Please Record
Your Registration Number: _____
(found on the registration card)

Date of Purchase: _____

Connectix Virtual PC

Version 3.0

The Key to Running PC Software on Your Mac

September 1999
Connectix Corporation

Copyright

Table of Contents

CHAPTER 1: Introduction

CHAPTER 2: Installing Virtual PC

CHAPTER 3: Using Virtual PC

CHAPTER 4: Virtual PC Preferences

CHAPTER 5: Using Windows 95 with Virtual PC

CHAPTER 6: Using Windows 98 with Virtual PC

CHAPTER 7: Using PC-DOS with Virtual PC

CHAPTER 8: Mac—PC Integration

CHAPTER 9: Using USB Devices with Virtual PC

CHAPTER 10: Networking with Virtual PC

CHAPTER 11: Frequently Asked Questions

CHAPTER 12: Support and Sales

CHAPTER 13: Technical Specifications

1

Introduction

Welcome to Virtual PC

Congratulations on deciding to have the best of both worlds, the Mac OS *and* the PC —all on one machine, one desktop—your Macintosh!

Full PC compatibility

Connectix Virtual PC 3.0 allows you to run the latest PC programs –including business, education, entertainment, Internet and home applications– right on your Power Mac. With Virtual PC you can:

• Run PC programs

• Access PC networks

• Share files with PC users

Virtual PC is a Power Macintosh native application, using the full potential of the PowerPC processor to deliver performance for the full range of PC software.

You can easily switch between Virtual PC and other Mac applications, and run Virtual PC simultaneously with other Mac applications.

Off-the-shelf PC software works on your Macintosh with full functionality and allows you to use the Macintosh peripherals you already have such as printers, modems, and CD-ROM drives.

Virtual PC is designed with all the elements of a PC, including Sound Blaster 16 sound support, S3 Trio 32/64 video card support, Ethernet networking, and the Pentium™ MMX® instruction set.

Keep in mind that the faster your processor and the more RAM you make available, the more quickly PC applications can run with Virtual PC.

Using this manual

This manual covers all three versions of Virtual PC—Windows 98, Windows 95 and PC-DOS. It is written "by Mac users, for Mac users" and the provides the following:

- installing and setting up Virtual PC (chapter 2);
- using the Virtual PC application and setting the Preferences (chapters 3 and 4);
- learning the essentials of Windows 95 and 98 for Mac users (chapters 5 and 6);
- working with PC-DOS (chapter 7), especially for those who chose this option;
- using the integration features between the Mac OS and PC (chapter 8);
- using additional functions, including USB (universal serial bus) devices (chapter 9) and networking (chapter 10).

This manual also supplies Frequently Asked Questions (chapter 11), contact information for Connectix sales and support (chapter 12), and finally, technical specifications of Virtual PC emulation (chapter 13).

2

Installing Virtual PC

This chapter provides installation requirements and procedures. Included in this chapter are:

- Installation requirements
- Installing Virtual PC with Windows 98, Windows 95 or PC-DOS

Installation Requirements

To run Virtual PC you must have the following:

	PC-DOS	Windows 95	Windows 98
Processor	Any G3 Any 604e or 604 Any 601, 603e or 603 running at 100 MHz or faster	Any G3 Any 604e or 604 Any 603e or 603 running at 180 MHz or faster	Any G3
Mac OS	7.5.5 or later	7.5.5 or later	8.0 or later 9.0 or later for USB
Hard disk space	130 MB minimum	200 MB minimum 260 MB recommended	320 MB minimum 520 MB recommended
RAM	32MB minimum	48MB minimum	64 MB minimum
CD-ROM	Yes	Yes	Yes

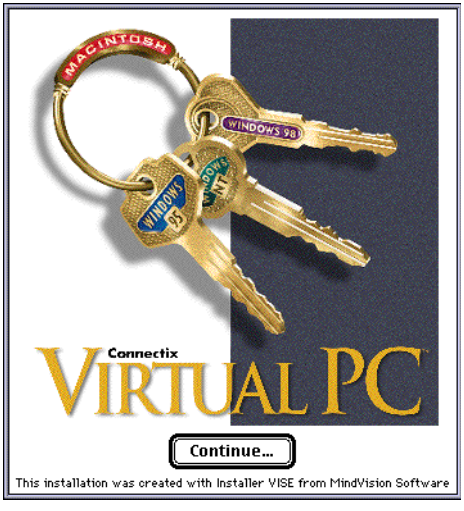
For some guidelines on PC operating system memory allocation, see the section in Chapter 3 on RAM and Performance on page 25.

Virtual PC Installation

This section provides the step-by-step procedures necessary for installing Virtual PC and its components.

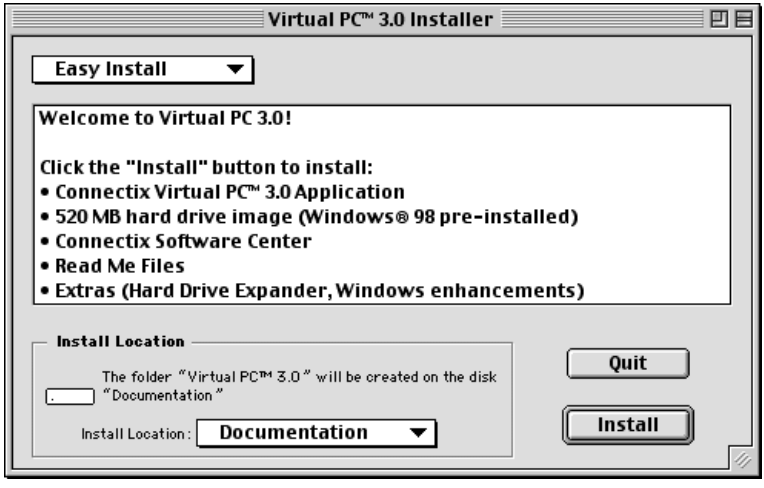
Installing Virtual PC

1. Insert the Virtual PC™ CD.
2. Double-click the Virtual PC installer on the CD.
3. The Virtual PC installation screen displays. Click Continue.



4. Read the agreement and select Accept to continue.

The Virtual PC installation screen displays.



5. Choose **Easy Install** to perform a standard installation. You can also select **Custom Install** to select a smaller Disk Image.

You can also use Custom Install to selectively install or reinstall individual components, such as the Virtual PC Extras.

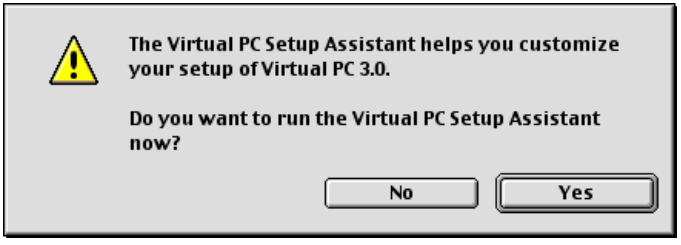
6. When you have selected the appropriate installation, click the Install button. The Virtual PC installation procedure begins.

The Installer copies the following to your hard drive from the Virtual PC CD.

- Virtual PC™ application
- Hard Drive Image containing the operating system (Windows 98 Second Edition, Windows 95 or PC-DOS 2000)
- Hard Drive Expander folder
- Virtual PC™ Setup Assistant
- Virtual PC Extras folder
- Scripts folder
- Shutdown Items folder
- Startup Items folder
- Connectix Software Center
- Virtual PC™ 3.0 Read Me file

Next, a dialog box appears asking if you want Virtual PC Setup Assistant to help you set up Virtual PC.

7. Click **Yes** for Setup Assistant to begin.



Setup Assistant guides you through the settings for memory, video, drive image size, network and modem, and more. When Setup Assistant is complete, it saves your settings and launches Virtual PC.

If you chose not to run Setup Assistant, navigate to the Virtual PC application in the Virtual PC 3.0 folder on your hard drive and double-click on the application icon to launch Virtual PC.

The first time you launch Virtual PC, you are prompted to enter your name and organization.

8. Enter your user name and organization.

Virtual PC opens and launches the pre-installed version of Windows or PC-DOS.

NOTE: If you purchased the PC-DOS version of Virtual PC, you can install Windows at a later time. For more information, See "Installing Windows 98 or Windows 95" on page 91.

3

Using Virtual PC

Virtual PC is a Macintosh application that you can use like any other Macintosh application. This chapter covers the essential commands, and provides an overview of Virtual PC's functionality.

Be sure to review the essential key commands covered in this chapter, such as quitting the application, and accessing Virtual PC's settings.

Launching Virtual PC

To launch Virtual PC, open the Virtual PC folder and select the Virtual PC™ icon and double-click. The application launches and simultaneously starts your copy of Windows (or DOS) from the C drive disk image. See "C Drive" on page 30.

Changing the Virtual PC Screen Mode

Virtual PC runs the PC environment inside the Virtual PC window which can either fill a window within your Macintosh screen (called "Window" mode) or be resized to fill your entire screen (called "Full Screen" mode). You can change your Virtual PC screen mode in either Window mode or Full Screen mode (see the following sections for an explanation of modes).

In Window Mode

To change your Virtual PC screen mode from Window mode (that is, when Virtual PC only fills a portion of your screen and the Macintosh menu bar is showing), do one of the following:

- Click on the Control Menu and select Toggle Screen Mode, or
- Press the Command + M on your keyboard, or
- Click on the Full Screen button on the lower Virtual PC menu

In Full Screen Mode

To change your Virtual PC screen mode from Full Screen mode (that is, when the PC environment fills your entire screen), do one of the following:

- Press the Command + M on your keyboard, or
- Hold down the Command key to make the Mac Mouse and Menu Bar visible; then do one of the following:

  –Click on the Control Menu and select Toggle Screen Mode, or

  –Click on the Window button on the lower left-hand corner of the Virtual PC menu.

Your familiar Apple Menu Bar and Mac Mouse functions are available to you by pressing the Command key on your Mac keyboard even when you are in the PC environment in full screen mode.

Quitting Virtual PC

When you are finished using Virtual PC, you have two options:

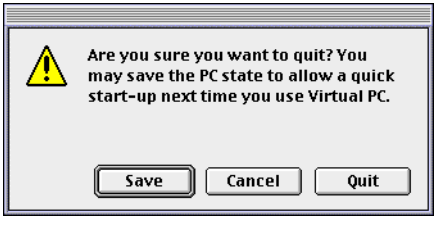
- You may save the current PC environment and applications, and quit Virtual PC. The PC environment and applications load automatically the next time you run Virtual PC.

This process is called *saving the current PC state*. This feature allows you to pick up where you left off in Virtual PC without having to launch the PC operating system and any associated applications.

- You may choose to shut down or exit the PC operating system environment and quit Virtual PC.

Saving the Current PC State

1. To save the current PC state, select Quit from the Virtual PC File Menu or press Command + Q. The following dialog appears:



2. Click on Save to save the current environment (including Windows, DOS and any applications) and have it load automatically the next time you run Virtual PC.

NOTE: The Save PC environment file uses up to as much hard drive space as the amount of RAM allocated to Virtual PC. Thus, if you have 32 MB allocated to Virtual PC, the Save PC environment file will take up to 32 megabytes of hard drive space.

Shutting Down the PC Operating System

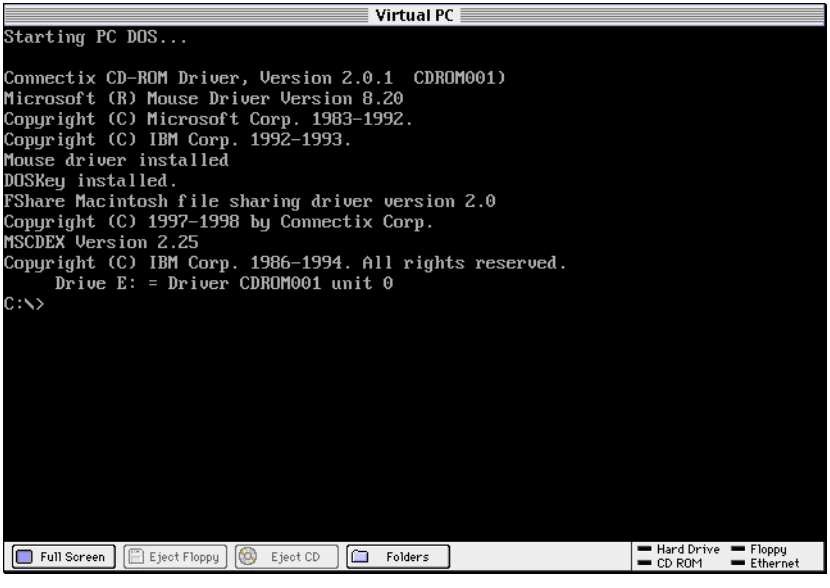
You may also choose to quit Virtual PC without saving the PC state.

1. Select Quit from the Virtual PC File Menu or press Command + Q. The dialog appears with the options to save the PC state, quit or cancel.
2. Press the Quit button.

Virtual PC exits Windows and Virtual PC quits automatically.

NOTE: If you are running Windows, Virtual PC shuts down the operating system for you automatically. By contrast, there is no way you can shut down PC-DOS; simply quit the Virtual PC application. For other operating systems (such as Windows NT), shut down manually.

Restarting the PC



The Restart method for the different PC operating systems is similar to the method for restarting your Mac OS when you press the Reset button or use a combination of key commands (Command + Control + Power).

To restart the PC environment, select Restart PC from the Control Menu located at the top of the screen on the Virtual PC Menu bar.

NOTE: You should avoid using the restart control if possible, because damage can occur to your PC drive files.

Toolbar Commands

The toolbar commands are essential to the operation of Virtual PC, and provide convenient ways to alternate between the PC and the Macintosh environments.

Toggle Screen Mode

The **Toggle Screen Mode** command (or **Command + M**, or Full Screen or Window button) switches Virtual PC's display between window mode (a window within the Macintosh desktop), and full screen mode, (the window as a full screen display). See the section, *Changing the Virtual PC screen mode*, earlier in this chapter.

Eject Floppy

The Eject Floppy command lets you eject a floppy disk or floppy disk image by pressing the mouse on the Eject Floppy button.

Eject CD

The Eject CD command lets you eject a CD-ROM by pressing the mouse on the Eject CD button.

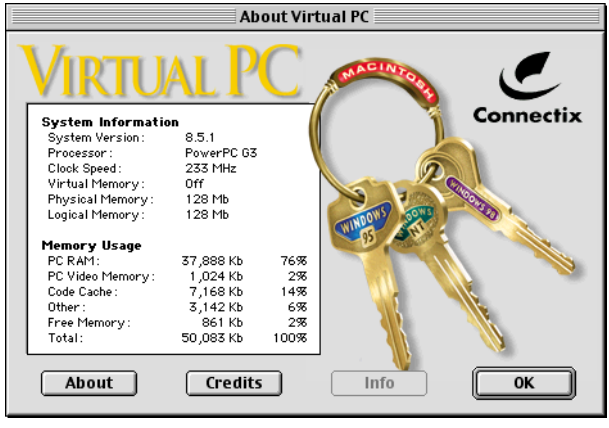
Folders

Clicking on the Folders button takes you to the Shared Folders Preferences. See Chapter 4, Preferences, for more information.

Status LED lights

The LED lights indicate that one or more I/O (input/output) devices are currently in use (hard drive, CD-ROM, Ethernet controller, and either Floppy drive or USB). A green LED light indicates the device is reading or receiving information. An orange LED light indicates the device is writing or sending information.

About Virtual PC

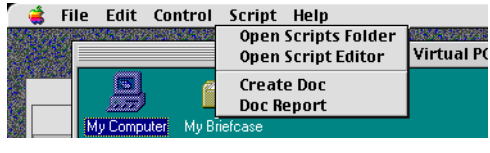


To view technical information about your Mac system and Virtual PC for troubleshooting or reference, select About Virtual PC from the Apple menu. Then press the **Get Info** button in the About Virtual PC box.

Working with AppleScript

Virtual PC is a scriptable application, and contains scripts that you can use without modification. If you are unfamiliar with AppleScript and how it can help your productivity, see the **Virtual_PC_AppleScript.PDF** file included on the Virtual PC CD-ROM.

To select an Apple Script from within Virtual PC, there must be a **Scripts** folder in the same folder as Virtual PC. If there is, the **Script** menu item appears in your Virtual PC application bar. From this menu, you can open the Scripts folder, or open the Script Editor for creating or editing scripts.



Virtual PC adds a menu item for each script in the Scripts folder. When you select an item from the menu, Virtual PC runs the script. In the examples above, the available scripts are titled *Create Doc* and *Doc Report*.

Sample scripts are included with Virtual PC.

Virtual PC provides startup and shutdown folders for AppleScript scripts that you want to launch at startup or shutdown. These folders are found in the Virtual PC application folder. They are:

- Startup Items folder, which contains:

  –Virtual PC Startup Items folder (scripts that run when Virtual PC launches)

  –Windows 95/98 Startup Items folder (scripts that run when Windows starts)

- Shutdown Items, which contains:

  –Virtual PC Shutdown Items folder (scripts that run when Virtual PC shuts down)

  –Windows 95/98 Shutdown Items folder (scripts that run when Windows shuts down)

Using USB Devices

Virtual PC 3.0 supports a wide range of USB (universal serial bus) devices. For information on using USB devices, see chapter 9, *Using USB Devices with Virtual PC.*

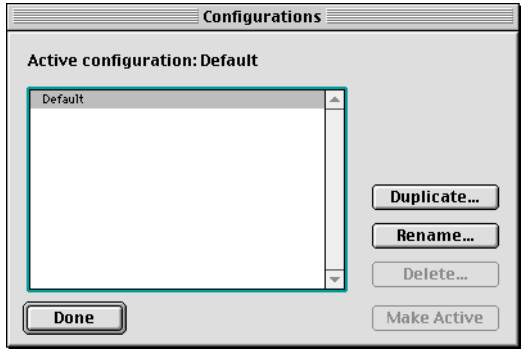
Using the Configuration Manager

Virtual PC lets you save multiple configurations. Use multiple configurations to install different operating systems, including Windows 98, Windows 95 and Windows NT, and alternate between them. Or, you can use multiple copies of the same operating system, such as Windows 98, assigning each version a different configuration (for example, each for a different user).

Each configuration must have a unique C drive image assigned to it. There are two ways to create a new C drive for use with the Configuration Manager:

- Copy your existing drive in the Finder by using the **Duplicate** command from the Edit menu (or press **Command + D**);
- Create a new drive image in the Virtual PC Preferences, and install an operating system in it. For information on creating a new drive image, see Chapter 12, *Frequently Asked Question*s.

To open the Configuration Manager, select **Configurations** from the Edit menu, or press **Command + K** You can also hold down the **Command** key while launching Virtual PC.

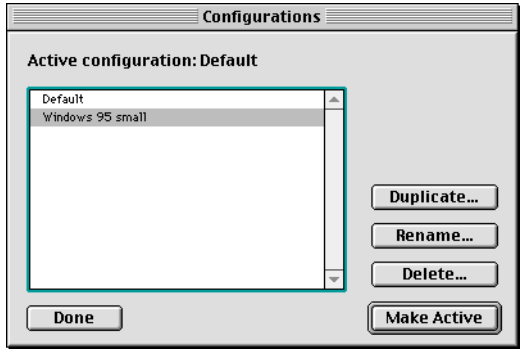


A dialog box appears showing the configurations installed on your version of Virtual PC. When first installed, only one configuration is present, labelled **Default**.

1. To create a new configuration, press the **Duplicate** button.

NOTE: This duplicates only the configuration for the drive image, not the drive image itself.

You are prompted to name the file. Select a name that describes what it is; in this example, *Windows 95 small*, the title indicates a minimum-sized version of Windows 95 that occupies only 180 Mb of hard disk space.



2. Press **OK**.

The second configuration file appears in the Configurations menu.

3. Select the new configuration and press the **Make Active** button.

You are prompted that you must restart in order to use the new configuration.

4. Press **Save** to save the PC state and restart, or **Restart** to restart without saving the PC state.

Once Virtual PC has restarted, you are prompted to select a new C drive image for this configuration.

5. Select the drive image and press **Restart**.

You can now alternate between the two (or more) configurations.

The Hard Drive Expander

The Hard Drive Expander allows you to expand the size of your current Virtual PC drive image. It also lets you convert other drive images (for example, from SoftWindows or PC hardware cards) to a Virtual PC hard drive image.

NOTE: The hard drive expander can only expand drives formatted using the FAT16 file system. It cannot expand FAT32 or NTFS PC drive images.

Due to the structure of PC hard drive directories, there is a limit to the amount of hard drive expansion possible.

The largest drive image provided with Virtual PC with Windows 98 is 520 MB, which is expandable to a maximum of 1023 MB. The largest drive image provided for Windows 95 and PC-DOS is 260 MB, which is expandable up to a maximum of 512 MB. The easiest way to create more hard drive space is to create a new D drive image. If you prefer a C drive larger than the maximum expanded size, you must create a new hard drive image and install Windows or PC-DOS on it.

Use the following table as a guide when creating a new drive image to provide enough room for future expansion; it specifies the expansion limitations for each drive size.

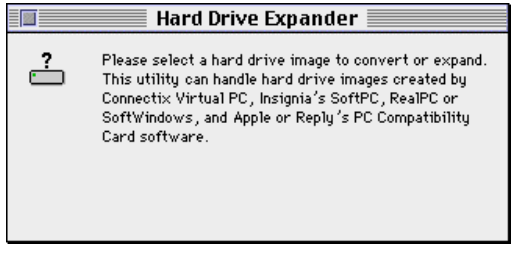
Drive Image Size Range	Maximum Expanded Size
0MB to 127MB	127MB
128MB to 255MB	255MB
256MB to 511MB	511MB
512MB to 1023MB	1023MB
1024MB to 2048MB	2048MB

Expanding a Drive Image

NOTE: Be sure to back up your data before expanding a drive image.

1. To use the Hard Drive Expander, open the **Hard Drive Expander** folder in the Virtual PC™ 3.0 folder.
2. Be sure to read the ReadMe file that comes with the Hard Drive Expander for any late-breaking information.
3. Launch the Hard Drive Expander application by double-clicking on its icon.

The Hard Drive Expander window opens.



4. From the File menu, select Open Hard Drive Image. Browse to find the image you want to modify.
5. Select the drive image, and click **Open**.

A dialog box indicates the size of the drive image, and a text box showing the maximum size to which you can expand it.

6. To change the new hard drive image size, enter a new number in the text box (up to the maximum hard drive image size).
7. Click Expand to expand the size of your drive image.

You are prompted with a warning that expanding your drive image may cause problems—be sure to back up your data before expanding your drive image.

8. Click Expand to continue.

Converting a Drive Image

Converted drive images do not boot under Virtual PC. Instead, you need to mount the converted drive image in the Virtual PC Preferences as the D drive (see Chapter 4, *Virtual PC Preferences*, for more information). To convert a drive:

1. Launch Virtual PC Hard Drive Expander application.
2. Select Open Hard Drive Image (or Command **+ O**) in the File menu and navigate to the hard drive image you want to convert.
3. Press the Convert button.

Virtual PC Performance Recommendations

Virtual PC is a software application that relies on hardware for performance. In general, the faster a system's overall performance, the faster Virtual PC runs. This section outlines the specific areas of hardware that are most critical for Virtual PC performance, ranked in order of priority.

PowerPC Processor Speed

The speed of the PowerPC processor is the most important element for overall Virtual PC performance. Virtual PC is optimized specifically for the PowerPC processor, and uses the full capacity of the chip.

In addition to raw processing speed, Virtual PC also benefits from a larger processor instruction cache. Built into the processor, the instruction cache helps deliver instructions to the processor faster. The newest PowerPC chips, the G3 series, run Virtual PC the fastest due in part to the larger on-chip caches.

Recommendation: The only way to improve processor speed is to replace the current processor. Some newer Mac models have an upgradeable processor card (most older Macs can only be upgraded with an accelerator card).

Level 2 (L2) Cache

The Level 2 (L2) cache is a memory chip that improves overall system performance by providing fast data transfer between the PowerPC Processor and RAM. It is made up of relatively small (usually from 256K to 1MB) and very fast memory, and offers the most improvement on memory-intensive applications like Virtual PC, which rely on fast transfer of data to the processor.

Nearly all Power PC models have the capability of using a L2 cache. Most high-end systems (like PowerPC 604 and G3 systems), come with a L2 cache installed, while most early models and some entry level models have a slot for a L2 cache to be installed (sold separately).

Recommendation: If your Mac system has the capability for a L2 cache, installing one provides an overall Mac system performance improvement and specifically benefits Virtual PC performance. The larger the L2 cache, the better the performance.

RAM and Performance

If you are using Microsoft Windows, having more RAM available to Windows improves performance by reducing Windows' usage of virtual memory. With more PC memory available, Windows spends less time storing memory information to the hard drive (virtual memory), which is much slower. Memory usage of Windows is the same using Virtual PC as it is running on a Pentium-based PC.

For performance reasons, Virtual PC requires physical RAM—extended memory solutions such as Connectix RAM Doubler or virtual memory are not recommended methods to provide memory for Virtual PC use. If you do not have enough RAM to run Virtual PC and are using extended memory, Virtual PC performance degrades dramatically.

Recommendations: For PC-DOS, 32MB of Macintosh memory is required.

For Windows 95, 48MB of Macintosh memory is required. At least 64 MB is recommended, especially if you are using multiple Windows applications simultaneously.

For Windows 98, 64MB of Macintosh memory is required.

How Virtual PC Uses Memory

When memory is allocated to Virtual PC application (in the **Get Info** dialog box), an amount of memory is allocated to Virtual PC code cache and operations. The code cache is memory used as storage for converting Pentium instructions to optimized sequences of PowerPC instructions on the fly. The larger the code cache, the better the performance.

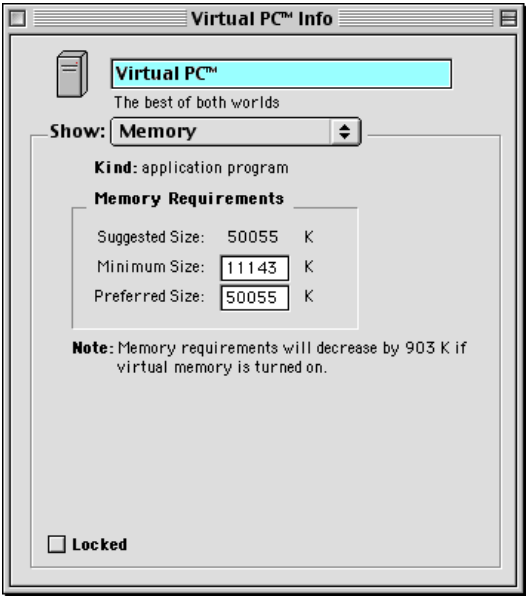
Virtual PC automatically increases its code cache size depending on the amount of RAM given to the application. For example, the code cache associated with a 16 MB PC is roughly 2.5 MB. The code cache associated with a 32 MB PC is roughly 6 MB. To determine the exact size of the current code cache, use the **Get Info** section of the About Virtual PC Box.

Increasing RAM Allocation

For best performance, you can increase the RAM allocation for Virtual PC. To do so, follow these steps:

1. Select the Virtual PC application icon.
2. From the File Menu, select Get Info (or press Command I).
3. In the Virtual PC™ Info box, select **Memory** from the **Show:** menu; it displays the fixed Virtual PC suggested memory size, the minimum size and preferred size. You can expand the amount of RAM allocated to Virtual PC by entering a new number in the Preferred Size text box.

NOTE: The default sizes for memory requirements are different for PC-DOS, Windows 95 and Windows 98.



If you are using virtual memory or Connectix's RAM Doubler to expand your memory capabilities, do not increase the memory allocation of an application beyond the amount of installed memory. If you allocate a memory partition larger than the physical memory available, your system's performance may decrease.

If you have 32MB of physical RAM that you have expanded to 48 MB using virtual memory or RAM Doubler, do not allocate more than 32MB to the combination of the Mac OS System and Virtual PC (for example, if 12MB are used for the Mac OS, you should allocate no more than 20 MB to Virtual PC).

How Video Uses Memory

Virtual PC video performance is best when:

- the PC window is in full screen mode and no other windows are overlapping it (for example, the control strip); Virtual PC automatically chooses the best Mac screen depth and resolutions for optimal performance;
- video mirroring is not being used (this can slow performance).

If you don't want to use full-screen mode, your best solution is to try to match your Mac display to the PC bit depth (see the chart below for details).

Matching bit depth with your PC settings:

PC Bit Depth	Best Mac Mode
4 bit	8 bit is best, 16 bit is OK
8 bit	8 bit is best, 16 bit is OK
16 bit	16 bit is best, 32 bit is OK
32 bit	32 bit is best, 16 bit is OK

The on-board video on your Macintosh provides the fastest display speed for Virtual PC. However, in some cases, video accelerator cards can equal that performance if they are optimized and include enough RAM (usually 8 MB).

Disk Optimization and Disk Space

Disk optimization can improve the disk performance of PC software running under Virtual PC. By defragmenting the Mac hard disk or PC hard disk image with a disk optimization utility, less hard disk activity is required to retrieve data from the disk. As a result, less time is spent accessing the disk.

Microsoft Windows uses virtual memory, so if you are using Windows, free hard drive space needs to be available for the Windows virtual memory swapfile. When there is not enough hard drive space, Windows alerts to insufficient memory and requests more free disk space.

Recommendations: Defragment your Mac disk and PC disk file regularly for best disk performance. If you are using Windows, be sure to leave several megabytes of free hard disk space on your PC disk file to maintain virtual memory.

4

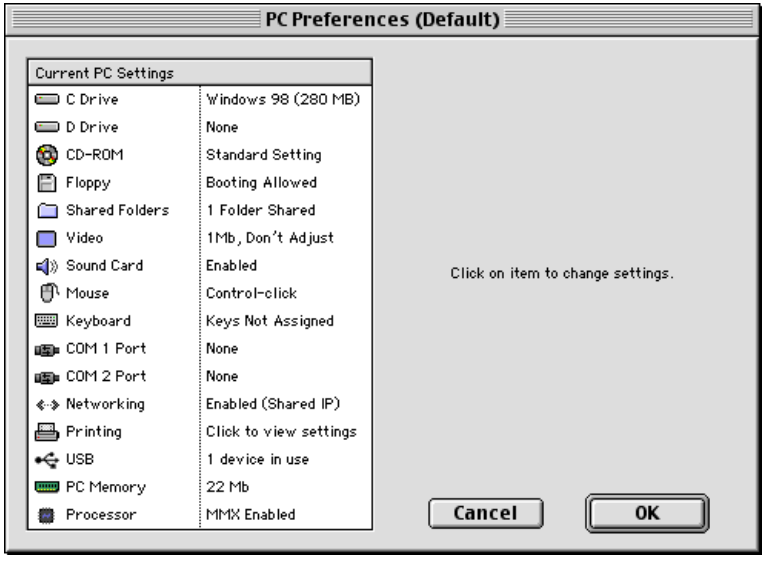
Virtual PC Preferences

To make changes to your Virtual PC configuration and to change the functionality of the PC environment, use the Virtual PC Preferences settings. Virtual PC Preferences are accessible from the Edit menu or by pressing **Command + E.** Also**,** you can access Virtual PC Preferences when launching Virtual PC by holding down the Option key during Virtual PC launch.

Configuration Manager

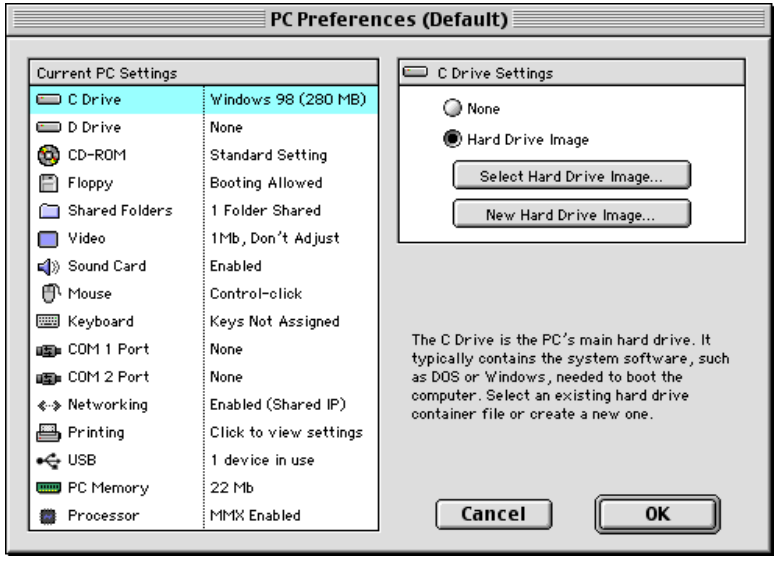
If you want to keep more than one set of Preferences, you can create multiple Preferences and alternate between them using the Configuration Manager option. For details, see the Configuration Manager section on page 20.

Current PC Settings



This view provides a quick reference to the current PC environment. Click on any settings icon to change a setting or for more information.

C Drive



This is the drive image that is used to launch the PC environment, or the Boot Drive. By default, the C drive is the drive image installed by Virtual PC. It contains all of the system files needed to run DOS or Windows.

Virtual PC hard drive images are double-clickable, allowing the drive images to mount on the Finder desktop just like with any other Mac volume. This allows easy file transfers between PC hard drive and Mac drive contents.

Changing your C drive

If you have created or installed another drive image, you can make it your C drive by doing the following:

1. Click on the C Drive image in the Current PC Settings window.
2. Click on the Select Hard Drive Image... button.

A dialog box opens, showing the available hard drive images in your Virtual PC folder.

3. Select the new hard drive image, and click Open.

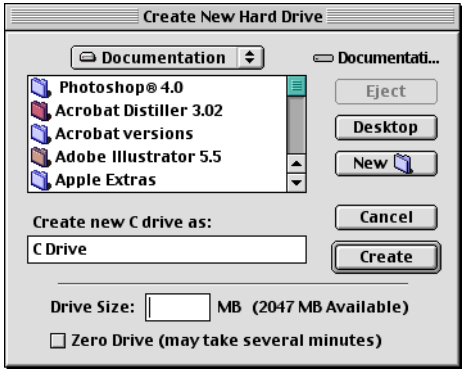
Creating a New Hard Drive Image

New hard drive images created with Virtual PC can be any size from 1 MB to 2 GB in size. They are automatically formatted with a single FAT16 partition.

You can create a new hard drive image in Virtual PC by doing the following:

1. Click on the C Drive image in the Current PC Settings window.
2. Click on the New Hard Drive Image... button.

A dialog box opens, prompting you to create a new hard drive image (the new image is titled **C Drive** by default.



3. Type in the desired size for the new drive (in megabytes).
4. Click the **Zero Drive** check box to completely erase all previous data on the portion of the hard disk that will hold the new drive image (do this—for example, if you intend to share the hard drive image with others—so that your old data cannot be recovered by someone else).
5. Press the Create button to create a new C drive image.

In order to boot from a new C drive, you must install an operating system such as DOS or Windows.

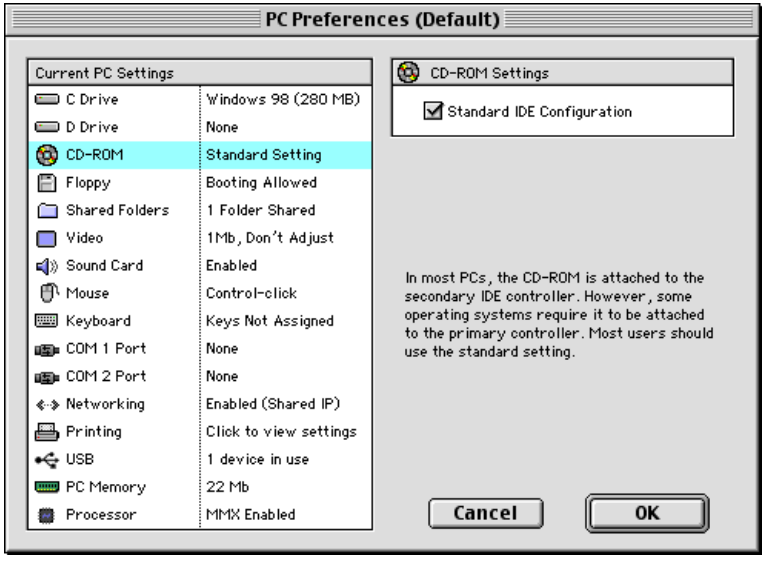
D Drive

This is a location for a secondary hard drive image. It is not required to use a second drive, but it can be allocated if you require additional storage space.

In addition to its own hard drive images, Virtual PC supports hard drive images created by SoftWindows, Real PC, and PC compatibility cards from Apple and Orange Micro.

NOTE: These hard drive images can only be used as D drives in Virtual PC.

CD-ROM Drive

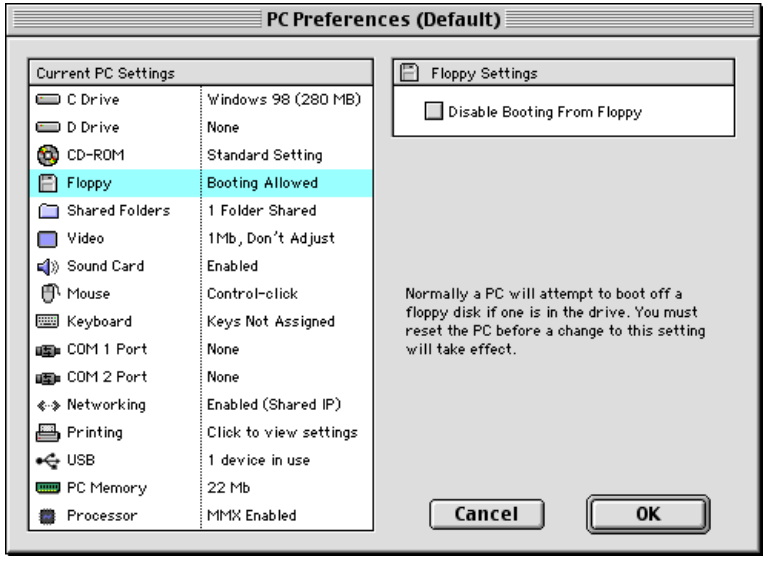


Virtual PC automatically recognizes your Mac's CD-ROM drive and reads PC CDs. To eject a CD, either:

- Select the Eject CD command from the Control menu;
- Select the Eject CD button from the lower Virtual PC Toolbar;
- Press Command + 2 on your keyboard.

On most PCs, the CD-ROM is connected to the secondary IDE controller. However, the NeXT OPENSTEP Installer requires the CD-ROM to be attached to the primary controller. Most users can use the standard configuration and never need to adjust this setting.

Floppy Drive

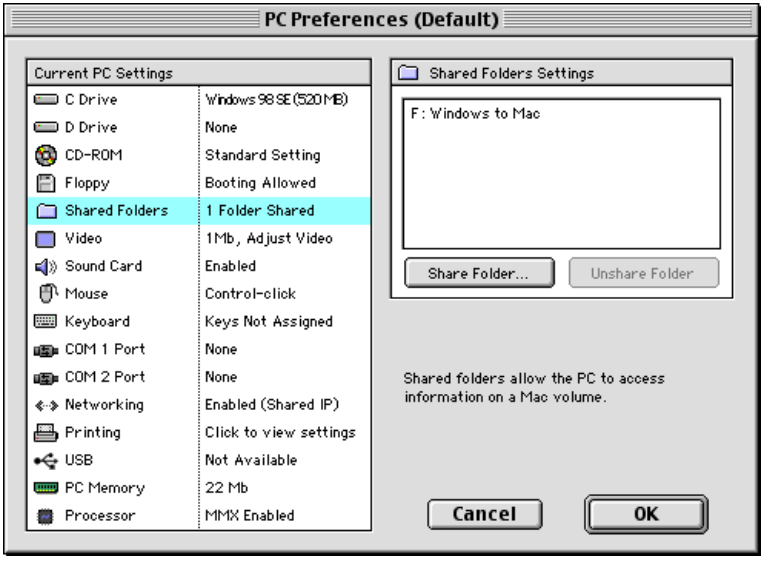


A PC will attempt to boot from a floppy instead of your hard drive, if there is a disk loaded in the floppy drive. You can disable this function by selecting the Disable Booting from Floppy check box in the Floppy Settings.

Virtual PC automatically recognizes your Mac's floppy drive and reads PC -formatted floppies. To eject a floppy, either:

- Select the Eject Floppy command from the Control menu;
- Select the Eject Floppy button from the lower Virtual PC Toolbar;
- Press Command + 1 on your keyboard.

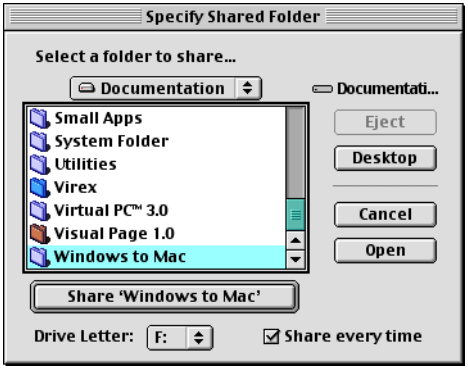
Shared Folder



This feature allows the PC to access a Mac folder as a PC Drive. Use this option to easily transfer files between Mac OS and PC environments. For example, if you have downloaded PC shareware files with your Mac browser, you can share the Mac folder as a PC drive to access the files in the PC environment.

To configure a Shared Folder, click on the Share Folder... button.

The following dialog appears:

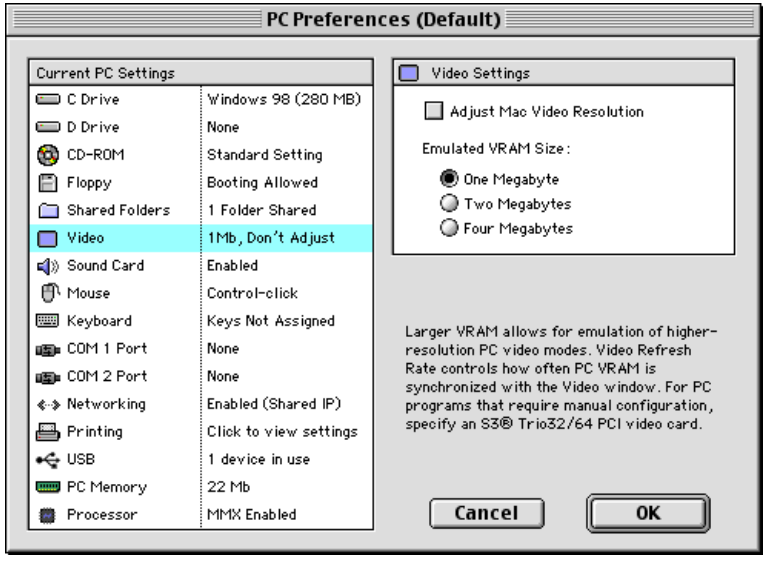


Navigate to the appropriate folder and click the button that says Share '[folder name].' If you would like to have this folder shared every time you use Virtual PC, click the Share every time check box.The Mac folder now appears as a PC drive with the drive letter listed in the Preference box.

You can select a different drive letter from the popup menu.

NOTE: Folder Sharing is not a PC hardware feature. It is accomplished by the Virtual PC additions that are included in your pre-installed hard drive image.

Video



Virtual PC emulates the S3 Trio 32/64 PCI video card.

VESA versions 1 and 2 are supported (VESA compliance is required for some DOS games).

Virtual PC lets you adjust the amount of emulated video RAM (VRAM) up to four MB, which supports many video modes and screen sizes (see below). You change this setting in the Preferences dialog box.

Video resolution can be adjusted to:

- Automatically change Mac monitor resolution to fill the screen when using Virtual PC in full screen mode;
- Support a larger PC desktop or more display colors for PC applications.

Increasing the VRAM size to 2MB or 4MB supports a larger PC desktop and increased resolution options and color depth, such as millions of colors. Increasing VRAM uses additional megabytes of Mac RAM (1MB of Mac RAM for each added MB of VRAM), which reduces the amount of memory available to the PC. Increasing VRAM size is only recommended if you have enough RAM memory available or if the PC software requires increased video resolution.

Use the following table to determine how much VRAM to allocate.

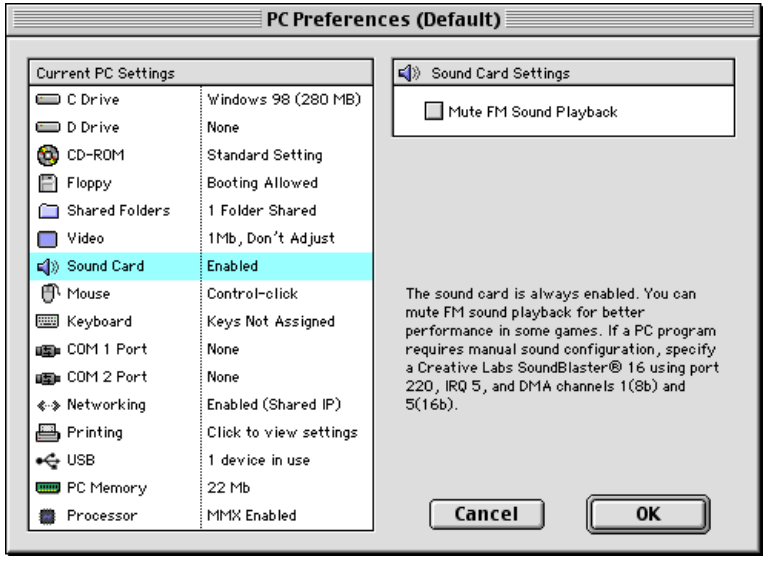
VRAM	Maximum Color Depth	Resolution
1MB	thousands	800 x 600
1MB	millions	640 x 480
2MB	thousands	800 x 600
2MB	millions	800 x 600
4MB	thousands	1600 x 1200
4MB	millions	1152 x 864

The Adjust Mac Video Resolution check box automatically sets the Mac monitor to display in the same screen size as the PC environment. For example, if DOS is set to 640 x 480 resolution, Virtual PC will set the Mac display to 640 x 480 when using full screen mode. This provides an easier-to-read display, filling the entire Mac screen.

NOTE: This feature is only available on systems with multisync monitors. For example, video resolution will not be adjusted on a PowerBook with an LCD screen.

The Mac screen resolution is automatically restored when switching out of Virtual PC.

Sound Settings



Click the Mute FM Sound Playback check box in the Sound Card settings to improve performance on some games.

Unlike the Mac OS, the PC has no standards for sound cards and sound settings. Virtual PC uses a popular sound card, Sound Blaster 16, that is recognized by nearly all PC software.

Because of the variety of sound cards available in PC's, some applications that use sound require manually entering the exact sound card settings when installing or configuring the application for the first time.

The table below shows the appropriate settings used for programs that require manual sound configuration.

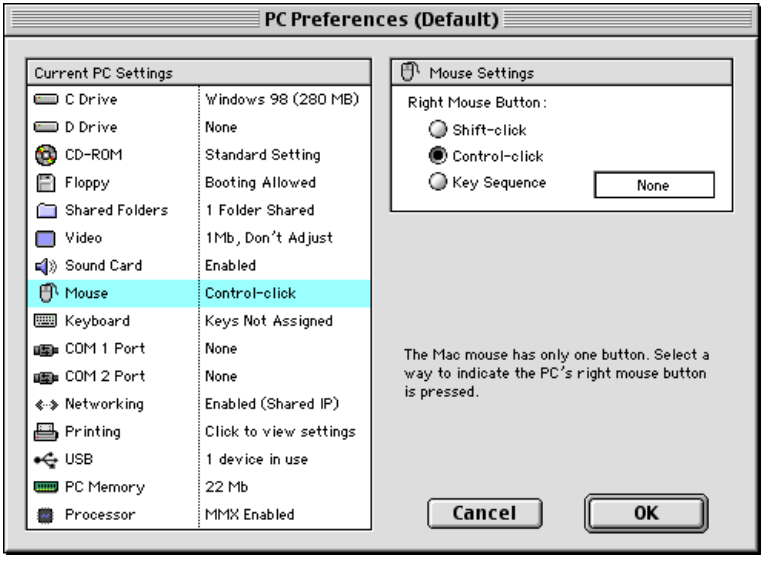
Sound configurations	
Sound card	Sound Blaster 16
Sound Quality	16-bit Stereo with FM Synthesis
Frequency Playback	44 KHz
Base Address	220
IRQ (Interrupt Request)	5
DMA (Direct Memory Access)	1 (for 8 bit), 5 (for 16 bit)

These same settings are used if the application requests MIDI or musical settings.

Sound Input

Virtual PC provides 16-bit, 44Khz sound input through Sound Blaster 16 emulation. This means that you can use a Mac microphone to record sound directly into PC sound applications. You can also record directly from a CD-ROM drive.

Mouse



The PC environment uses two mouse buttons. If your PC software requires a "right click" or Right Mouse Button you can set a key command to be a right mouse click.

Select a Mac key or key sequence to be the right mouse button.

Using a two-button mouse

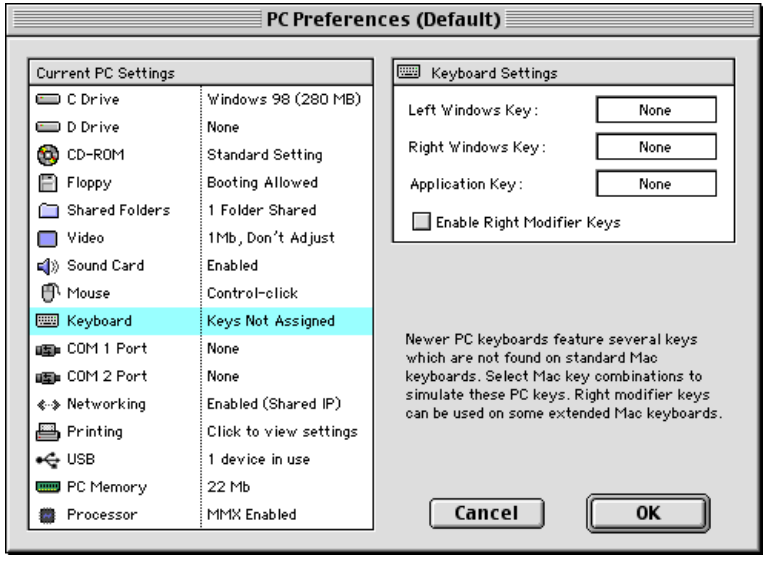
If you have a two-button mouse or trackball that provides software for assigning keyboard commands to a mouse click, you can use the mouse with Virtual PC. Check the manufacturer's instructions that came with the mouse for instructions on assigning the keyboard commands.

If the mouse or trackball supports the standard Cursor Device Manager interface in the Mac OS toolbox and one or more buttons on the mouse are unassigned, Virtual PC automatically uses the next available button to emulate the right button. This works, for example, with Kensington mice when the Kensington software is not installed.

However, many mice and trackballs ship with software that overrides the default behavior (allowing users to assign other actions to buttons). When this is the case, Virtual PC cannot take over the second mouse button automatically.

For instructions on using the Kensington mouse with MouseWorks with Virtual PC, see Chapter 12, *Frequently Asked Questions*. This method may also work with other two-button mouse software from other manufacturers.

Keyboard

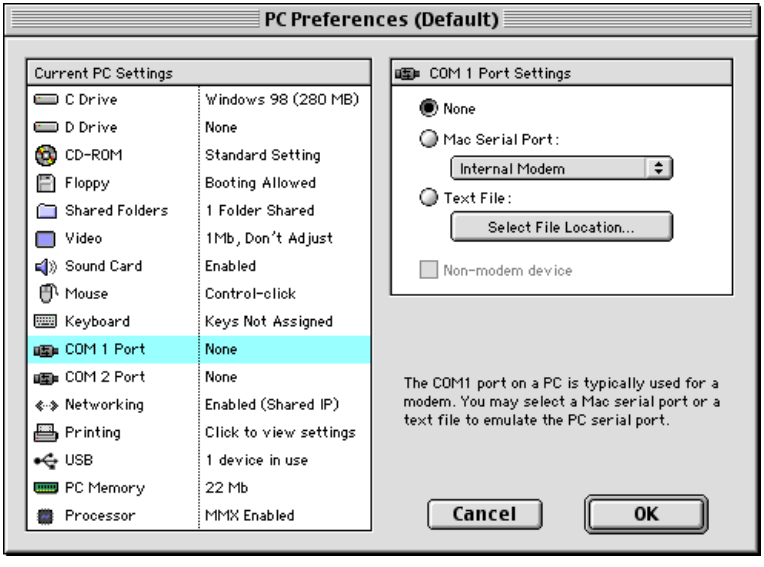


PC keyboards have several keys not found on standard Mac keyboards. Select Mac key combinations to simulate these PC keys.

Enable Right Modifier Keys should be used if the PC program treats the right and left modifier keys differently. For example, a pinball game that treats the two shift keys as controls for the two flippers.

NOTE: Apple keyboards support Right Modifier Keys, but some third party keyboards do not operate correctly in this mode.

COM1 Port



The COM1 in Virtual PC is typically used for a modem. If you have a modem connected to your Mac OS system, select the appropriate port to make it accessible by your PC software. Select the port from the pull down list under Mac Serial Port:.

If you would like PC serial output to be spooled to a Mac text file, you can select the file location through the Text File: Select File Location dialog box.

Hand-held Organizers

Virtual PC provides serial port input for hand-held organizers such as REX and Palm devices.

NOTE: You must use Microsoft Windows to use a hand-held device.

To activate support for a hand-held organizer, do the following:

1. Select either the COM 1 or the COM 2 port;
2. In the Port Settings which display in the right-hand window, click the Mac Serial Port radio button.
3. Select either the Modem Port or Printer Port option from the drop-down menu.
4. Select the Non-modem device check box.
5. Click Restart.

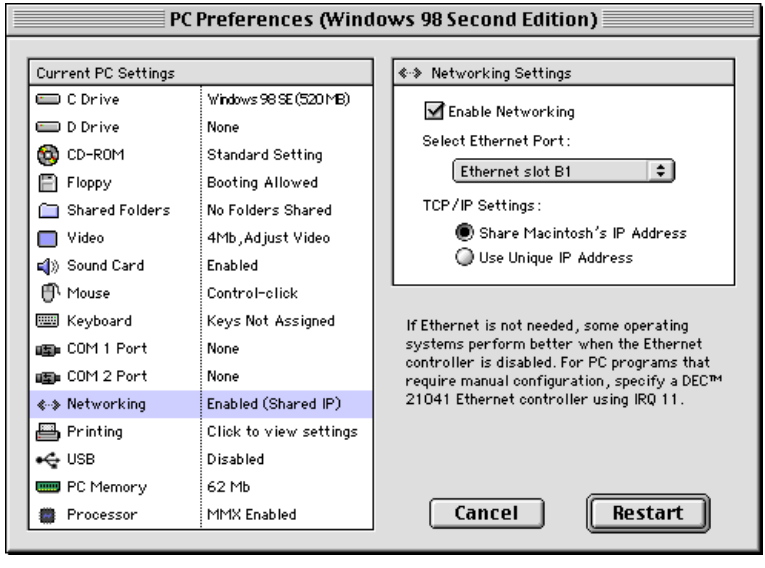
To use your Personal Digital Assistant (PDA) with Virtual PC, install the Windows version of the desktop software for the PDA. Connect your PDA through the serial port that you selected in the Preferences (above), and synchronize with the desktop software. See your PDA user documentation for details.

COM2 Port

The COM2 on a PC is typically used for a serial device or modem. If you have a modem connected to your Mac OS system, select the appropriate port to make it accessible by your PC software. Select the port from the pull down list under Mac Serial Port:.

If you would like PC serial output to be spooled to a Mac text file, you can select the file location through the Text File: Select File Location... dialog box.

Networking



The Networking preference enables networking when the Enable Networking check box is selected. If your Mac is not on a network, or if you are not accessing the Internet through Virtual PC, you can deselect the check box to disable networking; this can prevent possible delays if PC software checks the network controller.

Configuring Network Software

Virtual PC uses a Digital Equipment Corporation™ (DEC) 21041-based PCI Ethernet card for networking. Regardless of the Ethernet hardware installed in your Mac, use the DEC 21041 standard as your Ethernet card setting if you are configuring PC networking.

NOTE: In some cases, the DEC 21041 may show up on your system as Intel 21041. These are the same Ethernet controllers.

For more information on networking, see Chapter 10, *Networking with Virtual PC.*

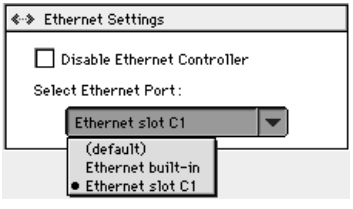
Using Multiple Ethernet Cards

If you have more than one Ethernet card installed, you can select the card you want to use with Virtual PC from the Select Ethernet Port pulldown menu in the Networking Preferences window.

You are given the following three options (or more if you have additional Ethernet cards installed):

- Default (determined by Apple's Open Transport software);
- Ethernet built-in, the onboard Ethernet on your Macintosh;
- Ethernet slot (and additional slots if they have Ethernet cards installed)

NOTE: This pulldown menu only appears when you have more than one Ethernet device.



NOTE: If you have only one Ethernet cable connected to your Macintosh, be sure to use the same Ethernet controller for Virtual PC.

TCP/IP Settings

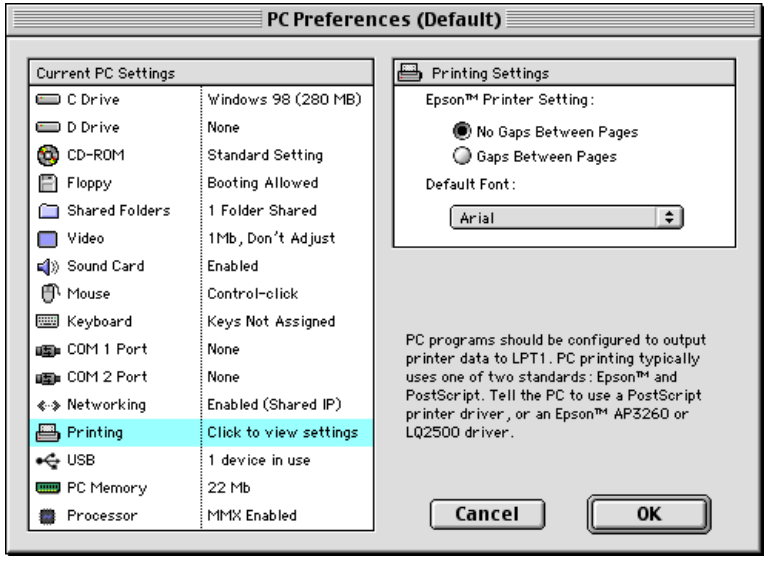
There are two options under TCP/IP Settings: **Share Macintosh's IP Address** and **Use Unique IP Address.**

When you choose to share an IP address, you are able to alternate between your Mac and Virtual PC, and access the Internet without resetting any network information.

When you select **Use Unique IP Address**, your Mac's IP number is not shared with Virtual PC. You must use an IP number that you enter in the Network Control Panel under Windows.

For more information on IP addresses, see Chapter 10, *Networking with Virtual PC.*

Printing



Virtual PC uses the printer that is selected in your Chooser. Before printing, be sure to select a printer in the Chooser.

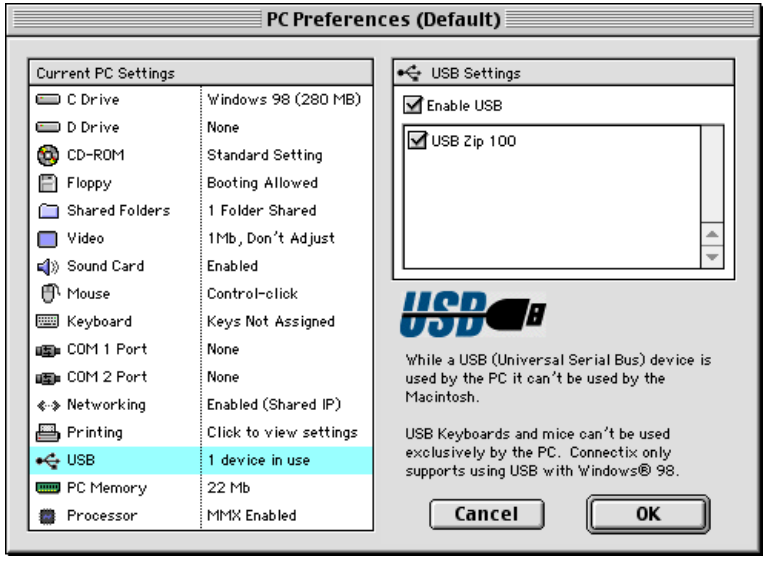
NOTE: If you are using a USB printer in Windows 98 (and you have installed the Windows drivers), you do not need to select the printer in the Chooser.

The PC environment typically uses one of two printing standards: Epson™ or PostScript™. Virtual PC automatically recognizes your Mac printer (if installed) and formats the PC printing output for either Epson (such as an inkjet printer) or PostScript printers (such as the LaserWriter).

Use the Gaps Between Pages option to adjust printing if printed text flows over page boundaries. Also, if you are printing text documents with an Epson driver, you can set the default font—for example, to Arial, as shown in the sample screen above.

For more information on printing under DOS, see the section Printing Under PC-DOS on page 86. For more information on printing under Windows, see the section Using printers on page 61.

USB



If you have USB (Universal Serial Bus) on your Macintosh, you can select USB devices for use with Virtual PC.

NOTE: USB is only recommended for use with Windows 98.

To use USB devices under Windows 98:

1. Make sure that USB is enabled in Virtual PC.

If it is not, click the **Enable USB** check box. When this check box is selected, any active USB device(s) on your computer appear in the USB column.

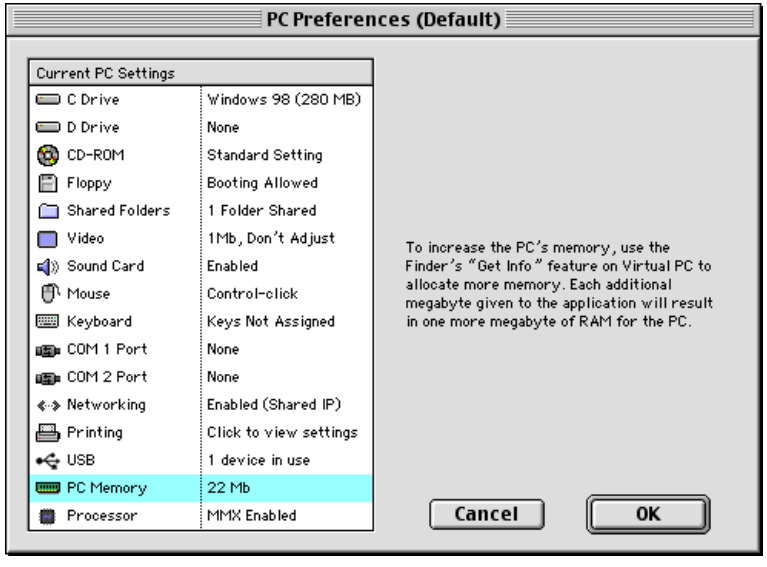
2. Press the **Restart** button.
3. Select the check box for the device(s) you want to use under Virtual PC; for example, USB Zip 100.

NOTE: Your USB devices can be used by Windows under Virtual PC, or by your Macintosh, but not by both at the same time. When the device is selected in the Preferences, it is no longer available to your Macintosh.

4. Click **OK**.

For more information on using USB devices, see Chapter 9, *Using USB Devices with Virtual PC*.

PC Memory



This display provides a quick reference to the amount of PC memory available. The amount of memory allocated to the PC is one of the most critical elements to overall PC software performance.

NOTE: Memory cannot be allocated to an application program while it is open.

You can adjust the amount of PC memory available to Virtual PC; do the following:

1. Click on the Virtual PC icon.
2. Press Command + I. The Get Info dialog box displays.

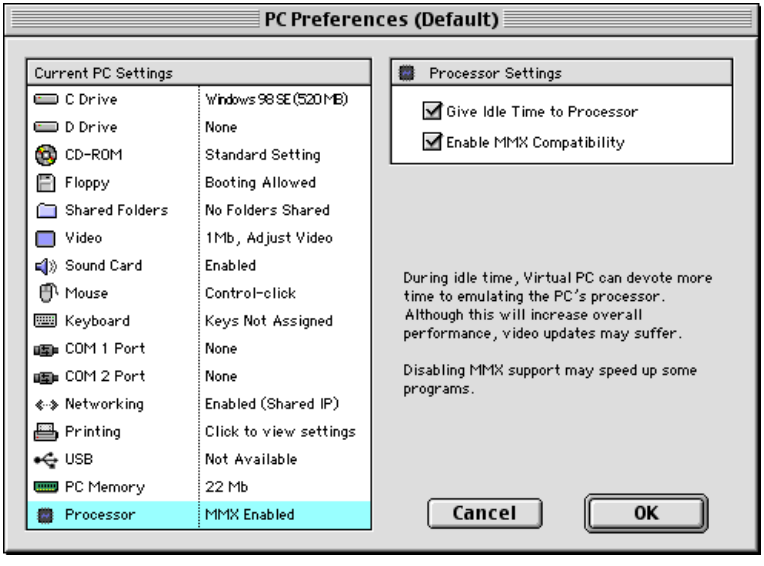
Type in the amount of memory you wish to have Virtual PC use in the Preferred Size of the Memory Requirements box. Every additional MB of memory allocated to Virtual PC results in additional PC memory.

3. Close the Get Info box.

The tradeoff for giving more memory to Virtual PC is having less memory available for other Mac OS applications running simultaneously.

Processor

Virtual PC provides a preferences setting for the processor, including the option to give idle time to the processor and to turn on or off MMX support.



Give Idle time to Processor lets Virtual PC devote more time for emulating the PC's processor; select this checkbox to enable this feature. Note that this increases overall performance; however, it may slow down video updating. If you are using a self-running video application (for example, a slide show) you may want to deselect this check box.

Enable MMX compatibility lets Virtual PC provide MMX support; select this checkbox to enable this feature. If you want to speed up performance of applications that do not require MMX support, deselect this checkbox.

5

Using Windows 95 with Virtual PC

Introduction

This chapter is intended to orient a Macintosh user to the world of Microsoft Windows 95. This chapter is intended for users who have the Windows 95 version of Virtual PC; also, users who have the Windows 98 version should read this chapter, as well as the next chapter on Windows 98.

If you have never worked with Windows 95 before, use this chapter to get started. If you require assistance while in Windows 95, use WinHelp, the built-in online help system (see the section *Getting WinHelp* later in this chapter). Or you can read *Microsoft's Introducing Windows 95* for more information.

For better viewing, you may want to change the Windows 95 display to full screen. To view the full Windows 95 window, click the Full Screen button located on the button of the Virtual PC window. See "Changing the Virtual PC Screen Mode" on page 15.

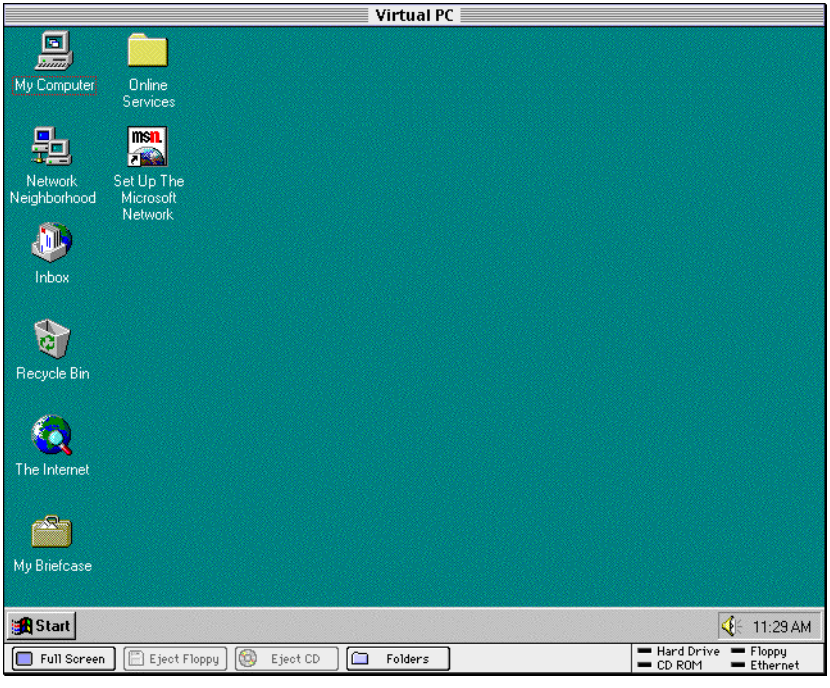
NOTE: If you know how to use Windows 95 already and are more than a novice in using it, you can skip this chapter.

The following basic Windows 95 information is discussed in this chapter:

- The Windows 95 Desktop
- The Start Button and the Taskbar
- Starting and Quitting a Program
- Finding and Opening a Program, Shared Folder, or File
- Switching to DOS Mode
- Changing System Settings
- Installing a Program
- Getting WinHelp
- Shutting Down Windows 95

In addition, there are sections on Using Printers and Joysticks, and using 3D gaming graphics cards.

The Windows 95 Desktop



The Windows 95 desktop consists of the following:

- My Computer
- Network Neighborhood
- Inbox
- Recycle Bin
- My Briefcase
- Set Up The Microsoft Network
- Setup for Microsoft Internet Explorer
- Start Button and Task Bar

My Computer

This desktop icon allows you to access your computer drives including:

- A—Your Macintosh 3 1/2” floppy drive
- C—Your PC hard drive image
- D—Hard drive image (optional)
- E—Your CD ROM drive
- F, G, and so forth—Any shared folders

Network Neighborhood

The Network Neighborhood icon appears on your desktop if you are using a network. Double-click on the icon to browse through the computers on your workgroup or your entire network.

See Chapter 9, *Networking with Virtual PC*, for more information on networking with Virtual PC.

Inbox

If you use Microsoft Exchange for your e-mail, all your incoming e-mail is sent to your inbox. Double-click on the icon to access your mail (You can also set up your Inbox to receive faxes).

Recycle Bin

This icon is your Trash Can for the PC and acts in a similar manner for deleting files, programs, etc.

My Briefcase

Double-click on this icon to display your priority and current document files.

Set Up The Microsoft Network

This function allows you to view and set up access to Microsoft Network, an online service provider.

Setup for Internet Explorer

Not to be confused with Windows Explorer, this desktop function allows you to view and set up connections to the Internet.

Start Button and Taskbar

See the following sections for details.

The Start button and Taskbar are located at the bottom of your screen when you start Windows 95 for the first time. By default, they are always visible when Windows 95 is running.

Using the Taskbar

Located beside the Start Button, the Taskbar initially runs along the bottom width of the screen. However, you can move the Taskbar to the top or sides of your screen. The Taskbar displays buttons representing programs and files as you open, minimize and access them.

As a Mac user, you would normally open files and programs and have them displayed one on top of another on your desktop. Use the Application Menu (in the upper right-hand side of the menu bar) to select the appropriate window from the list which brings it to the front to view.

In Windows 95, the Taskbar organizes the active files and programs for you and represents each one on the Taskbar as a button.

Every time you start a program, file or directory, the button representing that window appears on the Taskbar. When you close a window, the representative button on the Taskbar disappears.

Also, depending on the task, other indicators can appear in the notification area (far right), of the Taskbar. Tasks are graphically shown such as a printer with paper rolling out the top representing a print job being processed. At one end of the Taskbar is the clock. To view or change settings, just double-click the clock or any of the indicators.

Starting and Quitting a Program

Starting a Program

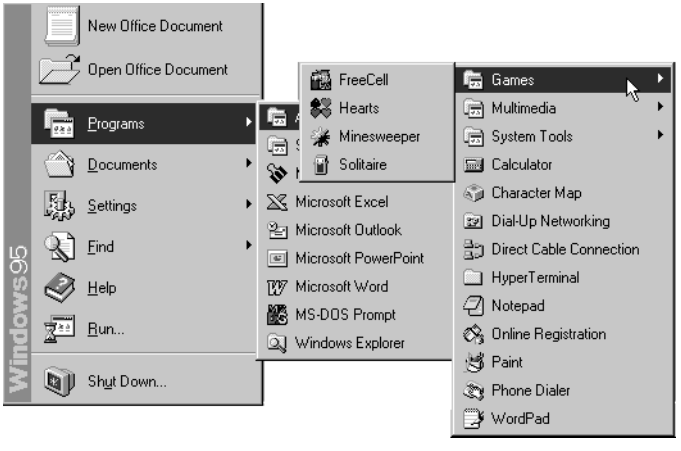
Click on the Start button (bottom left), hold the mouse button down and navigate up the displayed list to Program. Still holding the mouse button down, navigate to the right to access any of the programs available to you on your hard drive.

To see the menu containing everything you need to begin using Windows 95, click the Start button. The Windows 95 menu options include:

Command	Action
Programs	Displays a list of the programs installed on your hard disk

Documents	Displays a list of documents you have opened previously
Settings	Displays a list of system components for changing settings
Find	Enables you to find a folder, file, program or shared computer
Help	Starts Help. You can then use the Help Contents, Index, or other tabs to find out how to do a task in Windows 95
Run	Starts and installs a program, and opens a document, file or folder when you type an MS-DOS command on the Run dialog box
Shut Down	Shuts down, restarts your computer, or logs you off

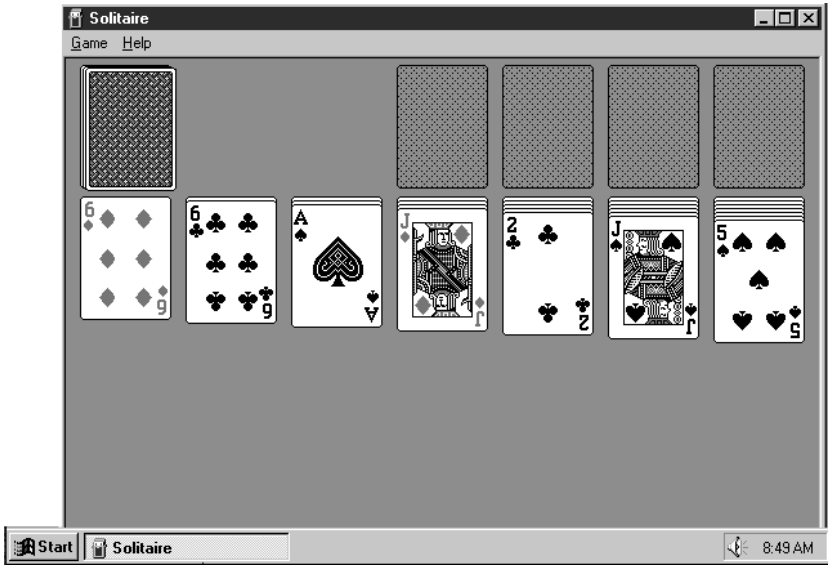
Additional commands may be listed on this menu depending upon the PC software you have on your PC.



To access a game from Programs, navigate to the right to Accessories. Navigate to the right of Accessories and Games displays, then a list of games to the left.

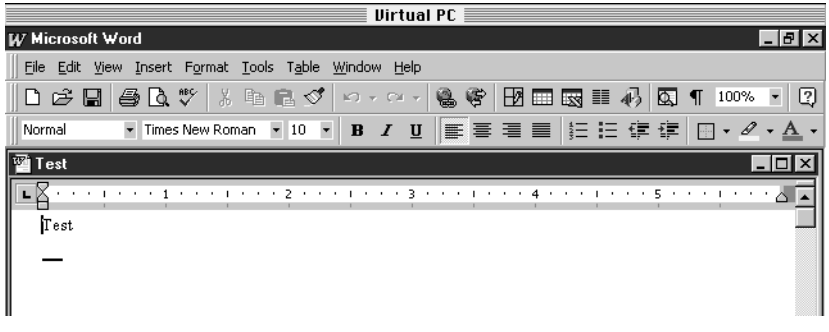
From the list of games, select the appropriate game (i.e., Solitaire) and click to open.

When a game is selected it is represented as a button on the Taskbar, with the game title (or a shortened version of the title), appearing in a 3-dimensional box.



Using the Title Bar

The Title bar above the Menu bar displays for each currently active program, file or directory.



Each Title bar contains the following:

–Program Icon on the left hand side. This icon represents the currently active program.

–Name of the program, file or directory currently active.

–Minimize (– dash), Maximize (window icon) and the Close/Quit (large X) buttons.

NOTE: Be aware of the difference in how the Macintosh and Windows use sizing boxes: the Macintosh uses one sizing box for maximizing or minimizing the size of a window; in Windows 95, the upper right-hand corner contains separate icons for these functions.

- The Minimize button, (– dash) makes the program, file or directory window disappear and the title of the program, file or directory appear on the Taskbar.
  To return to the program, file or directory, select the title on the Taskbar.

  –To switch between minimized programs, click the appropriate program title on the Taskbar to display the program window on your screen.

- The Maximize button (window icon) serves the same function as the sizing button does on the Macintosh—the window display fills your screen.

- The Close/Exit button (large X) on the upper right hand corner closes a file or directory or it can exit the currently active program.

  –The Close button closes a file or directory acting in the same way the close button on the upper left hand corner of a Macintosh screen does. Your file or directory closes. Save your file before using the Close/Exit button.

  –The Exit function quits a program.

Quitting a Program

As mentioned previously, to quit a program, click the Close/Exit (large X) button located in the upper right hand corner of the appropriate Title bar.

Caution: You can have several title bars displayed on your screen at one time. Be careful before clicking the Close/Exit button that you are not closing the program instead of closing a file or directory.

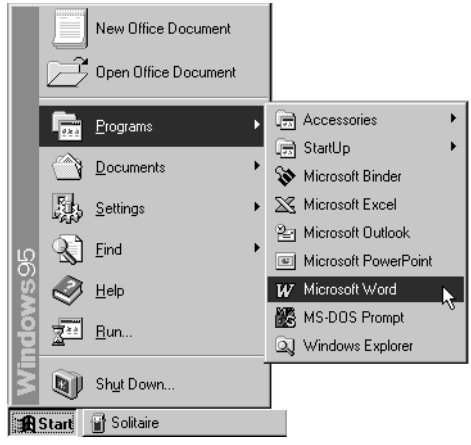
Finding and Opening a Program or File

There are several ways to open a program or file in Windows 95:

- From the Start Menu
- From the My Computer directory
- From the Documents Menu
- From a Program File Menu
- Using the Find Command
- Double click the icon on the desktop

From the Start Menu

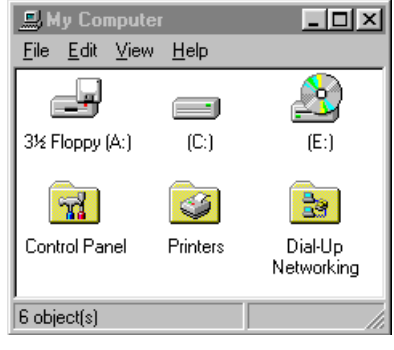
The most common way to open a program is to use the Start button on the lower left hand corner of your screen.



1. Click the Start button.
2. Navigate up the Start list to Programs. A list of programs available to you opens and displays to the right.
3. Navigate down the list of programs. Select the appropriate program by scrolling the cursor down the list to highlight it.
4. Click on the program title (i.e. Microsoft Word) and the program opens.

From My Computer

Use the My Computer view to find and open a program, game or file in Windows 95.



1. From your Windows 95 desktop, find and double-click on the My Computer icon.

   The following icons display according to the hardware you have installed:

–3 1/2 floppy drive (A drive)

–your C: hard drive image (C drive)

–your D: hard drive image (D drive, if available)

–CD-ROM drive (E drive)

–Control Panel

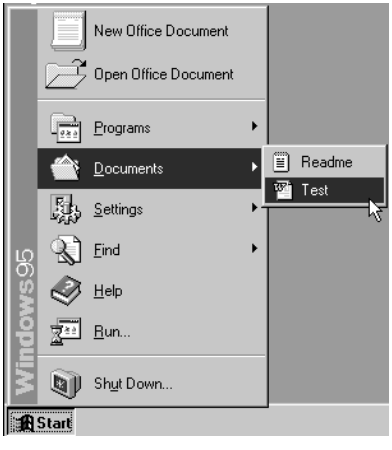
–Printers

–Dial-Up Networking Folder

–Shared Folder drive (F, G, H, etc. drives; these are optional)

2. Double click on C hard drive, (hard drive icon).
3. The C hard drive directory displays.
4. Scroll down the directory displayed to the appropriate program, game, folder or file.
5. Select and double click to open.

From the Documents Menu

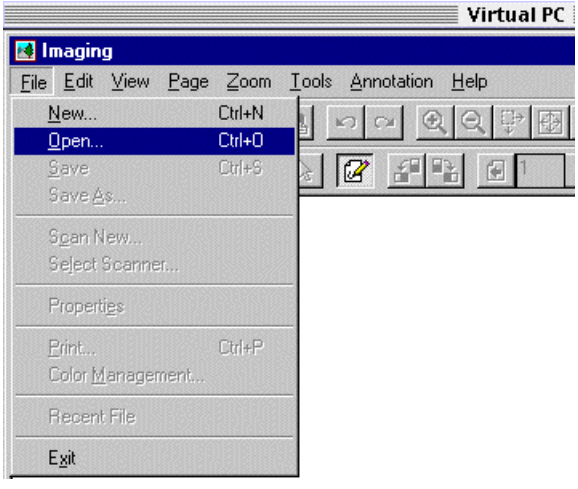


1. From the Start button, navigate up the command list to Documents.

A list of recently activated documents displays.

2. Select the required document from this list. The application program this document was generated from automatically opens, then the document opens.

From a Program File menu



If you are in a program and want to access a program file:

1. Navigate from the File menu down to the Open command.

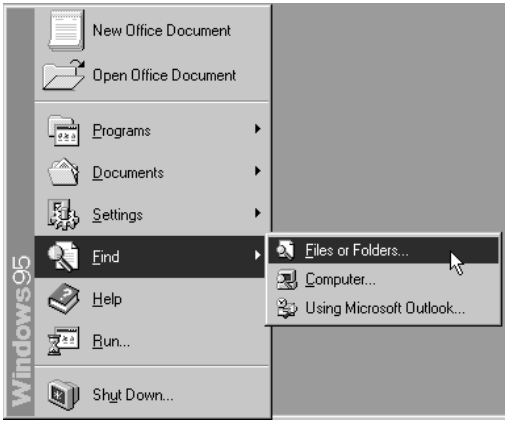
The directory that is currently active, displays.

2. Select the appropriate file from the directory to open and display it.

If the file is not in the currently active directory:

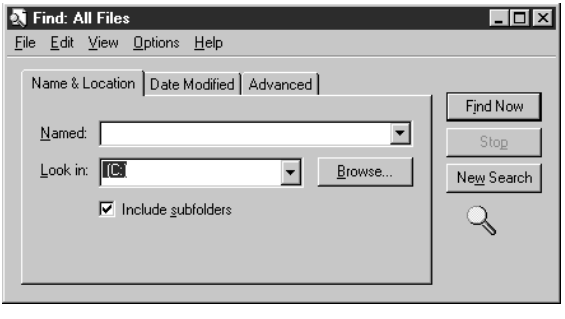
1. Click on the C drive to display folders with files in them.
2. Select the appropriate folder to display the list of files contained in the folder.
3. Select the file with the appropriate program icon to open and display the file.

Using the Find Command



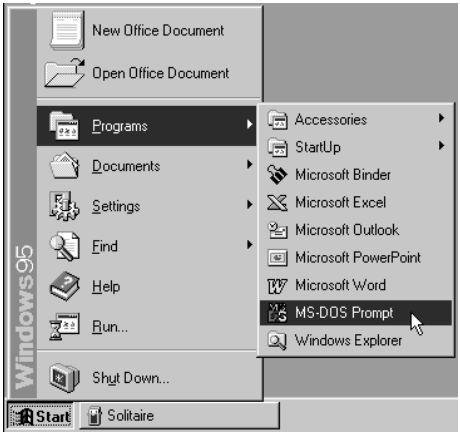
To use the Find command to find a file or folder:

1. From the Start button, navigate up the command list to the Find command.
2. A list to the right of the Find command displays including Files and Folders.
3. Select Files and Folders.
4. A dialog box opens with a Named and a Look In box for you to type in information.
5. Click the Named box then type the name of the file or folder you want to find.



- To specify where to search, click the arrow next to the Look In box and verify that this is the correct disk letter (i.e., Hard disk [C]), or select the appropriate disk letter from the pulldown menu.
- Or click the Browse button to search on the hard disk for the required file or folder.
- To start the search, click the Find Now button.

Switching to DOS Mode



From the Start button, navigate up the command list to the Program command.

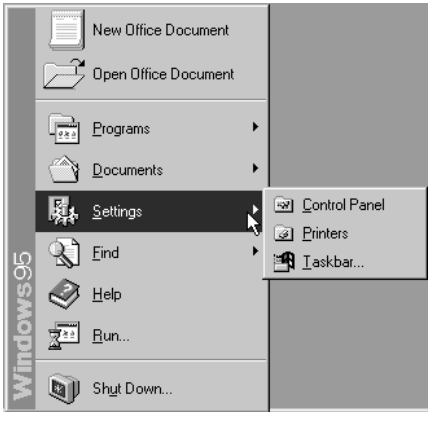
1. Navigate up the Start list to Programs.

A list of programs available to you opens and displays to the right.

2. Navigate down and to the right of the list of programs to the MS-DOS Prompt.
3. Click on the MS-DOS Prompt icon.

The `C://` prompt displays and you are in DOS.

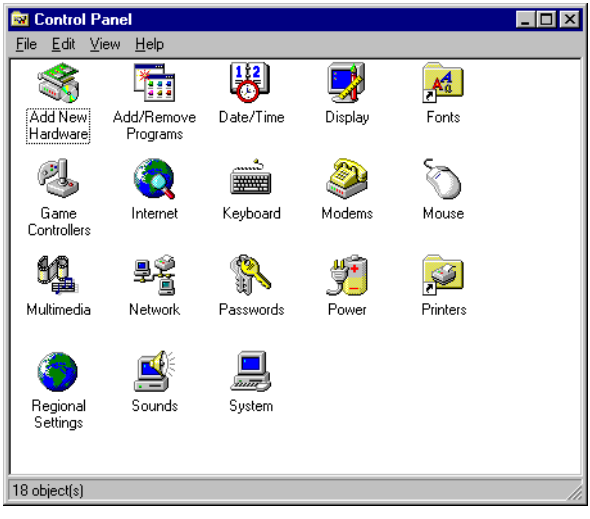
Changing System Settings



From the Start button, navigate to Settings, which includes the following:

- Control Panel
- Printers
- Taskbar

Using the Control Panel



Some of the things you can use the Control Panel for are:

- Changing your screen colors and desktop size
- Installing or changing settings for hardware and software
- Setting up or changing settings for printing and networking
- View your fonts, view and change your date and time settings, view and set your mouse settings, and view and set your internet access.

To use the Control Panel:

1. Click the Start button, navigate to Settings, then click Control Panel.
2. Click on the appropriate control panel icon to view or change settings.
3. Follow the instructions as displayed in the dialog boxes and click the OK button when completed.

Using printers

Virtual PC installs two printers:

- Mac Printer (PostScript)
- Mac Printer (Inkjet). This printer is set as the default.

NOTE: Before you print, make sure a printer is selected in the Chooser.

Viewing or changing printer settings

To view your printer or to change the printer settings:

1. Click the Start button, navigate to Settings, then click Printers.
2. Your printer dialog box opens.
3. Select the printer that you wish to use or modify.

Making a PostScript printer the default

The default printer for Virtual PC is the Mac Printer (Inkjet). To make a different printer (such as the Mac printer [PostScript]) the default, do the following:

1. In the Start menu, select Settings.
2. Select Printers.
3. Click on the printer you want to make the default.
4. From the File menu, select Set As Default.
5. Click Close.

Printing to a Windows Networked Printer

If you are printing to a printer that is attached to a Windows network, be sure to install the correct driver for the printer.

To add a Windows networked printer:

1. Double click the Add Printer icon.
2. Follow the instructions on your screen to setup an additional printer.

When the printer is added, an icon representing it displays.

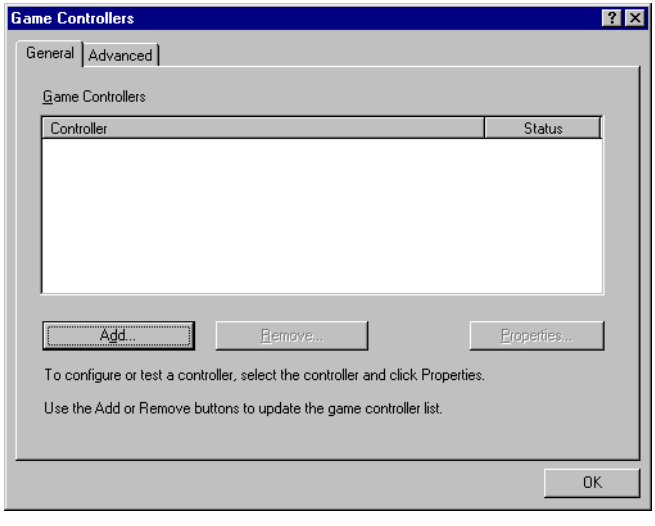
Adding Joysticks

You can use a joystick with Virtual PC by installing the Virtual PC joystick controller software within Windows.

NOTE: Joystick support requires Apple's InputSprockets. *For your convenience, the InputSprockets Installer is located on the Virtual PC 3.0 CD.*

To add a joystick, do the following:

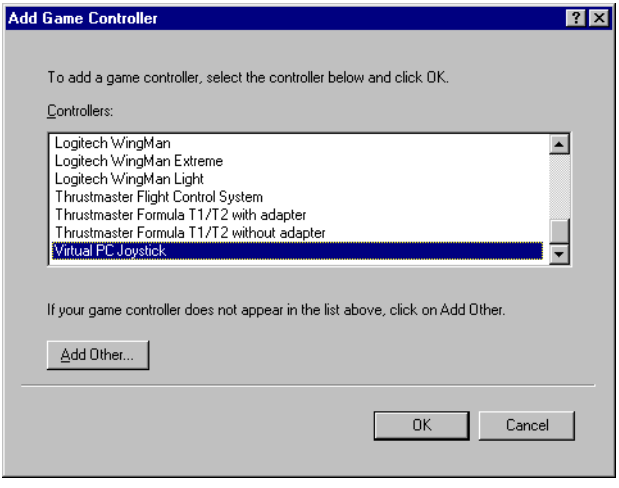
1. Plug in the joystick.
2. From the Start menu, select Settings.
3. Select the Control Panel and double-click.
4. Select Games Controllers and double-click.
5. The Games Controllers dialog box appears.



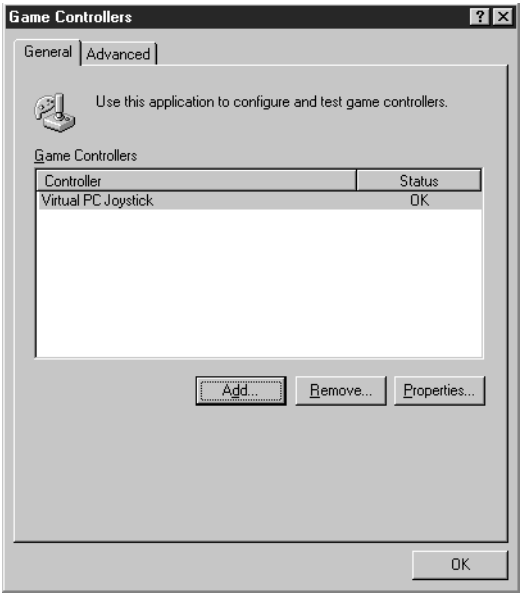
6. Click the Add button.

The Add Games Controller dialog box appears with a list of joysticks drivers;.

7. Scroll down to the Virtual PC Joystick selection, and select it.
8. Click OK.



This opens the Games Controller dialog box, where you can calibrate the joystick.



9. Click Properties.
10. Click the Calibrate button.

11. Follow the instructions on the screen.
12. Click the Finish button.

Using 3Dfx graphics accelerator cards

Virtual PC directly accesses 3D graphics accelerator cards that are based on the 3Dfx Voodoo Graphics or Voodoo2 chip set, such as TechWorks' Power 3D card or Voodoo2 Game Wizard from Micro Conversions. The card must handle 3D graphics only; it cannot be a combined 2D/3D hardware card.

Using 3Dfx cards with Virtual PC requires drivers that are not included. If your card came with drivers for Windows, you must install them. See the instructions that came with your card. If your card did not come with Windows drivers, go to the Web site for the manufacturer of the card. If you cannot find the drivers, you can also see the 3Dfx Interactive Website; it provides reference drivers that may work with your card.

NOTE: Be sure to read and follow the installation instructions!

NOTE: You must have a Power PC-based Mac with PCI slots to use these cards.

Using the Taskbar

You can make modifications to the Taskbar, such as showing the clock or adding or deleting items to the Start menu. To change the settings in the Taskbar:

1. Click the Start button
2. Navigate to Settings
3. Click Taskbar

The Taskbar Properties dialog box opens and displays two tabs: Taskbar Options and Start Menu Programs. Use these dialog boxes to make modifications, then click OK.

Installing a Program

There are two ways to install a program:

- Using the Control Panel and selecting the Add/Remove Programs icon
- Using the Run command

NOTE: Connectix recommends that you use the Control Panel method of installation.

Using the Control Panel to Install a Program

To use the Control Panel to install a program, do the following:

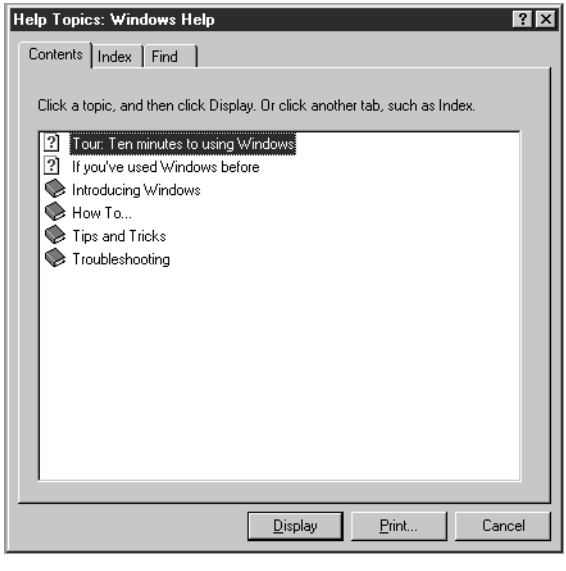
1. Click the Start button, navigate to Control Panel.
2. Click on the Add/Remove Programs icon.
3. Click on Install.
4. Follow the instructions as displayed to add a program.

Using the Run Command to Install a Program

To use the Run command to install a program, do the following:

1. Insert the program's first installation floppy disk or CD-ROM into the appropriate drive.
2. Click the Start button, navigate to Run and click on Run.
3. The Run dialog box displays. Verify that you have the correct drive and the setup command displayed in the dialog box.
4. Click the OK button to run the installation program.
5. Follow the program's installation instructions as displayed.

Getting WinHelp



To access Online Help for Windows 95:

1. Click the Start button, and then click Help.
2. The list of Help topics displays. You can also use the Tabs to search for information in other ways.
3. Select the topic required and click the Open button.
4. The topic's contents displays.

Shutting Down Windows 95 and Virtual PC

Virtual PC automatically shuts down the Windows environment when you quit Virtual PC. Or, you can choose to shut down Windows:

1. Click the Start button, navigate to Shut Down, and click once.

The Shut Down Windows dialog box displays.

2. The selected radio button is Shut down the computer?
3. Click the Yes button to shut down Windows 95. A prompt reminds you to save changes to your open documents. Virtual PC also quits automatically.

6

Using Windows 98 with Virtual PC

Overview of Windows 98

This chapter is intended for users of Virtual PC with Windows 98. It explains the new features of Windows 98. It does not reproduce any information that is contained in Chapter 5, *Using Windows 95 with Virtual PC*. Instead, it explains how Windows 98 is different from Windows 95. If you have never used Windows 95, be sure to read Chapter 5, *Using Windows 95 With Virtual PC*, because that information is relevant to using Windows 98 as well.

If you have Virtual PC with PC-DOS, you can install your own copy of Microsoft Windows. For information, See "Installing Windows 98 or Windows 95" on page 91.

For more detailed information on Windows 98, see the manual *Getting Started with Microsoft Windows 98* supplied with Windows 98, or the Windows 98 online help system.

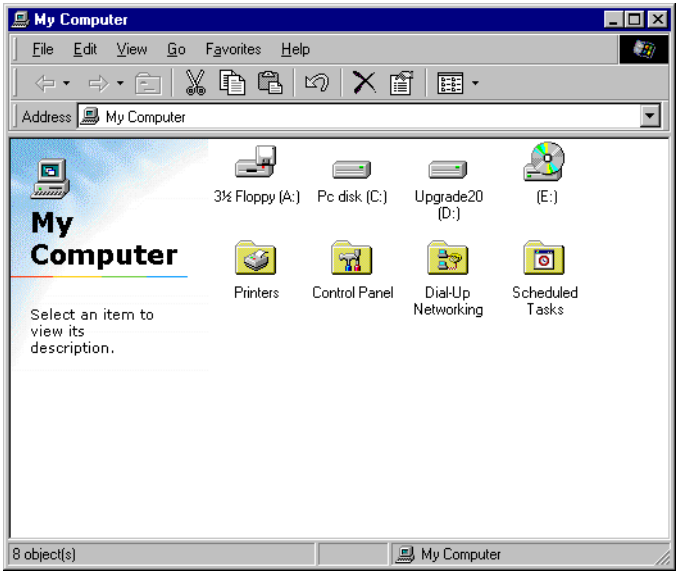
The Windows 98 features covered in this chapter include:

- Web integration
- "Browser" option for the desktop
- Easier Internet access
- New Start menu features, including:
  - Quick Launch toolbar
  - Task scheduler
  - Favorites folder
- New Settings options, including:
  - Taskbar & Start Menu
  - Folder options
  - Active Desktop

- FAT32 and FAT32 Drive Converter utility
- HTML-based Help
- Internet communications tools

Web Integration

The main change from Windows 95 to Windows 98 is the tight integration of the desktop and applications with the World Wide Web (WWW). Many applications (including those in Microsoft's Office 97 and Office 2000, such as Word and Excel) now are Web-aware, so that you can open URLs from within the application itself.



"Browser" option for the Desktop

The Windows 98 desktop is designed to appear like a browser, with forward and backward buttons, an address bar for entering pathnames (like URLs in a browser) and other features.

In addition, Microsoft's Internet Explorer is integrated with the desktop so that you can click on a URL from a file or a Help window and launch the browser to directly locate information on the Web. This can be especially helpful when you want up-to-date information on a software product or new feature of Windows.

Easier Internet Access

Windows 98 includes Wizards that simplify the process of connecting your computer to the Internet.

See Chapter 10, *Networking with Virtual PC*, for more information on setting up Internet access.

New Start Menu Features

The Start menu is your usual point of access to Windows programs, and there are several new features in Windows 98 to facilitate your routine tasks.

Quick Launch Toolbar

The Quick Launch toolbar is a new feature on the taskbar that provides four quick-launch buttons:

- Internet Explorer
- Outlook Express (e-mail)
- Show Desktop
- Channels

These four buttons are always available when you are in an application so that you can go directly to them without leaving the application.

Task Scheduler

You can have Windows 98 perform routine maintenance tasks when you are not at your computer, for example, at night. These tasks can include checking your email and downloading large files, examining your hard disk for errors, and defragmenting your hard disk.

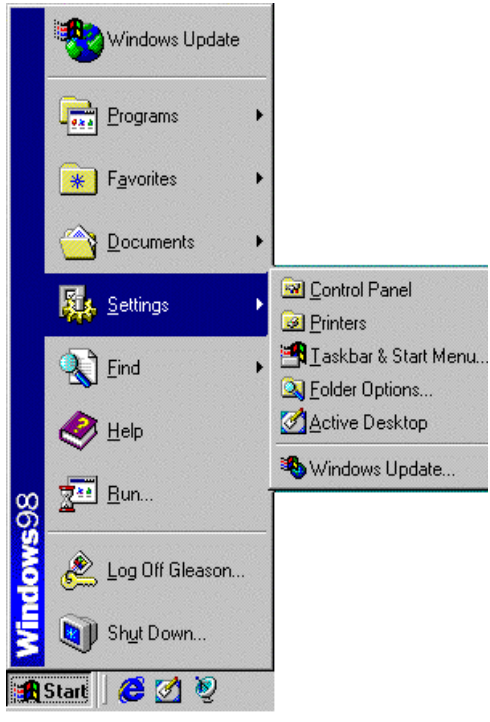
Click on the Task scheduler in the taskbar and follow the instructions for setting up automated tasks.

Favorites Folder

The Favorites folder is a new addition to the Start menu that lists useful Web sites. It comes with preinstalled categories, including Web channels and links and Web sites for automatic updates.

New Settings Options

Under Settings, Windows 98 provides several new options for customizing your hard disk and how you access programs, files and Web pages.



Taskbar & Start Menu

You can make modifications to both the Taskbar and Start menu from the Settings.

Taskbar options include:

- Always on top (keep the Taskbar on top of applications windows);
- Auto hide
- Show small icons in Start menu
- Show clock

Start Menu options include:

- Customize the start menu (add programs' icons)
- Documents menu

Folder Options

You can modify the way Windows 98 displays your folders using the Folder Options selection on the Start menu.

General Folder Options include:

- Web style (make your Desktop look like a Web page)
- Classic style (make your Desktop look like Windows 95)
- Custom (use your own settings).

View Folder Options include:

- Files and folders (choices of how files and folders are displayed, file attributes, details and so forth)
- Visual Settings (window contents, Web display and smoothing fonts)

File Types Options let you choose which file types are displayed and the icons that represent each file type.

Active Desktop

Windows 98 provides extensive integration of the World Wide Web with your desktop, including the Active Desktop, which essentially lets you place active Web links on your desktop. Active Desktop includes a number of Web-related features, including the Channel bar.

You can use the Channel bar to access a number of Web channels that send you information dynamically from their Web sites directly to your desktop.

FAT32 and FAT32 Drive Converter Utility

Windows 98 includes an improved version of the File Allocation Table (FAT) file system that uses space on large disks more efficiently. By using the Driver Converter utility to convert from FAT16 to FAT32, you can create more space on your hard drive. A graphical conversion utility lets you quickly and safely convert a hard drive to FAT32.

To use the FAT32 conversion utility, go to the Start bar, navigate to Programs, Accessories, System Tools, and select Drive Converter (FAT32).

The minimum hard drive size for using the FAT32 conversion utility is 512MB.

NOTE: The Virtual PC hard drive expander can only expand drives formatted using the FAT16 file system. If you convert a drive image to FAT32, you cannot use the hard drive expander to increase its size.

HTML-based Online Help

Windows 98 includes an HTML-based online help system that assists you in finding the latest help information. This dynamic help system is regularly updated, is extensible and enables simplified help searching.

Internet Communications Tools

Windows 98 comes with a suite of communications tools that includes:

- Outlook Express, an e-mail and news reading client
- Personal WebServer, an easy way to publish Web pages
- Microsoft FrontPage HTML editor
- Microsoft NetShow Streaming multimedia services.

To access these tools, go to Programs then Internet Explorer.

7

Using PC-DOS with Virtual PC

Introduction

This chapter is an orientation to the basics of PC-DOS (Personal Computer Disk Operating System) commands. PC-DOS is included in the PC-DOS version of Virtual PC.

NOTE: If you have either Windows 98 or Windows 95 versions of Virtual PC, PC-DOS is not included. The Windows versions include MS-DOS, which is similar in many respects, though some commands have different names.

If you have never used PC-DOS before, use this chapter to get started. If you require assistance while in PC-DOS, use PC-DOS Help (See this chapter, *Getting PC Help f*or details), or you can read the *IBM PC-DOS Concise User's Guide* for more information (if you have the PC-DOS version of Virtual PC, the PC-DOS manual is included on the Virtual PC CD-ROM as a .PDF file).

PC-DOS is a command line interface. This means that all actions are executed by typing in the appropriate commands at the PC-DOS command line or `C:\` prompt—from creating a folder, to moving or copying a file, to running an application program or game.

Also, be aware that the mouse does not work in the PC-DOS command-line environment. To recover control of your mouse, hold down the **Command** key.

PC-DOS is installed with Virtual PC for PC-DOS. If you have this version of Virtual PC, when you start up Virtual PC, PC-DOS automatically starts up as well.

The following basic PC-DOS information is discussed in this chapter:

- The Command Prompt
- Typing a Command
- The PC-DOS Directory
- Copying Files
- Renaming Files

- Deleting Files
- Wildcard Commands
- Editing a file
- Printing Under PC-DOS
- Getting PC-DOS Help

The Command Prompt

When you first enter PC-DOS, a lot of installation information appears on the screen, much like extension icons loading when you boot your Macintosh. This part of the PC-DOS process is not critical to actually working in PC-DOS.

When the information stops scrolling past, you see the following on a black background in white letters:

```
C:\>_
```

This is called the *command prompt*. You are being prompted to enter a command that PC-DOS can execute.

The flashing underscore next to the command prompt is called the *cursor*. The cursor shows you where you can begin to type in the command at the prompt.

Typing a Command

To type a command at the command prompt:

1. Type the following command at the command prompt (you can type the command in either uppercase or lowercase letters):

   ```
   ver
   ```

2. Press the **Enter** key.

The **ver** command displays the version number of PC-DOS.

There are hundreds of commands in PC-DOS, but you need to know just a few in order to perform essential tasks such as accessing files, copying and deleting files, and working with directories.

You can get quick assistance by using PC-DOS Help (see the section Getting PC-DOS Help on page 90).

The PC-DOS Directory

Directory Contents

The `C:\` prompt represents your current location which is the top or root, level of the C drive. The C drive is PC hard drive image. The blinking cursor indicates that you are to type in the file or directory you wish to access.

To View the Directory (dir) List of Files

- Type the following at the command prompt:

```
dir
```

- A directory list similar to the following displays rapidly:

```
Volume in drive C is PC DISK
Volume Serial Number is 3AF1-41A7
Directory of C:\
CONFIG   SYS         135 07-15-97  10:03a
COMMAND  COM      52,956 11-17-94   1:00p
CNTX         <DIR>       07-23-98   6:33p
DOS          <DIR>       07-23-98   6:33p
AUTOEXEC BAT         173 07-03-97  11:55a
        5 file(s)       53,264 bytes
                   132,734,976 bytes free
```

To View the Contents of a Directory One Screen at a Time:

- Type the following at the command prompt:

```
dir /p
```

One screen of information displays and pauses. At the bottom of the screen, the following message displays:

```
Press any key to continue.
```

- To view the next screen of information, press any key on the keyboard. Repeat this step until the command prompt appears.

When the dir command is typed and includes **`/p`** as part of the command, PC-DOS is told to pause after displaying each screen of directory information. The information pauses at each screen display for better viewing.

This type of command is called a switch which modifies the way PC-DOS carries out a command. Generally, a switch consists of a forward slash (/) that is followed by one or more letters or numbers.

A directory list is a list of all the files and subdirectories that a directory contains. See *Creating a Directory* in this chapter, for details. In this example, you see all the files and directories in the main or root directory of your drive.

To View the Contents of a Directory in Wide Format

- Type the following at the command prompt:

```
dir /w
```

The directory list displays, with the filenames listed in wide format. Only filenames are listed. No information about the files' size or date and time creation appears.

- If the directory contains more files than will fit on one screen, you can combine the **/p** and **/w** switches as follows:

```
dir /w /p
```

Wildcard Commands

A wildcard command allows you to include all the files you specify to be affected by the command. You can include multiple wildcards in a command. For example, the following command lists all the files from the current directory:

```
dir *.*
```

All the files in the current directory are displayed.

Changing Drives

PC-DOS allows you access other drives used to store information by their assigned letters. Drive A is your floppy disk drive. Drive C and D represent your internal hard drives and Drive E represents your CD ROM drive. Mac Shared Folders can be identified by letter F: and beyond (see the section *Shared Folder* in Chapter 4). There may be other drives, and each one is assigned a letter. Each drive can contain files you can access and view.

1. To change to a different drive and view files:

- Type the following at the command prompt:

```
a:
```

The command prompt changes to the following:

```
A:\
```

The message may appear:

```
Not ready reading drive A Abort, Retry, Fail?
```

2. If you see this message, there is probably no floppy disk in the A drive. Insert a floppy disk into the A drive; then type:

```
r
```

for Retry.

3. To view a list of the files on the floppy disk in drive A, type the following at the command prompt:

```
dir
```

A list of the files on the disk appears.

4. Change back to drive C by typing the following at the A drive command prompt:

```
C:
```

When you type a drive letter followed by a colon, PC-DOS changes to that drive. The drive letter that appears in the command prompt shows which drive is the *current drive*. Unless you specify otherwise, any commands you type are carried out of the current drive and in the current directory.

For example, you can view the file on a disk in drive A without switching to drive A.

1. Type the following at the command prompt:

```
dir A:
```

A list of the files on the floppy disk in drive A appears, even though your command prompt indicates that drive C is current.

By specifying **A:** after the **dir** command, PC-DOS shows the list of files and directories on Drive A and not on Drive C. The **A:** you typed after the **dir** command is called *a parameter*. Parameters specify what a command should act on.

Changing Directories

All the names that have <DIR> beside them are directories. You can see a list of the files in another directory by changing to that directory, and then using the dir command again. In the following example, you change from the *root* directory to the PC-DOS directory.

To Change From the Root Directory to the PC-DOS Directory

1. To change directories, use the cd command or change directory command.

- Type the following at the command prompt:

```
cd dos
```

The command prompt changes and looks like the following:

```
C:\DOS>
```

The command prompt shows the current directory, the PC-DOS directory.

2. To view a list of the files in the PC-DOS directory, use the dir command to view a list of the files in the PC-DOS directory.

- Type the following at the command prompt:

```
dir
```

A list of the files in the PC-DOS directory appears, but scrolls by too quickly to read. .

NOTE: The Change Directory command without a back slash only goes down to a subdirectory. To change to other directories, you must use a back slash before typing the directory name.

Return to the Previous or Root Directory

1. To change to the Root Directory, type the following at the command prompt:

```
cd \
```

Note that the slash you type in this command is a backslash (\), not a forward slash (/). This command always returns you to the root directory of a drive.

The command prompt looks like the following:

```
C:\>
```

To switch back to the previous directory, type the following:

```
cd ..
```

Creating a Directory and Subdirectories

As with a Mac folder of files, in the PC-DOS environment files are organized or grouped into a directory. A directory is created using the md command. The md command represents make directory.

This command:

- creates a directory
- changes or moves to a directory
- creates a subdirectory

Example:

1. To create a new directory in PC-DOS named dogs:

- Type the following at the command prompt:

```
md dogs
```

A new directory named dogs is created and can contain files for various dog types such as hounds, terriers, etc.

2. To change or move to the new dogs directory from the current directory:

- Type the following at the command prompt:

```
cd dogs
```

The command prompt displays as follows:

```
C:\dogs>
```

The Mac OS allows you to create a subdirectory within a directory by creating a folder within a folder. By comparison, PC-DOS creates a subdirectory within a directory.

Creating a subdirectory within a directory

Create a subdirectory within the dogs directory named hounds:

1. Type the following at the command prompt:

```
md hounds
```

2. To confirm that you successfully created the hounds subdirectory, type the following command at the command prompt:

```
dir
```

There are three entries in the dogs directory list. One is the hounds subdirectory just created. The other two entries appear as:

- a single period (.)
- a double period (..)

These subdirectory entries appear in every PC-DOS directory.

The hounds directory is now a subdirectory of the dogs directory.

Changing a Directory

To change or move to the hounds directory,

1. Type the following at the command prompt:

```
cd hounds
```

The command prompt displays:

```
C:\dogs\hounds>
```

2. To switch back to the dogs directory, type the following:

```
cd..
```

The command prompt displays:

```
C:\dogs>
```

Deleting a Directory

To delete a directory (or subdirectory), use the rd command. The rd command stands for remove directory.

To delete the hounds subdirectory

1. Verify that the command prompt looks like the following:

```
C:\dogs>
```

2. At the command prompt, type:

```
rd hounds
```

To confirm that you successfully deleted the hounds subdirectory, type the following at the command prompt:

```
dir
```

The hounds subdirectory should no longer appear in the directory list under the dogs directory.

Note: You cannot delete a directory if you are in it. Before you can delete a directory, you must type **cd** *at the command prompt. If the directory contains a file, the command,* **rd** *will not remove it. To remove a directory containing files, use the* **deltree** *command.*

Copying Files

To copy a file, use the **copy** command and include three parameters:

- the location of the directory
- name of the file to copy, or the source.
- the **destination** where the file copy is to go.

Separate the source and destination with a space. The **copy** command follows this pattern:

```
copy source destination
```

Copying a Single File

To copy the EHELP.HLP file from the PC-DOS directory to the dogs directory, return to the root PC-DOS directory.

1. Type the following at the command prompt:

```
cd \
```

2. Change to the PC-DOS directory by typing the following at the command prompt:

```
cd dos
```

To copy the EHELP.HLP file from the PC-DOS directory to the dogs directory, type the following at the command prompt:

```
copy c:\dos\ehelp.hlp c:\dogs
```

The following message appears:

```
1 file(s) copied
```

The command copies the file from its source to its destination.

To summarize:

- By specifying `C:\DOS\EHELP.HLP` as the source, DOS finds the source file `EHELP.HLP` on drive C in the DOS directory.
- By specifying `C:\dogs` as the destination, PC-DOS places the copy of `EHELP.HLP` on drive C in the dogs directory.

Copying a Group of Files

Wildcards

Use wildcards to copy a group of files from the PC-DOS directory to the dogs directory. The asterisk (*) wildcard matches any character in that position and all the other positions that follow it.

For example, list all files ending with the extension `.INF` and then copy them from the PC-DOS directory to the dogs directory by using wildcards.

1. At the command prompt, list and view all the files in the PC-DOS directory that end with the extension .INF by typing the following at the command prompt:

```
dir *.inf
```

NOTE: There is a space before the asterisk (*), but not after it.

This command lists all files and subdirectories in the current directory that end with the extension .INF. The asterisk matches the first character of the filename and all other characters that follow it, up to the period (.) that separates the name from the `.INF` extension.

For example, to copy files with a `.INF` extension to the dogs directory:

- At the command prompt, type:

```
copy *.inf c:\dogs
```

This command copies all the files that have the `.INF` extension from the current PC-DOS directory to the dogs directory.

File Naming: The Rule of 8.3

PC-DOS file naming requires you to use the 8.3 rule of naming a file with a maximum of 8 alphanumeric characters followed by a dot, followed by an extension maximum of 3 letters. For example:

```
filename.doc
```

Macintosh and Windows users can create file names up to 32 characters in length. This can lead to confusion when files are copied from one environment to another. For example, with PC-DOS, a Mac file named:

```
letter to my boss
```

should be named in PC-DOS format as:

```
bosslet.doc
```

or other variation, such as

```
bosslet.txt, bosslet.ppt, bosslet.cvs
```

The extension of three letters at the end of the file name represents the application program that created the file. For example, the extensions:

```
.doc, .ppt, .cvs
```

represent files written in Microsoft Word; Microsoft PowerPoint (.ppt), and Deneba Canvas (.cvs).

If you have not named your Macintosh files in PC-DOS format, when the files are transferred then opened in PC-DOS (or Windows), the file or folder name will appear shortened (truncated) and may have a tilde (~) included with the name, representing the missing letters.

For example, the file titled:

```
letter to my boss
```

may appear as:

```
letterto~!.txt
```

Renaming Files

PC-DOS uses the ren (rename) command to rename a file.

The ren command must include two parameters:

- the file (oldname) you want to rename
- the new name (newname) for the file.

Separate the two names with a space.

The ren command follows this pattern:

```
ren oldname newname
```

Renaming a Sample File

To rename the file README.TXT that you copied into the dogs directory:

1. Change directories by typing in the following at the command prompt:

```
cd\dogs
```

The command prompt is as follows:

```
C:\dogs>
```

2. To rename the **CMD.INF** file to **POODLE.INF,** type the following at the command prompt:

```
ren cmd.inf poodle.inf
```

Wildcards can also be used to rename a group of files.

Deleting Files

To delete a file, for example, the `EHELP.HLP` file:

- Verify that the command prompt is as follows:

```
C: \dogs>
```

- Delete the `EHELP.HLP` file by typing the following at the command prompt:

```
del ehelp.hlp
```

To confirm that the file is deleted successfully, type the following at the command prompt:

```
dir
```

The `EHELP.HLP` file is no longer in the dogs directory list.

Deleting a Group of Files

Delete files in the current directory that end with the extension `.INF` by using wildcards:

- View all files that end with the extension `.INF` by typing the following at the command prompt:

```
dir *.inf
```

A list of all the files that end with the extension `.INF` appears.

Note: Verify that these files are the files you want to delete.

When you are deleting files by using wildcards, this step is very important. It can prevent you from deleting a file accidentally.

Delete all files ending with `.INF` by typing the following at the command prompt:

```
del *.inf
```

To confirm that all the files with the extension `.INF` have been deleted, type the following at the command prompt:

```
dir
```

The dogs directory should contain no file. Once the dogs directory is empty, you can delete it.

To delete the dogs directory:

- Return to the root directory by typing the following at the command prompt:

```
cd \
```

- You can see the dogs directory in the directory list by typing the following at the command prompt:

```
dir
```

- Remove the dogs directory by typing the following at the command prompt:

```
rd dogs
```

- To verify that the dogs directory has been removed, type the following at the command prompt:

```
dir
```

- The dogs directory should not appear in the directory list.

Printing Under PC-DOS

PC DOS has built-in support for inkjet printers.To print a document:

1. Select your printer in the Macintosh Chooser

NOTE: you can also turn off background printing for faster printing.

2. Locate the directory that contains the file you want to print.

For example, say you want to print the **autoexec.bat** file located in the **C:** directory.

3. At the command prompt, type:

```
print autoexec.bat
```

NOTE: Be sure to enter the entire file name. For example, typing autoexec will not work; you must enter the complete file name, including the three-character extension.

4. Press **Return** or **Enter**.

PC-DOS asks for the name of the printer's port:

```
Name of list device [PRN]:
```

5. Enter the name of the printer port. In this example, specify **LPT1** (the port Virtual PC uses). At the command prompt type:

```
LPT1
```

6 Press **Return** or **Enter**.

NOTE: Once you have select the LPT1 port, the print queue is available without specifying a the LPT1 port for the remainder of the current PC-DOS session.

PostScript Printing with PC-DOS

To print from the PC-DOS environment to a PostScript printer, you must select a printer driver for each DOS application from which you want to print. Note that not all DOS programs have this feature. If you are using the PostScript printing option, choose the PostScript version of the printer driver for the printer connected to the Macintosh. If a driver is not available for that printer, you can use any PostScript Level 1 printer driver, such as Apple LaserWriter II NTX.

If you are using the Printer Specific feature, be sure to select a driver that works with the printer selected in the Chooser for each application from which you want to print.

Editing a File

The E Editor is the text editor provided with PC DOS. E Editor allows you to create, edit, and print notes, simple documents and special files (such as AUTOEXEC.BAT or CONFIG.SYS) that customize DOS.

NOTE: *Do not edit files such as the AUTOEXEC.BAT file unless you are sure you know what you are doing. Incorrect typing in these files can cause your system to stop functioning.*

Starting the E Editor

You can start the E Editor by typing **e** (or **e** followed by the path and name of the file) at the DOS command prompt.

For example, to edit an existing file named *readme.txt*:

1. Type:

```
e readme.txt
```

2. Press **Return**.

PC-DOS opens the file in the Editor.

NOTE: Be sure to enter the entire file name. For example, typing readme *does not work; you must enter the complete file name, including the three-character extension.*

To create a new file. type e followed by the new file name.

For example, to create a new text file named *report*:

1. Type:

```
e report.txt
```

2. Press **Return**.

PC-DOS opens the file in the Editor.

When you load the E Editor, you have the option of using the E Editor command line for all your editing tasks or using the menus. If you use the E Editor command line, you need to press ESC to switch between the command line and the editing window.

Viewing the E Editor Screen

After you start the E Editor and begin typing, the version number displayed is replaced by the function keys at the bottom of the screen and you see a screen like the following:

As you type, text fills the **Text Input Area**; the area expands as you enter text).

Reminder Line

The bottom line of the E Editor screen displays a brief reminder of each action associated with the function key (or F keys, such as F1=Help and F2=Save). You can perform the most common editing tasks with one keystroke. For a complete list of function keys see the table below.

E Editor Function Keys

Key	Name	What It Does
F1	Help	Accesses help information . Page through this help information using the PAGE UP and PAGE DOWN keys.
F2	Save	Saves the file you are editing but does not exit the file.
F3	Close	Removes your file's text from memory. If your file has been modified, asks if you want to close it without saving.
F4	File	Saves your file and quits the E Editor after saving. When there are no remaining files in memory, you exit to DOS.
F5	Print	Prints the file.
F6	Draw	Starts the drawing text graphics feature.
F7	Rename	Lets you change the name of the file you are editing.

E Editor Function Keys

Key	Name	What It Does
F8	Open	Lets you open another file or more than one file at a time.
F9	Undo	Restores the original contents of a line you typed incorrectly. Only affects the current line you are editing.
F10	Menu	Jumps to the menu. Use the arrow keys to move from selection to selection and to access the associated menus.
F11	Previous	Accesses the previous file you have worked on when you have loaded multiple files in the E Editor. This key is available only on an enhanced keyboard.
F12	Next	Accesses the next file in the ring when you have loaded multiple files into the E Editor. This key is available on an enhanced keyboard.

The reminder line, called the function key text area, changes when you hold down a SHIFT, CTRL, or an ALT key to show you the appropriate text to that shifted state.

Information Line

You also can see the name of the file you are editing, location of the cursor (line number and column number), working mode (insert, replace, or browse), and the version number of the E Editor.

Command Line

The command line can be found near the bottom of the E Editor screen. To jump the cursor from the typing area to the command line, press ESC. Press ESC again to return to the typing area.

Using Menus

You can access menus using the mouse. For example, place the cursor over the Edit in the top bar and the following menu appears.

Use the mouse to select a menu item, then **click** to select the action.

Window Style

You can change the location of the reminder line, the information line, and the command line by selecting a different window style.

For more information on using E Editor, see the *IBM PC-DOS Concise User's Guide* (included on the Virtual PC CD-ROM as a PDF file).

Getting PC-DOS Help

There are two types of online help for PC-DOS commands: the PC-DOS Command Reference, which is a complete online reference for PC-DOS commands, including syntax, notes, and examples; and PC-DOS Error Messages, which displays the errors and explains what they mean and how to resolve the problem.

- To Start PC-DOS Help and choose a Topic, type the following at the command prompt:

```
view cmdref
```

The PC-DOS Help table of contents appears.

- To start PC-DOS Error Messages and Choose a Topic, type the following at the command prompt:

```
view doserror
```

You can use PC-DOS Help to review installation and setup tips for applications.

Installing Windows 98 or Windows 95

You can choose to install Microsoft Windows 98 or Windows 95 after installing Virtual PC. Windows is not included with the PC-DOS version of Virtual PC. Windows can be purchased separately; you will need the Microsoft Certificate of Authenticity to install Windows.

NOTE: For instructions on installing other operating systems, including Microsoft Windows NT, see the file titled, "Installing Other OSes Read Me" located on the Virtual PC CD.

1. Launch the Virtual PC application.
2. Insert the Microsoft Windows 95 or 98 CD-ROM.
3. As soon as the C: prompts appears, change to the E: directory by typing E: and the Return key (E: directory is the CD-ROM).
4. Type Setup and press the Return key.
5. This loads the Windows 95 or 98 installer. Windows auto-detects most of the emulated hardware in Virtual PC.
6. Follow the installation instructions for Windows 95 or 98 (be sure to have your Certificate of Authenticity number available).
7. The Windows installer prompts you to set up your printer. If you have an ink jet printer, choose Epson AP-3260 ESC/P2 option. If you have a PostScript printer, choose the Apple LaserWriter II NT option.
8. When installation is complete, quit Windows by selecting Shut Down from the Start menu.

Installing the Windows Integration Additions

1. Open the Virtual PC™ 3.0 folder on your hard drive; make sure the Extras folder is in the Virtual PC folder. If it is not there, you can install it from the Virtual PC CD-ROM (select **Custom Install** and install just the Virtual PC Extras).
2. While holding down the **Option** key, launch the Virtual PC application.

   The Virtual PC Preferences opens.
3. Select the D drive.
4. In the D Drive Settings, click on the button Select Hard Drive Image.
5. A dialog box appears; navigate to find the Extras file; Select the file and click Open.

This mounts the Extras file as a drive image.

6. Click Restart.
7. When Virtual PC has restarted, open My Computer within Windows and open the Extras (D:) drive.

8. Double-click on the icon for Vpc30add.exe.
9. The Installer begins the installation process.
10. You are prompted to choose from the following Components; the default value is install all additions components:
    - Windows Support Files
    - Improved Mouse Functions
    - DOS CD-ROM Support
    - Folder Sharing between Mac and Windows
    - Joystick Support for Windows
    - Sound Blaster 16 Sound Drivers
11. Click Next to continue. The setup is complete and you are prompted to restart Windows.

8

Mac—PC Integration

Introduction

Virtual PC provides powerful and easy-to-use integration features for working back and forth between Mac and PC. Some of the features are available in DOS, some require Windows 95 or 98. These include:

- Drag and drop for files and folders between Mac and Windows
- Shared folder support, including:
  - –Removable drives access (for example, Zip and Jaz drives)
  - –Long file name support
- Bidirectional copy and paste of text and graphics;
- Using a floppy drive image
- Auto-shutdown of Windows when you select Quit or make changes to the Preferences

Most of these integration features are accomplished through the Virtual PC additions files.

Dragging and Dropping Files and Folders

(Windows only)

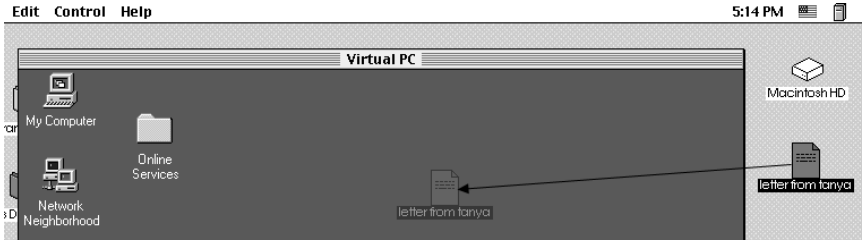
In Virtual PC, copying folders and files can be done by simply dragging and dropping from Mac to PC or PC to Mac.

NOTE: Drag and drop actually duplicates the file or folder (it does not simply create an alias).

Dragging from Mac Desktop to PC Desktop

(Windows only)

To copy a file from your Mac to Windows 95 or 98, simply drag from the Mac desktop or your hard disk to the Virtual PC desktop, as shown below:



The dragged file appears on your PC desktop. You can drag and drop folders, and both the folders and the contents of the folders are copied over. You can also choose to drag to a Windows volume, such as a hard disk or a floppy disk, in My Computer.

In Windows (as in DOS), files have 3-letter extensions; for example, a text file receives the extension.txt, a document file receives the extension.doc, and so forth. When you copy a file from Mac to PC, it's best to include the extension so that Windows knows which application can open the file. If you do not include the extension, when you double-click on a file, Windows prompts you to select an application to open the file.

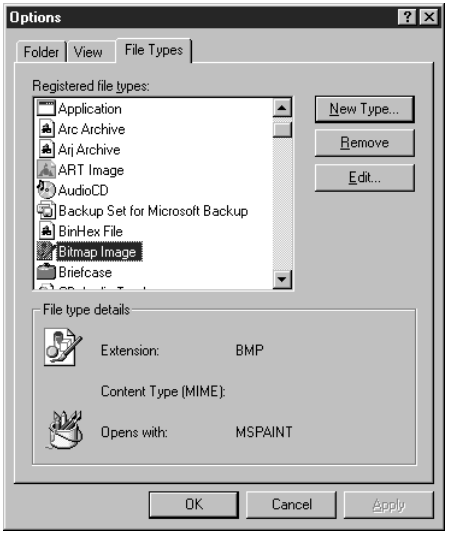
In Windows 95 and 98 you have the option to hide the file extensions from view. The default value in Virtual PC is Hide MS-DOS file extensions.

To view file extensions:

1. Select a drive in My Computer.
2. Choose Options from the View menu (or Folder Options in Windows 98).
3. Select View.
4. Deselect the check box Hide MS-DOS file extensions for file types that are registered.
5. Click OK.

To find out the extensions for various file types:

1. Select a drive in My Computer.
2. Choose Options from the View menu.
3. Select File Types.

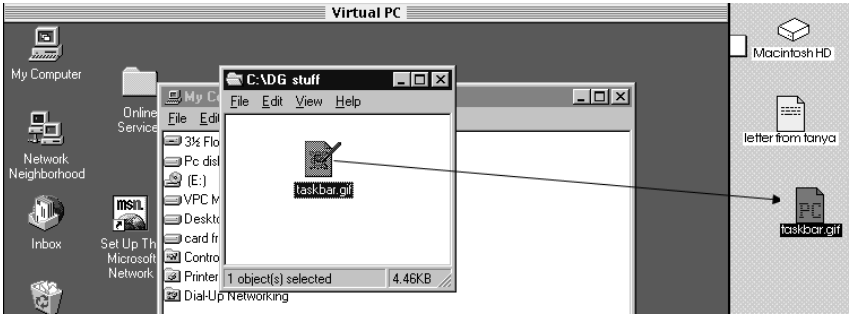


Extensions are listed for all file types that are currently registered with Windows. Click on a file type to learn the content type and the application that can open the file.

Dragging from PC Desktop to Mac Desktop

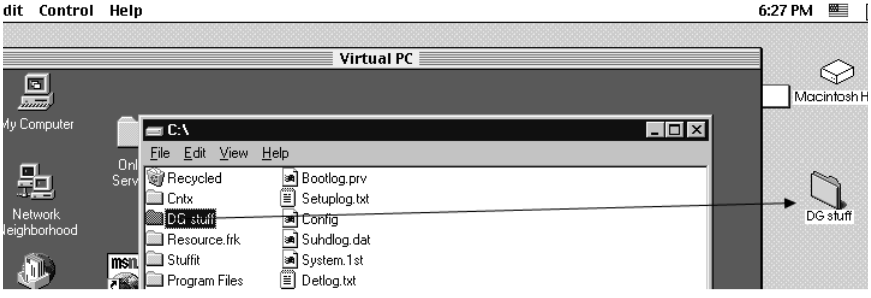
(Windows only)

To copy a file from your Virtual PC hard disk to your Mac, simply drag from your hard disk to your Mac desktop or hard disk, as shown below:



The dragged file appears on your desktop with the icon of a PC file.

When dragging folders from PC to Mac, simply drag to the Macintosh desktop; the PC folder is converted to a Macintosh folder, as shown below:

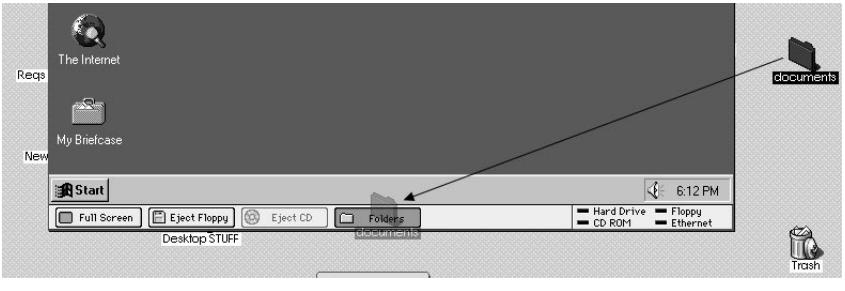


Sharing Folders and Volumes Between Mac and PC

(DOS or Windows)

Virtual PC lets you access a Mac folder or volume as a PC Drive. Use this option to easily transfer files between Mac OS and PC environments. For example, if you have downloaded PC shareware files with your Mac browser, you can share the Mac folder as a PC drive to access the files in the PC environment.

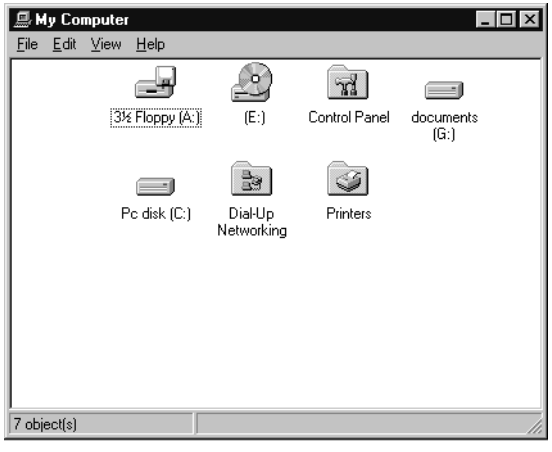
You can share Mac folders and volumes by dragging them from your Mac to the Folders button on Virtual PC, as shown below:



The shared folder or volume then appears on the PC as a separate drive, as shown below. In this case, Windows assigns the folder the designation G drive. In PC-DOS, you can access the folder by typing the assigned drive letter (in this case, G:).

NOTE: Dragging an alias of a folder or volume does not share the folder or volume. Instead, drag the folder or volume itself.

NOTE: See Chapter 4, Preferences, *for information on selecting a shared folder through the Preferences.*



Accessing Removable Drives

(DOS or Windows)

You can access removable drives, such as Zip, Jaz or Syquest, by using the Shared Folders feature of Virtual PC. The removable drive shows up as a drive in My Computer on your PC desktop.

To mount a removable drive, simply drag it to the Folders button on the Virtual PC window (as described in the Sharing folders between Mac and PC section above). Or use the following procedure:

1. From the Virtual PC Edit menu, choose Preferences. Locate Shared Folders on the left side window and highlight.
2. Click the Share Folder... button.
3. Highlight the drive or folder you want to share and click Share <folder/drive name>. Check the Share every time box if you would like it always to be mounted.

Long File Name Support

(Windows only)

Virtual PC supports long file names, which in Windows can be up to 32 characters in length (DOS file names can be a maximum of eight characters in length with a three-character extension). This means you can drag files with 32-character titles from Mac to PC or PC to Mac and keep the full file name. In addition, long file names are maintained within a Mac folder that is shared in Windows 95.

Windows 95 and 98 support file names of up to 256 characters; any PC file name longer than 32 characters is truncated when copied to the Mac.

Bi-directional Copy and Paste

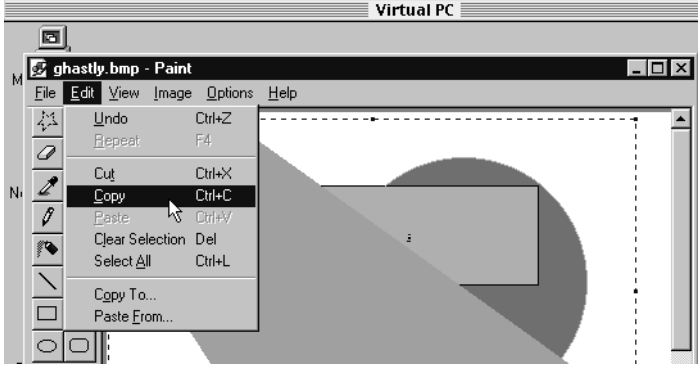
(Windows only)

You can copy text and graphics from a PC application to a Mac application, or from a Mac application to a PC application simply by copying and pasting.

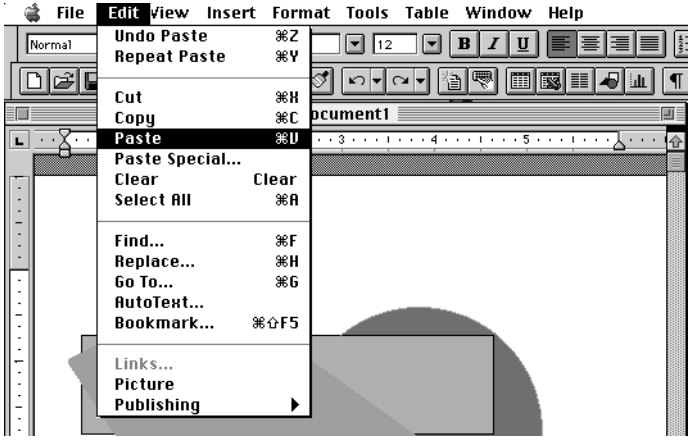
Text files are copied unformatted, so that no formatting from the application is maintained (such as bold or italic, or paragraph styles).

When you select a Mac graphic, it is copied into the Mac Clipboard. Virtual PC converts the graphic from Mac Clipboard format to Windows Clipboard format, so you can paste the graphic into a Windows application. Likewise, a graphic selected in the Windows environment is converted into the Mac Clipboard format.

For example, you can select and copy a graphic within a PC application as shown below:



Virtual PC translates the PC graphic into Mac Clipboard format (PICT). The image can then be pasted into any Mac application that can read the Mac Clipboard, as shown below:



Copying Graphics Using the Marquee Tool

(DOS or Windows)

You can capture screen images using the standard Mac marquee tool. To select an image or a portion of the Virtual PC screen, hold down the Command key and drag the mouse. The area selected can be copied using the Copy command from the Virtual PC Edit menu, and then pasted into a Mac application as a bitmapped image.

To deselect the area, hold down the Command key and click within the Virtual PC window.

Using a Floppy Drive Image

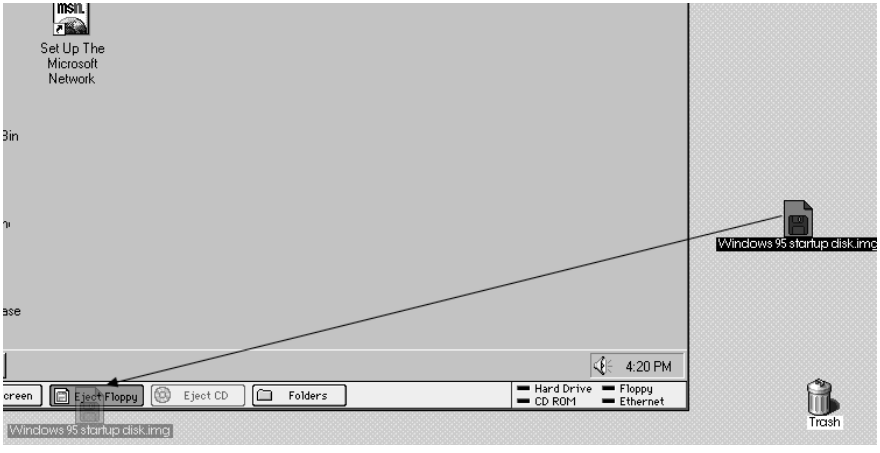
(DOS or Windows)

You can use a floppy drive image, for example, for installing software applications such as Quark XPress which require a floppy disk that works together with the installer CD-ROM.

NOTE: See Chapter 11, Frequently Asked Questions, for instructions on using a floppy disk image for installing Windows 95.

To use this feature, create a floppy disk image using an application such as DiskCopy (from Apple Computer, either version 4.2 or version 6.x,) or Shrinkwrap (from Aladdin Systems, Inc.). Note that disk images must end with the extension .img or .image.

From the Mac desktop, drag the disk image to the Eject Floppy button in Virtual PC. This mounts the floppy image in the PC as the A: drive.



Note that the Eject Floppy label changes from grayed out to highlighted; this indicates that the disk image is mounted. To unmount the floppy image, click the Eject Floppy button or Press Command + 1.

NOTE: Be sure the disk image you use is uncompressed (compressed images will not mount).

Auto-shutdown of Windows When You Select Quit or Change Preferences

(Windows only)

Virtual PC will intelligently shut down Windows 95 or 98 when you quit Virtual PC. This can prevent corruption of the Windows drive image.

When you select Quit from the Virtual PC application menu, Virtual PC lets you either Save State or Quit. If you select Save State, you keep the current environment, including Windows/DOS and any applications that you have open at the time. This lets you start up Windows or DOS more quickly when you restart.

If you choose Quit, Virtual PC shuts down Windows automatically without saving the state.

When you change any Virtual PC Preferences that require a restart to take effect, Virtual PC will intelligently restart Windows.

9

Using USB Devices with Virtual PC

USB (Universal Serial Bus) is a widely-used standard for peripheral devices, including printers, scanners, storage devices and more. Virtual PC 3.0 provides support for a wide range of USB devices.

Using a USB device with Virtual PC requires three components:

- Windows 98
- Windows 98 drivers for your USB device (provided by the manufacturer)
- Mac OS 9

Using USB Devices

This section provides an overview to the USB technology and how Virtual PC supports USB devices. Refer to this section for a list of USB devices work with Virtual PC, or if you intend to purchase a USB device for use with Virtual PC.

For updated information on using USB devices with Virtual PC, see the Read Me file on the Virtual PC 3.0 CD, and also the Connectix Web site (*www.connectix.com*).

What is USB?

USB is a computer-industry standard for connecting peripherals to personal computers, including PCs and Macintoshes. Its wide-spread use, expand ability and easy installation make it a convenient alternative to other peripheral standards including serial, parallel and SCSI.

USB support is also easily expandable. If you wish to add additional USB ports to your Macintosh, you can obtain a USB hub that supports 4 or more devices.

Virtual PC can support up to 15 USB devices.

Which Macintoshes support USB?

USB is the architecture for connecting peripherals included in iMacs, Blue & White G3 Macs, and the 1999 models of PowerBooks. Virtual PC also supports USB devices for a Macintosh that has PCI USB card installed, and PowerBooks with USB PC cards.

Virtual PC supports USB by simulating a USB chip. When USB is supported, the Virtual PC application window displays a USB status LED light (in place of the Floppy drive light) as shown below:

USB devices supported

Here is a partial list of USB devices that are known to work with Virtual PC; for an updated list, see the Connectix Web site at: *http://www.connectix.com*.

Manufacturer	USB Device
Scanners	
AGFA	SnapScan 1212U Scanner
Artec	1236 Scanner
Canon	CanoScan FB 620U Scanner
UMAX	Astra 1220U Scanner
UMAX	Astra 2000U Scanner
Printers	
Epson	Stylus Photo 750 Printer
Epson	Stylus Color 740 Printer
Epson	Stylus Color 900 Printer
Hewlett Packard	895Cse Printer
Joysticks and Gamepads	
Ariston Technologies	Hermes Gamepad
Ariston Technologies	ARES Joystick
Gravis	Gamepad Pro
iMac Accessories	Game Pad

Saitek	Cyborg 3D Stick
Thrustmaster	Fusion Digital Game Pad
Thrustmaster	Top Gun USB Joystick
Cameras	
Kodak	DC220 Camera
Logitech	QuickCam VC
Logitech	QuickCam Express
Adapters	
Entrega	USB -Serial-Parallel Adapter
Entrega	USB -SCSI Adapter
Microtech	USB -SCSI Adapter
Mass Storage	
Antec	PhotoChute 3USB
Imation	SuperDisk USB Drive LS120
Imation	SuperDisk USB Drive LS 120 II
Iomega	USB Zip Drive
SanDisk	ImageMate
VST Technologies	USB Floppy Drive

Installing USB devices

For instructions on preparing Virtual PC for installing USB devices, see the section in Chapter 4, *USB*.

Before installing a USB device, be sure to review the documentation for the device. If you do not have the drivers for the USB device, consult the Web site for the manufacturer; often the drivers are available for downloading.

NOTE: Some devices require you to install the software drivers before plugging in the device. See the instructions that came with your device.

When you have connected a USB device, Windows 98 scans for USB devices, and if it finds your device, Plug and Play begins, and attempts to install the necessary software (drivers) for your device.

You may be prompted to insert the manufacturer's CD, or the CD for Windows 98.

When Windows is done installing the software, you may use the USB device after restarting Windows 98.

10

Networking with Virtual PC

Virtual PC uses your Macintosh network settings, providing a single network connection for file sharing, Web browsing and e-mail. You can use your Mac's Ethernet and TCP/IP configuration to send and receive data over a network, including the Internet.

Networking Overview

Virtual PC uses your Mac configuration information by assigning your system a predefined, "false" IP number, so that your Mac can talk to Virtual PC as though it were another computer (because the IP numbers are always different). If you are not a network administrator, you don't need to worry about the details; Virtual PC is pre-set to connect through your Mac settings.

With these settings, Virtual PC can use any valid TCP/IP configuration, including Ethernet, PPP, SLIP and others. It can "share" the IP number with your Mac, so there is no need to reset any configuration when alternating between Mac and Virtual PC.

In setting up Virtual PC, you can choose either to share your Macintosh's IP address (Shared IP) or use a unique IP Address. See the following sections for details on setting up shared or unique IP addresses.

NOTE: Most users only require Shared IP addressing, and do not need to change the default settings that come with Virtual PC. If you do need to set a Unique IP address, see that section later in this chapter.

Networking using a Shared IP address

The Virtual PC 3.0 drive image is pre-configured for you to use a Shared IP address (for Windows 98, Windows 95 and PC-DOS).

When setting up Shared IP, keep the following in mind:

- Shared IP is the default setting in Virtual PC;
- Virtual PC is set for a DEC 21041 Ethernet controller;

NOTE: In some cases, the DEC 21041 may show up on your system as Intel 21041. These are the same Ethernet controllers.

- Virtual PC must be set to use DHCP (Dynamic Host Control Protocol);

  NOTE: If your network uses a WINS server, you must enter the server information manually into the Network Control Panel—>Configuration—>TCP/IP (Intel 21041 Ethernet based controller)—>WINS Configuration—>Enable WINS Resolution.

- You cannot use Virtual PC as a server over the Internet (for example, for Web, chat, or FTP) when it is sharing an IP number.
- Some networking software (for example, chat programs) that require a unique IP address may not function correctly (see the section below, *Networking Using a Unique IP Address*).

With Shared IP you can access the network either by a modem or over a LAN.

Modem Users

If you are accessing the Internet using a modem, connect to your Internet service provider as you always do, on your Macintosh. With this connection still open, you can now access the Internet from Virtual PC. In Windows 95 or 98, double-click on the Internet Explorer icon on your Windows desktop.

LAN Users

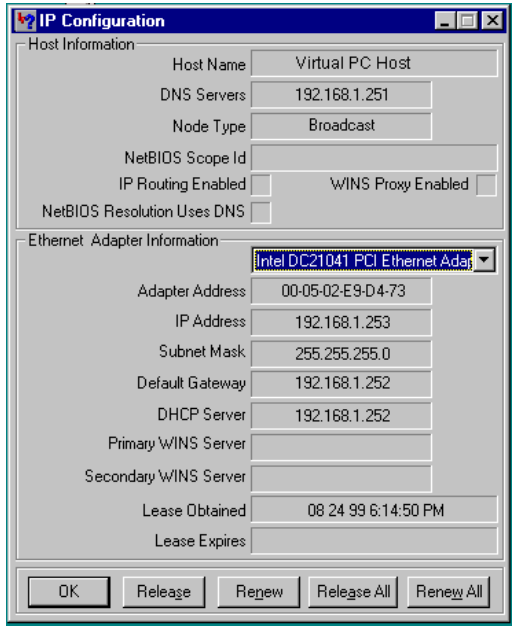
If you are accessing the Internet over a LAN, you must have an IP address already assigned to your Mac—either a static IP address, or one that is dynamically assigned by a server. With this IP address, you can access the Internet from Virtual PC. In Windows 95 or 98, double-click on the Internet Explorer icon on your Windows desktop.

You can also do peer-to-peer file sharing over a Microsoft Network. To do so, you have to be connected to a network. Do the following:

1. Select **Settings** from the Start bar.
2. Select **Control Panel**.
3. Double-click on the **Network** icon.
4. Click on the **Identification** tab.
5. Enter a **Computer** name, your **Workgroup** name, and a computer description (optional).
6. Click **OK**.
7. Click **Yes** to restart.

You can now access other computers on the network through Network Neighborhood.

Below is a screen shot of the Virtual PC Shared IP Address Configuration settings in Windows 98. This information includes the IP address settings provided by Virtual PC for any Shared IP Address. You can view this information by clicking: Start—>Run—>{type] *winipcfg*—>OK.



Networking using a Unique IP address

NOTE: Drive images are pre-configured to use the shared IP feature, and for most users, this is correct option to use for network access.

If you have reason to use a unique IP address, see the rest of this chapter; for most users, these settings are unnecessary.

Connecting to a Windows Network

With Virtual PC, Windows networking functions the same as it does on a PC; thus if you are familiar with Windows, you can configure networking as you would on a PC—with the following factors in mind:

- the Mac and Virtual PC must have unique IP addresses;
- if you are using DHCP, one IP address must be static.

If your information systems technician can provide one static IP address to you and DHCP is also available, the following should cover any issue needed for you to apply that address to the PC side while keeping your Mac on the network.

NOTE: If DHCP is not available, you'll need two static IP addresses.

To configure Windows 95 or 98 Networking, follow these steps:

From the Windows environment, open the Network Control Panel.

There are three tabs along the top, and all three must be modified: Configuration, Identification, and Access control, as described below.

Configuration

1. In the Network Control Panel, click on the Configuration tab.
2. Highlight Client for Microsoft Networks and click Properties. If you are logging onto a Windows NT domain, check the box and enter the name of the domain.
3. Click OK.
4. Highlight TCP/IP PCI Ethernet DECchip 21041 Based Adapter and click Properties.

NOTE: In some cases, DEC 21041 may show up on your system as Intel 21041. These are the same Ethernet adapters.

The following steps depend on whether you are using DHCP (Dynamic Host Control Protocol).

If you are using DHCP:

1. make sure that the Obtain an IP address automatically button is checked on the IP address tab.
2. On the WINS Configuration make sure that Use DHCP for WINS resolution is selected.
3. If you are using DHCP on the Windows side, make sure that the Mac has a static IP address.

If you are not using DHCP:

1. Enter the IP number manually on the IP Address tab and then the subnet mask (usually 255.255.255.0).
2. On the WINS Configuration tab, click Disable WINS Resolution.
3. On the Gateway tab, enter in a New Gateway number that you use to access the internet and click Add.

4. On the DNS (Domain name server) Configuration tab, Click Enable DNS and enter in the name for the Host (your network logon name), the Domain (usually the end of your email address, for example, connectix.com) and the DNS Server Search Order (the IP address[es]). Click Add.
5. When done, click OK.

Identification

1. In the Network Control Panel, click on the Identification tab.
2. Enter in the Computer name as it will appear on the network. Virtual PC is viewed by the network as a completely different computer than the Mac so it is very likely that you will need to have another account set up for Virtual PC.
3. Enter in the Workgroup which is the same as you entered for Client for Microsoft networks step 2 under Configuration above).
4. Enter the optional Computer Description if you like.
5. Click OK.

Access Control

1. In the Network Control Panel, click on the Access Control tab.
2. Set the Access Control for your shared resources. This allows you to set how much access others have to you computer. You must select either Share-level or User-level access control.

- Share-level access control lets you supply a password for each of your shared resources.
- User-level access control lets you specify which users and groups have access to each of your shared resources.

3. Click OK to complete your networking setup.

Setting Up Internet access in Windows

To set up Internet Access in Windows with a unique IP address, do the following.

Setting Virtual PC Modem Preferences

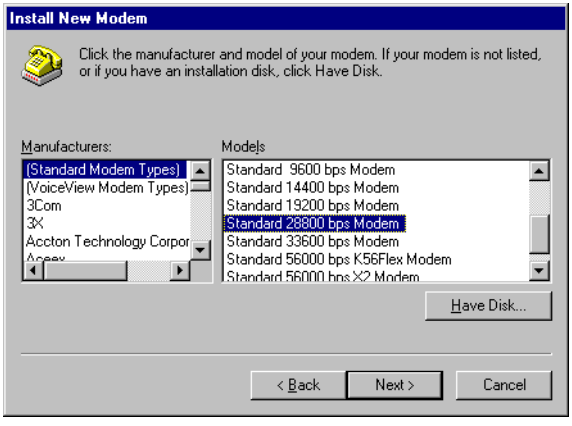
To set up your modem in the Preferences, do the following.

1. Select either the COM 1 or the COM 2 port.
2. In the Port Settings which display in the right-hand window, click the Mac Serial Port radio button.
3. Select either the Modem Port or Printer Port option from the drop-down menu. Click OK.

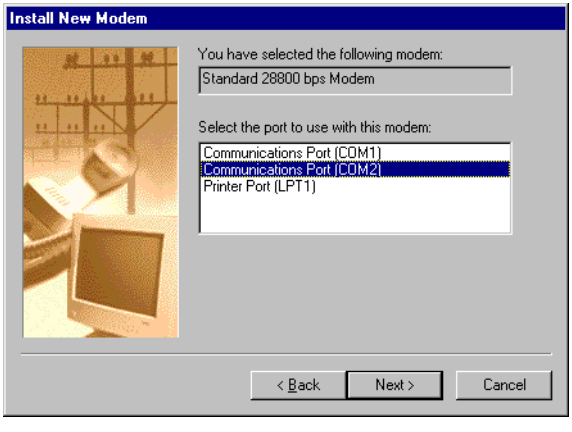
Selecting Windows Modem Settings

In the Windows environment, set up your modem by doing the following:

1. In the Control Panel double-click on Modems.
2. Check the box that reads Don't detect my modem; I will select it from a list. Click Next.



3. The Install Modem window appears; for the manufacturer, select Standard modem type; for the modem model, select (Standard) and your modem's speed. Click Next.
4. Select the port you are using for your modem (COM1 or COM 2). Be sure to select the same port your chose in the Virtual PC Preferences above. Click Next. The Windows Wizard installs the modem.



5. Enter your Country and Area Code (if in the US). Click Next. Modem installation should be complete at this point.
6. Click Finish.
7. The Modem Properties box appears. Click OK.

Important Information for the Geoport

If you have a GeoPort, follow these steps:

8. Open the Control Panel, and select Modems.
9. Click the Properties button.
10. In the Modem Properties dialog box, click on the Connection tab.
11. Click the Advanced button.
12. Unselect the Use Flow Control check box.
13. Click OK.

Internet Connection Setup

Still in the Windows environment, set up your dial-up Internet connection by doing the following:

1. From the Start menu go to Programs, select Internet Explorer, select Connection Wizard. The Windows Internet Connection Wizard launches, and guides you through the process of configuring your connection.
2. You then choose whether to connect using a new account or an existing account with whomever provides your Internet access—usually an Internet Service Provider (ISP). You are presented with three options:

- I want to sign up and configure my computer for a new Internet account.
- I have an existing Internet account through my phone line or a local area network (LAN).
- My computer is already set up for the Internet. Do not show this Wizard again.

If you do not have Internet access, choose the first option, and the setup Wizard can automatically dial up a number and provide you with a list of local service providers.

If you already have a dial-up Internet service provider, you can set up Windows access by choosing the second option. If you already have Internet access, you are then prompted to choose between and ISP and an online service such as Microsoft Online or America Online (AOL).

If you do not have a modem set up for Internet connection, you are prompted to install a **New Modem (**see **Selecting Windows Modem Settings** earlier in this chapter**).** If you have a modem already set up, this window does not appear**.**

3. Choose whether to set up your connection using a phone line or a local area network (LAN).
4. Enter the phone number for your Internet Service Provider.
5. Enter your user name and password (also known as your Member ID or User ID).

6. The Advanced Settings dialog box appears and you are asked if you want to set your advanced settings. The default is No; clicking Yes gives you options that allow faster DNS lookup by providing specific DNS server information.

7. If you select Yes to Advanced Settings, you are prompted for Connection Type. If you have an ISP, PPP (Point to Point protocol) is the most common protocol (if you are unsure, contact your ISP).

8. The Login Procedure screen appears. This permits you to log in manually or using a script. In most cases, you should select the first option, I don't need to type anything when logging on.

9. When prompted for your IP Address, select either:

- My Internet service provider automatically assigns me one, or
- Always use the following. If you select this option, enter your IP number.

10. When prompted for a DNS Server address, select either:

- My Internet service provider automatically sets this when I sign in, or
- Always use the following. If you select this option, enter your DNS server number and an alternate number.

11. Enter your Dial-Up Connection name (this is the name used in the Dial-Up Networking folder in My Computer).

12. You are then prompted to enter your e-mail account information. This is optional; if you choose to enter it, you need to have your e-mail account name, incoming e-mail server name and outgoing e-mail server names.

13. You may also enter an Internet News account for downloading information from news servers. This is optional.

14. You may also set up an Internet Directory services account for accessing "white pages" servers on the Internet. This is optional.

When configuration is complete, launch your Internet connection (go to My Computer, open the Dial-Up Networking folder, and select your connection), or launch your browser, and the Dial-up Connection box appears.

To make changes to these settings, go to My Computer and open Dial-Up Networking. Select your connection and select Properties (either right-click your mouse or select from the File menu). Select the Server Types tab, and click on the TCP/IP button.

Connecting to an AppleTalk Network

As long as you are connected to an AppleTalk file server or printer on the Macintosh environment, no other software is needed (other than what is installed on the PC Disk) on the PC environment to share folders on an AppleTalk network.

To access a folder on an AppleTalk file server from the PC:

1. From the Chooser (Apple Menu) highlight AppleShare and choose the folder you wish to access and mount it on your Mac's desktop.
2. Drag the mounted folder to the Folders button.

See the section in Chapter 8 titled, *Sharing Folders and Volumes Between Mac and PC*, for more information.

11

Frequently Asked Questions

Q *How do I get my Mac mouse back when I am in DOS or in full screen mode?*

A Hold down the Command Key (the “Apple” key) on your Mac keyboard. When the Command key is held down, the Mac mouse and Mac menus become visible in addition to the lower status bar of Virtual PC.

Q *I just inserted a floppy while running Virtual PC; how come I can’t see it on the Mac desktop?*

A Virtual PC “captures” floppy disks inserted into the floppy drive while Virtual PC is the front-most application. This is true of all floppies—including Mac-formatted floppies, which are generally not readable by PC software. If you want to access the floppy in the Finder, switch to the Finder first, then insert the floppy.

Q *How can I get more drive space for more PC software?*

A One of the easiest methods is to create a new hard drive image as a D: drive. See the section *Creating a New Hard Drive Image* on page 30. Another method is to use the Hard Drive Expander to expand your C: drive. See “The Hard Drive Expander” on page 22.

Q *Can I recognize other PC drive images like SoftWindows™ or the PC Compatibility Card?*

A Yes, with limitations. Virtual PC recognizes these PC drive images as D drives. First use the Hard Drive Expander to convert the drive to a Virtual PC drive image. Then select the drive and make it the D drive in the Virtual PC Preferences.

Q *I can't get this PC program to install; what do I do?*

A Read the Read Me file for the PC program. Unlike most Mac software, installers for PC software varies widely in configuration and system requirements, especially for DOS applications. The Read Me file typically covers specific installation and configuration requirements.

Q *My DOS game says it doesn't have enough memory—what do I do?*

A Read the game's Read Me file or documentation for memory management suggestions. DOS memory is a very limited resource and games typically require all available DOS memory. The game documentation should have specific suggestions to make more DOS memory available to run the game.

Q *I have 256MB of RAM in my Mac, and I've allocated 200MB to Virtual PC, how come it is only using 126MB for the PC?*

A The PC memory limit is 126MB in Virtual PC, any additional memory allocated is not utilized. You should reduce the amount of memory allocated to Virtual PC.

Q *I saved the state of my PC and tried to restore it, but Virtual PC tells me there is not enough RAM. I didn't change the Get Info settings on Virtual PC, so why won't it restore?*

A There are two reasons this could happen—either there is less memory available due to other applications running or you are running RAM Doubler and have run low on available physical memory. In either case, you should try quitting other applications to free up memory, then re-launch Virtual PC.

Q *The sound breaks up when I'm playing a game on Virtual PC, what can I do?*

A There are several reasons the sound quality can degrade:

1. The game's sound settings are too demanding. Try reducing the number of sound channels, switching from stereo to mono, turning off music (FM Synthesis), and decreasing the sample rate (e.g., from 44KHz to 11KHz).
2. The machine you're using is too slow to keep up with the demands for the PC game or program you're using.
3. You are using Virtual Memory or RAM Doubler or are not giving Virtual PC enough memory. Virtual PC requires physical RAM for best performance.
4. You are running background applications on your Mac which take up time from Virtual PC just when it is needed to generate more sound. For games, you should quit every other Mac application before playing.

Q *How do I use my Kensington two-button mouse with Virtual PC?*

A To set up your Kensington mouse, do the following:

1. Launch Kensington's MouseWorks.
2. From the Options menu choose Application Sets....
3. Click Add, then navigate to the Virtual PC application and click Open.
4. Click the Buttons tab.
5. For the right button, pull down the menu and choose Keystrokes...
6. Choose Clear Keys then from the Insert menu choose Shift-Tab.
7. Keep the left button as Click.
8. Launch Virtual PC and select Preferences from the Edit menu.

9. Highlight Mouse (left side of the window).

10. Click the Key Sequence button under Mouse Settings.

11. Press the Shift-Tab keys simultaneously on the keyboard.

Other two-button mice may work, if they have a way of assigning the right button to use keyboard commands.

Q *Some of my function keys do not work; why?*

A If you have assigned function keys in the Mac environment, be sure that no other Mac programs are using the same function key as the one you need in the Windows environment. If they are assigned by other programs, they won't be available to Virtual PC.

Q *How do I create a New Drive Image for installing a new operating system?*

A To create a new drive image for installing a new operating system such as Windows 95 or 98, follow the procedures below for creating a new hard drive image and installing from a startup floppy disk image.

Creating a New Hard Drive Image

1. Launch Virtual PC while holding down the Option key. This brings up the Virtual PC Preferences.

   If you have an Ethernet card installed on your Mac that you will be using, be sure that the Ethernet controller in the Virtual PC Preferences is enabled.

2. Select the C Drive (left window).

3. Select New hard drive image (right window).

   The dialog box prompts you to Create new C: drive as: The default name of the drive is C: drive.

4. Enter a drive size (for example, 260 MB). The size is limited to the amount of space left on your hard disk. If you are installing Windows, you should make the drive size 260 MB or larger.

5. Click Create.

Installing From the Startup Floppy Disk Image

1. Press Restart (lower right corner of the Virtual PC Preference window). Ignore the error message:

   ```
   Non-system disk or disk error
   Replace and press any key when ready
   ```

2. Drag the image OS_Install.img from the Virtual PC Extras folder to the Eject Floppy button at the bottom of the Virtual PC window (Eject Floppy is grayed out until you drag the image to it). See the section *Using a Floppy Drive Image* in Chapter 8 for an illustration.

3. You are prompted to press any key; do so and the following message appears:

```
This will prepare your current C drive for installation of
a new operating system.
This will overwrite your current configuration files on
the C drive.

Are you sure you want to continue?
[Y, N]?
```

4. Enter Y to continue, or N to cancel.

   If you choose to continue, your C drive is now bootable and ready for installation.

5. Eject the floppy disk by pressing the Eject Floppy button and restart the PC environment by selecting Restart the from the Control menu (or by holding down the Control-Option-Delete keys). You can now install Windows; see the section *Installing Windows 98 or Windows 95* in Chapter 2 for more information.

Q *How do I install other operating systems?*

A For detailed instructions on installing other operating systems, see the ReadMe found in the Installing Other OSes folder on the Virtual PC 3.0 CD-ROM. Alternatively, check the Connectix Web site at: *www.connectix.com* and see the *Technical Support* section, *Virtual PC*.

Q *Does Virtual PC support Token Ring?*

A No, Virtual PC does not support Token Ring. Virtual PC emulates an Ethernet card.

12

Support and Sales

Should you ever have a problem with Connectix Virtual PC, please read this section first.

Before Contacting Tech Support

If you have questions or problems with Connectix Virtual PC, contact us by telephone, by fax, or through electronic mail. But first, try the following:

1. Read this manual. It may only take a few moments to get the answers you need. Also, check the “ReadMe” file. This has information on known problems and solutions.
2. Write down the events that lead to the problem. Have you changed anything in your computer recently?

Have the following available when you contact Technical Support:

- Registration number—on the Registration Card (or on the front page of the manual if you wrote it down there)
- Software version number—Get Info (Command + I) on the Virtual PC application
- Computer model
- Apple System software version—from the Apple menu, select “About This Computer...” or “About This Macintosh...”

Contacting Connectix Support

You can contact us on the World Wide Web, or by e-mail, fax, or phone:

- WWW: http://www.connectix.com
- E-mail: vpcsupp@connectix.com
- Fax: 650-571-0621
- Phone: 970-304-9533, 8AM to 8PM PST, Monday through Friday

Contacting Connectix Sales

Contact Connectix Sales for more information about other Connectix products or about site licenses for Virtual PC:

- Internet: sales@connectix.com
- Fax: 650-571-0850
- Phone: 800-950-5880 (US and Canada) or
  650-571-5100 (international)

Returning a Product

To return Connectix software under the terms of its 30-day money back guarantee, you must contact Connectix Sales to obtain an RMA (Return Merchandise Authorization) before returning the product.

Connectix is not responsible for products returned without an RMA.

Contacting Connectix Support in Europe

For all European countries, dial +31-20-5814385. This number is in Holland; information will be provided in English, French, German and Dutch.

European Addresses

Mailing: SEI, Attn: Connectix, Orlyplein 85,1043 DS Amsterdam, The Netherlands

FAX: Fax questions to: +31-20 581 4380

Internet: For e-mail use the Internet address: CONNECTX@NL.SYKES.COM
(NOTE: there is no “I” in CONNECTX)

13

Technical Specifications

This appendix provides details on the technical specifications of Virtual PC version. Use this information as a reference for technically-oriented PC software or for your own knowledge.

Processor

- Emulates the Intel Pentium® with MMX™. Includes complete support for Pentium architecture including protected mode, MMU, FPU as well as MMX.

Motherboard

- Virtual PC uses the Intel Triton chipset (Intel Zappa motherboard). It includes all auxiliary chips needed for a PC, including:
- 8259 PIC (programmable interrupt controller)
- 8254 PIT (peripheral interval timer)
- 8237 DMA (direct memory access) controller
- CMOS (persistent RAM)
- RTC (real-time clock)

BIOS

BIOS is the Microid Research System BIOS (MR BIOS)

Memory

126MB RAM PC limit

IDE Controller

Uses standard dual IDE/ATAPI controllers, which are configured according to two options as listed in the following tables, Standard Configuration and Alternate Configuration.

Standard Configuration:

Controller	Drive
Primary Controller	Drive 1: Drive C
Primary Controller	Drive 2: Drive D
Secondary Controller	Drive 1: CD-ROM
Secondary Controller	Drive 2: Unused

Alternate Configuration (needed for OPENSTEP installation)

Controller	Drive
Primary Controller	Drive 1: Drive C
Primary Controller	Drive 2: CD-ROM
Secondary Controller	Drive 1: Drive D
Secondary Controller	Drive 2: Unused

Hard Drive

- Uses hard drive container images.
- Supports Virtual PC, SoftPC, SoftWindows and Apple PC Compatibility Card drive images.
- Supports simultaneous use of two drive images, each up to 2 GB in size.

CD-ROM

- Uses the CD-ROM in the Standard Macintosh (if present).
- ATAPI interface supports data and audio commands.

Video

- Emulates the S3 Trio 32/64 PCI SVGA Card.
- Supports 1MB, 2MB or 4MB of emulated VRAM (using Mac memory), allowing for up to 1600 x 1200 PC screen resolutions.
- Fully implements S3 Trio 32/64 graphic acceleration features and is compatible with S3 Trio 32/64 drivers.
- Also backwards compatible with MDA, CGA, EGA, and VGA video modes.
- VESA 2.0 compliant.

Keyboard Controller

Controller emulates 8255 keyboard controller for interface between PC and keyboard/mouse.

Keyboard

- Uses the standard Macintosh keyboard.
- Allows key-combination assignments to represent Windows and application keys found on newer PC keyboards.

Mouse

- Uses the standard Macintosh mouse.
- Emulates a PS/2 mouse using IRQ 12.
- Emulates second-button support by means of key combinations on the Macintosh.

Floppy

- Uses a standard Macintosh floppy drive.
- Emulates the standard PC floppy controller interface.

Serial Ports

- Virtual PC supports COM1 and COM2 ports, and allows mapping to text files or any available Macintosh serial port (e.g., Modem and Printer ports).

Printer

- Handles printing through an LPT1 parallel port.
- Output is interpreted as PostScript or Epson AP3260 print data.
- PostScript printing requires a PostScript printer to be selected in the Macintosh Chooser.
- Epson AP3260 emulation works with any standard Macintosh printer.

Sound

- Emulates Creative Labs Sound Blaster 16 card.
- Supports both DSP (sound effects) and FM synthesis (music).
- Emulation includes two Yamaha OPL2 chips as well as a CT1345 mixer.
- Sound card is configured to use a base port of 0x220, IRQ 5 and DMA channel 1 (for 8 bit) or 5 (for 16 bit).

Ethernet

- Emulates a DEC 21041-based PCI Ethernet card.
- The card is plug-and-play and can be reconfigured by the operating system, but default settings use IRQ 1.

USB

- Emulates a standard OHCI-based PCI card.
- The emulated PCI card simulates 15 USB ports. This allows as many as 15 USB devices to be simultaneously connected to Virtual PC.

Numerics

A

B

C

D

E

F

G

H

I

J

K

L

T

U

V

W

Z