an object in a destination document. A server application cannot respond if it is performing an action such as printing or making calculations, if the cursor is in a field waiting for information, or if a dialog box is open.

Use the following guidelines to solve the problem:

- Wait a short while to determine whether the server is going to become available to respond to your request. If it becomes available, the message closes and your request is processed.

If the server application does not become available, you may be able to choose the Cancel button in the dialog box to cancel the request. If you do not want to or cannot cancel the request, determine which server application is unavailable. Then switch to the server application, and complete or cancel the action that is causing the application to be unavailable.

- Your registration database may be corrupted. For information about restoring your registration database, see "You Receive a Message That the Registration Database is Corrupted" earlier in this appendix.

You choose an object type from the Insert Object dialog box, but the application doesn't open.

If you choose an object type from the Insert Object dialog box and the application doesn't open, it means Windows cannot find the application.

Use the following checklist to solve the problem:

- Make sure the application that creates this object type has not been deleted from the computer. For example, Paintbrush (PBRUSH.EXE) needs to be on your computer before you can open a Paintbrush Picture object type.
- If the application has been moved from the location specified in the registration database, make sure the directory containing the application is included in the path in your AUTOEXEC.BAT file.
- Try reinstalling the application.

You get different results each time you use the Paste command.

When you use the Paste command, the contents of the Clipboard are either inserted or embedded into the document. The result is determined by the type of application you used to create the information on the Clipboard.

If you used a server application—one that can supply objects for object linking and embedding—the information may be embedded when you choose the Paste command. When the information is embedded, you can activate the information or edit it from within the document.

If the application used to create the information on the Clipboard does not support object linking and embedding, the information is simply inserted when you choose the Paste command and cannot be edited or activated from within the document.

A linked sound object updates automatically even though it is set to update manually.

When you create a link, you are inserting into the destination document a reference to the source document that contains the linked object. When the object is placed in the destination document, you see either the same information that is in the source document or a representation of that data, such as an icon. When an object is represented by an icon, as it always is for a sound object, you always get the latest information when you choose the object.

The Picture option in the Content window of Object Packager is unavailable.

The Picture option in the Content window displays a snapshot view of the object. Picture View is available only when the object was created with a server application and when the Clipboard is used to transfer the object into Object Packager.

If you use the Import command on the File menu to load a document into Object Packager, or you copy onto the Clipboard information created by using an application that is not a server, the Picture option is not available.

A linked object is not updating.

Under certain circumstances, a linked object must be manually updated in the source document before the linked object in the destination document is updated, regardless of whether it is an automatic or manual link. This is true for links to documents that contain text, spreadsheets, and pictures because these linked objects are represented in the destination document by images that reproduce the information in the source file. This is not true for links to sound and animation files because these types of links are represented by icons and not by the contents of the linked document.

For example, suppose you have a destination document open that contains a link to a Paintbrush document, and you have the source document open in Paintbrush. When you make changes to the source document in Paintbrush, the visual presentation of the Paintbrush object in the destination document is not updated with the changes you are making. You must save the document in Paintbrush and then update the linked object in the destination document to see the updated object.

▶ **To update a link**

1. Select the linked object in the destination document.
2. From the Edit menu, choose Links.
3. Choose the Update Now button.
4. Choose the OK button.

The Paste command in Cardfile is not available, yet there is information on the Clipboard.

You must first choose the Picture command from the Edit menu before you can use the Paste, Paste Link, and Paste Special commands in Cardfile.

A check mark appears next to the Picture command when it is in effect.

The Paste Link command appears dimmed, yet there is information on the Clipboard.

If the Paste Link command appears dimmed in your application and you know there is information on the Clipboard, one of the following may be the cause:

- You can only create a link to information in a saved file, so the Paste Link command is available in the destination document's application only when you copy information from a saved file onto the Clipboard.

  Save the file before copying information onto the Clipboard. Then you have the choice of using the Paste command to embed the information or the Paste Link command to create a link to it.
- If you have chosen the Paste Special command in a destination document and are selecting from a list of file formats, the Paste Link command will be available only when the format you have selected is supported by the application used to create the destination document.

Printing

The following sections describe common printer problems and offer suggestions for correcting the problems. When there are suggested steps to follow, you should try to print after you complete one of the steps. If you can print from Windows, you've solved the problem. If not, try the next step.

Your printer does not print.

When a printer cannot print, the cause is often mechanical. For example, the printer could be offline, turned off, or disconnected. Use the following checklist:

- Is the printer plugged in, turned on, and online?
- Do you have the correct cable for your printer, and is it properly connected? For example, if you are using a Hewlett-Packard plotter, you need to use a Hewlett-Packard plotter cable. If you suspect the cable is the problem, you may want to borrow a cable that is working with another computer and printer.
- Does the currently selected printer in the application you are printing from match the printer you are printing to?
- Are the printing options set correctly, and have you chosen the correct port for the selected printer? For more information, see Chapter 8, "Print Manager."
- When you are using a serial printer and you choose the Ports icon in Control Panel, does the information in the Settings dialog box match those required by your printer? For more information, see Chapter 13, "Configuring Hardware."
- Do you need to change the ribbon, install a print wheel or cartridge, or add paper? Choose the Print Manager icon in the Main group. Depending on the printer you are using and the commands you have chosen from the Options menu, a message might appear that describes the problem.
- If you are printing to a network printer, have you connected to the network printer?
- Can you print from Notepad and Write? If so, the problem is likely with the application you are using. Consult the application's documentation or contact the software manufacturer.
- If you are using a switchbox to switch between different printers, try clearing the Fast Printing Direct To Port check box in the Connect dialog box. (Choose the Printer icon in Control Panel, and then choose the Connect button.) If this doesn't work, try printing directly to the printer without using the switchbox.

If you still cannot print, try copying a small text file from MS-DOS directly to the port your printer is connected to. For printers that accept ASCII codes (such as dot-matrix printers) and PCL printers (Hewlett-Packard DeskJet, LaserJet, or compatible printers), you could type the following at the command prompt, specifying the directory where your Windows files are located, and the port you are using:

copy c:\windows\setup.txt lpt1:

The output from the **copy** command (in this example, the contents of your SETUP.TXT file) is sent to the printer that is using LPT1 instead of to the screen. If the file doesn't print, the problem is not with Windows. For more information, see the documentation supplied with your printer.

For PostScript printers, try copying the file TESTPS.TXT to the port you are using. This file was copied to your hard disk when you installed the PostScript printer driver. For example, if your Windows system files are stored in a directory named C:\WINDOWS\SYSTEM (the default directory name), you would type the following:

copy c:\windows\system\testps.txt com1

This command line prints a list of communications settings. Make sure your settings match the list.

You can print from MS-DOS but not from Windows.

If you can print from MS-DOS but not from Windows, there may not be enough space for Windows to store temporary files. (Windows creates temporary files when printing, even if you are not using Print Manager.)

▶ To see how much space exists for temporary files

1. At the command prompt, type **set** to see what directory the TEMP environment variable is set to use.
2. If there is a TEMP variable listed, make sure the specified directory exists. If it doesn't exist, you need to create it or reset the value of TEMP to specify an existing directory. If there is no TEMP variable listed, define one. For example, to set the TEMP variable to use a directory named TMP located on drive C, add the following line to your AUTOEXEC.BAT file:

   set temp=c:\tmp

   You need to restart your computer after making changes to the AUTOEXEC.BAT file. Windows uses the root directory of your startup drive to store temporary files if no other location is defined.
3. Change to the directory specified by the TEMP variable.
4. Type **dir** to see how much space is available. Windows needs at least 2 MB of free disk space in which to store temporary files.
5. If you had to change any of these settings, try printing again.

If you still cannot print, step through the following checklist:

- Check the printer cable. Windows-based applications require that all pin connectors are functioning, whereas some MS-DOS–based applications do not. Try using a cable that you know is functioning.
- If you are using a serial printer, make sure you do not have an interrupt (IRQ) conflict. A mouse might be on the same IRQ as the serial port being used for printing.

- Make sure you are not using a serial port to connect to a network printer. Windows supports network-printer connections on parallel (LPT) ports only.
- If you are using a printer that isn't listed during Windows Setup (or in the Printers dialog box in Print Manager or Control Panel) and are trying to emulate a standard printer, make sure you have chosen the correct printer to emulate. See your printer documentation.
- Try printing without using Print Manager. To turn off (deactivate) Print Manager, choose the Printers icon in Control Panel, and then clear the Use Print Manager check box.
- If you are printing to LPT1, try printing to the LPT1.DOS file instead. To specify the LPT1.DOS file, choose the Printers icon in Control Panel. When the Printers dialog box appears, choose the Connect button. Choose LPT1.DOS from the Ports list. If LPT1.DOS does not appear in the list, you need to add it to the list of ports in the [ports] section of the WIN.INI file.
  For more information, view the WININI.WRI online document by using Write (in the Accessories group).

The page prints but is formatted incorrectly.

If the pages of a document are formatted incorrectly, the margins are incorrect, the document contains extra lines, or the document is paginated incorrectly, use this checklist:

- If you haven't already read the PRINTERS.WRI online document provided with Windows, you should determine whether it contains information specific to your printer. You can view this file by using Write (in the Accessories group).
- Make sure your printer is capable of printing the formats you specified in your application. Pay special attention to your printer's capabilities when selecting fonts and point sizes. For more information about the font you specified in Windows, start Write, and then choose Fonts from the Character menu. The Font dialog box appears, providing information about the fonts that are available with Windows.
- Make sure you specified the correct settings when you configured your printer. When configuring a printer, you can control settings such as margin size, number of lines per printed page, paper orientation, and number of dots per inch. Choose the Printers icon in Control Panel. In the Printers dialog box, select the printer you are using, and then choose the Setup button.
- If your printer has hardware switches that set page length or line length, make sure you've chosen the correct settings. (For information, see your printer documentation.) For example, on a Hewlett-Packard LaserJet printer, you would set the number of lines per printed page to a maximum of 66.

- If your printer has a hardware switch that inserts an automatic linefeed at each carriage return, it should be set for carriage returns only. For more information, see your printer documentation.
- Determine whether the formatting problems are consistent by printing the same file twice. If the two printouts look different, you may be having problems sending printing information through the port.

Your printer output is garbled.

If you can print your document, but it is unreadable or contains extra characters, use this checklist:

- Make sure the correct printer is selected as the default printer. For more information, see Chapter 8, "Print Manager."
- If your printer accepts font cartridges, make sure you select the correct cartridge when you set the printing options. If the wrong font cartridge is selected, the printer may insert stray characters at the beginning of lines.
  For more information, see Chapter 12, "Customizing Windows."
- If you have a serial printer, make sure the settings for the printer port match those required by your printer. Choose the Ports icon in Control Panel, and then choose the Settings button. Lowering the baud rate might solve the problem.
- You may be using a printer that isn't listed during Windows Setup (or in the Printers dialog box in Print Manager or Control Panel). If so, you are probably trying to use your printer to emulate a standard printer. Few printers are 100-percent accurate when emulating industry-standard printers. Often, fonts are not printed accurately. Try emulating a different type of printer. You could also contact the printer manufacturer to find out whether a Windows printer driver is available for your printer.
- The printer buffer may be retaining garbled information. Try turning the printer off, waiting a few seconds, and then turning it on again.
- The printer cable may be faulty. Verify that you have the correct cable and that it is functioning.

As a last resort, try installing the Windows Generic/Text Only printer-driver file to see how it works with your printer. You could also contact your printer manufacturer or dealer to determine whether there is a problem with your printer. For information about installing printer drivers, see Chapter 8, "Print Manager."

The last page of a document is left in the printer.

Some MS-DOS–based applications leave the last page of a document in the printer instead of ejecting it when printing is completed. When this happens, the next document to be printed starts printing on the last page of the previous document.

If your printer has a form-feed or continue button, you can press the button to get the last page out of the printer.

If you are printing multiple documents, using separator pages can also solve this problem. If the last page of a document is still in the printer, it is ejected when the separator page that precedes the next document is fed in.

The fonts on your screen and the fonts that print are different.

A font set is a group of letters, numbers, symbols, and punctuation marks having the same design. Screen fonts display information in windows and dialog boxes. Printer fonts are part of the printer driver or are in the form of cartridge fonts and soft fonts. Many printer drivers, cartridge fonts, and soft fonts have matching screen fonts so that the fonts on your screen look the same as those that print.
If matching fonts are not available, Windows uses a font that looks the most like the printer font being used. Sometimes there isn't a font that looks the same.

If you use TrueType fonts, Windows and Windows-based applications use the same fonts, and fonts appear the same on the screen as they do when printed. TrueType fonts are installed when you set up Windows.

▶ **To find out whether TrueType fonts are available**

1. In the Control Panel window, choose the Fonts icon.
2. Choose the TrueType button.
3. Note whether the Enable TrueType Fonts check box is selected. If it is, TrueType fonts are available and can be used in your documents.

To view available fonts, choose the Write icon in the Accessories group, and then choose the Fonts command from the Character menu. The Font dialog box appears, displaying samples of various fonts. The TrueType fonts have a TrueType icon next to them, and printer fonts have a printer icon. Plotter and screen fonts have no icon next to them.

You cannot print TrueType fonts on your laser printer.

When you are using a laser printer, TrueType fonts are listed in your application as a selectable font only if you are using a Windows version 3.1 printer driver. Windows version 3.1 printer drivers provide the necessary information for

printing TrueType fonts. If you cannot print TrueType fonts, the printer driver you are using may not be the correct version. Contact your printer manufacturer to find out whether a Windows version 3.1 printer driver is available for your printer or whether one of the printer drivers supplied with Windows can work with your printer.

Your laser printer does not print your cartridge or soft fonts.

If you install a font cartridge or soft fonts for your laser printer, but the printer doesn't print these fonts, use this checklist:

- Make sure the printing-option settings for your printer are correct and that you have selected the correct cartridge from the Cartridges list in the Setup dialog box. To select a cartridge, choose the Printers icon in Control Panel, and then choose the Setup button.
- If you are using a font cartridge, turn off the printer and make sure the cartridge is all the way in its slot. You may need to press firmly on the cartridge until it pops into the slot.
- If you are using soft fonts, make sure they are properly installed. (For information, see the installation kit provided with your soft fonts.)
- If your soft fonts are installed as permanent, perhaps the printer was turned off or reset. Try sending the soft fonts to the printer again.
- You may be using too many soft fonts. Printer drivers can support a limited number of soft fonts. Generally, PostScript printer drivers have a limit of about 170 soft fonts. PCL printer drivers generally have a limit of 250 soft fonts.

  The number of soft fonts you can use is also limited by the maximum size of the WIN.INI file. The WIN.INI file can be no larger than 64K. If the file is full, you cannot specify any additional soft fonts. One way to minimize the size of the WIN.INI file is to move the soft-font files closer to the root of the directory structure and then specify these shorter paths in the WIN.INI file.

  You can also try installing fewer fonts or installing them as temporary fonts, if appropriate. For more information, see your printer documentation or contact your printer manufacturer.
- If you have changed port connections since you installed soft fonts, you need to reinstall the soft fonts for the new port. If you are using the Hewlett-Packard LaserJet and DeskJet family of printers, choose the Printers icon in Control Panel, and then choose the Setup button in the Printers dialog box. Then use the Fonts button in the Print Setup dialog box to copy soft fonts from one port to another.

The printer loses text.

- If you are using a parallel printer and an LPT port, and the printer loses text, the cable could be faulty. Try using a new cable of the same type.

If you have a serial printer and it prints the document but loses blocks of text, you might have a flow-control (also called *handshake*) problem with your serial port.

To check for a flow-control problem:

- Try lowering the baud rate.
- Make sure all communications settings (baud rate, data bits, parity, stop bits, and flow control) are set the same in Windows, in MS-DOS, and on the printer. The most common values for these settings are 9600 baud, 8 data bits, no parity, 1 stop bit, and Xon/Xoff flow control.

  You can change these settings in Windows by choosing the Ports icon in Control Panel and then choosing the Settings button. You can also change these settings in MS-DOS by using the **mode** command. For information about **mode** command-line options, see your MS-DOS documentation. For information about settings on the printer, see your printer documentation.

If the printer is still losing text, make sure all the manual switches on your printer are set as described in your printer documentation. If you are using a network printer, make sure you are using network software that works with Windows. For more information, see the NETWORKS.WRI online document provided with Windows. You can view this file by using Write (in the Accessories group).

Only part of a page prints.

If your printer prints only part of your document, use the following checklist:

- The most common cause of this problem is insufficient memory in the printer. It is recommended that you add more memory to the printer. If you are printing graphics, try using a lower print resolution. You can try printing a page of text to confirm that you are running out of memory because you are printing graphics.
- Make sure the paper size you chose when configuring the printer matches the paper size loaded in the printer.
- Make sure you have selected the appropriate memory setting in the printer-driver dialog box. Make sure you haven't specified more memory than your printer actually has.

  To view this dialog box, choose the Printer Setup command from the Options menu in Print Manager.

Paintbrush graphics are too small when printed.

If you are using Paintbrush and the printed image is much smaller than you expected, use the following checklist:

- From the File menu in Paintbrush, choose Print. Make sure the Use Printer Resolution check box is cleared in the Print dialog box. Also, check the scaling factor. If a small scaling factor is specified, the printer output is small.
- From the View menu, choose View Picture to see how the image appears on the page. You may need to adjust the position.

Your PostScript printer runs out of memory.

Occasionally when you try to print a file, you might see a message indicating that the printer is out of memory.

If you are using a PostScript printer, and the document you are trying to print includes soft fonts, try using TrueType or printer fonts instead. (For more information, see Chapter 12, "Customizing Windows.")

You can also try changing some of the options in the Advanced Options dialog box.

▶ To change a PostScript printer's options

1. In the Main group, choose the Print Manager icon.
2. From the Options menu, choose Printer Setup.
3. From the list of installed printers, select the printer you are using.
4. Choose the Setup button.
5. Choose the Options button.
6. Choose the Advanced button.
7. In the Send To Printer As list, make sure Adobe Type 1 is selected. This option causes the driver to use outline fonts for large point sizes and bitmaps for small point sizes.
8. Make sure the Clear Memory Per Page check box is selected. This option causes the driver to clear the printer's memory after printing each page.
9. Make sure the Use Substitution Table check box is selected. This option causes the driver to use a built-in printer font already in the printer's memory instead of using a new font. Make sure you select a printer font

to use in place of the TrueType fonts in your document. To do this, choose the Edit Substitution Table button, and then supply the necessary information in the Substitution dialog box.

If you need help working with the Advanced Options or the Substitution dialog box, choose the Help button or press F1 while using the dialog box.

If a problem still exists after completing this procedure, consider adding more memory to your printer. If your printer still runs out of memory when printing, there is a problem with the driver or printer. For more information, contact your printer manufacturer.

You receive a message that the printer is not responding.

When printing files, you may receive the following message from Print Manager: "The printer on LPT1 is not responding. Check the printer or increase the Transmission Retry value in the Printer Connect dialog box, and then resume the print queue."

Check whether there is a problem with the printer, such as jammed paper, and make sure the printer is online.

You might also receive this message if you are using PostScript printer cartridges; it is most common when printing graphics with these cartridges. When the printing process takes too long, it appears to Windows that a printer is not responding. If you receive this message, go through the following procedure to increase the value (in seconds) of the Transmission Retry setting.

▶ **To change the Transmission Retry setting**

1. In the Main group, choose the Print Manager icon.
2. From the Options menu, choose Printer Setup.
3. Select the printer you are using.
4. Choose the Connect button.
5. In the Transmission Retry box, type a larger value (start by doubling the current value).

Managing Memory

The following sections describe solutions to problems you might encounter when managing memory in Windows. For more information about managing memory, see Chapter 14, "Managing Memory and Performance."

You receive an out-of-memory message.

If you receive an out-of-memory message when you try to start an application, you can free memory in a number of ways, including the following:

- Free some memory before starting Windows. You may be able to do this by modifying your CONFIG.SYS and AUTOEXEC.BAT files to eliminate any memory-resident software that isn't needed by all applications. For information about how to do this, see Chapter 14, "Managing Memory and Performance."
- Close any applications you aren't using.
- 386 Run MS-DOS–based applications in a full screen instead of a window (possible in 386 enhanced mode only). If an MS-DOS–based application is running in a window, you can switch it to a full screen by pressing ALT+ENTER while it is the active application.
- Reduce Windows-based applications to icons. Many applications use less memory when minimized than when running in a window. To reduce an application to an icon, click the Minimize button in the upper-right corner of the window. Or bring the application to the foreground, press ALT+SPACEBAR to open the Control menu, and then choose Minimize.
- Clear or save the Clipboard contents. For information about using the Clipboard, see Chapter 5, "Application Basics."
- If you are using a desktop wallpaper, set the wallpaper to None or use a pattern (a pattern uses less memory than wallpaper). For more information, see Chapter 12, "Customizing Windows."
- If you are trying to run an MS-DOS–based application, change its PIF options. Descriptions of PIF Editor options follow this section. For more information about PIF options, see Help for PIF Editor.
- 386 If you are trying to run more than one MS-DOS–based application at a time (in 386 enhanced mode), use PIF Editor to change the multitasking options, Background Priority and Foreground Priority. For more information about these options, see Chapter 11, "MS-DOS Applications."
- 386 If Windows is running in 386 enhanced mode, set the PIF for each MS-DOS–based application so that the application does not run when it is in the background. When the Execution Background setting is not selected, the MS-DOS–based application does not run when it is in the background. This may temporarily free memory.
- Make sure Windows has enough available hard-disk space to create and use swap files. For information about how Windows uses swap files, see Chapter 14, "Managing Memory and Performance."

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- If possible, set up a permanent swap file. If Windows is running in 386 enhanced mode, you can do this by choosing the 386 Enhanced icon in Control Panel and then choosing the Virtual Memory option button. For help with this dialog box, press F1 while using it, or see Chapter 14, "Managing Memory and Performance."

Freeing Memory by Using PIF Editor: Standard Mode

If Windows is running in standard mode and you receive an out-of-memory message when trying to run an MS-DOS–based application, first try the techniques listed in the preceding section. If you still get an out-of-memory message, consider changing the following PIF options. Choose the PIF Editor icon in the Main group to open PIF Editor. (If you upgraded from Windows version 3.0, PIF Editor remains in the Accessories group.)

Option	Suggested change
Video Mode	Under Video Mode, select the Text option button to reduce the amount of memory Windows sets aside to display the application. This makes more memory available to the application. However, if you change modes while using the application, you might not be able to switch from the application.
Memory Requirements	If Windows displays an out-of-memory message when you try to start the application, reduce the amount specified in the Memory Requirements: KB Required box. If the application starts but subsequently displays an out-of-memory message, you might need to free more memory before starting Windows. For information, see Chapter 14, "Managing Memory and Performance."
XMS Memory	If the application does not need extended memory, make sure that XMS Memory: KB Required and XMS Memory: KB Limit are set to 0. This prevents the application from taking up memory that another application could use.
No Screen Exchange	Select this check box to prevent Windows from allocating memory when you copy information onto the Clipboard by using PRINT SCREEN or ALT+PRINT SCREEN. This makes more memory available to the application. However, you cannot take a "snapshot" of the MS-DOS–based application screen.
Prevent Program Switch	Select this option to make more memory available to the application. Windows makes more memory available by preventing you from switching from the application. When this option is selected, you have to quit the application to return to Windows.

Freeing Memory by Using PIF Editor: 386 Enhanced Mode

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When Windows is running in 386 enhanced mode, Windows-based applications and MS-DOS–based applications share memory resources. The more memory that is allocated to one application, the less memory there is available to others. If you receive an out-of-memory message when trying to start an application, first try the techniques described earlier in the "You Receive an Out-of-Memory Message" section.

If you still receive an out-of-memory message, try changing the PIF for the MS-DOS–based application. You can free memory for an application by changing the following PIF settings. Choose the PIF Editor icon in the Main group to open PIF Editor. (If you upgraded from Windows version 3.0, PIF Editor remains in the Accessories group.)

Option	Suggested change
Video Memory	Under Video Memory, select the Text option button if you plan to use only text mode while running the application. Text mode requires less memory than graphics mode. Clear the Retain Video Memory check box in the Advanced Options dialog box to free memory.
Memory Requirements	If Windows displays an out-of-memory message when you try to start the application, reduce the amount specified in the KB Required box. If the application starts but subsequently displays an out-of-memory message, increase the amount specified in the KB Required and KB Desired boxes. (An application might also run out of memory if it doesn't have enough extended or expanded memory. If you suspect this is the case, try increasing the amounts in the XMS Memory and EMS Memory boxes.)
Display Usage	Select the Full Screen instead of the Windowed option button. Running an application in a window requires more memory.
Execution	Select the Exclusive check box to suspend other applications while this application is in the foreground. This might make more memory available to the application, but it prevents other applications from running in the background.

If you still receive an out-of-memory message after changing the application's PIF, try changing the PIFs for other applications you plan to run at the same time. You can free additional memory for an MS-DOS–based application by changing the following PIF settings for other applications.

Option	Suggested change
Memory Requirements	Reduce the amount specified in each application's KB Desired box. (Do not reduce it so much that the applications cannot run effectively.)
Display Usage	Select each application's Full Screen option button.
Execution	Clear other applications' Background check boxes to prevent them from running in the background. This makes more memory available to the application you want to run but prevents the other applications from running at the same time. You might want to do this to prevent particular applications from running in the background. If you want to prevent all applications from running in the background, it is easier to select the foreground application's Exclusive check box.
Lock Application Memory	Clear each application's Lock check boxes (Lock Application Memory, XMS Memory: Locked, and EMS Memory: Locked) to free memory. This might make more memory available to the application you want to run but also might slow down the applications for which you clear the Lock check boxes.

For more information about freeing memory, see Chapter 14, "Managing Memory and Performance."

Using Serial Communications

With Windows, you can have serial communications on serial ports COM1 through COM4. The following sections describe solutions to problems you might have when using serial communications.

You cannot access a serial port.

If Terminal or another Windows-based communications application cannot access a modem or other device connected to a serial port, use the following checklist to determine the problem.

- Determine whether another application is preventing access to the port even though it is not actively using it. If so, close the application so that other applications can gain access to the serial port.

- Make sure Windows is using correct base port address and hardware interrupt (IRQ) settings for the serial port you are trying to use. For instructions on how to specify these settings, see Chapter 13, "Configuring Hardware."

The computer locks up when you try to access a serial port.

When a serial device attempts to use a hardware interrupt (IRQ) or memory address that is being used by another device, your computer can lock up. If you encounter this problem, determine whether one of the following is the cause:

- Serial ports COM1 and COM3 are often set to use IRQ4, and serial ports COM2 and COM4 are often set to use IRQ3. If you are using these ports and your computer locks up, try including the following setting in the [386Enh] section of the SYSTEM.INI file:

  COMIrqSharing=true

  Note This setting works only for some systems. Many serial-communications adapters do not allow these ports to be used simultaneously, regardless of the setting in the SYSTEM.INI file.

- Some 8514/A display adapters and some network adapters conflict because they use the common address for serial port COM4 (2E8). If you are using either of these two devices, determine whether they are conflicting with your serial port.

For information about which IRQ your device uses and how to change IRQ settings, see the documentation supplied with the device. For more information about specifying IRQ and address settings for your serial devices and ports in Windows, see Chapter 13, "Configuring Hardware."

Errors occur during high-speed communications.

The fastest communications speed possible in Windows is dependent on many factors, including your serial device, computer speed, communications software, and other programs (or applications) running on your system. If you have problems during communications transmissions at high speeds (9600 baud and higher), use the following checklist:

- Close or adjust the background-execution priority for any MS-DOS–based applications running in the background. Such an application could prevent the active communications application from receiving information fast enough. For information about adjusting settings for MS-DOS–based applications, see Chapter 11, "MS-DOS Applications."

- Make sure the computer is running at its fastest possible speed. Some computers may run at slower speeds to prolong battery life. See the documentation supplied with your computer.
- Use a serial port that contains a 16550A Universal Asynchronous Receiver Transmitter chip (UART). Windows uses the buffering capabilities of such ports so that Windows-based communications applications can achieve high speeds even on slow computers. For more information, see your serial-port documentation.

Note Using the buffering capabilities of Windows causes problems with some versions of the UART. In this case, you need to disable the buffer of the UART by using the **com*x*fifo** setting in the SYSTEM.INI file. For more information about this setting, view the SYSINI.WRI online document by using Write (in the Accessories group).

Errors occur when you use MS-DOS communications applications.

If you are running an MS-DOS–based application that uses the Xon/Xoff protocol for serial-port communications, you might lose characters or receive protection violations when other running applications are slowing down the system. If this happens, include the following setting in your SYSTEM.INI file:

COM*x*Protocol = XOFF

where *x* is the number of the COM port. For information about this setting and how to change it, view the SYSINI.WRI online document by using Write (in the Accessories group).

Using Terminal

If you have trouble using Terminal and a modem to connect to a remote computer, a number of factors could be the cause. The following sections describe solutions for a few common problems.

The modem does not dial the number.

Your hardware may be connected improperly, or the incorrect COM port is specified. Use this checklist:

- Make sure the correct cables are attached to the modem and phone jack, and between the two computers.

- Make sure the proper COM port is specified in the Communications dialog box. Choose the Communications command from the Settings menu in Terminal to see how the Connector option is set.

You cannot establish a connection.

If the modem dials and you get an answer, but no connection is established, you might not have the correct settings for the remote computer. Communicating systems must use the same baud rate, although some modems can drop back to the rate of the remote modem and notify Terminal of the change. (For information about this feature, see your hardware documentation.) If you want to transfer data, both systems must also use the same settings for data bits, parity type (none, odd, even, mark, and space), stop bits, and flow control.

If you do not know what settings the remote system is using, refer to its documentation by calling the remote system's information number (not the data-transmission number). Request the information, and then set Terminal to match the remote-system settings by using the Communications command on the Settings menu.

You cannot send or receive a text file.

Communicating systems must use the same flow-control (or *handshake*) method.

To determine whether the systems use the same handshake method, you need to know the following information:

- What software-handshake method, if any, the remote system uses.

  The standard method is Xon/Xoff. However, another method may be used.
- Whether the remote system is using the hardware-handshake method.

  If it is, choose the Communications command from the Settings menu in Terminal, and then select the Hardware option button.

Using Windows with a Network

The following sections provide solutions for problems you might encounter when running Windows with a network. Be sure to also read the NETWORKS.WRI online document; you can do so by using Write (in the Accessories group).

You cannot connect to a network drive.

- If you cannot connect to a network drive or network printer from Windows, try making the network connection before starting Windows. If you cannot, it is probably not a Windows problem.
- If you cannot connect to a network, make sure you are using the correct network drivers. You can find out what network driver you are using by choosing the Windows Setup icon in the Main group.

You have trouble when running a shared copy of Windows.

- If you receive a message about sharing violations while running a shared copy of Windows or a shared copy of another application, make sure the application's file attributes are set to read-only. You can view or change a file's attributes by using the Properties command on the File menu in File Manager.
- If you have trouble running a shared copy of Windows, make sure your personal Windows directory and the shared Windows directory are both specified in your path. Your personal Windows directory must be specified first.
- Make sure you are using the same letter to designate the network drive every time you connect to that drive. For example, if you use the drive letter W when you connect to the network drive to set up a shared copy of Windows, Windows records W as the path it should use in the future to look for the shared Windows files. If the next time you connect to the same network drive you use a letter other than W, you will not be able to start Windows correctly.

  If you do need to specify a different drive letter when you connect to a network drive in order to use a shared application, be sure to change the path that Windows uses to find the application.

You have trouble with network software when running Windows.

- If you cannot run Windows or other applications while your network software is loaded into the high memory area (HMA), the first 64K of extended memory, try disabling the network software's HMA options. For more information, see the documentation provided with the network software.
- If you cannot run Windows while your network software is loaded into the upper memory area between 640K and 1 MB, try loading the network software into conventional memory. Some network software does not work when loaded into the upper memory area.

- If your system locks up when you receive a network pop-up message, you might need to either disable such messages or run a Windows-based application that properly displays them. For example, WinPopup, supplied with Windows, is such an application.

Using Two Versions of Windows

The following list describes solutions for problems you might encounter when you have two versions of Windows installed on your computer:

- Make sure the PATH setting in your AUTOEXEC.BAT file specifies the directory that contains the version of Windows that you are currently using. Remove the directory of the older version from the PATH setting before you install the newer version. You can check the dates of files by using the All File Details command on the View menu in File Manager.
- When you want to run an application, print a file, install a printer, or install a driver, make sure the current directory is the directory that contains the version of Windows that you are currently using. Windows searches the current directory for the application's files before searching other directories specified by the PATH setting.
- Always use the device drivers for the version of Windows that you are currently using.
- If you want to use applications that are set up in the same directory as the earlier version of Windows (not a subdirectory of it), you probably need to set up those applications in the directory where the later version of Windows is located. In some cases, you can simply copy the files to the new directory; in other cases, you must set up the application again.
- If you set up an application in Windows version 3.0, and you want to run the application in Windows version 3.1, you need to set up the application again from version 3.1.

Additional Troubleshooting Techniques

If you still have difficulties with Windows, you should read the following guidelines for additional troubleshooting techniques.

Read the Windows text files.

During Windows Setup, several online documents are copied to your hard disk and are placed in the directory where you set up your Windows files. The filenames end with the .TXT and .WRI extensions. The files contain information that was received too late to be printed in this book. They also contain information about the initialization files SYSTEM.INI and WIN.INI.

▶ To open and read the README.WRI document

- In the Main group, choose the Read Me icon.

Write starts and opens the README.WRI document, which contains information about locating and opening other Windows online documents. For information about using Write, press the F1 key, or choose Contents from the Help menu in Write.

If you chose not to install the initialization files when you set up Windows, you can run the Setup program again to install them now. For more information about using Setup, see Chapter 1, "Setting Up Windows."

Know your system.

When troubleshooting your computer system, it is helpful to note anything unique about your system—for example:

- The contents of your CONFIG.SYS and AUTOEXEC.BAT files. (For more information about the role these files play in troubleshooting, see the following section, "Streamline the CONFIG.SYS and AUTOEXEC.BAT Files.")
- The drive and directory where Windows is installed.
- The type (brand and processor) of computer you are using (for example, COMPAQ 386).
- The version and type of BIOS (basic input/output system) in your computer.
- The amount of RAM (random access memory) your computer has.
- The size of your hard disk.
- The type of display adapter you are using (for example, EGA or VGA).
- The type of mouse you are using (brand, model, and whether it is a serial or bus type).
- The type and layout of the keyboard you have (for example, enhanced).
- If you are running Windows on a network; and if so, the name and version number of the network software you are using.
- The printer and printer port you are using.
- The amount of memory your printer has.
- The names and version numbers of applications you are running with Windows.

It may also be helpful if you know the type of hard-disk controller in your computer.

Microsoft Diagnostics

If you are uncertain about your computer configuration, you can use the Microsoft Diagnostics (MSD) program to find out. This program, provided with Windows, provides information about your system memory and the device drivers installed on your system. During the setup process, this file is placed in your Windows directory.

▶ **To start Microsoft Diagnostics**

- Type the following at the command prompt, and then press ENTER:

  msd

  Then follow the instructions on the screen.

Note If Windows was not successfully set up on your hard disk, you can run MSD from the Windows Setup disks.

Streamline the CONFIG.SYS and AUTOEXEC.BAT files.

If you want to troubleshoot a problem yourself, it's best to start with a "minimum" Windows configuration. This means that as a test, you should try removing unused applications, memory-resident programs (TSRs), and unnecessary device drivers from your CONFIG.SYS and AUTOEXEC.BAT files. You can use a text editor, such as Notepad (in the Accessories group), to open and edit these files. When just a few applications are running with Windows, it's easier to isolate your problem.

Before you make any changes, create a system disk that includes a backup copy of both the CONFIG.SYS file and the AUTOEXEC.BAT file. You can restore these files when you are finished with the troubleshooting tests. You also can use this disk to start your system, if necessary.

You can make a system disk by starting File Manager (in the Main group), and then choosing Make System Disk from the Disk menu. Then copy your current CONFIG.SYS and AUTOEXEC.BAT files to the disk. These files are usually located in the root directory of your first hard disk drive, which is usually drive C. If you start your system by using a floppy disk, these files are located in the root directory of that disk.

When removing command lines from your CONFIG.SYS and AUTOEXEC.BAT files, make one change at a time. After making one change, test it. This will help you isolate the problem. As a general rule, if you don't know what a particular command line does in the CONFIG.SYS or AUTOEXEC.BAT file, do not remove it. If you are using disk-partitioning software, such as DMDRVR.BIN, do not remove the command lines that specify it.

The following are examples of CONFIG.SYS and AUTOEXEC.BAT files at a minimum configuration.

A streamlined CONFIG.SYS file:

```
files=30
buffers=20
device=c:\windows\himem.sys
```

The **files** command sets the number of files MS-DOS can access at one time. The **buffers** command allocates memory for buffers when your system starts. The **device** command in this example sets up the HIMEM.SYS device driver.

A streamlined AUTOEXEC.BAT file:

```
prompt $p$g
path c:\;c:\windows;c:\msdos
set temp=c:\windows\temp
```

The **prompt** command determines the appearance of the command prompt. The **path** command specifies the search path for MS-DOS and Windows. (Some versions of MS-DOS might name this directory something other than \MSDOS.) The **set temp** command specifies the directory where temporary files are stored. You may need to create the specified directory if it does not exist. The directory for temporary swap files should be a location that has at least 2 MB of available disk space. For more information about temporary swap files, see Chapter 14, "Managing Memory and Performance."

Microsoft Support Services

If you have a question about Microsoft Windows, first look in the printed documentation, or consult Help. If you cannot find the answer, contact the Microsoft Support Network. You can also find late-breaking updates and technical information by double-clicking the Readme icon in the Main group.

Outside the United States, contact Microsoft Product Support Services at the Microsoft subsidiary office that serves your area. For information about Microsoft subsidiary offices, see "Product Support Worldwide" later in this section.

The Microsoft Support Network

The Microsoft Support Network offers you a wide range of choices and access to high-quality, responsive technical support. Microsoft recognizes that support needs vary from user to user; the Microsoft Support Network enables you to choose the type of support that best meets your needs, with options ranging from electronic bulletin boards to annual support programs.

Services vary outside the United States and Canada. In other locations, contact a local Microsoft subsidiary for information. The Microsoft Support Network is subject to Microsoft's prices, terms, and conditions at the time, and is subject to change without notice.

Product Support Within the United States and Canada

In the United States and Canada, the following support services are available through the Microsoft Support Network.

Electronic Services

These services are available 24 hours a day, 7 days a week, including holidays.

- Microsoft FastTips: (800) 936-4200 on a touch-tone telephone. Receive automated answers to common questions, and access a library of technical notes, all delivered by recording or fax. You can use the following keys on your touch-tone telephone after you reach FastTips.

To	Press
Advance to the next message	*
Repeat the current message	7
Return to the beginning of FastTips	#

- CompuServe: Interact with other users and Microsoft support engineers, or access the Microsoft Knowledge Base to get product information. At any ! prompt, type **go microsoft** to access Microsoft forums, or type **go mskb** to access the Microsoft Knowledge Base. For an introductory CompuServe membership kit, call (800) 848-8199, operator 230.
- Microsoft Download Service: (206) 936-6735 via modem. Access the Driver Library and the most current technical notes (1200, 2400, or 9600 baud; no parity; 8 data bits; 1 stop bit).
- Internet: Access the Driver Library and the Microsoft Knowledge Base. The Microsoft Internet FTParchive host, ftp.microsoft.com, supports anonymous login. When logging in anonymously, you should type your complete electronic mail name as your password.

Standard Support

No-charge support from Microsoft support engineers is available via a toll call between 6:00 A.M. and 6:00 P.M. Pacific time, Monday through Friday, excluding holidays. This support is available for 90 days after your first call to a support engineer.

- For technical support for Microsoft Windows, call (206) 637-7098.

  When you call, you should be at your computer and have the appropriate product documentation at hand. Be prepared to give the following information:
- The version number of Windows that you are using.
- The type of hardware that you are using.
- The exact wording of any messages that appeared on your screen.
- A description of what happened and what you were doing when the problem occurred.
- A description of how you tried to solve the problem.

Priority Support

The Microsoft Support Network offers priority telephone access to Microsoft support engineers 24 hours a day, 7 days a week, except holidays.

- (900) 555-2000; $2 per minute, $25 maximum. Charges appear on your telephone bill.
- (800) 936-5700; $25 per incident, billed to your VISA card, MasterCard, or American Express card.

Text Telephone

Microsoft text telephone (TT/TDD) services are available for the deaf or hard-of-hearing. Using a TT/TDD modem, dial (206) 635-4948 between 6:00 A.M. and 6:00 P.M. Pacific time, Monday through Friday, excluding holidays.

Other Support Options

The Microsoft Support Network offers annual support plans. For information, contact the Microsoft Support Network Sales Group at (800) 936-3500 between 6:00 A.M. and 6:00 P.M. Pacific time, Monday through Friday, excluding holidays.

Product Training and Consultation

Microsoft Solution Providers are independent organizations that provide consulting, integration, customization, development, technical support and training, and other services for Microsoft products. These companies are called Solution Providers because they apply technology and provide services to help solve real-world problems.

For more information about the Microsoft Solution Providers program or the Microsoft Solution Provider nearest to you, call (800) 426-9400 between 6:30 A.M. and 5:30 P.M. Pacific time, Monday through Friday, excluding holidays.

Product Support Worldwide

If you are outside the United States and have a question about Microsoft Windows, first:

- Consult the documentation and other printed information included with Windows.
- Check online Help.
- Check the README files that come with your Windows disks. These files provide general information that became available after the books in the Windows package were published.
- Consult electronic options such as CompuServe forums or bulletin boards, if available.

If you cannot find a solution, you can receive information on how to obtain product support by contacting the Microsoft subsidiary office that serves your country.

The Microsoft Support Network, where available, offers you a wide range of choices and access to high quality, responsive technical support. Microsoft recognizes that support needs vary from user to user; the Microsoft Support Network allows you to choose the type of support that best meets your needs, with options ranging from electronic bulletin boards to annual support programs.

The Microsoft Support Network is subject to Microsoft's prices, terms, and conditions in place in each country at the time the services are used, and is subject to change without notice.

Calling a Microsoft Subsidiary Office

When you call, you should be at your computer and have the appropriate product documentation at hand. Be prepared to give the following information:

- The version number of Windows that you are using.
- The type of hardware that you are using, including network hardware, if applicable.
- The operating system that you are using.
- The exact wording of any messages that appeared on your screen.
- A description of what happened and what you were doing when the problem occurred.
- A description of how you tried to solve the problem.

Microsoft subsidiary offices and the countries they serve are listed as follows.

If there is no Microsoft office in your country, please contact the establishment from which you obtained your Microsoft product.

Area	Telephone numbers
Argentina	Microsoft de Argentina S.A. Phone: (54) (1) 814-5105 (54) (1) 814-4807 (54) (1) 814-4808 (54) (1) 814-7199 Fax: (54) (1) 814-0372
Australia	Microsoft Pty. Ltd. Install and Setup: (61) (02) 870-2870 Fax: (61) (02) 805-1108 Bulletin Board Service: (61) (02) 870-2348 Technical Support: (61) (02) 870-2131 Sales Information Centre: (61) (02) 870-2100
Austria	Microsoft Ges.m.b.H. Phone: 0222 - 68 76 07 Fax: 0222 - 68 16 2710 Information: 0660 - 6520 Prices, updates, etc.: 0660 - 6520 CompuServe: GO MSEURO (Microsoft Central Europe) Technical Support: Windows, Windows for Workgroups: 0660 - 6510
Belgium	Microsoft NV Phone: 02-7303911 Customer Service: 02-7303922 CompuServe: 02-2150530 (GO MSBEN) Bulletin Board Service: 02-7350045 (1200/2400/9600 baud, 8 bits, no parity, 1 stop bit, ANSI terminal emulation) (Dutch speaking) Technical Support: 02-5133274 (English speaking) Technical Support: 02-5023432 (French speaking) Technical Support: 02-5132268
Bolivia	See Argentina
Brazil	Microsoft Informatica Ltda. Phone: (55) (11) 530-4455 Fax: (55) (11) 240-2205 Technical Support Phone: (55) (11) 533-2922 Technical Support Fax: (55) (11) 241-1157 Bulletin Board Service: (55) (11) 65-8564

Area	Telephone numbers
Canada	Microsoft Canada Inc. Phone: 1 (905) 568-0434 Technical Support Phone: 1 (905) 568-3503 Bulletin Board Service: 1 (905) 507-3022 Text Telephone (TT/TDD) 1 (905) 568-9641
Chile	Microsoft Chile S.A. Phone: 56 2 218 5771 56 2 218 5711 56 2 218 7524 Fax: 56 2 218 5747
Colombia	Microsoft Colombia Phone: (571) 618 2245 Technical Support: (571) 618 2255 Fax:(571) 618 2269
Denmark	Microsoft Denmark AS Phone: (45) (44) 89 01 00 Fax: (45) (44) 68 55 10
Dubai	Microsoft Middle East Phone: (971) 4 513 888 Fax: (971) 4 527 444
England	Microsoft Limited Phone: (44) (734) 270000 Fax: (44) (734) 270002 Upgrades: (44) (81) 614 8000 Technical Support: Main Line (All products): (44) (734) 271000 Database Direct Support Line: (44) (734) 271126 Bulletin Board Service: (44) (734) 270065 (2400 baud) Fax Information Service: (44) (734) 270080
Finland	Microsoft OY Phone: (358) (0) 525 501 Fax: (358) (0) 522 955
France	Microsoft France Phone: (33) (1) 69-86-46-46 Telex: MSPARIS 604322F Fax: (33) (1) 64-46-06-60 Technical Support Phone: (33) (1) 69-86-10-20 Technical Support Fax: (33) (1) 69-28-00-28
French Polynesia	See France

Area	Telephone numbers
Germany	Microsoft GmbH Phone: 089 - 3176-0 Telex: (17) 89 83 28 MS GMBH D Fax: 089 - 3176-1000 Information: 089 - 3176 1199 Prices, updates, etc.: 089 - 3176 1199 Bulletin board, device drivers, tech notes : Btx: microsoft# or *610808000# CompuServe: GO MSEURO (Microsoft Central Europe) Technical Support: Windows, Windows for Workgroups: 089 - 3176 - 1110
Greece	Microsoft Hellas, S.A. Phone: (30) (1) 6893 635 Fax: (30) (1) 6893 636
Hong Kong	Microsoft Hong Kong Limited Technical Support: (852) 804-4222 Fax: (852) 560-2217
Ireland	See England
Israel	Microsoft Israel Ltd. Phone: 972-3-575-7034 Fax: 972-3-575-7065
Italy	Microsoft SpA Phone: (39) (2) 269121 Telex: 340321 I Fax: (39) (2) 21072020 Customer Service (Prices, new product information, product literature): (39) (2) 26901359 Bulletin Board: (39) (2) 21072051 Technical Support: Windows, Windows for Workgroups: (39) (2) 26901363
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Korea	Microsoft CH Phone: (82) (2) 552-9505 Fax: (82) (2) 555-1724 Technical Support: (82) (2) 563-5194 Bulletin Board Service: (82) (2) 538-3256
Liechtenstein	See Switzerland (German speaking)
Luxembourg	Microsoft NV Phone: (32) 2-7303911 Customer Service: (32) 2-7303922 CompuServe: (32) 2-2150530 (GO MSBEN) Bulletin Board Service: (32) 2-7350045 (1200/2400/9600 baud, 8 bits, No parity, 1 stop bit, ANSI terminal emulation) (Dutch speaking) Technical Support: (32) 2-5133274 (English speaking) Technical Support: (32) 2-5023432 (French speaking) Technical Support: (32) 2-5132268
México	Microsoft México, S.A. de C.V. Phone: (52) (5) 325-0910 Fax: (52) (5) 280-7940 Technical Support: (52) (5) 325-0912 Customer Service: (52) (5) 325-0911 Bulletin Board Service: (52) (5) 590-5988 (1200/2400 baud, 8 bits, No parity, 1 stop bit, ANSI terminal emulation)
Netherlands	Microsoft BV Phone: 02503-89189 Customer Service: 02503-77700 CompuServe: 020-6880085 (GO MSBEN) Bulletin Board Service: 02503-34221 (1200/2400/9600 baud, 8 bits, No parity, 1 stop bit, ANSI terminal emulation) (Dutch speaking) Technical Support: 02503-77877 (English speaking) Technical Support: 02503-77853
New Zealand	Technology Link Centre Phone: 64 (9) 358-3724 Fax: 64 (9) 358-3726 Technical Support: Applications: 64 (9) 357-5575
Northern Ireland	See England
Norway	Microsoft Norway AS Phone: (47) (22) 18 35 00 Fax: (47) (22) 95 06 64 Technical Support: (47) (22) 02 25 50
Papua New Guinea	See Australia

Area	Telephone numbers
Paraguay	See Argentina
Portugal	Microsoft, Lda. Phone: (351) 1 4412205 Fax: (351) 1 4412101
Republic of China	Microsoft Taiwan Corp. Phone: (886) (2) 504-3122 Fax: (886) (2) 504-3121 Technical Support : (886) (2) 508-9501
Republic of Ireland	See England
Scotland	See England
South Africa	Phone: (27) 11 444 0520 Fax: (27) 11 444 0536
Spain	Microsoft Iberica SRL Phone: (34) (1) 804-0000 Fax: (34) (1) 803-8310 Technical Support: (34) (1) 803-9960
Sweden	Microsoft AB Phone: (46) (8) 752 56 00 Fax: (46) (8) 750 51 58 Technical Support: Applications: (46) (8) 752 68 50 Development and Network products: (46) (8) 752 60 50 Bulletin Board Service: (46) (8) 750 47 42 Fax Information Service: (46) (8) 752 29 00
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Uruguay	See Argentina
Venezuela	Corporation MS 90 de Venezuela S.A. Technical Support: 58.2.910046, 58.2.910510 Other information: 58.2.910008, 58.2.914739, 58.2.913342 Fax: 58.2.923835
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