Multimedia Essentials for Windows

Welcome to the world of Windows multimedia! Macromedia is pleased to provide you with tips, techniques, and direction for using a Windows–based environment to author and deliver successful multimedia productions. This guide is based upon inquiries from our end users, resellers, and developers and includes answers to questions frequently asked of our technical support group. We hope that it will help you navigate through many of the important choices you will face in cross-platform multimedia development.

If you have previously used the Macintosh as an authoring platform, you will find this a useful guide to understanding the differences between Macintosh and Windows–based computers in order to take advantage of cross–platform authoring and delivery opportunities. Useful topics include working with different file formats and converting applications from Macintosh to Windows.

If you are new to developing interactive multimedia productions on Windows—even if you are already familiar with the Windows environment—you will find this a beneficial overview of multimedia authoring on the Windows platform. This document offers guidelines for configuring your Windows environment for multimedia, tips for optimizing performance, and suggestions for effectively testing and distributing your productions. A multimedia glossary provides definitions for some of the most commonly used Windows, DOS, and multimedia terms and acronyms to help you become familiar with the talk of the trade.

Even veteran Windows multimedia developers interested in becoming acquainted with Macromedia products and cross-platform delivery issues will find this guide informative. It will provide you with insights on how Macromedia tools can empower your multimedia development efforts.

We hope that this guide will enable you to take advantage of the exciting opportunities of Windows–based multimedia. Macromedia is committed to providing you with the tools, training, and resources necessary to make your multimedia projects successful.

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Introduction

Welcome to *Multimedia Essentials for Windows*. You'll find the information in this book helpful if you are:

- A new Windows user just getting started with multimedia

- An existing Windows user upgrading your hardware and software for multimedia authoring

- A Macintosh user who wants to create and distribute multimedia presentations on both Macintosh and Windows PCs.

Everyone using Windows for multimedia, including experienced Windows users, will benefit from the information in this book. Even if some of the information presented is already familiar to you, don't overlook the useful tips and techniques sprinkled throughout the book.

This book offers guidelines for:

- Configuring Windows for multimedia authoring and playback

- Improving Windows multimedia performance

- Authoring, testing, and distributing your productions.

We've also included information on:

- Troubleshooting your hardware or software problems

- Getting help.

Windows basics

This section offers a brief refresher course in the basics of using Windows. If you are already comfortable working with Windows, skip this section.

Starting Windows

To start Windows, type WIN at the DOS prompt and press Enter:

```
C:\> WIN
```

If you get an error after typing this command, you probably need to add the \WINDOWS directory to the PATH statement in your AUTOEXEC.BAT file.

Tip   *To automatically start Windows when you start your computer, add the WIN command as the last line in your AUTOEXEC.BAT file. See "Editing files" for instructions on how to edit your AUTOEXEC.BAT file.*

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Program Manager and File Manager

When Windows first starts, it displays Program Manager and File Manager, depending on how you've set up Windows. When you start Windows after it has just been installed, it always displays Program Manager.

Program Manager
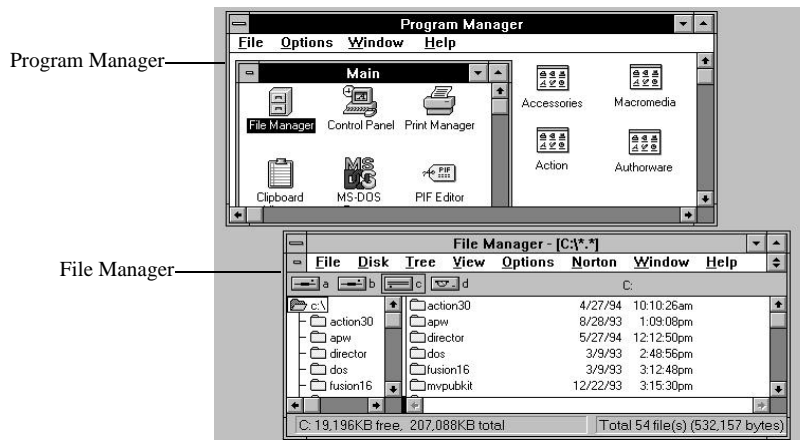
File Manager

Program Manager displays programs using icons. You use Program Manager to organize your programs for easy access.

File Manager displays the contents of your hard disk, including programs and files, using filenames instead of icons. You use File Manager to manage files (copy, delete, or rename them) and to get access to any file on your hard disk. File Manager also displays the contents of any storage devices such as floppy disks, CD-ROMs, and network drives.

Tip   *If you want Program Manager to remember the way it's currently set up, check the Save Settings on Exit option in the Program Manager's Options menu. Alternatively, hold down the Shift key while choosing Exit from the Program Manager's File menu.*

Starting a program

To start a program from Program Manager or File Manager, double-click its icon or filename. In File Manager, a program's filename usually ends in .EXE or .COM.

Exiting a program

To quit a Windows program, do one of the following:

- Double-click the window's Control Menu button

- Press Alt-F4

- Choose the Exit command from the program's File menu, or pressing Alt, F, X.

Exiting Program Manager automatically exits Windows. Use any of the above methods in the Program Manager to exit Windows.

Changing a window's size or location

When you first start a program, Windows chooses a default size and location for the program's window.

If you want the program's window to be as large as possible, you can maximize it by:

- Clicking the window's maximize button

- Pressing Alt, Spacebar, X

- Double-clicking the window's title bar

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To shrink the program's window as much as possible, click the window's minimize button, or press Alt, Spacebar, N. Minimizing a window gets it out of the way, but leaves it available on your desktop.

Tip   *Double-clicking a window's title bar toggles the window's size between full screen and normal size.*

To move a window, drag its title bar. To change a window's size, drag its borders or corners.

To move a minimized window, drag its icon. To restore a minimized window to its former size and location, double-click it.

DOS commands every Windows user should know

Even if you rarely venture outside of Windows, you may occasionally find yourself staring at the DOS prompt, wondering what to do next. The DOS prompt, commonly displayed as C:\>, tells you which drive you are currently using. Here's a list of the most popular DOS commands you should know.

Tip   *From DOS 6.x, you can get command help by typing HELP at the DOS prompt and pressing Enter.*

DOS Command	What It Does	Examples and Useful Variations
CD	Takes you up or down one or more sublevels in the directory structure	`CD..` takes you to the parent directory of the current subdirectory. `CD \WINDOWS` takes you to the WINDOWS directory.
CHKDSK	Reports on the number and sizes of files on your hard disk. Use this command outside of Windows.	`CHKDSK/f` cleans up any lost files on your hard disk. Lost files can accumulate if a program crashes or if you have to restart suddenly. See also SCANDISK.

COPY	Copies a file from one location to another	`COPY a:\myfile.act c:\`
		copies the file to the root directory of drive C.
		`COPY a:\oldfile.act c:\action30\newfile.act`
		copies oldfile.act into the Act30 directory on drive C and renames it to newfile.act.

DELETE	Removes a file	`DELETE c:\myfile.act`

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DOS Command	What It Does	Examples and Useful Variations
`DIR`	Displays the contents of the current subdirectory	`DIR/p` displays one screenful, then pauses. `DIR/w` shows an abbreviated listing, with several entries on each line. `DIR *.VDR` displays only those files that end in .VDR.
`FORMAT`	Formats a disk	`FORMAT b:`
`MKDIR` (MD)	Creates a new subdirectory	`MD mydir`
`RMDIR` (RD)	Deletes a subdirectory	`RD c:\mydir` removes the subdirectory mydir. Note that the subdirectory must be empty or DOS won't let you delete it.
`RENAME`	Renames a file	`RENAME old.doc new.doc`
`SCANDISK`	In DOS 6.x or later, cleans up lost files on your hard disk. Use this command outside of Windows.	Type `SCANDISK`.
`TYPE`	Displays the contents of a file	`TYPE autoexec.bat` displays one screenful; press any key to continue.

Minding your file names

DOS file and directory names must be eight characters or less followed by an optional three-character extension, separated by a period (often referred to as "eight-dot-three" format). Punctuation characters, including periods, colons, and spaces, are not allowed in file names.

Tip   *Use a three-character extension that's relevant to the file type or to the application that you used to create the file—for example, .AVI for a Video for Windows file, or .MOV for a QuickTime file. This will help keep your files organized.*

Assign your Macintosh files names that conform to the DOS 8.3 format. That way, the filenames will be consistent and usable on both the Macintosh and the PC.

Using wildcards

There are two wildcards that are useful for making DOS and Windows operations apply to any filename with any extension. The "*" wildcard substitutes any characters and the "?" wildcard substitutes for a single character.

This Command:	Copies:	Examples
COPY C:*.DIR A:	all files with the extension .DIR	draft.DIR, final.DIR
COPY C:*nd.* A:	all files whose names end with "nd"	second.WKS, trend.TXT
COPY C:\r*.BMP A:	all files ending with the .BMP extension whose names begin with r	review.BMP, redo.BMP
COPY C:\t??d.* A:	all files whose names begin with t, followed by any two characters, and end with d	toad.BMP, tied.DOC

Configuring Windows for multimedia

This section includes information on setting up your PC to create and run multimedia productions. It also includes helpful troubleshooting tips.

Determining what you already have

If you don't already know what's installed on your PC, you can run the Windows Setup program (in the Program Manager's main group) to see information about your current display, keyboard, mouse, and network configuration.

Windows Setup	
Options Help	
Display:	VGA
Keyboard:	Enhanced 101 or 102 key US and Non US
Mouse:	Microsoft, or IBM PS/2
Network:	No Network Installed
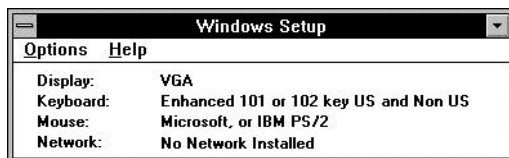
To see a list of currently installed Windows device drivers, open the Drivers control panel.

Control Panel
Settings Help

Drivers

Installed Drivers

Intel Indeo(TM) Video Driver
Media Vision Pro Audio/CDPC Mixer
Media Vision Pro Audio/CDPC Wave/MIDI/Au
Microsoft ACM IMA ADPCM Audio CODEC
Microsoft ADPCM Audio CODEC
Microsoft RLE Compressor
Microsoft Sound Mapper
Microsoft Video 1 Compressor
MIDI Mapper
SuperMatch Cinepak Codec
Timer

Cancel
Add...
Remove
Setup...
Help
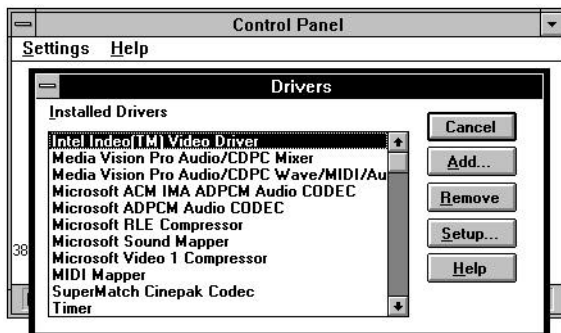
From DOS, you can run the MSD (Microsoft Diagnostics) utility by typing MSD at the DOS prompt and pressing Enter. The MSD utility displays information about your hardware and software, such as memory usage, video adapter type, and other system information.

Preparing for multimedia authoring

The Multimedia PC Marketing Council (MPC) publishes minimum system requirements for multimedia PCs. Here are some general guidelines for setting up a multimedia authoring system.

For hardware, you should have:

- 486 or better PC (recommended); 386 (minimum)

- 300 MB or more hard drive (recommended); 100 MB (minimum)

- VGA monitor capable of displaying 256 colors

- Local bus Windows video accelerator card

- 16-bit sound card with support for CD audio playback, and external speakers (recommended); 8-bit sound card (minimum)

- Double-speed CD-ROM drive, Photo CD multi-session capable

- 8 megabytes of physical RAM.

For software, you should have:

- MS-DOS 6.0 or greater (recommended); MS-DOS 5.0 (minimum)

- Windows 3.1 or later

- Appropriate drivers to control your sound card and CD-ROM drive, or any other special devices you want to use.

If you already own a PC, consider upgrading it by buying a multimedia upgrade kit, which generally comes with a sound card, CD-ROM drive, speakers, and the necessary driver software.

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Getting to know AUTOEXEC.BAT and CONFIG.SYS

DOS automatically sets up your AUTOEXEC.BAT and CONFIG.SYS files in the root directory of your startup drive, which is usually C:\. You should be aware of what they contain, just in case something goes wrong and you have to edit them.

AUTOEXEC.BAT contains a list of DOS commands that your computer executes every time you turn it on or restart.

DOS uses CONFIG.SYS to load device drivers. This file contains settings and device drivers, entered as lines of text, that are customized for your computer. Device drivers are special programs that get loaded into memory whenever you start your computer. They tell DOS and Windows how to use your computer's hardware such as your mouse, screen, and keyboard.

Windows won't run unless your CONFIG.SYS file loads the HIMEM.SYS device driver. HIMEM.SYS allows Windows to use extended memory.

Device drivers are similar to Macintosh extensions.

Follow the instructions that come with your new hardware for installation information. When you install the software that comes with your new hardware, the installation program generally makes the necessary changes to CONFIG.SYS automatically for you. Otherwise, you'll need to update CONFIG.SYS yourself.

Tip   *Before you install new hardware or software, make backup copies of AUTOEXEC.BAT and CONFIG.SYS. That way, if something goes wrong later, you can always copy the files back to your hard disk. You should also make backup copies of these files before you edit them. Properly designed installation programs automatically back up these files, as well as Windows' WIN.INI and SYSTEM.INI before modifying them.*

Looking at a sample AUTOEXEC.BAT file

```
REM Sample AUTOEXEC.BAT file
@ECHO OFF
PROMPT $P$G
PATH C:\;C:\DOS;C:\WINDOWS
C:\DOS\SMARTDRV.EXE
SET TEMP=C:\WINDOWS\TEMP
```

- `REM`

  Used to enter a comment. DOS ignores any lines that begin with REM

- `@ECHO OFF`

  Tells DOS not to display the contents of the AUTOEXEC.BAT file

- `PROMPT $P$G`

  Sets the DOS prompt to show your current directory, e.g., C:\>

- `PATH C:\;C:\DOS;C:\WINDOWS`

  Tells DOS where to look for program files

- `C:\DOS\SMARTDRV.EXE`

  Loads Microsoft's SMARTDrive disk caching program, which increases hard disk performance by storing frequently used information in memory

- `SET TEMP=C:\WINDOWS\TEMP`

  Sets the location where DOS and Windows can store temporary files. You should create the \WINDOWS\TEMP directory if it does not already exist

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Looking at a sample CONFIG.SYS file

```
REM Sample CONFIG.SYS file
DEVICE=C:\DOS\HIMEM.SYS
DEVICE=C:\DOS\EMM386.EXE NOEMS X=A000-C7FF
BUFFERS=15
FILES=30
LASTDRIVE=K
SHELL=C:\DOS\COMMAND.COM C:\DOS\ /E:512 /P
DOS=HIGH,UMB
STACKS=9,256
```

- REM

  Used to enter a comment. DOS ignores any lines that begin with
  REM

- DEVICE=C:\DOS\HIMEM.SYS

  Loads the extended memory manager device driver; required by
  Windows

- DEVICE=C:\DOS\EMM386.EXE NOEMS X=A000-C7FF

  Loads the upper memory manager device driver; required to load
  TSRs (Terminate and Stay Resident) and device drivers high

- BUFFERS=15

  Sets aside memory that DOS uses when accessing your hard
  disk; this is the recommended setting for use with SMARTDrive

- FILES=30

  Specifies the number of files that can be open at one time

- LASTDRIVE=K

  Sets the highest drive letter DOS can use

- SHELL=C:\DOS\COMMAND.COM C:\DOS\ /E:512 /P

  Specifies COMMAND.COM as the command interpreter, or
  shell

- `DOS=HIGH,UMB`

  Loads DOS into the High Memory Area (HMA) and enables upper memory for loading TSRs high

- `STACKS=9,256`

  Specifies the number and size of hardware interrupt stacks DOS uses.

Troubleshooting

If something goes wrong after you install new hardware and software, check the instructions that came with the device to see if they tell you how AUTOEXEC.BAT or CONFIG.SYS was changed. If you know which lines were added to these files during installation, you can have DOS ignore these new lines if you insert the phrase `REM` (for REMark) at the beginning of each line that you want DOS to ignore.

Tip   *Adding comment lines beginning with REM when you edit these files helps you remember the changes you made.*

Tip   *Using DOS 6 or later, you can bypass AUTOEXEC.BAT or CONFIG.SYS by holding down the F5 or Shift key while restarting your computer. To bypass individual lines in each file, instead hold down the F8 key while restarting.*

Getting to know .INI files

When you first install Windows, it creates some .INI (initialization) files in your \WINDOWS directory. These .INI files tell Windows about its configuration, so that Windows knows how to run on your PC.

Many Windows programs also create their own .INI files. See the documentation that came with the program for information about its .INI file.

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.INI files are similar to the preferences files that some programs add to the Preferences folder inside your System folder.

Windows automatically updates its .INI files, so most of the time you don't have to worry about them. However, there are two .INI files you should know about.

The .INI files you should know about are:

- WIN.INI

  Specifies settings for Windows and Windows applications. Some applications automatically add their own information to WIN.INI.

- SYSTEM.INI

  Contains sound, graphics card, and other hardware information, so that the proper drivers are loaded when you run Windows.

The Windows Control Panel allows you to easily change some Windows preferences and device drivers that are stored in .INI files.

Editing an .INI file

You typically don't have to edit an .INI file unless something goes wrong. Make sure you make a backup copy of the .INI file before you edit it. That way, if something later goes wrong, you can always copy the original file back to your hard disk. You can use Notepad or Sysedit to edit an .INI file. See "Editing files" in the next section.

Windows ignores all lines in an .INI file that begin with a semicolon (;). Adding comment lines when you edit an .INI file helps you remember the changes you made.

Tip   *Make only one change at a time to an .INI file. That way, you can keep track of your changes in case something goes wrong after you edit the file.*

If you change WIN.INI or SYSTEM.INI, you must restart Windows to have your changes take effect. Similarly, if you change a program's .INI file, restart the program to have your changes take effect.

Editing files

You can use any text editor, such as Notepad, to edit CONFIG.SYS, AUTOEXEC.BAT, or an .INI file. Windows comes with a special program called Sysedit, which makes editing CONFIG.SYS, AUTOEXEC.BAT, WIN.INI, and SYSTEM.INI as easy as possible. To use Sysedit, choose Run from the Program Manager's File Menu, type SYSEDIT, and press Enter. Sysedit automatically opens CONFIG.SYS, AUTOEXEC.BAT, SYSTEM.INI, and WIN.INI.

Tip   *To add Sysedit to the Program Manager's main group, open the File Manager and drag the SYSEDIT.EXE icon from the File Manager into the Program Manager's main group. To save your changes when you exit Windows, make sure that Save Settings on Exit option is checked in the Options menu. You'll now be able to run Sysedit by double-clicking its icon in the Program Manager's main group.*

When you change a file and save it, SYSEDIT automatically creates a backup copy of the changed file, ending in .SYD.

Note   *Changes you make to CONFIG.SYS and AUTOEXEC.BAT don't take effect until you restart your computer. Changes you make to WIN.INI and SYSTEM.INI don't take effect until you restart Windows.*

Using DOS EDIT

You can use the DOS editor called EDIT to edit your AUTOEXEC.BAT, CONFIG.SYS, WIN.INI, or SYSTEM.INI file from DOS. You might want to use EDIT if you can't get access to Windows.

To use EDIT, type the command EDIT followed by the name of the file you want to edit, and press Enter. For example, to edit your AUTOEXEC.BAT file, type:
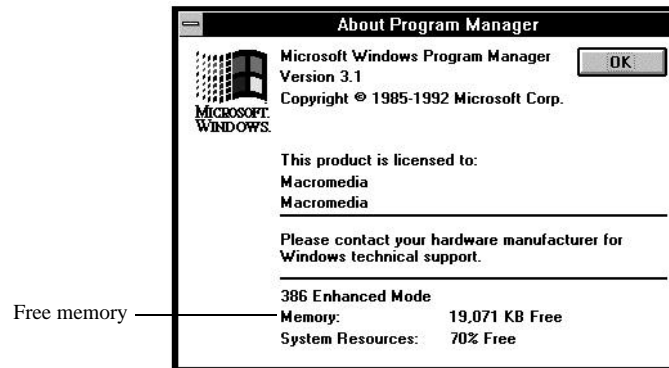
```
C:\> EDIT C:\AUTOEXEC.BAT
```

When you are done using EDIT, press Alt, F, X, Y to save your changes and exit EDIT.
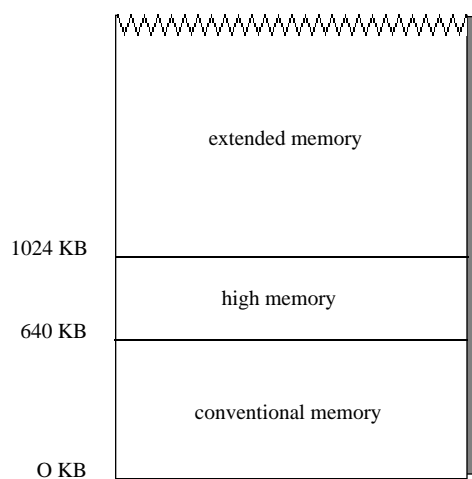
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Managing memory

To check how much memory you have available in Windows, choose About Program Manager from the Program Manager's Help menu.

Free memory

This dialog box displays the amount of free (unused) memory available.

Types of memory

Conventional memory is the portion of memory, between 0 KB and 640 KB, that DOS uses. Upper or high memory, between 640 KB and 1 MB, is typically reserved for your PC's video display, network controller, and other hardware you might add. All memory above 1 MB is referred to as extended memory. Windows primarily uses extended memory.

```
                    ┌──────────────────────────┐
                    │      extended memory      │
                    │                           │
         1024 KB    ├──────────────────────────┤
                    │       high memory         │
          640 KB    ├──────────────────────────┤
                    │                           │
                    │    conventional memory    │
                    │                           │
           O KB     └──────────────────────────┘
```

Windows uses a technique called virtual memory to allow you to run one or more applications that wouldn't otherwise fit into your computer's physical memory. Even if your PC has a large amount of physical memory, you should still enable virtual memory.

Creating a permanent swap file

Virtual memory saves a portion of memory to a swap file on your hard disk. For best performance, you should configure virtual memory to use a permanent swap file instead of a temporary swap file. Windows can access a permanent swap file more quickly than a temporary one.

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Note   *If you are currently using a temporary swap file and want to use a permanent one, you should first defragment your hard disk. With DOS 6.x, you can exit Windows and run the Defrag program. Running Defrag optimizes your hard disk.*
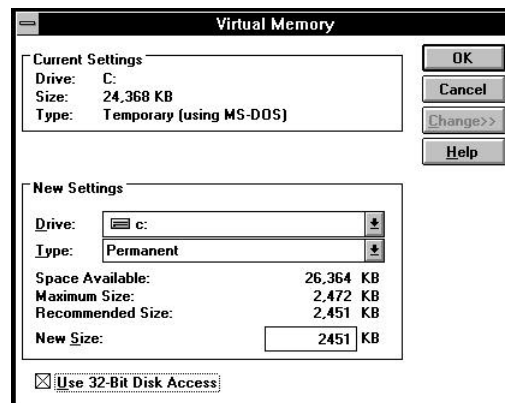

386 Enhanced

To create a swap file or change the size, type, and location of your current swap file, open the 386 Enhanced icon in the Control Panel.
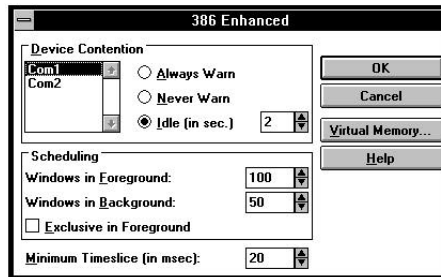
Click the Virtual Memory button to see the current settings for your swap file.
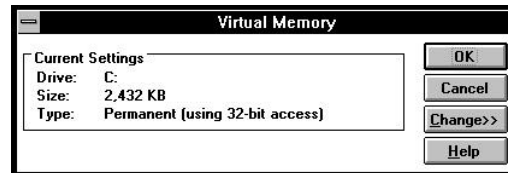
Click Change to change the virtual memory settings.

For a permanent swap file, the Recommended Size setting is a good choice. If available, choose Use 32-Bit Disk Access for faster swap file performance. You must restart Windows for your changes to take effect.

## *Installing or changing a graphic display driver*

Windows 3.1 includes an assortment of drivers for various graphics cards. You should install the display drivers supplied by your graphics card's manufacturer.

To install the display drivers, run the installation program that came with the graphics card. This program copies the card's drivers to your hard disk. If no installation program is provided, you can install the drivers using the steps described below.

To install or change a display driver:

1. **Double-click the Windows Setup program in the Program Manager's main group.**

2. **Choose Change System Settings from the Options menu.**
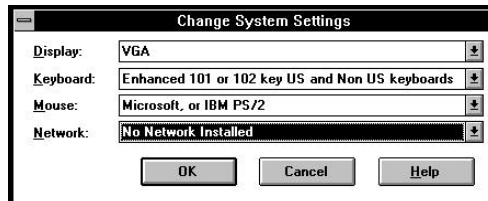
3. **Open the Display drop-down list box.**

   ▫ If the driver for your graphics card is listed, choose it and click OK.

   If the driver you want to install is not listed, refer to the documentation that came with your graphics card.

   If the driver can't be found, Windows asks you to insert a disk or specify the path to locate the file.

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p   If Windows asks you whether you want to use the new or current display driver, click Current.

This installs the new driver as the default display driver.

4. **Restart Windows to have your changes take effect.**

Changing your color depth setting

Your color depth setting (the number of colors it can display), depends on the capabilities of the graphics card installed in your computer. Most PCs come with a graphics card capable of displaying 16 colors (VGA) and 256 colors (SVGA).

To change your color depth setting, use a special utility program, if one is provided by your graphics card's manufacturer, or else use the Windows Setup program. You must restart Windows to have your changes take effect.

Troubleshooting

The following errors may indicate a memory conflict or a problem with your display driver:

- "General Protection Fault..."

- The screen doesn't update, images or icons don't display or appear in the wrong place, or objects don't move as they are supposed to.

Use the Windows Setup program to change your display driver to the generic driver called "VGA." Restart Windows to have your changes take effect. If the errors don't occur after you switch drivers, your display driver may need updating. Contact the graphics card manufacturer to see if there is an updated Windows display driver for your graphics card. Manufacturers frequently update their drivers.

If the errors persist after you change display drivers, you may have a memory conflict. Verify that you've excluded memory addresses A000-C7FF from use by your memory manager. For more information on avoiding memory conflicts, see "Configuring upper memory" later in this book.

Tip   *If you can't get into Windows because of a display driver problem, you can still use Setup from DOS. First, make sure you are in the \WINDOWS directory. Then type SETUP and press Enter.*

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Installing multimedia device drivers

Macromedia programs such as Authorware and Director support any hardware device as long as the device's manufacturer has written a standard Windows 3.1 MCI (media control interface) device driver for use with their device.

Sound cards, CD-ROM drives, and other devices often come with one or more device driver files that tell Windows how to make the device work.

Note   *Before installing a driver, make sure that you have the latest version of the driver file. Check with the device's manufacturer or check an online service such as CompuServe or America Online to see if a newer version exists.*

Tip   *Keep your Windows installation disks handy when you install a driver, since Windows may ask you to insert an installation disk.*

To add a new hardware device to your computer, follow the instructions that came with the device. To install the device drivers, use the supplied installation program.

The Drivers control panel lets you install new multimedia-related drivers, remove old ones, and configure a driver. It also shows a list of currently installed drivers.

Drivers control panel
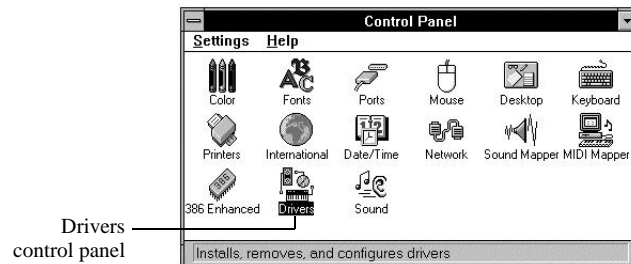
Troubleshooting

If you get a Windows error message saying that a driver can't be found:

•   Make sure the driver is installed in the proper location.

•   Check the PATH statement in your AUTOEXEC.BAT file to make sure that it is correct, so that Windows can find the driver.

Installing a sound driver

Sound cards require you to install different drivers for DOS and Windows. Run the installation program that came with your sound card to install the proper driver software.

Windows requires that the appropriate hardware and MCI drivers are installed. You install these drivers using the Drivers control panel.

To test proper installation of your multimedia-related drivers, try using Media Player, to play:

•   .WAV sounds, which consist of digitally recorded sounds

•   CD audio from an audio compact disc

•   .MID (MIDI) sounds, which consist of electronically synthesized sounds.

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Troubleshooting

If you can't hear any sound:

- Check the volume control on the sound card. Use the Sound mixer application that came with your sound card to check and adjust the volume.

- Make sure that the speakers are correctly connected to the proper jack on the sound card.

- Make sure that you've installed the appropriate Windows and MCI sound drivers, using the Drivers control panel.

- Try playing a sound using Media Player (in the Accessories group). If you can't play a sound in Media Player, then you won't be able to play it in your multimedia application.

If you still can't hear any sound, refer to the manual that came with the sound card.

Installing CD-ROM drivers

To use a CD-ROM drive, you must install the following:

*   CD-ROM DOS drivers

*   CD Audio Windows driver (so you can play audio CDs).

Use the installation program that came with your CD-ROM device to install the proper drivers. The installation program usually adds a file called MSCDEX.EXE (Microsoft CD-ROM Extensions) to your AUTOEXEC.BAT file, and adds a CD-ROM driver to your CONFIG.SYS file. These files tell DOS how to work with your CD-ROM drive.

Use the Drivers control panel to install the Windows MCI CD Audio drivers for your CD-ROM drive.

Installing CD audio

You must install the MCI CD Audio driver before you can play audio CDs in WIndows. Use the Drivers control panel to install the MCI CD audio driver.

To install the CD audio device driver:

1. **Double-click the Drivers icon in the Control Panel window.**
    A dialog box lists the installed drivers.

2. **Click the Add button.**
    A dialog box lists available drivers.

3. **Double-click [MCI] CD Audio to install the driver.**
    Windows displays a dialog box asking you to confirm your choice.

4. **Insert the appropriate Windows disk as requested and click OK.**

5. **Close the Drivers control panel and restart Windows to have your changes take effect.**

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Troubleshooting

During installation, a mixer control application may have been added to a Program Manager group. Double-click the mixer application's icon to open it, and adjust the volume for the CD Audio channel.

If you still can't hear audio CDs:

*   Make sure that you've installed the appropriate DOS and Windows drivers

*   Try playing CD audio using Media Player (in the Accessories group)

*   Make sure that the CD-ROM drive and speakers are correctly connected and that the internal audio cable on the CD-ROM drive is connected to your sound card.

If you still can't hear CD audio, refer to the manual or contact the manufacturer to see if there is an updated Windows device driver for your CD-ROM drive.

Installing digital video drivers

To play digital video, you must first install the appropriate software for playing back digital video movies. Common digital video formats are:

*   Video for Windows (.AVI)

*   QuickTime for Windows (.MOV)

*   MPEG (.MPG).

To play digital video movies in .MPG format, you must also install a special MPEG playback card.

Video for Windows

Video for Windows is Microsoft's digital video format for playing movies. Video for Windows:

- Is the most common digital video format for PCs

- Typically plays at 15 frames per second in a window whose optimum size is 320 by 240 pixels

- Can be created using video capture cards that perform on-the-fly compression to reduce disk space requirements

- Can be played back on a Macintosh by converting them using Microsoft's AVI to QT Utility.

To play back a movie that's in .AVI format, you must first install the run-time version of Video for Windows. The run-time version of Video for Windows comes with Action!, Authorware, and Director, and is available from Microsoft, from your dealer, or from an online service.

To create .AVI movies, you can use a video capture card and a digital video editing program. Some digital video capture cards use built-in compression to reduce the size of your digital video movies.

QuickTime for Windows

QuickTime is Apple's digital video format for playing movies. QuickTime for Windows plays movies:

- Created on either a Macintosh or a PC

- At 15 frames per second in a window whose optimum size is 160 by 120 pixels

- Using the currently displayed palette with 16-bit color movies.

To play back a movie that's in .MOV format, you must first install the run-time version of QuickTime for Windows. The run-time version of QuickTime for Windows comes with Action!, Authorware, and Director and is available from your dealer or from Apple Computer.

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You can create QuickTime for Windows movies by converting them from Macintosh QuickTime format to .MOV format. See "Converting QuickTime movies" later in this document for more information.

QuickTime for Windows 1.1 supports Cinepak video compression, while QuickTime for Windows 1.0 does not. If you compress your QuickTime movies on the Macintosh using Compact Video compression, be sure that you have QuickTime for Windows 1.1.

MPEG video compression format

MPEG (Motion Picture Experts Group) is a digital video format that uses compression methods to produce full-motion 30 frames-per-second video. To play back .MPG digital video movies, you must install a special card such as the ReelMagic MPEG Playback Controller from Sigma Designs, or another MPEG card that has drivers compatible with the Microsoft MCI MPEG standard.

Director 4.0 uses the Lingo `mci` command to pass strings to an MPEG playback controller such as the ReelMagic card.

Macromedia supplies a driver that allows you to use Authorware's movie icon to play MPEG movies through the ReelMagic card.

Video overlay

Digital video movies are pre-recorded and play from disk. By adding a video overlay card to your PC, you can display live full-motion video from any video source, such as a laser disc player, television set, or a VCR. The software that comes with the video overlay card usually includes the necessary Windows drivers and application software to use the card.

Troubleshooting

- To verify that Video for Windows is properly installed, try playing an .AVI file using Media Player. If you can't play the file using Media Player, then you won't be able to play it using Action!, Authorware, or Director. Try re-installing Video for Windows, and make sure the file you want to play is in the correct format.

- To verify that QuickTime for Windows is properly installed, try playing a .MOV file using Media Player. (To play QuickTime for Windows movies using Media Player, you must have Version 1.1.1 or later.) If you can't play the file using Media Player, then you won't be able to play it using Action!, Authorware, or Director. Try re-installing QuickTime for Windows, and make sure the file you want to play is in the correct format.

If you can play back .AVI or .MOV files using Media Player but not using Authorware, check to make sure that the A3DGV.VDR driver file (for Video for Windows) or the A3QT.VDR driver file (for QuickTime for Windows) is located in the same directory as A3W.EXE (during authoring) or RUNA3W.EXE (during run-time playback). You can use the SearchPath variable or Content Search Path field in the File Setup dialog box to specify the location of your .AVI and .MOV files.

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Improving Windows performance

Even on a fast computer, you can still gain performance improvements for your multimedia productions by optimizing resources, memory, and hard disk usage. This section provides tips on improving your PC's performance, improving application performance, working with file formats, and converting files to PC format from the Macintosh.

Checking system resources

Use the About Program Manager command in the Help menu to display a dialog box that lists the amount of free memory and the percentage of free system resources.
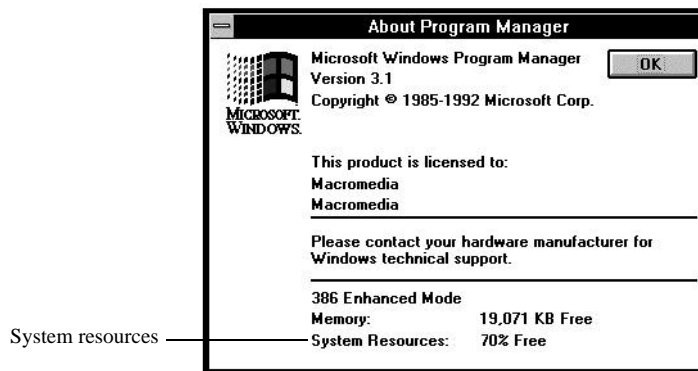
System resources ———

System Resources is a special area of memory used for managing application windows, menus, icons, and fonts. If this value falls below 40%, you should close some windows or quit applications you are not using.

Optimizing device drivers

Some device drivers include a variety of settings that you can change to achieve the best performance. Consult the documentation that comes with the device for information on advanced options and improving performance.

Authoring guidelines

Drive optimization tips

- Use a disk caching utility such as SMARTDRV.EXE to improve your hard disk's performance. Disk caching reads disk information into memory before it's needed. Since memory access is much faster than disk access, disk caching improves your computer's performance.

  To activate disk caching, add the following command to your AUTOEXEC.BAT file:

  ```
  C:\WINDOWS\SMARTDRV.EXE
  ```

  SMARTDrive automatically allocates a minimum amount of memory for its cache, depending on how much memory your PC has. Refer to DOS Help or your Windows manual for more information on using SMARTDrive.

- Check and fix disk errors using a program such as ScanDisk (included in DOS 6.2) or Norton Utilities.

- Use a drive optimization program such as the DOS 6 Defrag utility or Norton Utilities on a regular basis to defragment your hard disk.

  Before running Defrag, be sure to back up your data and disable any disk caches you have set up. Also be sure to check for disk errors with ScanDisk or Norton Utilities before running Defrag.

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Memory optimization tips

- Install as much physical memory as you can. It's the fastest type of memory, since Windows uses physical memory before virtual memory.

- Using the 386 Enhanced control panel, create a permanent swap file. For more information, see "Creating a permanent swap file" in the previous section.

- Use a memory management program such as EMM386 to enable upper memory.

- MemMaker is a DOS 6 utility that examines how your computer is using memory and then tries to optimize it for you. To run MemMaker, exit Windows, type MEMMAKER at the DOS prompt, and press Enter.

- Don't install any memory resident programs and device drivers that you don't need.

Tip *From DOS, you can run the MSD (Microsoft Diagnostics) utility to show you how your computer is using memory. Exit Windows, type MSD at the DOS prompt, and press Enter. In the MSD screen, press the M key to select the Memory option. You'll see a visual map of your computer's memory usage.*

Troubleshooting

Before you get started, you'll want to make sure that you've properly configured your upper memory areas which is between 640 KB and 1MB, so that Windows and drivers don't conflict with your hardware.

To eliminate memory conflicts, you must edit CONFIG.SYS and SYSTEM.INI. Check the documentation that came with your hardware devices to see if you need to modify CONFIG.SYS and SYSTEM.INI. Alternatively, you can manually edit them as described in the following section.

To edit CONFIG.SYS to configure upper memory:

1. **Using SYSEDIT, open your CONFIG.SYS file.**
   Alternatively, from the DOS prompt, enter the command EDIT
   CONFIG.SYS to open your CONFIG.SYS file.

2. **Locate the line that loads the upper memory manager, EMM386.EXE.**
   This line will look something like the following:

   ```
   DEVICE=C:\DOS\EMM386.EXE
   ```

   If you cannot locate this line, then proceed to step 4.

3. **Check the documentation that came with your hardware device for the
   specific memory addresses to exclude or edit on this line.**
   If no such information is available, edit this line to look like the
   following:

   ```
   DEVICE=C:\DOS\EMM386.EXE NOEMS X=A000-C7FF
   ```

   You've told DOS that all upper memory (between memory
   addresses A000 and C7FF) cannot be used, and is reserved for
   exclusive use by hardware devices. This setting ensures the
   highest level of compatibility between DOS and your hardware.

4. **Save and close CONFIG.SYS.**

5. **Open and edit SYSTEM.INI as described below.**

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To edit SYSTEM.INI to configure upper memory:

1. **Using SYSEDIT, open your SYSTEM.INI file.**
    Alternatively, from the DOS prompt, enter the command EDIT
    SYSTEM.INI to open your SYSTEM.INI file.

2. **Locate the [386Enh] section.**

3. **Check the documentation that came with your hardware device for the
    specific memory address to exclude, and add them to the [386Enh] section.**
    If no such information is available, insert the following line:

    ```
    [386Enh]
    EMMEXCLUDE=A000-C7FF
    ```

    This setting forbids Windows from using any upper memory.
    This is the most conservative and safest setting for avoiding
    memory conflicts with your hardware.

4. **Save SYSTEM.INI and exit.**

5. **Restart your computer to have your changes take effect.**

Consult your DOS and Windows documentation for more
information about memory management.

Improving application performance

There are several ways you can improve the performance of your multimedia application. Refer to the documentation that comes with your application for specific guidelines on improving performance. Some general tips are provided below.

Sound performance tips

- Keep sound segments as short as possible by breaking them into short durations. For example, if your production uses narration, break the narration into small files containing individual phrases.

- To keep sound file sizes as small as possible, sample sounds at the lowest acceptable sample rate.

- Unless you have a specific need for stereo narration, record narration in mono sound.

- For standard 8-bit mono (1-channel) sounds, use the formula:

  file size (Kbytes) = #seconds*sample rate (kHz)

  to determine the approximate size of a sound. For example, file sizes for various sampling rates are:

Sound	File size per second
8-bit, 11 kHz, mono	11 Kbytes
8-bit, 22 kHz, mono	22 Kbytes
16-bit, 44 kHz, mono	88 Kbytes

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- For sound that uses two or more channels, such as stereo sound, use the formula:

  file size (Kbytes) = #seconds*(#bits/8)*(sample rate in kHz)*(#channels)

  to determine the sound's approximate size.

  File sizes for various sampling rates are:

Sound	File size per second
8-bit, 22 kHz, stereo	44 Kbytes
8-bit, 44 kHz, stereo	88 Kbytes
16-bit, 44 kHz, stereo	176 Kbytes

Graphic performance tips

- Create 8-bit color graphics instead of 24-bit color graphics whenever possible. 24-bit graphics are three times larger than 8-bit graphics.

- Smaller graphics animate more quickly and occupy less memory than large images, so the computer can process them faster.

- To avoid undesirable palette shifts, display 8-bit images in 16-bit or 24-bit display mode.

- Preload large graphics to have them readily available in memory.

- Avoid using the Matte ink in Authorware or Director, since images that use Matte ink occupy more memory.

- VESA local bus or PCI local bus video offers additional speed improvements for displaying large graphics and complex animations. If possible, use a PC that supports VESA local bus or PCI local bus video.

Digital video performance tips

- Use the optimum compression codec for the movie type and the playback hardware.

- Preload large movies to have them start more quickly.

- Use a smaller digital video window and a lower frame rate to improve performance.

Troubleshooting tips

If you are having trouble importing or working with a file, try using it in an application other than the one that created it.

If you are having trouble using or importing:

- Sounds or digital video files from within your authoring application, try playing them in Media Player, an application that comes with Windows.

- .BMP or .DIB files, try opening them in Paintbrush, an application that comes with Windows.

For example, if you can open a .BMP file in Paintbrush, then the file is probably OK. If you cannot open the file in Paintbrush, or the image looks strange, then the file's format may be incompatible with Paintbrush and with your authoring application.

If you see strange color shifts when you play your production, check to see if you are running in 8-bit (256 colors) display mode. When you play your production in 8-bit mode, Windows and your graphics card must select colors from one 256-color palette. When you change palettes, the colors of graphic objects on the screen will shift to remap to the new palette. To avoid undesirable color shifts, change your display to 16-bit or 24-bit mode, or make sure that all the 8-bit images in your production share a common palette.

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Useful utilities

These tools are useful when authoring your multimedia productions:

- DeBabelizer, from Equilibrium Technologies (Macintosh only): graphics processing and conversion among different formats

- HiJaak Pro, from Inset Systems (Windows only): image processing and conversion among different formats

- Microsoft Video for Windows Development Kit: conversion and editing utilities for sound and digital video

Check with your software dealer for additional image creation and video editing tools.

Working with file formats

The following tables list commonly used multimedia file formats.

Movie and animation formats

File Type	Contains
.MMM	Director 3.0 or earlier movie (Director Player for Windows)
.DIR	Director 4.0 movie
.AVI	Video for Windows digital video movie
.MOV	QuickTime for Windows digital video movie
.CEL, .FLC, .FLI	Autodesk Animator animation files
.MPG	MPEG full-motion video

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Graphic formats

File Type	Contains
.BMP, .DIB, .RLE	Windows bitmap formats
.WMF	Windows Metafile
.TIF	Tagged Image File Format
.PCX	PC Paintbrush image
.GIF	CompuServe Graphic Interchange Format
.EPS	Encapsulated PostScript file, used by illustration and page layout programs
.PCD	PhotoCD
.PNT	MacPaint
.PIC, .PCT	PICT format
.DXF	2D/3D geometric data format
.RIB	Renderman format

Palette formats

Palettes created in the .PAL format, using PALEDIT.EXE included with the Windows Multimedia Software Development Kit, are compatible with Action! for Windows, Director for Windows, and Authorware for Windows.

Macromedia products support Microsoft RIFF (Raster Image File Format) palettes created using PALEDIT.EXE. Palettes created with Paintbrush are not compatible with Microsoft RIFF format, and therefore cannot be used with Macromedia products.

Sound formats

File Type	Contains
.WAV	Windows standard—digitally recorded sound
.MID	MIDI sound format (digitally synthesized music)
.PCM	Digitally recorded sound
.AIF	Macintosh standard—Audio Interchange File format

.WAV files are generally much larger than .MID files because .WAV files contain sampled sound whereas .MID files contain notation to reproduce tones. .WAV sounds generally sound the same on different computers; .MID sounds depend on your sound card configuration.

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Macromedia file formats

		Action! 3	Authorware 3.0	Director 4	MacroModel1.5	SoundEdit 16
File Import						
	Graphic	.BMP, .DIB, .EPS, .GIF, .TIF, .PCD, .PCX, .WMF	.BMP, .DIB, .EPS, .PCT, .PCX, .PIC, .PNT, .RLE, .TIF, .WMF	.BMP, .DIB, .EPS, .GIF, .PCD, .PCT, .PCX, .PIC, .PNT, .TIF, .WMF	.DXF, .EPS, .WMF	
	Palette	.PAL	.BMP, .DIB, .PAL	.PAL		
	Sound	.MID, .WAV, CD Audio	.MID and CD audio (through external functions), .PCM, .WAV	.AIF, .WAV		.AIF, .SND, .WAV, sound resource, QuickTime
	Digital Video	. AVI, .MOV	.AVI, .MOV, .MPG, .DIR	.AVI, .MOV		QuickTime (Macintosh)
	Animation	.FLC, .FLI, .MMM	.CEL, .FLI, .FLC, .MMM, .MVE	.DIR, .FLI, .FLC		
File Export						
	Graphic	.DIB, .WMF		.BMP	.BMP, .DXF, .RIB, .WMF	
	Sound					.AIF, .SND, .WAV, Sound, QuickTime (audio-only)
	Digital Video			.AVI		.MOV
Native File Formats		.ACT, .ACP, .STA	.A3W, .APP, .EXE, .A3L, .APR, .MOD	.DIR, .DXR, .EXE	.MDL	SoundEdit 16

Cross-platform development

If you plan to create productions for both Macintosh computers and PCs, you'll find the following sections useful.

As you develop your productions on one platform, you should frequently preview your work on the other platform. Previewing lets you know exactly how the production plays on the destination platform as work progresses.

Transferring files

There are three basic ways to transfer files between platforms:

- Over a network

- Through a direct serial connection, such as MacLink Plus, or a communications program between the Macintosh and the PC

- On removable disks and cartridges that you carry from one computer to the other.

The most practical way to transfer files depends on how large the files are.

Tip   *Always keep a backup of your files.*

The following products can help you transfer files from a Macintosh to a PC:

- AccessPC

  A software product that lets you use MS-DOS 3.5-inch disks or removable cartridges with your Macintosh.

- DOS Mounter

  A software product that allows you to mount MS-DOS formatted cartridges or 3.5-inch disks on your Macintosh desktop.

- Apple PC Exchange

  A software product that allows you to mount MS-DOS formatted disks on your Macintosh desktop.

- Apple File Exchange

  A file translation utility that ships as part of Apple's system software.

- PhoneNET PC

  A software product for high-volume data transfer between a Macintosh and a PC.

- MacLink Plus/PC

  A complete kit for transferring and converting files between a Macintosh and a PC.

- LapLink Mac II

  A complete kit for transferring files between a Macintosh and a PC or between an unlimited number of Macintoshes on an AppleTalk network.

Converting fonts

Most PCs don't use the same fonts used in your Macintosh productions. If Windows doesn't have one of these fonts, it substitutes another font.

Macromedia Director and Authorware provide their own font mapping for productions converted from the Macintosh to the PC. Check the documentation that comes with the application for information on font substitution on the PC.

If you plan to convert your Macintosh production to run under Windows, follow these general guidelines for using fonts:

- Since the fonts in Windows and on the Macintosh are not identical, avoid displays that depend on tightly constrained text, such as text inside boxes. Centering text inside a box and leaving an extra margin in text objects before converting can help compensate for font differences.

- Macintosh and Windows font sizes can differ. For example, 12-point text on the Macintosh can appear smaller on the PC.

- Outline and Shadow styles appear in Bold on Windows.

- To align text, use tabs and tab markers instead of spaces in text display fields.

- To ensure that your fonts look the same across both platforms, create your text in a drawing program and import it as a bitmap into your application.

- If you use a font that's not installed by Windows, you must license and install it in all PCs on which you plan to play back your production. Alternatively, create your text as a bitmapped graphic.

- Use TrueType fonts instead of bitmap fonts on both the Macintosh and the PC. Macintosh TrueType fonts map to the same fonts and point sizes on the PC, but will still appear smaller on the PC. Some examples of TrueType Windows fonts are: Arial, Courier, Symbol, Times New Roman, and Wingdings.

- Avoid the following Macintosh special characters:

Instead of	Use this
• (bullet)	*
" "(smart quotes)	"
(not equal)	<>
(less than or equal to)	<=
(greater than or equal to)	>=
… (ellipsis)	... (three periods)

- Font vendors such as Adobe, Bitstream, Cassady & Greene, ZSoft, and Image Club specialize in fonts. Become familiar with their products.

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Converting graphics

Authorware, Director, and MacroModel will convert graphics within their own file format when going from one platform to another. Consult your authoring documentation for specific details for converting your files.

To convert individual graphic files, use a graphics conversion application such as HiJaak Pro (on Windows) or DeBabelizer (on the Macintosh).

Tip *To avoid conversion problems, try converting some graphics and displaying them on the PC before you create any intricate graphics using a file format that may not be supported on the PC.*

Converting colors

When you convert colors from the Macintosh to Windows, they map to their nearest equivalents. The results depend on the color palettes used on each platform.

Productions created on a Macintosh using a 13-inch color monitor and a 256-color palette transfer easily to the PC, especially if the PC's screen size is set to 640 by 480 pixels, and the PC supports Super VGA.

The following table compares Macintosh color monitor resolutions (in pixels) to their nearest PC equivalents.

Macintosh monitor resolution	PC equivalent resolution
640 by 480 (13-inch or 14-inch)	640 by 480
832 by 624 (16-inch)	800 by 600
1,152 by 870 (21-inch)	1024 by 768

Converting sound files

Authorware and Director will convert sounds within their own file format when going from one platform to another. Consult your authoring documentation for specific details for converting your files.

To convert individual sound files, use a Macintosh application such as SoundEdit 16 to convert Macintosh sound files to .WAV format, or to open .WAV files on a Macintosh.You can also use SoundEdit 16 to edit soundtracks for QuickTime movies.

Tip   *If your productions will run on PCs that don't have sound cards, include a visual clue wherever a sound plays. For example, include a balloon with the word "Honk" to replace a horn sound.*

Converting digital video movies

QuickTime movies created on the Macintosh must be converted, or "flattened," before they can be used by QuickTime for Windows. This is because the Macintosh saves movie data in a data fork, but saves the control information in a separate resource fork. Converting the movie combines the data and resource information into one file that can be used on a PC. A flattened movie can still be played on the Macintosh.

Video for Windows movies created in Windows can be used by QuickTime for Macintosh if they are first converted using Microsoft's AVI to QT Utility.

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The following applications and utilities let you convert QuickTime movies from Macintosh to PC format:

- Macromedia SoundEdit 16

- Adobe Premiere

- Apple QuickTime Movie Converter

- MovieShop (shareware)

- flattenMooV (available from online services such as America Online and CompuServe)

Tip   *Microsoft's Video for Windows Developer's Kit includes Macintosh utilities to convert Macintosh QuickTime movies to .AVI format, and to convert Video for Windows movies to QuickTime for Macintosh.*

If you use Apple's Movie Converter to convert a Macintosh QuickTime movie to .MOV format, make sure that you choose Make Movie Self-Contained and Playable on non-Apple Computers.

When you convert a QuickTime movie, be sure to give it a DOS-compatible filename, followed by the .MOV extension.

Tip   *Since Macintosh and Windows both support flattened files, you might want to convert all your QuickTime movies to flattened format, so that it's easier to exchange files.*

Distributing your productions

You are almost ready to unleash your creative talents on the world! This section provides essential information for making it happen.

Testing on different PCs

Since PC configurations can vary, test your production on different PCs to make sure that it plays consistently on all of them. Be sure to test your production on a PC that is slower than the computer you are using to create it. If performance on the intended delivery computer is too poor, you can make changes to improve playback before you distribute your production. Make sure that you have enough memory and hard disk space on all delivery machines.

Make sure all delivery PCs use the same monitor resolution (for example, 640 by 480) as the authoring PC. If you play back a production on a PC that is configured with a lower display resolution than the authoring PC, objects such as graphics and text will appear larger because of the different horizontal and vertical pixel count. If you play back a production on a PC that is configured with a display monitor resolution higher than the authoring PC, objects such as text and graphics will appear compressed.

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Network playback

These factors affect performance when playing your production over a network:

- Network efficiency

- Number of users on the network

- Speed and memory capacity of the playback machine

- Number and size of graphics and sounds used in the production

- Location of the executable production file. For best performance, put the executable on the playback machine.

Licensing considerations

Licensing agreements specify the terms under which you can use and distribute software. Before you distribute your production, assemble all the files you want to include, such as players, drivers, and fonts, and check the terms of their licensing agreements for distribution rights. If you are unclear about the terms, contact the software publisher for more information.

For example, if your production uses .AVI files, you must install Video for Windows on all target machines. The Microsoft Video for Windows Development Kit contains a royalty-free licensing agreement.

If your production uses .MOV files, you must license QuickTime for Windows from Apple Computer and install QuickTime for Windows on all target machines. Refer to the QuickTime for Windows licensing agreement for distribution terms.

Deciding what files to distribute

To distribute a play-only version of your multimedia production, you must generally include the following files:

- The production file (for example, MYMOVIE.EXE)

- A player or run-time program so you can play the production (for example, PLAYACT.EXE), if your authoring program does not create a stand-alone executable file

- Driver files necessary to play elements included in your production

  For example, if your Authorware for Windows production includes any QuickTime for Windows movies, you must include the QuickTime driver (A3QT.VDR) for Authorware.

- Non-system fonts used by your production

- Any external files used by your production, such as .DIR, .FLI, .FLC, .AVI, or .MOV movies

- Appropriate .DLL files or .UCD files.

Consult your authoring documentation for specific details for distributing your files.

Note   *Distribution of run-time, driver, font, and .DLL files is subject to the licensing agreements of each of the software publishers that provide the files. Before distributing your production, check with the software publisher for information on licensing terms.*

Including .DLL or .UCD files

Dynamic Link Library (.DLL) files contain special code that performs additional functions not directly supported by your multimedia application. You must generally include some .DLL files when distributing your production. Check the documentation that came with your authoring program for specific .DLL files to include.

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User Code (.UCD) files are a special type of .DLL file used by Authorware for Windows for loading external functions.

External functions, such as XCMDs, XFCNs, and XObjects, are similar to .DLL files in Windows.

Installing your production

If you plan to distribute your production to more than one PC, or if your production consists of many files, you should consider using an installer. Installers compress your files on one or more diskettes for easy installation. The following products are installers or file compression programs:

- Install Shield, from Sterling Software

- Installit, from Helpful Programs

- PKZip, from PKWARE.

Be sure to check the software licensing agreement for information on using the installer to distribute your production.

Determining disk space and memory requirements

Make sure you have enough disk space on your target machines to install your production file and its associated files.

If you are creating a production using an installer, the installation process may temporarily use free disk space and require additional memory. Don't wait until the last minute to build and test-run your production. Building a test version of your production early in the process will help you identify disk space and memory requirements before they become problems.

Glossary

AUTOEXEC.BAT A special file consisting of DOS commands that runs automatically when you start your computer.

.AVI AVI (audio video interleaved) Microsoft's digital video movie file format, Video for Windows.

Cinepak QuickTime for Windows and Video for Windows video compression method.

color depth The number of colors (e.g., 256) your monitor can display.

CONFIG.SYS A special file that DOS reads each time you start your computer. It includes commands that install device drivers, and sets DOS parameters.

conventional memory The portion of memory, between 0 KB and 640 KB, that DOS requires.

device driver A program that tells DOS or Windows how to use a software or hardware device, or that adds special features to DOS or Windows.

digital video A generic term that refers to video that has been stored digitally. Video for Windows and QuickTime for Windows are kinds of digital video.

.DLL Dynamic Link Library files are compiled code modules that are linked when a Windows program runs. You must generally include some .DLL files when distributing your production.

Drivers control panel A Windows program you use to install Windows multimedia device drivers.

EDIT A DOS text-editing application.

extended memory The portion of memory above upper memory, primarily used by Windows. To use extended memory, you must install the HIMEM.SYS device driver by adding a command to your CONFIG.SYS file.

File Manager	A Windows program you use to manage files and directories on your storage devices.
MCI	MCI (media control interface) is a standard protocol for enabling Windows programs to communication with multimedia devices.
Media Player	A Windows 3.1 program that lets you play pre-recorded sounds, music, digital video movies, and other types of MCI devices.
.MOV	Apple's digital video file format for QuickTime for Windows. You can play .MOV files on a Macintosh as well as a PC.
.MPG	MPEG (Motion Picture Experts Group) compressed digital video file format. To play back .MPG digital video movies, you must install a special MPEG card.
PATH	A DOS command in your AUTOEXEC.BAT file that specifies the directories where DOS and Windows look for program files.
Program Manager	A Windows program you use to organize and start other Windows programs.
resolution	The number of horizontal and vertical pixels, e.g., 640 by 480, that your graphics display card is capable of displaying.
SYSEDIT	A Windows system file editing application.
SYSTEM.INI	A system initialization file in your \WINDOWS directory that contains sound, graphics card, and other multimedia hardware information, so that the proper drivers are loaded when you run Windows.
swap file	A file on your hard disk used by virtual memory to store information.
.UCD	User Code (.UCD) files are a special type of .DLL file used by Authorware for Windows for loading external functions.
upper memory	The portion of memory between conventional memory and extended memory that is typically reserved for your PC's video display, network card, and any other hardware devices.
virtual memory	A type of memory that uses space on your hard disk. You use virtual memory to supplement the physical memory installed in your PC.

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Windows Setup A Windows program you use to add or change drivers for your display, keyboard, mouse, or network.

WIN.INI An initialization file in your \WINDOWS directory that contains Windows settings. Some applications add their own settings to WIN.INI.

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