

Virtual PC™

for OS/2™

Version 4.2

User Guide

innotek
innovative business solutions

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Aspenweg 16
88097 Eriskirch, Germany

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San Mateo, CA 94403
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NOTE *Some screenshots and descriptions in this manual may not exactly reproduce the current level of functionality found in Virtual PC for OS/2. See the README.TXT file shipped with the product for updates to this manual.*

Contents

Chapter 1 **Introduction / 1**

About this User Guide / 1

If you need additional help / 2

Online Help / 2

Read Me file / 2

InnoTek Web site / 2

InnoTek Corporate Support options / 2

InnoTek Support / 2

Other products and license information / 3

Chapter 2 **Touring Virtual PC / 5**

What is Virtual PC? / 5

About the host PC / 6

Components of a virtual machine / 6

More about disk images / 6

Undoable disk images / 7

Running multiple virtual machines / 7

The Virtual PC window / 8

VPC Additions and virtual machine integration / 8

Printing with Virtual PC / 9

Networking with Virtual PC / 9

Help / 10

Creating a virtual machine / 10

Chapter 3 **Setting Up Virtual PC / 11**

Chapter topics / 11

Installation requirements / 12

Installing Virtual PC for OS/2 / 14

Unattended installation of Virtual PC for OS/2 / 17

Starting Virtual PC for the first time / 18

Registering Virtual PC / 19

Creating a virtual machine with a copy of an OS / 19

Creating a disk image / 20

Installing an OS / 24
Installing VPC Additions / 26
Installing an application on a Windows virtual machine / 29
Modifying the settings for a virtual machine / 30
Creating a virtual machine with standard settings / 31
Duplicating settings of an existing virtual machine / 32

Chapter 4 **Using a Virtual Machine / 33**

Chapter contents / 33
Starting up Virtual PC / 34
Using the host key / 34
Starting up a virtual machine / 36
Using CTRL+ALT+DELETE / 36
Changing the virtual machine display / 37
Minimizing a virtual machine window / 37
Pausing, resuming, and restarting a virtual machine / 38
Running multiple virtual machines / 38
Using the VPC Toolbar / 39
Status and lights / 39
Host PC and virtual machine integration / 40
Pointer integration / 40
Copy and paste / 40
Sharing folders / 41
Sharing CDs / 41
Sharing other removable volumes / 42
Capturing a floppy image or floppy disk / 42
Floppy disk images / 42
Real floppy disks / 42
Releasing a disk or disk image / 42
Printing from a virtual machine / 43
Using sound / 43
Optimizing performance / 43
Host PC processor speed / 43
Host PC processor usage / 43
RAM allocation / 44
Backing up a virtual machine / 44
Shutting down a virtual machine / 44

Chapter 5 **Networking with Virtual PC / 47**

About the Networking setting / 47

Shared Networking option / 47

Modem access / 49

LAN, DSL, or cable access / 49

Virtual Switch option / 49

File sharing / 50

Switching the host PC network interface card / 51

Chapter 6 Changing Settings and Preferences / 53

Chapter topics / 53

Changing settings for a virtual machine / 54

PC Name setting / 54

Memory setting / 55

More RAM improves performance / 55

Real RAM required / 55

Hard Disk 1 setting / 56

About the Undoable option / 57

Hard Disk 2 and Hard Disk 3 settings / 57

CD-ROM setting / 58

Floppy setting / 59

Shared Folders setting / 60

Mouse setting / 61

COM1 and COM2 settings / 62

LPT1 (Printing) setting / 63

Networking setting / 64

Deleting settings for a virtual machine / 65

About global preferences / 66

PC Performance preference / 66

Sound preference / 67

Virtual Switch preference / 68

Keyboard preference / 69

Mouse preference / 70

Chapter 7 Using Virtual Disk Wizard / 71

Creating a hard disk image / 71

More about hard disk image types / 72

Disk image file splitting / 73

Creating a floppy disk image / 74

Examining or modifying a disk image / 75

Fixed-size disk images / 75
Dynamically expanding disk images / 76
Differencing disk images / 76

Technical Specifications / 77

Processor / 77
Motherboard / 77
BIOS / 77
Memory / 77
IDE controller / 78
Hard drive images / 78
CD-ROM / 79
Video / 79
Keyboard controller / 79
Keyboard / 79
Mouse / 79
Floppy / 79
Serial ports / 80
Parallel port / 80
Sound / 80
Ethernet / 80

Command Line Parameters / 81

Volume License Guidelines / 83

Preparing for large-scale deployment of Virtual PC / 83

Building a disk image for deployment / 83

Building a drive image / 83

Deployment / 84

Networking / 85

Legal Issues / 85

Managing Multiple COAs / 85

Index / 87

Introduction

Welcome to Virtual PC for OS/2 – a sophisticated software emulation program that lets you run multiple virtual machines each with a different operating system on a single host PC.

This introduction provides a road map to the chapters in this guide and information about getting additional assistance.

About this User Guide

Here is a brief description of each chapter and appendix in this guide. Please read Chapter 2, “Touring Virtual PC,” before you install the program.

Chapter 1 *Introduction*

—this chapter

Chapter 2 *Touring Virtual PC*

—reviewing the major features of Virtual PC

Chapter 3 *Setting Up Virtual PC*

—installing Virtual PC and creating a virtual machine

Chapter 4 *Using a Virtual Machine*

—using the key features of a virtual machine

Chapter 5 *Networking with Virtual PC*

—choosing networking options for Virtual PC

Chapter 6 *Changing Settings and Preferences*

—changing settings for a virtual machine or global preferences for Virtual PC

Chapter 7 *Using Virtual Disk Wizard*

—creating various types of disk images with Virtual Disk Wizard

Appendix A *Technical Specifications*
—technical specifications for Virtual PC

Appendix B *Command Line Parameters*
—using Virtual PC command line parameters

Appendix C *Volume License Information*
—information about volume licensing

If you need additional help

If you need additional help, please consider these options:

Online Help

Virtual PC for OS/2 comes with an online version of this manual that can be opened with Acrobat Reader from Adobe (<http://www.adobe.com>).

Read Me file

Check the Read Me file (README.TXT) in the Virtual PC directory on your PC or on the Virtual PC CD. It provides late-breaking information on known problems and solutions.

InnoTek Web site

Check the InnoTek Virtual PC Web site at:

<http://www.innotek.de/products/virtualpc>

for the latest information or updates for Virtual PC for OS/2.

InnoTek Corporate Support options

Contact InnoTek for individual fee-based support options at:

virtualpc@innotek.de

InnoTek Support

Free support is available through the InnoTek Online Support Forums at:

<http://www.innotek.de/support/forums>

Before you contact InnoTek Support, please have the following information available:

- Your Virtual PC for OS/2 serial number
- Software version number—In the Virtual PC window, on the **Help** menu, click **About Virtual PC**.
- Basic information about your host PC such as the processor type and the RAM memory installed
- The version of OS/2 Warp running on your host PC
- The operating systems running on your virtual machines
- Your notes on the events that led to a problem

Other products and license information

For more information about other InnoTek products or about volume license agreements for Virtual PC, please contact InnoTek Sales:

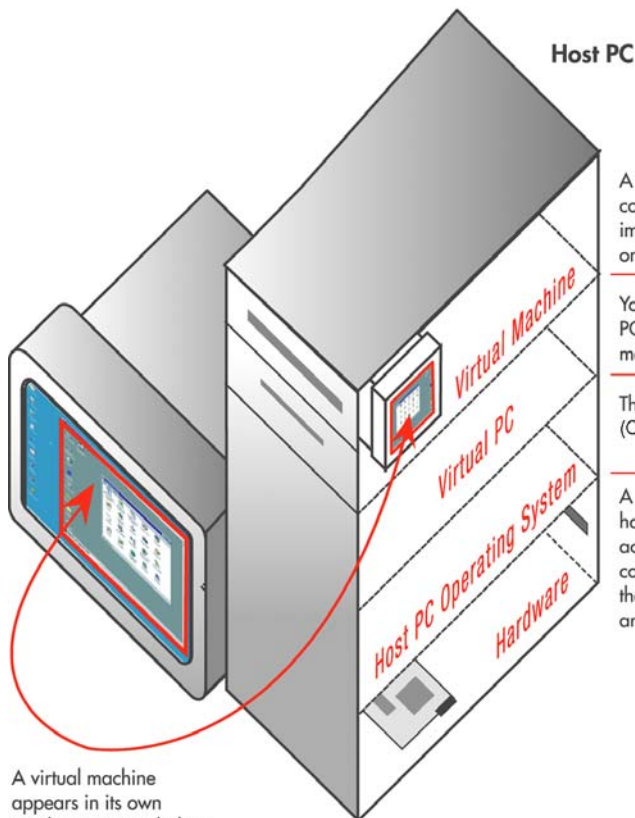
- E-mail: sales@innotek.de
- Worldwide Web: <http://www.innotek.de>

Touring Virtual PC

This chapter provides a tour of Virtual PC for OS/2. Look it over to get an understanding of key features before you install the program.

What is Virtual PC?

Virtual PC lets you create one or more *virtual machines* or *guest PCs* on a *host PC*. A virtual machine runs its own operating system.



A virtual machine appears in its own window on your desktop.

Host PC

A virtual machine has three components: settings, a disk image, and an OS you install on the disk image.

You install Virtual PC on a host PC and then set up a virtual machine.

The operating system of the host PC (OS/2 Warp)

A virtual machine can use the hardware resources of the host PC, accessing CD or floppy disks, connecting to the network, using the host PC parallel port to print, and so on.

About the host PC

The host PC where you install Virtual PC and create one or more virtual machines must be running OS/2 Warp. (For details of other host PC requirements, see page 12.)

Components of a virtual machine

A basic virtual machine (or guest PC) consists of three components:

- *Settings* that determine the operating relationship with the host PC, such as the amount of RAM allocated for the virtual machine, or the assignments for the COM1 and COM2 ports.
- A *disk image* file that represents the boot drive (Hard Disk 1) of the virtual machine. By default, this disk image is a dynamically expanding file that grows in size as you install applications or store data on it. (Optionally, you can designate other disk images as Hard Disk 2 or Hard Disk 3 for a virtual machine.)
- An operating system installed on the boot disk image file. This OS can be almost any x86 compatible operating system, including OS/2, Linux and Windows 95/98/ME/NT/2000/XP. (An operating system running on a virtual machine is also called a *guest OS*.)

More about disk images

Virtual PC supports several types of disk images, including:

- *Dynamically expanding*—the size of the disk image file expands as you add information to it. For example, if you create a 1 GB dynamically expanding disk image, the initial file is only about 3 MB in size.
- *Fixed-size*—the size of the disk image file is fixed at a size representing the entire virtual hard drive. For example, if you create a fixed-size hard disk image that represents a 1 GB hard drive, the image file is 1 GB in size.
- *Differencing*—information you add is written to a differencing image file only, not to its associated disk image.

You can create, examine, or modify disk images using the Virtual Disk Wizard. (See page 71.)

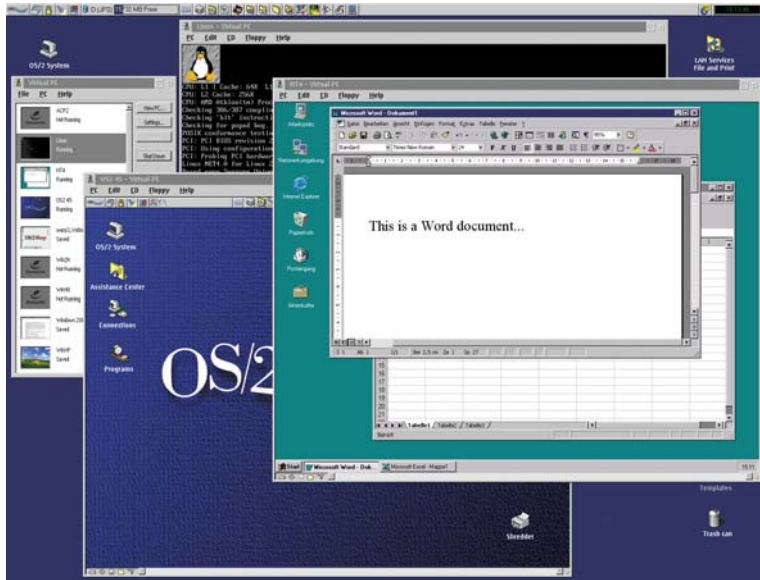
Undoable disk images

You can designate any disk image as *undoable*. This means that any changes you make during a session with a virtual machine are saved to a separate, temporary file. At the time you shut down the virtual machine, you then have the option of discarding these changes or committing them to the disk image.

Running multiple virtual machines

You can create and simultaneously run several virtual machines on the same host PC. Since each virtual machine has its own OS, you can in effect run several different operating systems at the same time on a single PC.

2-1

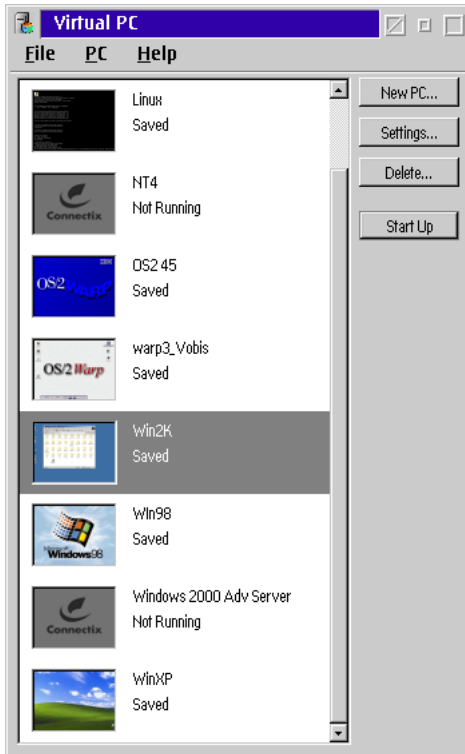


Note that each guest PC requires its own allocation of RAM on the host PC.

The Virtual PC window

When you start up Virtual PC, the Virtual PC window appears. This is the “dashboard” for Virtual PC. From this window, you can start up a virtual machine, create a new virtual machine, change the settings for a virtual machine, or delete the settings for a virtual machine.

2-2



As you run a guest PC, its thumbnail picture in the Virtual PC window updates dynamically.

VPC Additions and virtual machine integration

A set of software components called “VPC Additions” can be installed on a guest OS. VPC Additions enable host PC and virtual machine integration.

This integration takes several forms:

- You can drag and drop files and folders from the host PC desktop to a virtual machine, and vice versa.

NOTE *Drag and Drop support is not available in the current release of Virtual PC for OS/2.*

- You can copy and paste between applications running in the two environments.
- You can share a folder or a volume between the host PC and a virtual machine. (You can even share the same folder with multiple guest PCs running at the same time.)

In addition, the clock of the virtual machine is synchronized with the clock of the host PC. (This is especially important when saving or restarting a virtual machine.)

Printing with Virtual PC

Applications running on a virtual machine can print in two ways:

- over a network
- through a parallel port on the host PC

For information about printing, see page 43.

Networking with Virtual PC

By default, a virtual machine is set for *Shared Networking*. This means the virtual machine can share a single network connection transparently with the host PC. If the host PC can access the World Wide Web, then the virtual machine can also access the Web.

Two other networking options are available:

- *None*—the equivalent of removing the emulated networking card from the virtual machine
- *Virtual Switch*—an advanced option available when the corresponding device driver is installed in an Ethernet environment. One feature of Virtual Switch allows you to send network packets exclusively between virtual machines. You can actually set up a “virtual network” on the host PC and test network protocols without using your real network. (See page 47 for more details.)

NOTE *Virtual PC emulates a Digital Equipment Corporation™ (DEC) 21041-based PCI Ethernet card. Some operating systems also refer to this adapter as an Intel™ 21041 card.*

Help

In the current release, there is no other online help than this document. This may change in future releases of Virtual PC for OS/2.

Creating a virtual machine

After you install Virtual PC on the host PC, you create one or more virtual machines.

You can set up a guest PC by creating a disk image and then installing your own copy of an OS on it. (See page 19.)

Setting Up Virtual PC

This chapter provides step-by-step instructions for setting up Virtual PC for OS/2.

Chapter topics

The topics in this chapter include:

- Installation requirements - page 12
- Installing Virtual PC for OS/2 - page 14
- Unattended Installation - page 17
- Starting Virtual PC for the first time - page 18
- Registering Virtual PC - page 19
- Creating a virtual machine with your own copy of an OS - page 19
- Installing an application on a virtual machine - page 29
- Modifying the settings for a virtual machine - page 30
- Creating a virtual machine with standard settings - page 31
- Duplicating the settings of an existing virtual machine - page 32

Installation requirements

Before you install Virtual PC for OS/2 on a host PC, note these requirements:

- Host PC processor
 - Athlon, Duron, Celeron, K6-III, Pentium II, Pentium III, or Pentium 4
 - 266MHz minimum, 500 MHz recommended
 - Level 2 cache required
- Host PC OS
 - OS/2 Warp 4 (FixPak 15 recommended)
 - OS/2 Warp 4.51 (Convenience Pack 1)
 - OS/2 Warp 4.52 (Convenience Pack 2)
- Host PC Disk space

Use the following table to determine the required disk space on the host PC. The total required disk space is the sum of the disk space required for each virtual machine you create on the host PC.

Virtual Machine OS	Host PC Disk Space
OS/2 Warp 4.x	300MB
Windows 95	500 MB
Windows 98	500 MB
Windows Me	2 GB
Windows 2000 Professional	2 GB
Windows 2000 Server	2 GB
Windows 2000 Advanced Server	2 GB
Windows NT 4.0 Workstation	1 GB
Windows NT 4.0 Server	1 GB
Windows NT 4.0 Enterprise	1 GB
Linux	2 GB

- **Host PC RAM**

Use the table below to determine the minimum physical RAM required for the host PC. First determine the minimum required RAM for the OS on the host PC (usually 32-64MB for OS/2 Warp 4.x). Then add the RAM requirement for the virtual machine or machines you intend to run. Additional memory beyond this minimum amounts usually improves performance.

Note that if you are going to run multiple virtual machines *simultaneously*, you need to add up the RAM requirements for all the virtual machines running.

For example, on a host PC running OS/2 Warp 4 with a single guest PC running Windows 95 you need a minimum of 32MB plus 32 MB (or 64 MB) of host PC RAM. On the same host PC, simultaneously running a second virtual machine with Windows Me installed would require 32 MB plus 32 MB plus 96 MB (or 140 MB) of host PC RAM. If you only intend to run one of these virtual machines at a time on this host PC, you would need a minimum of 32 MB plus 96 MB (or 128 MB) of RAM.

Host PC or Virtual Machine OS	Minimum Host PC RAM
OS/2 Warp 4.x	32 MB
Windows 95	32 MB
Windows 98	64 MB
Windows Me	96 MB
Windows 2000 Professional	128 MB
Windows 2000 Server	128 MB
Windows 2000 Advanced Server	192 MB
Windows NT 4.0 Workstation	64 MB
Windows NT 4.0 Server	64 MB
Windows NT 4.0 Enterprise	64 MB
Linux	64 MB

Installing Virtual PC for OS/2

NOTE For unattended installation, see the next chapter.

To install Virtual PC for OS/2, follow these steps:

- 1 Start the host PC.
- 2 If you purchased Virtual PC for OS/2 Warp online, decompress the ZIP file (i.e. “VPC42OS2.zip”) you downloaded. Then open the extracted folder and double-click the file “INSTALL.EXE”. Alternatively, you can open an OS/2 Command Prompt, change to the directory created by unzipping the downloaded file and type “INSTALL”.

If you purchased a Virtual PC for OS/2 with an installation CD, insert this CD in the CD-ROM drive of the host PC and run the INSTALL.EXE program in the root directory of the CD.

This will launch the Virtual PC installation program.

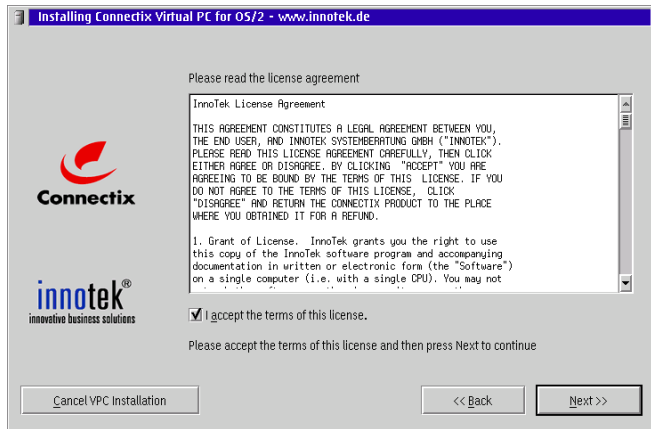
3-1



- 3 Click Next.

4 The license agreement dialog is shown:

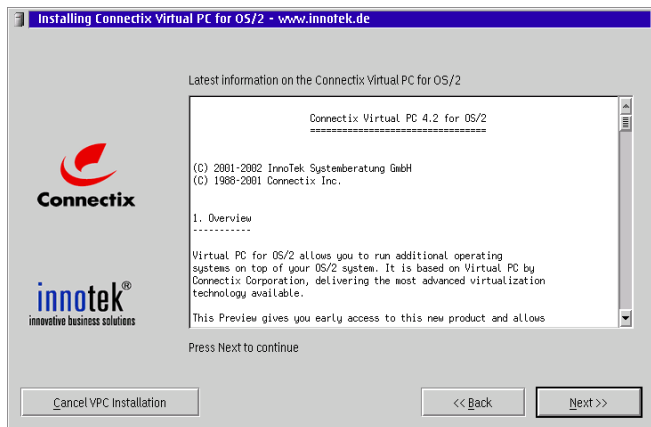
3-2



Read the license agreement and click “I Accept the terms of this license.”, then click Next.

5 The product README file is shown. Read it carefully as it contains the latest updates that did not make it into this manual.

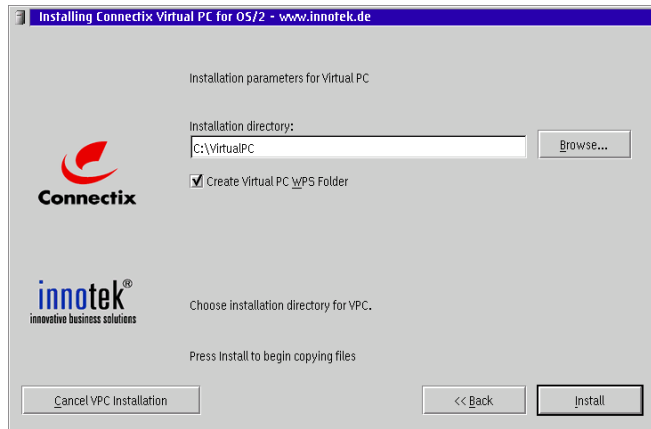
3-3



Then, click Next to continue.

6 The following screen appears:

3-4

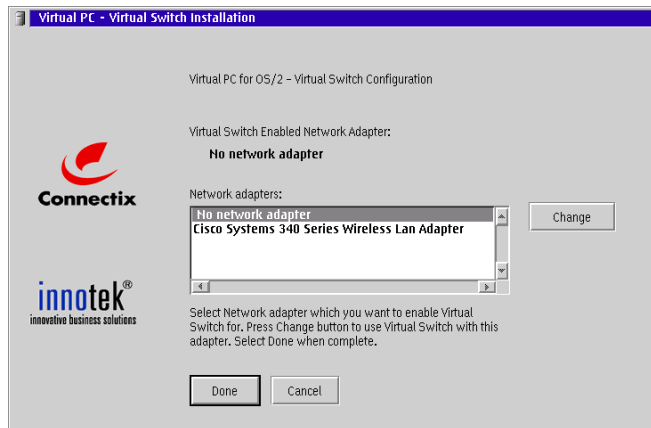


Use the default location for the installation, or change the location, and click Next.

At this point, the installer will copy the required files to the selected directory. This will take up to one minute.

7 Next, the Virtual Switch Configuration dialog appears:

3-5



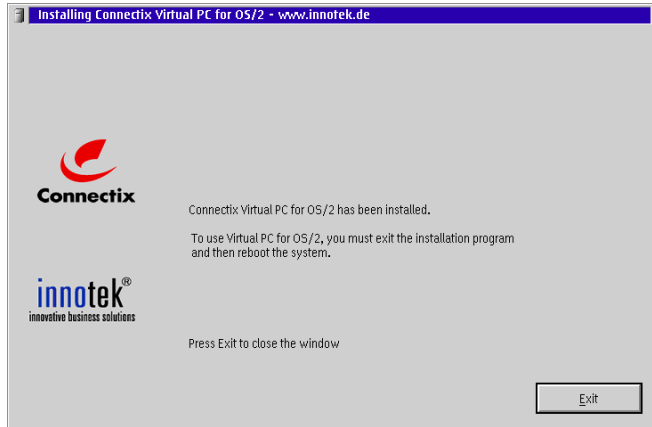
Select the network adapter that you want to use for Virtual Switch networking and click **Change**, then click **Done**.

NOTE Be sure to select an Ethernet adapter here, Token Ring network adapters are currently not supported for Virtual Switch networking.

NOTE If you do not want to use Virtual Switch networking, just click on *Cancel*.

8 Finally, the following screen will appear:

3-6



This indicates that the installation has completed. Click **Exit**.

9 Reboot the system to activate the changes made by the installer.

Virtual PC for OS/2 is now installed on the host PC.

Unattended installation of Virtual PC for OS/2

Virtual PC for OS/2 supports unattended installation in a CID environment. The following parameters are supported:

Parameter	Description
<code>/d=<directory></code>	Specifies the directory that Virtual PC will be installed to.
<code>/wps=[yes no]</code>	Specifies whether the Workplace Shell folder is going to be created or not.
<code>/config=[yes no]</code>	Specifies whether the Virtual PC device driver is added to CONFIG.SYS or not.
<code>/update=[force yes no]</code>	Specifies whether existing files are overwritten during installation or not. "force" always updates all files, "yes" updates older files only, "no" leaves all existing files unchanged.

The following example shows the use of these parameters:

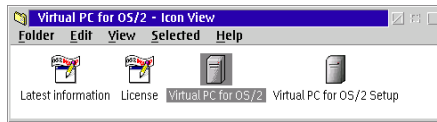
```
INSTALL /d='C:\VirtualPC' /wps=yes /config=yes  
/update=yes
```

Starting Virtual PC for the first time

Follow these steps to set up your copy of Virtual PC for OS/2:

- 1 After rebooting your system following the installation, you will find a folder called “*Virtual PC for OS/2*” on your desktop. Double click on it to open the folder:

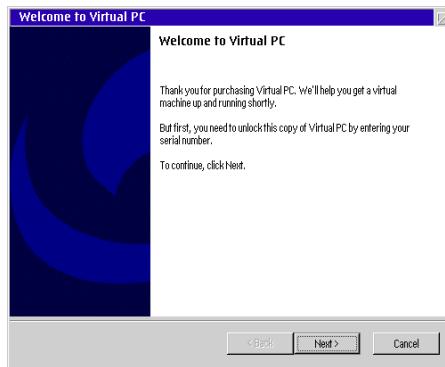
3-7



- 2 Double click on the “*Virtual PC for OS/2*” icon inside the folder.

- 3 The following welcome screen will be displayed:

3-8



Click **Next** to continue.

- 4 Now you need to enter the required information into the next panel:

NOTE For the boxed version of Virtual PC, the personal serial number is located on the small sticker included in the package. For the download version, you should have received that number electronically.

After filling in all the fields, click Next to continue.

- 5 The following panel explains the most important terminology used throughout Virtual PC. Click Next again.
- 6 Click Finish on the last panel.

You're ready to configure your first virtual machine now.

Registering Virtual PC

If you purchased Virtual PC for OS/2 with an installation CD, please follow the directions provided to register your product at the InnoTek Web site. You must register to receive support.

If you purchased Virtual PC for OS/2 online, you have already completed the registration process.

Creating a virtual machine with a copy of an OS

With Virtual PC installed on the host PC, you can now create a virtual machine using your own copy of an OS.

These are the required steps to do this:

- first create a disk image

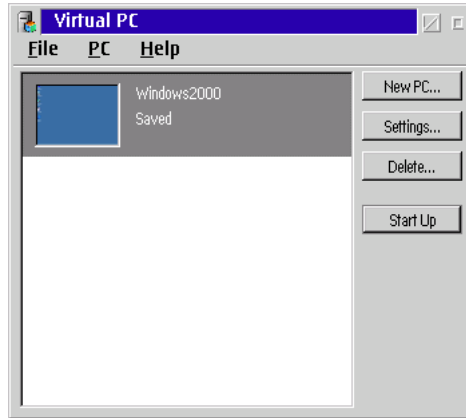
- install an OS on this image
- then install VPC Additions (if available for the OS you are using)

Creating a disk image

To create the disk image for the virtual machine, follow these steps:

- 1 Start up Virtual PC on your host PC.
The Virtual PC window appears.

3-10



2 Click New PC.

The PC Setup Wizard appears.

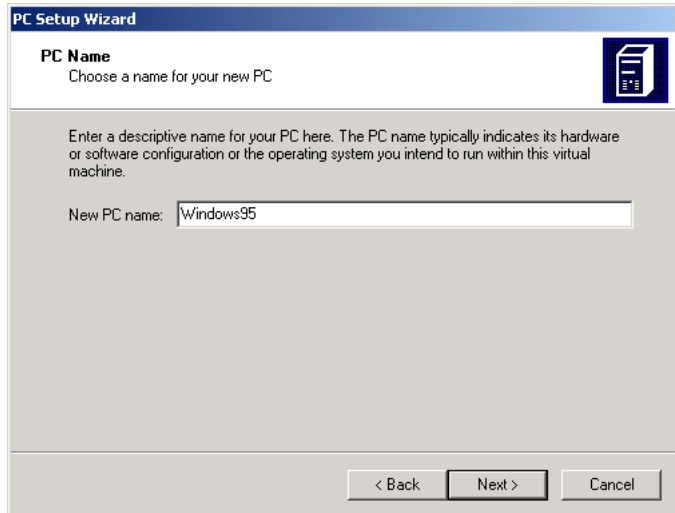
3-11



3 Click Next.

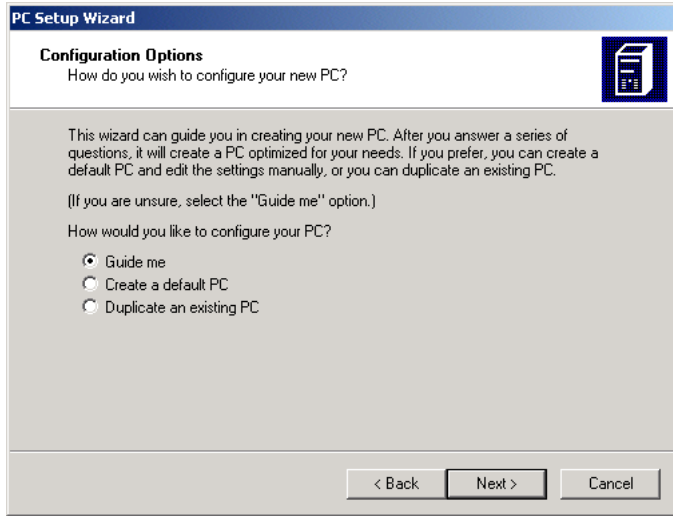
4 Type a name for the virtual machine and click Next.

3-12



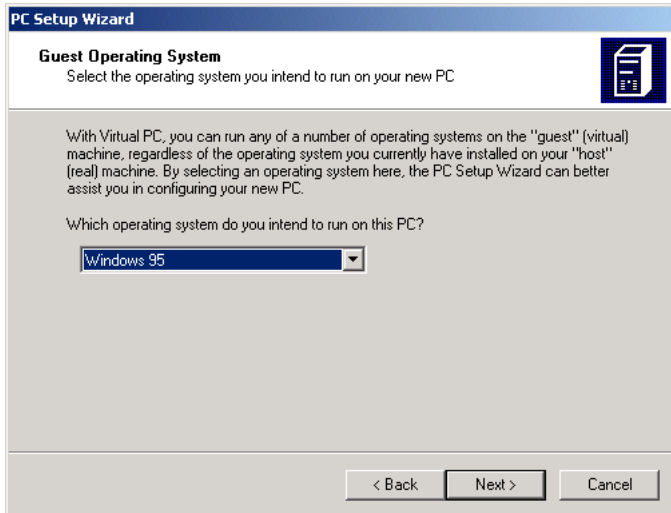
5 Choose the **Guide me** option and click **Next**.

3-13



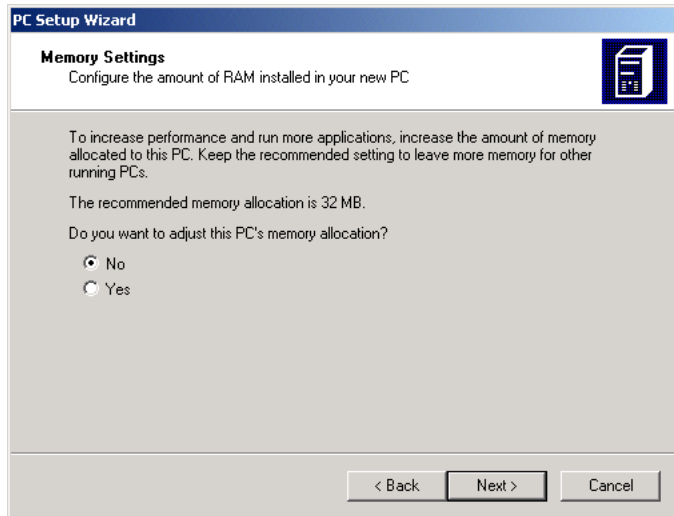
6 Use the drop-down menu to choose the operating system you plan to install on the disk image. Then click **Next**.

3-14



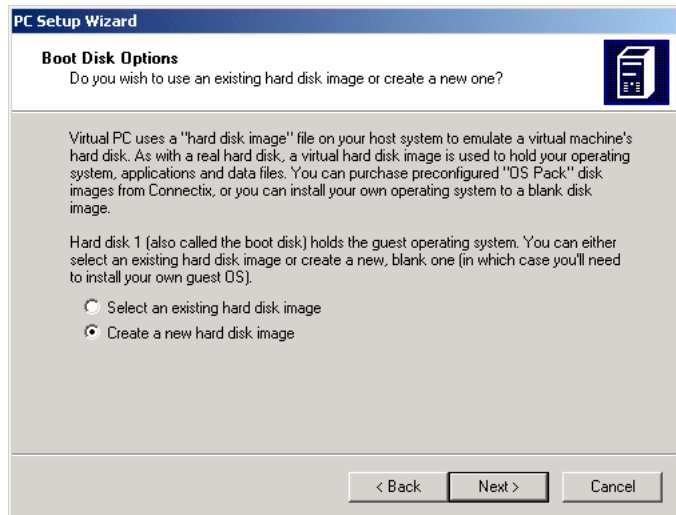
- 7 Click **No** to keep the recommended memory setting and click **Next**. (You can always change the memory setting later.)

3-15



- 8 Click the option **Create a new hard disk image** and click **Next**.

3-16



- 9 Click **Browse** and navigate to the location for the drive image. Type a name for the drive image and click **Save**. Then click **Next**.
- 10 Check the **Setup Summary** and click **Finish**.

Installing an OS

Virtual PC for OS/2 supports a variety of Pentium-based operating systems installed on virtual machines. Operating systems you can install on the boot disk image for a virtual machine include:

- IBM OS/2 Warp version 3.0 and higher
- IBM PC-DOS and Microsoft MS-DOS in various versions
- Windows 3.1
- Windows 3.11 for Workgroups
- Windows 95
- Windows 98 & 98SE
- Windows Me
- Windows NT 4.0
- Windows 2000 Professional, Server, Advanced Server
- Windows XP Home and Professional editions
- Many distributions of Linux

NOTE *Do not install Linux using the low-level format option. This forces a dynamically expanding disk image to grow to maximum size.*

- Many distributions of BSD UNIX

To install an operating system on a disk image for a virtual machine:

- 1 Start up the virtual machine. Select it in the Virtual PC window and click **Start Up**.

Since no OS is yet installed on the disk image, you receive an error message “Invalid System disk.”

- 2 Make sure the virtual machine is the foremost window on your desktop.

With a bootable CD

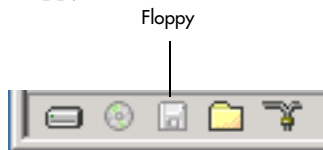
If you can install the OS from a bootable CD, follow these steps.

- 1** Insert the bootable CD in the CD-ROM drive. It is automatically captured by the virtual machine.
- 2** Press any key to continue.
The OS setup program on the CD then takes you through the process of installing the OS on the drive image for the virtual machine.
- 3** Now follow the instructions for installing VPC Additions on page 26.

With a non-bootable CD and a bootable floppy

If you install the OS from a non-bootable CD and a bootable floppy disk, follow these steps.

- 1** Insert the non-bootable OS installation CD.
The CD is automatically captured by the virtual machine.
- 2** Insert the bootable floppy disk required to install the OS in the floppy drive of the host PC. (It is automatically captured by the virtual machine.)
If you have a bootable floppy disk image, drag the image onto the Floppy icon on the VPC Toolbar to capture it.



- 3** Press any key to continue.
The OS setup program on the floppy then takes you through the process of installing the OS on the drive image for the virtual machine.
- 4** Now follow the instructions for installing VPC Additions on page 26.

Installing VPC Additions

VPC Additions enable integration between a virtual machine and the host PC. (See page 40 for more information.) VPC Additions are available for OS/2 Warp 3, Warp 4.x and most Windows operating systems installed on a virtual machine. Check the InnoTek Web site for new releases of Virtual PC Additions.

NOTE OS/2 Additions are sold separately.

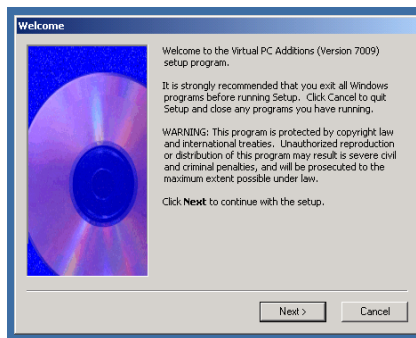
To install VPC Additions for Windows guests:

If you purchased Virtual PC for OS/2 with an installation CD

- 1 Make sure the virtual machine where you want to install VPC Additions is the frontmost window on the host PC desktop.
- 2 Insert the Virtual PC installation CD into the CD-ROM drive of the host PC.

The Virtual PC installation program appears on the virtual machine.

3-17



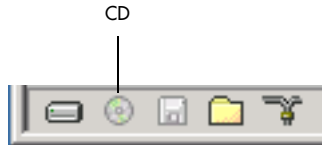
NOTE If the Autorun feature of your guest OS has been disabled, this screen will not appear automatically. In this case, double click the CD-ROM icon in your “My Computer” folder and then double click on the icon named “SETUP”.

- 3 Continue with the section “Finishing VPC Additions installation” on page 28.

If you purchased Virtual PC for OS/2 online

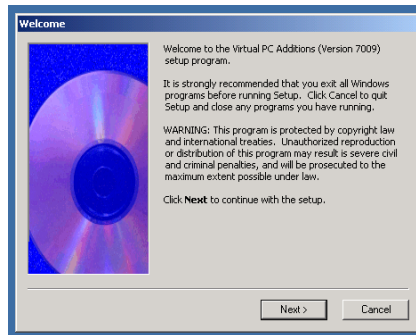
- 1 Open the Additions folder in the folder you extracted from the download.
- 2 Using the right mouse button, click on the CD icon on the VPC Toolbar of the virtual machine where you want to install VPC Additions.

3-18



Then select the ISO file containing the VPC Additions.
VPC Addition install starts automatically.

3-19



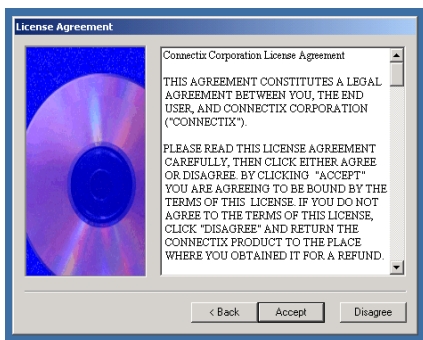
NOTE *If the Autorun feature of your guest OS has been disabled, this screen will not appear automatically. In this case, double click the CD-ROM icon in your “My Computer” folder and then double click on the icon named “SETUP”.*

- 3 Continue with the section “Finishing VPC Additions installation” on page 28.

Finishing VPC Additions installation

- 1 Read the explanatory text shown and click Next.
- 2 The license agreement screen appears:

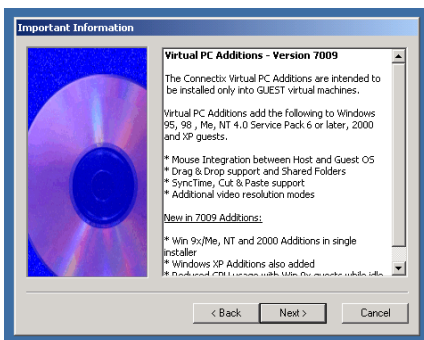
3-20



Click Accept to continue.

- 3 Another screen with additional information appears:

3-21



Click Next to go to the next panel.

- 4 Follow the instructions provided by the VPC Additions Installer Wizard. At the end, choose the option to *not* immediately restart the virtual machine.
- 5 Release the CD disk or disk image from the virtual machine by right-clicking the CD icon on the VPC Toolbar.
- 6 Restart the OS installed on the virtual machine.

You may now want to install an application on the new virtual machine. See the next section.

Installing an application on a Windows virtual machine

To install an application on a virtual machine:

- 1** Start up Virtual PC on your host PC.
This opens the Virtual PC window.
- 2** Select the virtual machine in the Virtual PC window and then click **Start Up**.
The virtual machine appears in a window on the desktop of the host PC.
- 3** Insert the CD for the application in the CD-ROM drive of the host PC.
The CD is automatically captured by the virtual machine.
- 4** From the virtual machine, navigate to the installation file on the CD (if necessary) and launch it.
- 5** Follow the onscreen directions for installation of the application.
- 6** When installation is complete, release the CD from the virtual machine using the VPC Toolbar (see page 39.)

Modifying the settings for a virtual machine

Each virtual machine has a number of settings you can modify. These include:

- PC Name—the name of the virtual machine
- Memory—the amount of host PC RAM allocated to the virtual machine
- Hard Disk 1—the disk image assigned to the boot drive of the virtual machine
- CD-ROM—options for booting from a CD or using a secondary IDE controller
- Floppy—options for booting from a floppy or automatically detecting a floppy inserted in the host PC
- Shared Folders—folders on the host PC designated for sharing with the virtual machine
- Mouse—option for turning pointer integration on or off
- COM1 and COM2—options for using serial communication from the virtual machine (such as an external modem connected to the host PC)
- LPT1—options for using the parallel port on the host PC for tasks such as printing from the virtual machine
- Networking—options for networking the virtual machine

For details about these settings and their options, see Chapter 6 on page 53.

Creating a virtual machine with standard settings

You can use the PC Setup Wizard to create a new virtual machine with standard settings.

- 1** Start up Virtual PC on your host PC.
The Virtual PC window appears.
- 2** Click **New PC** in the Virtual PC window.
The PC Setup Wizard appears.
- 3** Click **Next**.
- 4** Type a name for the virtual machine and click **Next**.
- 5** Click the option **Create a default PC**, and then click **Next**.
- 6** Leave the option selected to open settings for the new virtual machine when the wizard is finished. (You cannot start up a virtual machine until you assign a boot disk image to Hard Disk 1.) Click **Next**.
- 7** Click **Finish**.

Duplicating settings of an existing virtual machine

You can use the PC Setup Wizard to create a new virtual machine that duplicates the settings of an existing virtual machine.

- 1** Start up Virtual PC on your host PC.
The Virtual PC window appears.
- 2** Click **New PC** in the Virtual PC window.
The PC Setup Wizard appears.
- 3** Click **Next**.
- 4** Type a name for the virtual machine and click **Next**.
- 5** Click the option **Duplicate an existing PC** and click **Next**.
- 6** Choose the guest PC you wish to duplicate from the drop-down menu. Leave the option selected to open settings for the new guest PC. (You cannot start up a virtual machine until you assign a boot disk image to Hard Disk 1.) Click **Next**.
- 7** Click **Finish**.

Using a Virtual Machine

This chapter provides information about using a virtual machine on the host PC.

Chapter contents

The topics in this chapter include:

- Starting up Virtual PC for OS/2 - page 34
- Using the host key - page 34
- Starting up a virtual machine - page 36
- Using CTRL+ALT+DELETE - page 36
- Changing the virtual machine display - page 34
- Pausing, resuming, and restarting a virtual machine - page 38
- Running multiple virtual machines - page 38
- Using the VPC Toolbar - page 39
- Host PC and virtual machine integration- page 40
- Capturing a floppy image or disk- page 42
- Printing from a virtual machine - page 43
- Using a joystick - page 43
- Using sound - page 43
- Optimizing performance - page 43
- Backing up a virtual machine - page 44
- Shutting down a virtual machine - page 44

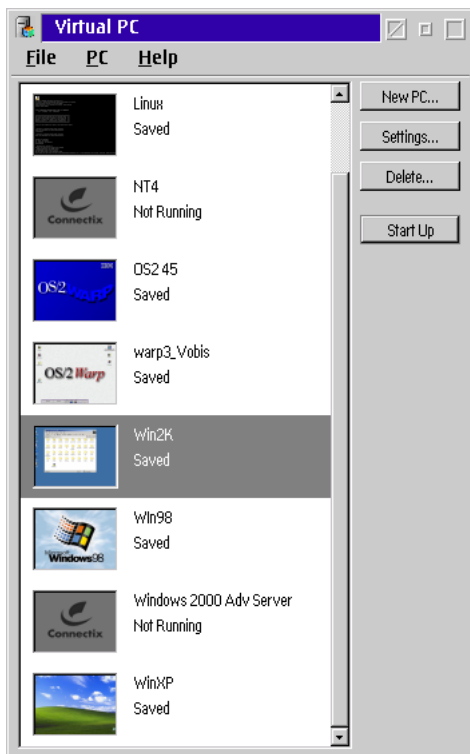
For information about settings for a virtual machine or global preferences for Virtual PC for OS/2, see Chapter 6 on page 53.

Starting up Virtual PC

To start up Virtual PC on your host PC, open the **Virtual PC** folder and double click the **Virtual PC** icon.

This opens the Virtual PC window.

4-1



NOTE With Virtual PC running, you can display the Virtual PC window by pressing the host key and the L key.

Using the host key

The host key is a designated key used to control certain behaviors of Virtual PC for OS/2. For example, holding down the host key and pressing the P key, pauses or resumes a virtual machine.

By default, the host key is defined as the right ALT key. You can change this using the Keyboard preference. (See page 69.)

NOTE *The Keyboard preference also provides an options that lets you set the behavior of the NUM LOCK key at startup. For laptops with numeric keyboards that overlap the main keyboard, you should clear this option.*

Starting up a virtual machine

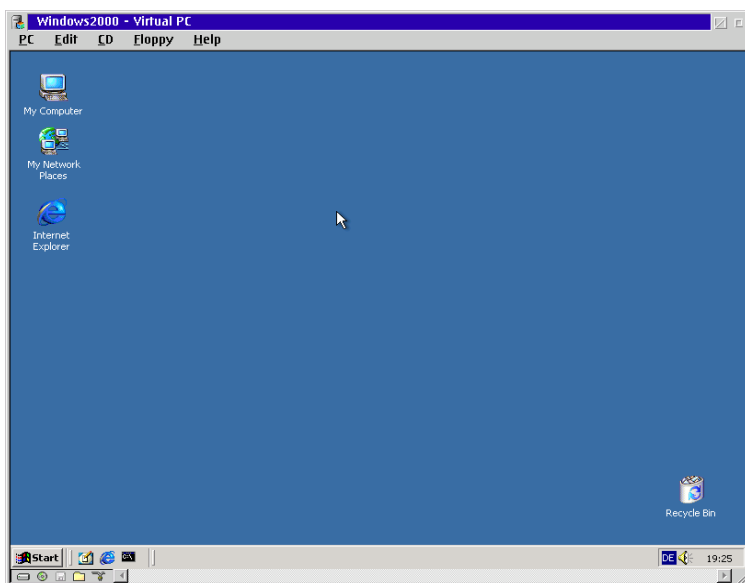
To start up a virtual machine:

- Select a virtual machine in the Virtual PC window and then click **Start Up**.
- Alternatively, double-click the thumbnail for the virtual machine in the Virtual PC window.

NOTE *You can also start up a virtual machine by right-clicking on it in the Virtual PC window and choosing **Start Up** from the shortcut menu.*

Virtual PC opens a virtual machine window on your host PC desktop and starts up the PC operating system installed on it. The name you chose for the virtual machine appears in the window's title.

4-2



Using CTRL+ALT+DELETE

Pressing CTRL+ALT+DELETE sends this key combination to the OS running on the host PC. In OS/2 this typically results in a reboot.

Pressing the host key and DELETE sends the equivalent of the CTRL+ALT+DELETE combination to the OS running on a virtual machine. (In some cases this combination is required—for example, to log in to Windows NT.)

Changing the virtual machine display

NOTE *A virtual machine can currently only run inside a window on your desktop (Windowed mode). Full Screen mode might be supported in a later release of the product.*

Minimizing a virtual machine window

Click the Minimize button at the top of the virtual machine window to minimize the virtual machine window. A minimized virtual machine continues to run unless you have paused the machine before minimizing.

NOTE *To help optimize system performance, a virtual machine's priority is reduced when it does not have the focus. To disable this feature, see the “-fastbackground” parameter in “Command Line Parameters” on page -81.*

Pausing, resuming, and restarting a virtual machine

You can pause a virtual machine so that it is no longer running. On the PC menu in the virtual machine window, click **Pause**. Click **Resume** to resume processing.

NOTE *You can press the host key and the P key to pause or resume a virtual machine.*

You can restart a virtual machine. On the PC menu in the virtual machine window, click **Reset**. This is the equivalent of pressing the restart button on the front of a PC. Alternatively, you can restart from the operating system running on the virtual machine.

NOTE *You can press the host key and the R key to restart a virtual machine.*

Running multiple virtual machines

Virtual PC can run multiple virtual machines at the same time. You can switch between virtual machines by:

- using the Virtual PC window
- clicking on the associated entry in the OS/2 window list
- pressing the host key and the RIGHT ARROW or LEFT ARROW key

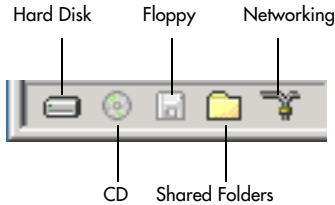
If you are running more than one virtual machine, selecting **Pause PCs when in background** in Preferences increases the performance of the front-most virtual machine. (See page 66.)

NOTE *When you are running multiple virtual machines and the background virtual machines are not paused, the virtual machine in front is allocated about 70 percent of the available processing time.*

Using the VPC Toolbar

The VPC Toolbar appears in the lower left corner of the window for a virtual machine. It provides shortcuts to several settings for a virtual machine as well as functions for capturing or releasing media.

4-3



The VPC Toolbar has five icons. Each icon has a shortcut menu you can access by right-clicking on the icon:

- Hard Disk—access Hard Disk settings, or launch Virtual Disk Wizard
- CD—access the CD-ROM setting, capture, release, or eject a physical CD or CD .iso image
- Floppy—access the Floppy setting, capture, release, or eject a floppy disk or floppy disk image
- Shared Folders—access the Shared Folders setting, designate a folder on the host PC for sharing
- Networking—access the Networking setting

Status and lights

An icon in the VPC Toolbar may appear as *active* or *shaded*. An active appearance indicates that a particular feature is enabled or that a removable media item (CD or floppy) is in place.

An icon may display a green light indicating a device is reading or receiving information, or an orange light indicating a device is writing or sending information.

Host PC and virtual machine integration

Virtual PC provides several capabilities that integrate the host PC and a virtual machine. Most require the installation of the set of software components called “VPC Additions.” (See page 26.) The capabilities include:

- Pointer integration (VPC Additions required)
- Copy and paste (VPC Additions required)
- Sharing folders (VPC Additions required)
- Sharing CDs
- Sharing volumes (VPC Additions required)
- Clock synchronization from the host PC to the virtual machine (VPC Additions required)

VPC Additions are available for OS/2 and most Windows operating systems installed on a virtual machine. Check the InnoTek Web site for new releases of Virtual PC Additions.

Pointer integration

You can move the pointer freely between the host PC desktop and the window displaying the virtual machine. By default, you must click in the virtual machine window to capture the pointer to the virtual machine. (You can change this behavior using the Mouse preference. See page 70.)

If VPC Additions are not installed or if pointer integration for a virtual machine is not enabled (see page 61), the pointer may be “trapped” in the virtual machine window. Hold down the host key to untrap the pointer and move it back to the host PC desktop.

Copy and paste

You can copy and paste text between an application running on a virtual machine and an application running on the host PC, or vice versa. You can also copy and paste between virtual machines.

Text is copied unformatted. (Formatting, including bold, italic, or paragraph styles, is not transferred.)

Sharing folders

You can designate a folder (directory) or volume (drive) for sharing between the host PC and a virtual machine (see page 60). For example, if you download shareware files from the World Wide Web to your host PC, you can share the host PC folder the files are in and then access the files from the virtual machine.

As an example, you can share your D:\data directory which is on an HPFS drive or volume as drive “X:” in the Windows guest.

NOTE *The shared folder is presented to the guest OS as a (virtual) LAN drive. This enables a Windows guest to read and write to a directory on an OS/2 HPFS drive that it normally could not access.*

You can share the same host PC folder with multiple virtual machines running at the same time.

Sharing CDs

A physical CD inserted in a host PC CD-ROM drive is automatically captured or “mounted” on the virtual machine—the frontmost machine if you are running several. You can also capture the CD simultaneously to other virtual machines using the CD shortcut menu on the VPC Toolbar.

Note that:

- You can capture or release a CD or a .iso image from a virtual machine using the CD shortcut menu on the VPC Toolbar.
- You can set an option to boot the virtual machine from a CD. (See page 58.)
- You can eject a CD using the CD shortcut menu on the VPC Toolbar.

Sharing other removable volumes

The virtual machine and host PC can share a removable volume such as a Zip disk (or media in other types of drives). To share a volume, drag it to the Folder icon on the VPC Toolbar.

You can share the same volume with multiple virtual machines running at the same time.

Capturing a floppy image or floppy disk

Virtual PC supports capture of both floppy disk images and real floppy disks by a virtual machine.

Floppy disk images

You can capture a floppy disk image using the shortcut menu for the Floppy icon on the VPC Toolbar. (You can also drag a valid floppy image directly to the icon to capture it.)

Be sure the disk image you use is uncompressed. Compressed images cannot be captured.

For more information on using Virtual Disk Wizard to create a floppy disk image, see page 71. You can also use floppy images created with other programs. (Valid floppy images are exactly 720 K or 1.44 MB in size.)

Real floppy disks

You can automatically capture a real floppy on a virtual machine by enabling the setting **Automatically detect floppy** in Floppy settings. (See page 59.)

You can capture a floppy disk inserted in a floppy drive of the host PC at any time using the shortcut menu for the Floppy icon on the VPC Toolbar.

Releasing a disk or disk image

You can release a floppy disk or floppy disk image from a virtual machine using the Floppy shortcut menu on the VPC Toolbar.

NOTE *Capturing a floppy disk or image to a virtual machine fails if the host PC has opened the floppy drive object in the Drives folder.*

Printing from a virtual machine

You can print from an application running on a virtual machine in two ways:

- Using the (default) Shared Networking option or the advanced Virtual Switch option (see page 64), you can print from an application running on a virtual machine to a network printer.
- Using the LPT1 setting (see page 63), you can associate the emulated LPT1 port on the virtual machine with a parallel port on the host PC, and then print from an application running on the virtual machine to a printer connected to the parallel port on the host PC.

Using sound

NOTE *Sound is currently disabled in Virtual PC for OS/2. For details, see the README.TXT file that comes with the product.*

Virtual PC provides 16-bit, 44-kHz sound input through Sound Blaster 16 emulation. This means that you can use a microphone to record sound directly into PC sound applications running on a virtual machine.

If several virtual machines are running and playing sound, you can use the Sound preference to mute sound from virtual machines in the background (see page 67).

Optimizing performance

Virtual PC relies on hardware for performance. In general, the faster the overall performance of the host PC system, the faster Virtual PC runs.

Host PC processor speed

The speed of the host PC processor is the most important element for overall Virtual PC performance. To improve performance and as circumstances warrant, upgrade the current processor in the host PC.

Host PC processor usage

Processor usage on the host PC—as reported in the WarpCenter CPU meter—is very high when a virtual machine is running the Windows

98 or earlier operating system with no Guest Additions installed. With later operating systems, Virtual PC can detect if a guest OS is executing its idle loop and give back most of the time to the host PC.

When the frontmost window on the host PC is not a virtual machine, Virtual PC scales back its processor usage. (You can override this behavior with the *fastbackground* command line parameter. See page 81.)

RAM allocation

Generally, the more RAM assigned to a virtual machine, the better it performs. More RAM decreases the need for the OS running on the virtual machine to use the hard disk for virtual memory.

Backing up a virtual machine

As you install applications and create data on a virtual machine, you should periodically back up the disk image (or images) for the machine. In case you need to recreate the virtual machine, using the backup disk image can make restoration relatively painless and quick.

Since this disk image file can expand to a significant size, you may require large-capacity backup media to take this step.

Alternatively, you can back up only data you create within the virtual machine.

Shutting down a virtual machine

When you are finished using a virtual machine, click the close box in the upper right corner of the virtual machine window. (Alternatively, you can choose **Shut Down** from the PC menu.)

Virtual PC presents a dialog box with a number of options that you can select from a drop-down menu. Only items that apply to the current situation appear in the menu:

Save PC State—Saves the state of the virtual machine to disk, allowing you to resume execution at the current place the next time you start up.

NOTE *To quit Virtual PC and save all running virtual machines in their current state, hold down the CTRL key while choosing Exit from the File menu in the Virtual PC window.*

Turn Off PC—This is the equivalent of pressing the power button on a real PC. The virtual machine is turned off immediately, and no information is saved. As with a real PC, it is recommended that you normally shut down the guest OS properly. Use this option as a last resort. Any unsaved data will be lost and you can potentially corrupt the contents of the virtual machine drive image.

Shut Down Windows [95/98/NT/Me/2000/XP] — If VPC Additions are running on the virtual machine, you can shut down the OS. This is equivalent to shutting down the machine from the Start menu in Windows. It cleanly shuts down the machine and then closes the virtual machine window. Note that it may take several seconds for the shutdown process to complete. If the virtual machine OS has crashed, the shutdown process may not complete correctly, forcing you to use an alternative shutdown option.

Save State and Commit Changes—This option is available only if one or more hard drives have been marked undoable in the settings dialog box. It saves the state of the virtual machine and commits any information written to the hard drive(s) since the machine was last started up.

Turn Off and Commit Changes / Turn Off and Undo Changes—These options are available only if you have marked one or more hard disk images as undoable. The option turns off the virtual machine, and commits or discards any information written to the hard drive(s) since the virtual machine last started up.

Shut Down Windows [95/98/NT/Me/2000/XP] and Commit Changes—

This option is available only if you have marked one or more hard disk images as undoable. The option cleanly shuts down the virtual machine OS and commits any information written to the hard drive(s) since the virtual machine last started up.

Networking with Virtual PC

This chapter provides information about networking with Virtual PC for OS/2.

About the Networking setting

The Networking setting for a virtual machine is briefly described on page 64. There are three options for the setting:

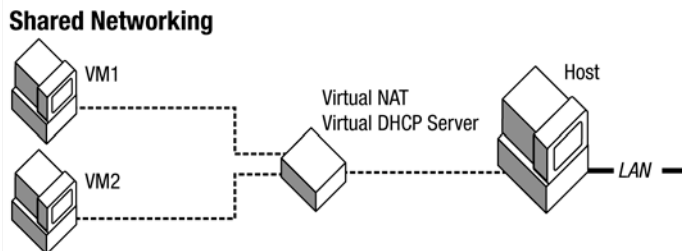
- None
- Shared Networking (the default option)
- Virtual Switch

The Shared Networking and Virtual Switch options are described in detail in this chapter

Shared Networking option

The Shared Networking option is the default option for the Networking setting for a virtual machine.

Shared Networking uses a sophisticated internal network address port translation service built into Virtual PC that enables one or more virtual machines to share the IP address of the host PC. With this option, you should configure the virtual machine OS to use Dynamic Host Control Protocol (DHCP). Virtual PC assigns the virtual machine a temporary, non-routable IP address and performs any necessary packet translations.



The Shared Networking option works well for standard network activities such as browsing the Web, reading e-mail, accessing FTP sites, or accessing shared printers and files. It is not suitable for more advanced scenarios, such as running HTTP or FTP servers on the virtual machine. For these advanced scenarios, use the Virtual Switch option.

With the Shared Networking option, note these points:

- The OS running on a virtual machine must be set to use DHCP. On Windows, you enable DHCP by selecting **Obtain an IP address automatically**. On OS/2, use the `tcpcfg2` command to set DHCP mode.
- When you use the Internet Connection Wizard to set up networking for a Windows OS on a virtual machine, always specify “Connect through LAN,” even if your host PC is using a dial-up connection.
- The virtual machine emulates a DEC 21041 Ethernet controller. (In some cases, the DEC 21041 may show up on your system as Intel 21041. This is normal behavior.)
- Some networking software—chat programs, for example— may not function correctly without a unique IP address.
- You can access the network either with a dial-up connection or over a LAN. Virtual PC uses the currently selected TCP/IP connection on the host PC for all Shared Networking traffic.
- You can access printers and files on other computers, but you can’t share files on a virtual machine. This is a server function that requires the Virtual Switch option.

Modem access

If you are running a virtual machine with Shared Networking and accessing the Internet over a modem, you can connect to your Internet service provider from your host PC. With the connection still open, you can then access the Internet from the virtual machine.

LAN, DSL, or cable access

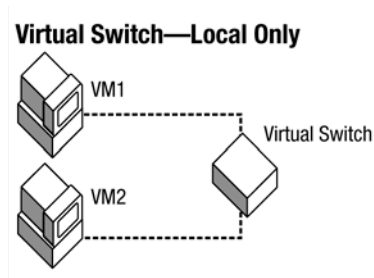
If you are running a virtual machine with Shared Networking and accessing the Internet over a LAN, using DSL, or using a cable modem, you have an IP address already assigned to your host PC—either a static IP address, or one that is dynamically assigned by a DHCP server. With this shared IP address, you can access the Internet from a virtual machine.

Virtual Switch option

The Virtual Switch option addresses advanced networking needs, such as running guest server software with predefined port numbers, remote login (rlogin), network performance analysis (netperf), or remote shells (rsh). It offers the highest degree of compatibility and control. Virtual Switch requires the Virtual PC Network Services Driver, which can be installed by the Virtual PC for OS/2 install program.

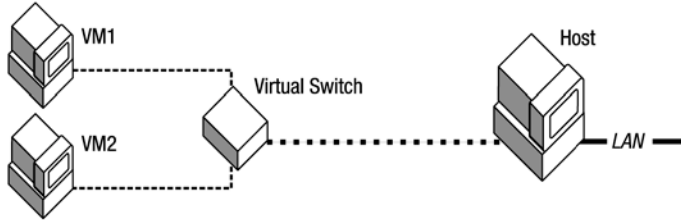
With Virtual Switch, there are two routing options:

- **Local only**—packets are only routed between virtual machines. The host PC never sees the packets, and they never go out over the wire. This setting is useful for testing network protocols.



- **Local and external**—packets are routed between virtual machines and also allowed to go out over the wire. In this case, a virtual machine becomes a first-class network citizen and acts like any other PC on the local network.

Virtual Switch—Local and External



NOTE When you create a virtual machine, Networking is set by default to *Shared Networking*. You have to change this to use *Virtual Switch mode!*

File sharing

If a virtual machine has a Windows OS installed and is set for the Virtual Switch option with the Local and external routing option, you can do peer-to-peer file sharing over a Microsoft Network.

Connect to the network and then follow these steps:

- 1 In the virtual machine OS, click the **Start** button and point to **Settings**.
- 2 Click **Control Panel**.
- 3 Double-click the **Network** icon.
- 4 Click the **Identification** tab.
- 5 Type a **Computer** name, your **Workgroup** or **Domain** 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** or **Network Places**.

Switching the host PC network interface card

If the host PC has more than one network interface card installed, you can use the Virtual Switch preference to designate a host PC network interface card for use by virtual machines. (See page 68.) Any external Virtual Switch traffic is routed to this network interface card.

NOTE *Token Ring network cards are currently not supported for Virtual Switch mode. Shared networking mode should be used instead.*

Changing Settings and Preferences

This chapter explains the settings for a virtual machine and the global preferences for Virtual PC for OS/2.

Chapter topics

The topics in this chapter include:

- Changing settings for a virtual machine - page 54
- PC Name setting- page 54
- Memory setting - page 55
- Hard Disk 1 setting- page 56
- Hard Disk 2 and 3 settings - page 57
- CD-ROM setting- page 58
- Floppy setting - page 59
- Shared Folders setting - page 60
- Mouse setting - page 61
- COM1 and COM2 settings - page 62
- LPT1 (Printing) setting - page 63
- Networking setting- page 64
- Deleting settings for a virtual machine - page 65
- About global preferences - page 66
- PC Performance preference - page 66
- Sound preference - page 67
- Virtual Switch preference - page 68
- Keyboard preference - page 69
- Mouse preference - page 70

Changing settings for a virtual machine

You should generally only make changes to the settings for a virtual machine when it is not running. To make changes to the settings of a virtual machine:

- 1 Click the thumbnail of the virtual machine in the Virtual PC window.
- 2 Click **Settings**.

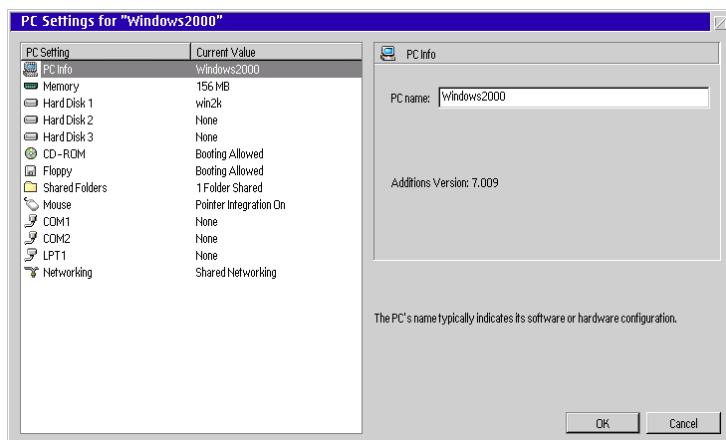
The PC Settings window appears. The following pages describe each setting.

- **IMPORTANT** Some virtual machine settings may be disabled if the machine is currently running or is saved to disk. Some settings that are editable while the virtual machine is running require a restart before they take effect, for example, changing a hard disk image or turning off networking. In these cases, the **OK** button changes to **Restart**.

PC Name setting

Use this setting to name the virtual machine. Typically, the name indicates the operating system running on the virtual machine. It must be fewer than 32 characters in length. It cannot begin with a period or contain a colon, or contain the *, ?, :, <, >, /, |, or \ characters.

6-1

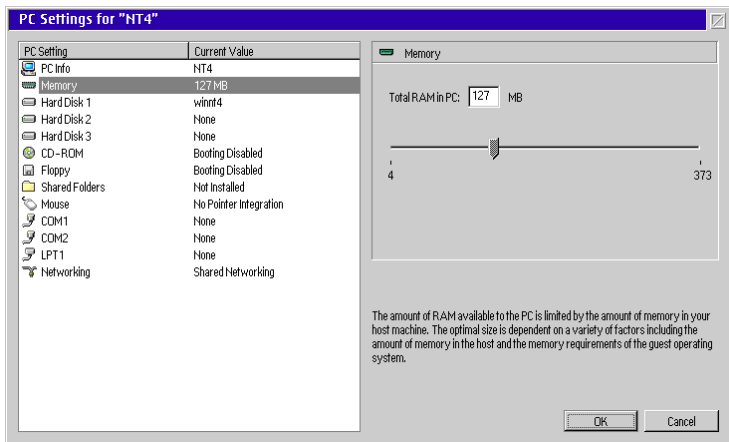


NOTE All the virtual machines in the Virtual PC window must have unique names.

Memory setting

Use this setting to allocate RAM for a virtual machine.

6-2



Use the slider control to make changes. The system warns you if you set too little memory. The maximum value allowed is based on the total physical RAM in your host PC.

NOTE *You need to make a separate allocation of physical RAM memory on the host PC for each virtual machine. See page 12.*

More RAM improves performance

Performance of the OS running on a virtual machine may improve when more RAM is allocated to the virtual machine. More RAM means that the virtual machine OS can reduce usage of virtual memory, spending less time storing information to the hard drive.

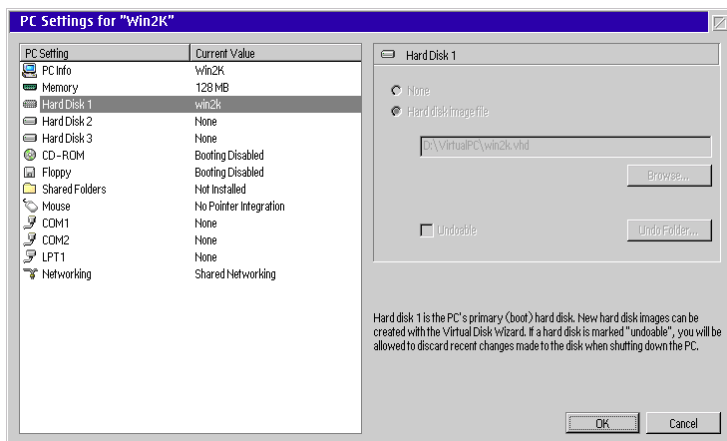
Real RAM required

Virtual machines running under Virtual PC require real physical RAM. Your ability to run virtual machines with large memory settings, or multiple virtual machines simultaneously will be limited by the amount of RAM installed in your host PC.

Hard Disk 1 setting

Use this setting to designate a disk image file as Hard Disk 1—the boot or C drive for a virtual machine. Hard Drive 1 contains all the files needed to run a guest OS.

6-3



The available options are:

None—click this option if no disk image is assigned to Hard Disk 1. If Hard Disk 1 is not specified, you can only start up the virtual machine from a bootable floppy or bootable CD.

Hard disk image file—click this option to specify a disk image as Hard Disk 1 (the boot disk). Click **Browse** to navigate to and select an image. (You can also drag the disk image to the path name field.) To make the image undoable, select **Undoable**. If you wish, click **Undo Folder** and select a location for the temporary file. (See the section “About the undoable option” below for more details.)

For information about creating a disk image, see page 71.

NOTE *Virtual PC for OS/2 is compatible with disk images created with other versions of Virtual PC 4.0 or later. For example, you can use a disk image created with the Windows version of Virtual PC 4.0.*

About the Undoable option

When you designate a disk image as undoable, information written to the disk image by the guest OS is not immediately written to the disk image file itself. Rather, changes are written to a temporary file and accumulated throughout the session.

When you shut down the virtual machine, you can choose to *commit* or *undo* the changes. If you choose commit, the changes from the temporary disk image are merged back into the original disk image. If you choose undo, the temporary file is discarded, leaving the initial hard disk image unmodified.

This feature is useful when you want to maintain the original state of a hard disk image. It is also useful if you are running software that may contain a virus or a disk-related bug that could corrupt the disk image.

The temporary undo file can grow large if you make significant changes to the drive image during the course of the session, for example, if you install a large program on the virtual machine. Choose a location for the undo file that has adequate space. (By default, the location is the same directory on your host PC as the drive image you have specified.)

Hard Disk 2 and Hard Disk 3 settings

Use the settings for Hard Disk 2 and Hard Disk 3 to control secondary and tertiary drive images for a virtual machine. (Hard Drive 2 and Hard Drive 3 function as drive D and drive E, respectively, on the virtual machine.) You may want to specify a Hard Disk 2 or a Hard Disk 3 for additional storage space.

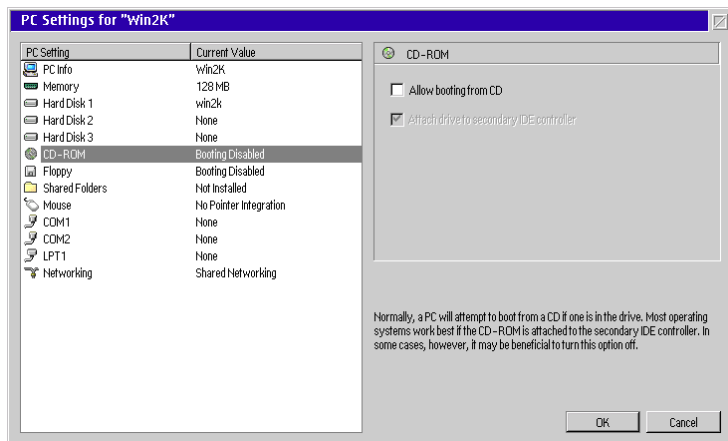
- **IMPORTANT** Be careful to use the Undoable option consistently
- between Hard Disks. For example, if you do not set Hard Disk 1 as
- undoable and then set Hard Disk 2 as undoable, this may result in
- problems if you install an application on Hard Disk 2 and shut down
- without committing changes (see page 44.)

NOTE *Most operating systems do not allow read-only drive images to be assigned as secondary drives (Hard Disk 2 or Hard Disk 3).*

CD-ROM setting

Use this setting to control the behavior of CDs. (Virtual PC automatically recognizes your host PC CD-ROM drive and reads CDs inserted in it.)

6-4



The available options are:

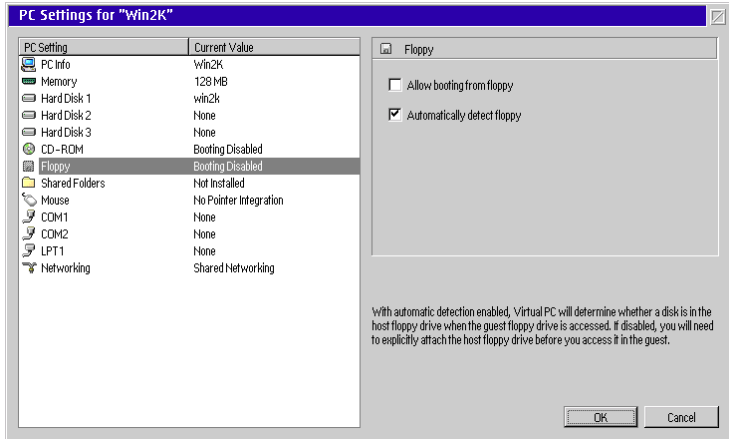
Allow booting from CD—select this option if you need to boot from a CD to install an operating system on the virtual machine. (See page 19.)

Attach drive to secondary IDE controller—clear this option only if the operating system on the virtual machine requires that the CD-ROM drive is attached to the primary controller. On most PCs, the CD-ROM is connected to the secondary IDE controller and you should leave this option selected.

Floppy setting

Use this setting to control the behavior of the emulated floppy drive in the virtual machine.

6-5



The available options are:

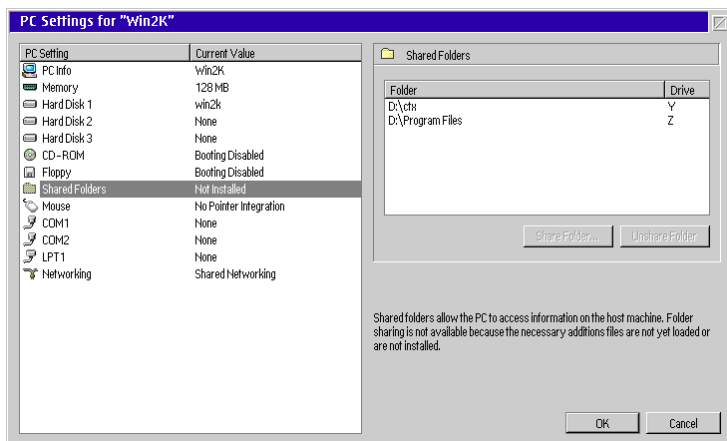
Allow booting from floppy—select this option to allow the virtual machine to attempt to boot from a floppy inserted in the floppy drive or a floppy disk image mounted on the virtual machine.

Automatically detect floppy—select this option to allow the virtual machine to search for a real floppy disk in the host PC at the time that the virtual machine OS accesses the emulated floppy drive. (If no floppy disk is inserted on the host PC, you may hear a distinctive sound from the host PC.) With this feature disabled, you can still capture real floppy disks from the host PC to the virtual machine using the shortcut menu for the Floppy icon on the VPC Toolbar.

Shared Folders setting

Use this setting to designate a folder on the host PC that is shared with the virtual machine.

6-6



To set up a folder as a Shared Folder:

- 1 Click **Share Folder**.
- 2 Navigate to the folder you want to share.
- 3 Click the option **Share every time** if you want to share the folder every time you start up the virtual machine.

NOTE Click this option if you using an application installer in a shared folder that may reboot the virtual machine.

- 4 Click **Share**.

The host PC folder now appears on the virtual machine as a drive with a drive letter assigned.

NOTE Since folders are shared as drives, you cannot share more folders than can be labeled from the range of available letters, e.g. from E to Z.

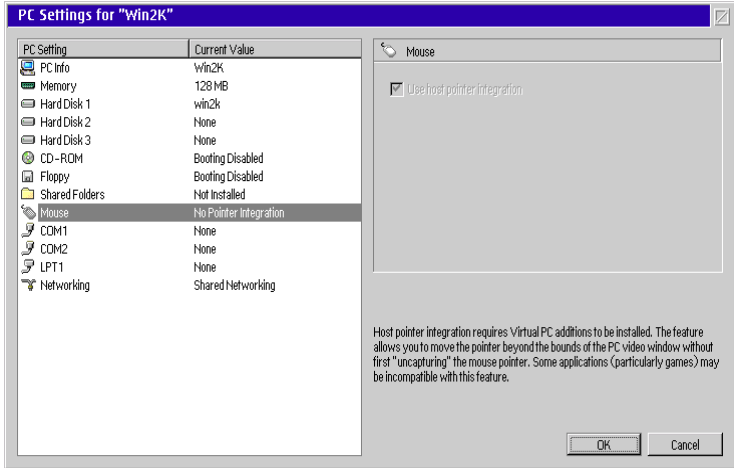
You can share the same host PC folder with multiple virtual machines running at the same time.

To unshare a folder, select it in the list of shared folders and then click **Unshare Folder**.

Mouse setting

Use this setting to control integration of the mouse pointer between the host PC and the virtual machine.

6-7



The available option is:

Use host pointer integration—select this option to allow the pointer to move freely between the host PC desktop and the window displaying the virtual machine.

This option is not active if VPC Additions are not installed (see page 26.)

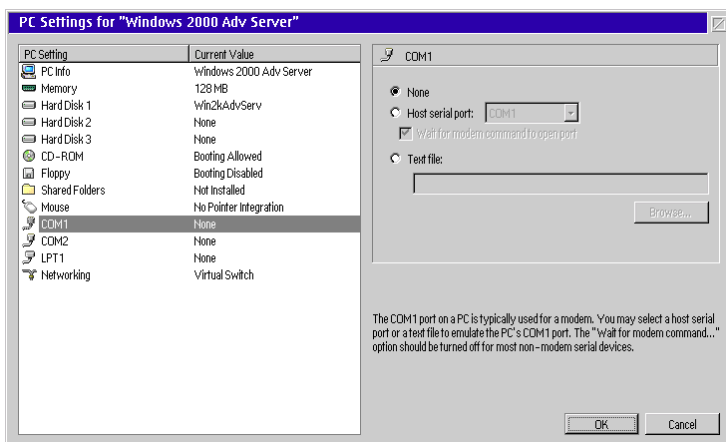
NOTE *You may need to clear this option for some programs (mostly games) that are incompatible with host pointer integration.*

COM1 and COM2 settings

Use these settings to support various serial communication options.

The COM1 port on a PC is typically used for a modem. The COM2 port is typically used for a serial device or modem. If you have an external modem connected to your host PC, select the appropriate host PC serial port to make it accessible by your virtual machine.

6-8



The options are:

None—click this option to not use the COM port.

Host serial port—click this option to redirect the COM port to the selected COM port on the host PC.

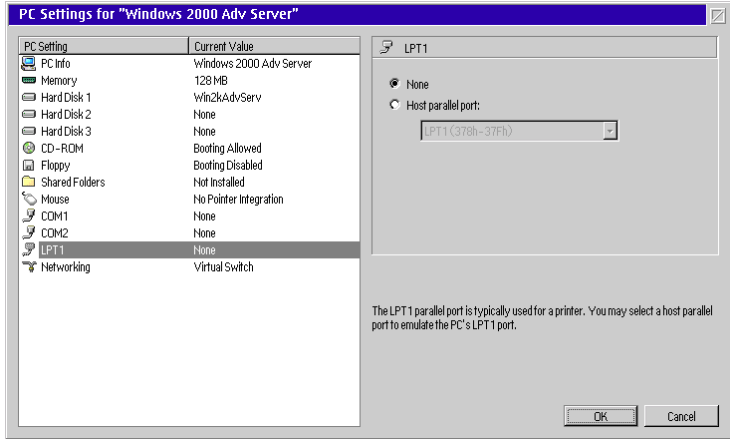
Wait for modem command to open port—select this option to not open the COM port on the host PC until Virtual PC sees a modem command sent to the COM port. (You should clear this option for most non-modem serial devices.)

Text file—click this option to direct the output from the port to a text file. Click the **Browse** button to select a location for the file.

LPT1 (Printing) setting

Use this setting to select a host PC parallel port that the virtual machine can use for its emulated LPT1 port. This feature is typically used to print from a virtual machine.

6-9



The options are:

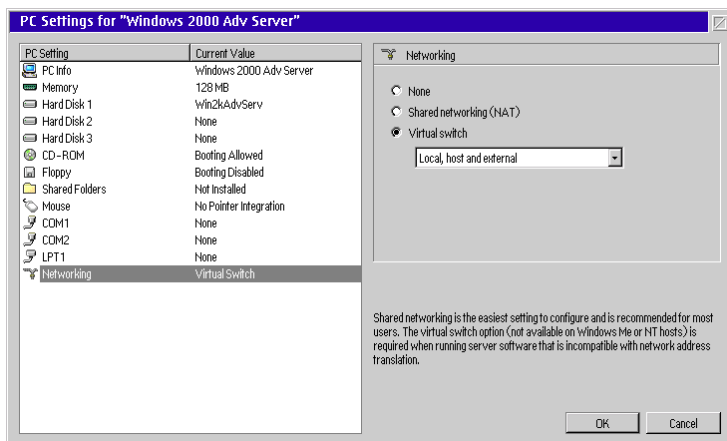
None—click this option if you do not want to use a parallel device connected to a parallel port on the host PC.

Host parallel port—click this option to redirect the emulated LPT1 port on the virtual machine to a parallel port on the host PC. Open the drop-down menu and select a host PC parallel port.

Networking setting

Use this setting to control networking options for a virtual machine.

6-10



The options are:

None—click this option to “remove” the emulated network interface card from the virtual machine.

Shared networking (NAT)—click this option to share the IP address of your host PC, including Ethernet, PPP, and SLIP. (This option works well for simple network activities such as browsing the Web, sharing printers and files, and so on.)

Virtual switch—click this option for advanced networking needs, such as running guest server software with predefined port numbers.

NOTE *If Virtual switch support has not been installed, this option is not available.*

For more details about these options, see page 47.

Deleting settings for a virtual machine

To delete the settings for a virtual machine and remove the virtual machine from the Virtual PC window, select it in the Virtual PC window and then click **Delete**. Deleting the settings for a virtual machine does not delete the drive image for the machine.

NOTE *The Delete key on your keyboard will not delete your virtual machine. You must use the Delete button on the Virtual PC window.*

About global preferences

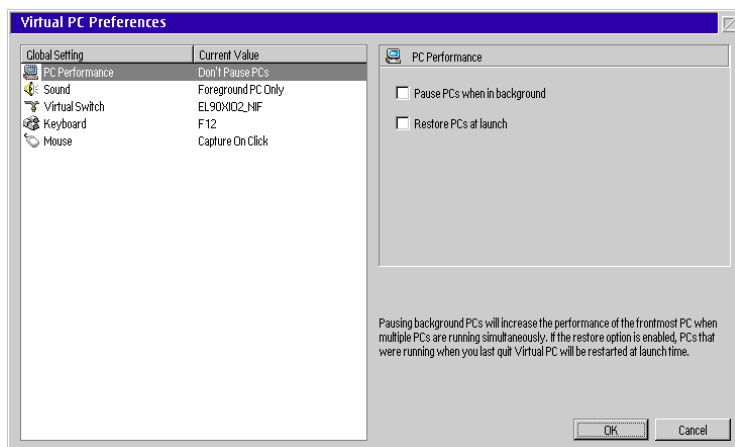
Virtual PC Preferences allows you to change five global preferences: PC Performance, Sound, Virtual Switch, Keyboard, and Mouse.

PC Performance preference

To change the PC Performance preference:

- 1 On the File menu in the Virtual PC window, click **Preferences**.
- 2 In the Global Setting list, click **PC Performance**.

6-11



- 3 Select or clear the following settings.
Pause PCs when in background—increases the performance of the front-most virtual machine when you are running more than one virtual machine at a time.
Restore PCs at launch—when you start up Virtual PC, restarts any virtual machines that were running the last time you quit Virtual PC. (Holding down the CTRL key when launching Virtual PC overrides this setting.)
- 4 Click **OK**.

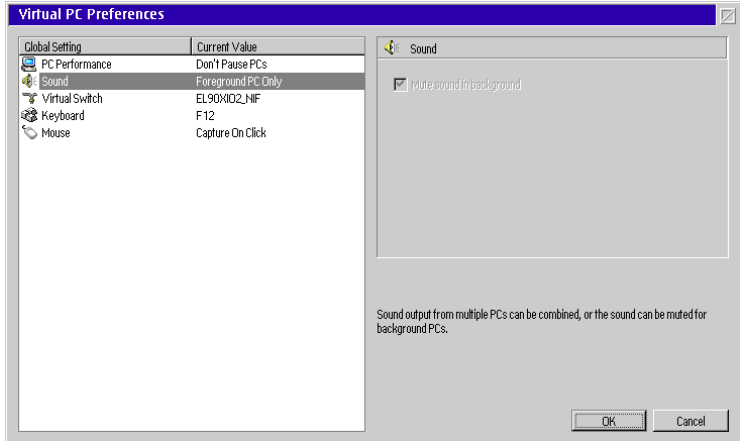
Sound preference

NOTE *Sound support in Virtual PC guests is not enabled in the current release. See README.TXT for details.*

To change the Sound preference:

- 1 On the **File** menu in the Virtual PC window, click **Preferences**.
- 2 In the Global Setting list, click **Sound**.

6-12



- 3 Select or clear the option **Mute sound in background**.
Enabling this option mutes conflicting sounds from multiple virtual machines running at the same time.
- 4 Click **OK**.

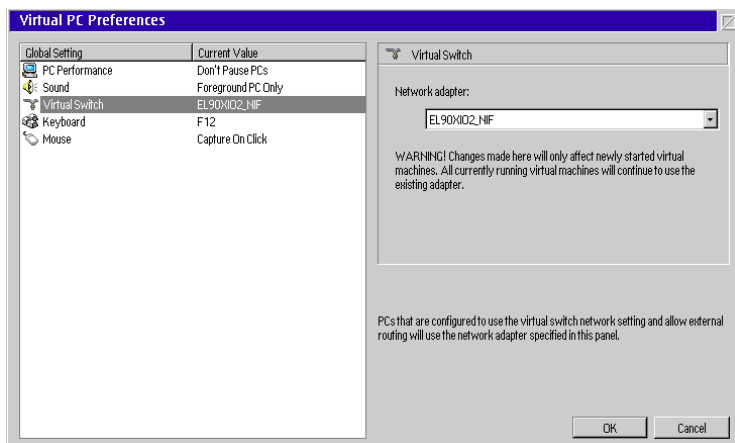
Virtual Switch preference

The Virtual Switch preference lets you choose among the available network interface cards installed in your host PC. All external virtual switch network traffic is routed to the selected network interface card.

To change the Virtual Switch preference:

- 1 On the File menu in the Virtual PC window, click **Preferences**.
- 2 In the Global Setting list, click **Virtual Switch**.

6-13



- 3 In the **Network adapter** menu, select the network interface card.
- 4 Click **OK**.

NOTE The name showing in this dialog will either be the user assigned name during installation or the section name of the `PROTOCOL.INI` file.

Keyboard preference

The Keyboard preference lets you determine the host key setting and the NUM LOCK key setting.

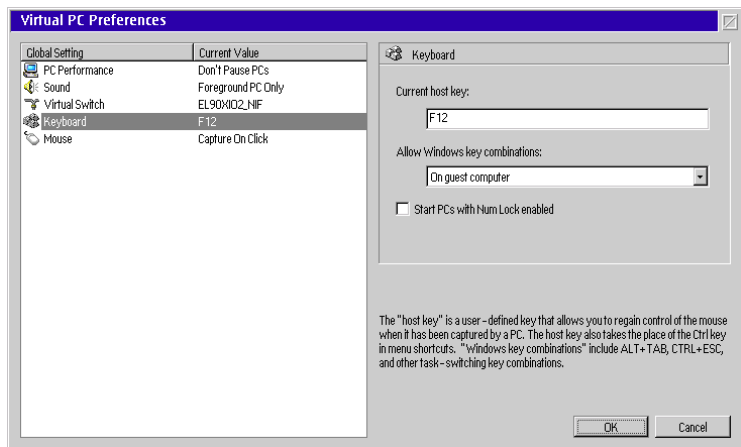
The host key is used in certain key sequences. For example, pressing the host key in combination with the ENTER key switches between Full Screen display mode and Windowed mode.

By default, the host key is set to the right ALT key.

To change the Keyboard preference:

- 1 On the **File** menu in the Virtual PC window, click **Preferences**.
- 2 In the Global Setting list, click **Keyboard**.

6-14



- 3 To change the host key, make sure the current host key definition is highlighted. Then press the new host key.
- 4 Select or clear the option **Start PCs with Num Lock enabled**. This option determines if the NUM LOCK key is on or off at the time you start up a virtual machine. For laptops whose numeric keypads overlap the main keyboard, you should leave this option off.
- 5 Click **OK**.

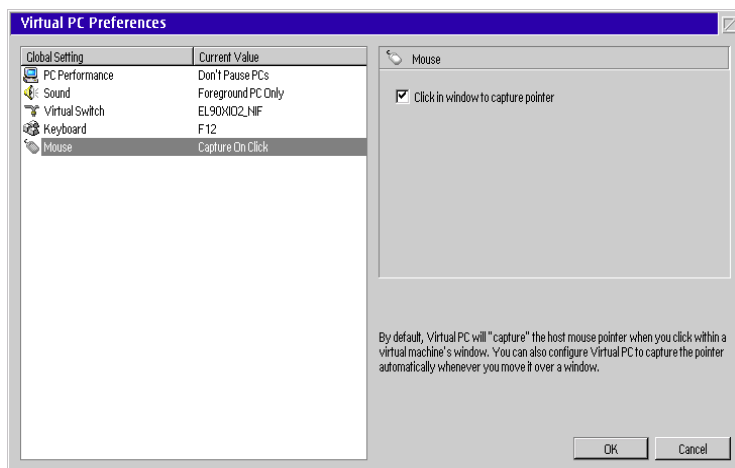
Mouse preference

The Mouse preference lets you set the behavior of the mouse pointer when you move it into a virtual machine window. By default, you must click in a virtual machine window to have the virtual machine capture the pointer.

To change the Mouse preference:

- 1 On the **File** menu in the Virtual PC window, click **Preferences**.
- 2 In the Global Setting list, click **Mouse**.

6-15



- 3 Select or clear the option **Click in window to capture pointer**. With the option cleared, the virtual machine automatically captures the pointer.
- 4 Click **OK**.

Using Virtual Disk Wizard

This chapter provides information about using **Virtual Disk Wizard**, an integrated utility that allows you to create, modify, and examine disk images.

Creating a hard disk image

Virtual PC stores data on virtual hard disks that take the form of disk image files stored on your host machine (or on a networked file server).

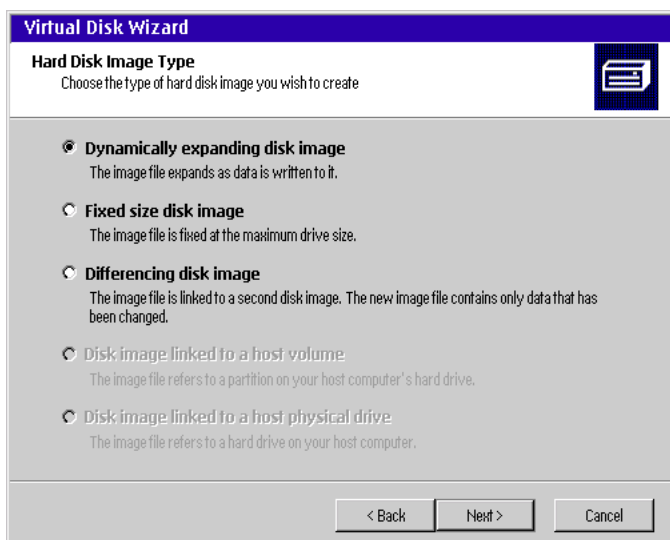
To create a hard disk image:

- 1 In the Virtual PC window, on the **File** menu, click **Virtual Disk Wizard**.
- 2 Click **Next**.
- 3 Click the option **Create new floppy or hard disk image**, and then click **Next**.
- 4 Click the option **Create hard disk image**, and then click **Next**.
- 5 Click **Browse** and select a name and location for the disk image. Click **Save**.
- 6 Click **Next**.

The panel for choosing a disk image type appears.

- 7 Choose the type of disk image you want to create and click Next. See the section “More about hard disk image types” below.

7-1



NOTE For security and consistency reasons, the last two options are currently not available. InnoTek will consider to enable these options in a future release of Virtual PC for OS/2.

- 8 Follow the Virtual Disk Wizard on-screen instructions to complete the creation of the disk image.

More about hard disk image types

Here are the details about the hard disk image types available in Virtual Disk Wizard.

Dynamically expanding disk image—A dynamically expanding disk image is the most commonly used type of disk image in Virtual PC. By default, the PC Setup Wizard creates disk images of this type. Dynamically expanding disk images are similar to fixed-size disk images, except that areas of the disk that haven't yet been written to are not included in the hard disk file. For example, if you create a 1-GB dynamically expanding disk image, the initial file will only be about 3 MB in size. As you write more information to the disk image, it grows to accommodate the new data. Along with this convenience, however, there is the danger that Virtual PC may be unable to expand the drive due to host hard drive size constraints. Virtual PC attempts

to monitor the available space on the hard drive of your host PC and warn you if the dynamically expanding drive starts to approach the limits of available space left on the host volume.

Fixed-size disk image—The simplest type of hard drive image is a fixed-size disk image that represents the entire virtual hard drive in a single disk image file. All of the space is pre-allocated, so these files are typically quite large. For example, if you create a fixed-size hard disk image that represents a 1-GB hard drive, the resulting file would be 1 GB in size. Although conceptually simple, fixed-size hard disk images are not generally recommended because of their large resource requirements. They do offer a slight performance advantage over other types of hard disk images, but this difference is small.

Differencing disk image—A differencing disk image is used in conjunction with one of the other types of disk images. The disk image associated with it is known as its *parent* disk image. The differencing file itself is similar to a dynamically expanding disk image file in that it starts small and grows to accommodate new data. However, data is only added to the differencing drive image when drive data is modified. In other words, contents of a differencing drive represents only the changes from the original disk image. There are several scenarios when this is useful:

- Several Virtual PC users want to share the same base disk image located on a network file server. In this case, each user creates a differencing disk image on his or her local hard drive. Any modifications made to the parent disk image are written to the local differencing disk image, leaving the parent disk image in a “pristine” state.
- You want to configure a single guest OS in multiple ways. You can duplicate the original hard disk image, but this requires substantially more hard drive storage space. Instead, you can create two differencing disk images, both with the same parent.

NOTE *Regardless of the scenario, InnoTek strongly recommends that you write-protect or lock the parent disk image. If a parent disk image is modified, all differencing disk images related to it become invalid, and any data written to them is effectively lost.*

Disk image file splitting

Because of limitations inherent in some OS/2 file systems, it is sometimes necessary to split dynamically expanding disk image files. In

particular, FAT and HPFS partitions only support files up to 2 GB in size.

For example, if you use an 8-GB dynamically expanding drive image on a FAT partition, Virtual PC splits the drive image into four 2-GB files. Dynamically expanding images and differencing images are split at the point where they cross the file size limit imposed by the underlying file system. If the disk image is located on a volume that doesn't impose these limitations (such as JFS or UDF), the disk image is left intact.

If you want to copy an existing disk image from one location to another, be careful to include not only the primary file, but any split files associated with it. Also, keep in mind that if a disk image on a JFS or UDF volume grows beyond 2 GB, you cannot copy it to a FAT volume.

Creating a floppy disk image

To create a floppy disk image:

- 1 In the Virtual PC window, on the File menu, click **Virtual Disk Wizard**.
- 2 Click **Next**.
- 3 Click the option **Create new floppy or hard disk image**, and then click **Next**.
- 4 Click the option **Create floppy disk image**, and then click **Next**.
- 5 Click **Browse** and select a name and location for the floppy disk image. Click **Save**.
- 6 Select the floppy disk type (low or high density).
- 7 Click **Next**.
- 8 Click **Finish**.

• **IMPORTANT** Virtual PC can mount any flat-file representation of a floppy disk. Many popular OS/2 utilities are able to create such images. However, make sure to disable any compression features. Virtual PC only works with floppy image files that are exactly 720 KB or 1.44 MB in size.

Examining or modifying a disk image

To examine or modify a disk image for a virtual machine:

- 1 Shut down the operating system on the virtual machine whose drive image you want to examine or modify. (If the machine has a saved state, you cannot modify the drive image.)
- 2 In the Virtual PC window, on the **File** menu, click **Virtual Disk Wizard**.
- 3 Click **Next**.
- 4 Click the option **Examine or modify existing disk image**, and then click **Next**.
- 5 Click **Browse** and navigate to the location of the disk image. Select the image and click **Open**.
- 6 Click **Next**.
- 7 Examine the disk image and click **Cancel**.

Or choose an option to modify the image and click **Next**. (The options available to modify a disk image depend on the type of image. See the relevant information below.) Follow the on-screen Wizard directions. Click **Finish** to make the modification.

Fixed-size disk images

Expand the disk image—increase the size of the disk image, increasing the primary partition and modifying the file system contents for consistency with the new partition size. The size to which you can expand a disk image is limited by the file system cluster size. For FAT16 drives, you can normally increase a disk image size up to the next power of two. For FAT32 disk images, this limitation doesn't exist.

Convert to dynamically expanding disk image—convert the fixed-size disk image to a dynamically expanding disk image. Any zeroed data in the fixed-size disk image is discarded, resulting in a smaller disk image file.

Dynamically expanding disk images

Expand the disk image—increase the maximum (fully expanded) size of the disk image. The same limit exists as for fixed-size disk expansion.

Convert to a fixed-size disk image—convert the dynamically expanding disk image to a fixed-size disk image.

Compact the disk image—attempt to “shrink” the dynamically expanding disk image by removing portions that have been “zeroed” with a disk utility program.

NOTE *When you delete files from a disk image, the data associated with these files is usually not removed. You must run a disk utility program to “zero” the deleted data before using the option Compact the disk image.*

Differencing disk images

Merge the differencing drive with its parent—write data from the differencing disk image back into its parent image. This requires that the parent disk image is writable.

Merge the differencing drive and its parent to a new file—combine data from the differencing disk image and its parent image into a new, dynamically expanding hard or fixed-size disk image.

Technical Specifications

This appendix lists the technical specifications for Virtual PC for OS/2

Processor

- The emulated environment “sees” the same processor model as the processor in your host PC. For example, if your host machine contains a Pentium III, the OS on a virtual machine reports running on a Pentium III as well. All functionality of your host processor is supported within the virtual machine, including MMX, SSE, SSE-2, 3DNow, and so on.

Motherboard

- Virtual PC emulates an Intel Pentium chipset, including all auxiliary chips needed for a PC:
 - 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 Systems BIOS (MR BIOS)
- Support for CD-ROM booting following El Torito CD-ROM booting specification

Memory

- Maximum 512 MB RAM per virtual machine

IDE controller

- Uses standard dual IDE/ATAPI controllers configured according to two options listed here: Standard Configuration and Alternate Configuration.

Standard configuration

Controller	Drive
Primary Controller	Drive 1: Drive 1
Primary Controller	Drive 2: Drive 2
Secondary Controller	Drive 1: CD-ROM
Secondary Controller	Drive 2: Drive 3

Alternate configuration

Controller	Drive
Primary Controller	Drive 1: Drive 1
Primary Controller	Drive 2: CD-ROM
Secondary Controller	Drive 1: Drive 2
Secondary Controller	Drive 2: Drive 3

Hard drive images

- Uses hard drive container images
- Supports five types of hard disk images:
 - Dynamically expanding images
 - Fixed-size images
 - Differencing images
 - Images linked to host volumes
 - Images linked to host drives
- Compatible with hard disk images created with other versions of Virtual PC 4.0 or later
- Supports simultaneous use of three drive images, each up to approximately 127 GB in size

CD-ROM

- Uses the CD-ROM in the host PC (if present)
- ATAPI interface supports data and audio commands

Video

- Emulates the S3 Trio 32/64 PCI SVGA Card
- Implements 4 MB of emulated VRAM, 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
- Supports 1600 x 1024 and 800 x 512 16:9 aspect ratio modes
- 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 PC keyboard

Mouse

- Emulates a PS/2 mouse using IRQ 12

Floppy

- Uses a standard PC floppy drive
- Emulates the standard PC floppy controller interface
- Supports floppy disk image files (720-KB or 1.44-MB flat-mapped files)

Serial ports

- Emulates COM1 and COM2 serial ports
- Redirects emulated COM1 and COM2 ports to specified host PC serial port or a text file

Parallel port

- Emulates LPT1 parallel port
- Redirects emulated LPT1 output to selected host parallel port

Sound

- Emulates Creative Labs PCI 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)
- Supports 8-bit and 16-bit sound input and output

Ethernet

- Emulates a DEC/Intel 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

Command Line Parameters

This appendix provides information about the command line parameters available in Virtual PC for OS/2.

If you launch Virtual PC for OS/2 using the Run command line interface, you can specify certain parameters.

For example, typing

```
VPC.exe -quiet
```

launches Virtual PC for OS/2, but does not start up any virtual machines.

Each command line parameter must be preceded by a hyphen (-). For example, typing:

```
VPC.exe -pc windows98 -launch
```

launches Virtual PC and starts up the virtual machine named “windows98”.

Also, names of virtual machines that contain a space character must be enclosed in quotation marks. For example, typing:

```
VPC.exe -pc "Test DOS" -launch  
-geometry 320x240
```

launches Virtual PC and starts up the virtual machine called Test DOS in a window 320 by 240 pixels.

See the next page for a complete list of command line parameters.

Parameter	Action
pc [name]	Targets a virtual machine by name
launch	Launches the target virtual PC
geometry	Sets the target virtual PC window size to [width] x [height] +/- [xoffset] +/- [yoffset]
pause	Pauses the target virtual PC
nopause	Resumes the target virtual PC
show	Redisplays the target virtual PC from the host PC's Minimized Window Viewer
noshow	Minimizes the target virtual PC to the host PC's Minimized Window Viewer
fastbackground	Lets Virtual PC for OS/2 run at high rates of CPU utilization, even when the application is in the background
help	Displays help information for all VPC command line parameters
pclist	Displays information about all virtual machines currently set up in Virtual PC for OS/2
quiet	Suppresses virtual machines from launching when Virtual PC for OS/2 starts up
version	Displays version information about Virtual PC for OS/2

Volume License Guidelines

This appendix provides information for anyone who needs to perform a Virtual PC volume license installation. Before you start the installation, you should be familiar with Virtual PC.

Preparing for large-scale deployment of Virtual PC

Building a disk image for deployment

In large-scale deployment, it is often easier to create a single drive image with the guest operating system installed and then copy that image to all target machines. You can also use this single drive image to re-install if the user needs to return to a known starting point.

Note that in this case, all target machines would have the same Microsoft Windows Certificate of Authenticity (COA) registration number in their drive images. This has legal implications that are covered in a later section of this appendix. (See page 85.)

Building a drive image

You need to build a disk image yourself using a licensed OS installation disk. For instructions on creating a new hard disk image with your own copy of an OS, see page 19.

Make sure that VPC Additions for the operating system you are using are also installed. These additions provide for the seamless integration of the guest OS with the host PC.

A way to test if your VPC Additions have been installed correctly is by checking the pointer function. If the pointer does not change back and forth from a host PC pointer to a virtual machine pointer as you cross the border of the Virtual PC window, then the VPC Additions have *not* been installed correctly.

Also, be sure to read the legal issues section of this appendix to ensure you are properly using your licensed OS installation disk. (See page 85.)

You can also install properly licensed Windows applications, utilities, and fonts in this disk image, as well as any data files needed by your users. Doing this step once saves your users start-up time, and probably saves you maintenance time later on.

Deployment

After installing Virtual PC on a single host PC and properly configuring the drive image for your organization, here are the recommended steps for deploying Virtual PC throughout your organization:

- 1 Quit Virtual PC without saving the state of your virtual machine.
- 2 Install Virtual PC on each client machine, using the Virtual PC Installation CD. Each client machine needs to be restarted after installation.
- 3 Copy the disk image to each client machine. As this may consume both time and network bandwidth, you might consider mechanisms for broadcasting this to many target machines simultaneously, or multiple staging servers for the image.
- 4 On each client machine, create a new virtual machine that uses the disk image copied in step 3.

Networking

Shared Networking is the default setting for Virtual PC networking and this default should be kept unless there are specific reasons for having a dedicated IP address for the guest operating system in Virtual PC.

Shared Networking is set to use DHCP. Other OS settings specific to networking the guest operating system have to be manually set (WINS, DNS, etc.).

The guest's machine name must be manually changed to avoid network conflicts when each machine comes online.

Legal Issues

Volume deployment of Virtual PC also implies a volume deployment of a guest operating system, as well as applications, utilities, and fonts, and so on for this operating system. You are responsible for ensuring that you have properly licensed all of these for deployment in your organization.

A special case is the deployment of the Windows operating system. Microsoft has stated that special agreement site licenses do not exist for Windows Operating Systems. If you are installing your own version of a Microsoft OS, you should review your site's agreement with Microsoft.

Managing Multiple COAs

It is your responsibility to purchase a unique Certificate of Authenticity (COA) for each computer using a Windows operating system with Virtual PC. To assist you with this, any volume purchase of Virtual PC with a Windows operating system comes complete with a unique COA for each seat purchased. While you must maintain these COAs in order to prove proper ownership and be prepared to present these COAs in the case of an audit by Microsoft or by the Software Publishers Association, you do not need to actually use a unique COA in each deployed drive image. The total number of drive images copied to target machines may not exceed the number of COAs purchased.

Index

B

- backing up a virtual machine 44
- booting from a CD 58
- booting from a floppy 59

C

- cable access 49
- capture floppy 42
- CD disk image (.iso) 39
- CD-ROM 79
- COM1 port 6, 62
- COM2 port 6, 62
- command line parameters 81
- compact the disk image 76
- Connectix support 3
- convert to dynamically expanding disk image 75
- copy and paste 40
- CTRL+ALT+DELETE 36

D

- DHCP 48
- differencing disk image 73
- disk image 6, 71
 - creating a floppy disk image 74
 - creating a hard disk image 20, 71
 - differencing 73
 - dynamically expanding 72
 - examining an image 75
 - file splitting 73
 - fixed size 73
 - linked to host physical drive 73
 - modifying an image 75
 - types 72
- DSL access 49
- dynamically expanding disk image 72

E

- Ethernet 80
- expand the disk image 75

F

- file sharing 50
- fixed-size disk image 73
- floppy capture 42
- floppy disk image 42
- Full Screen mode 37

G

- guest OS 6
 - installing 24
- guest PC 5, 6

H

- Help feature 10
- host PC 5

I

- InnoTek Support 2
- installation requirements 12
- installing an application 29
- installing an OS 24

K

- keyboard 79

L

- LAN access 49
- Local and external option 50
- Local only option 49

M

- merge differencing drive and parent to new file 76
- merge differencing drive with parent 76
- modem access 49
- motherboard 77
- mouse pointer 40, 61

N

- networking 9
- Networking settings
 - None option 64
 - Shared Networking option 47, 64
 - Virtual switch option 49, 64

O

- optimizing performance 43, 55

P

- parameters 82
- PC Setup Wizard 21
- pointer integration 40
- preferences 66

- Keyboard 69
- Mouse 70
- PC Performance 66
- Sound 67
- Virtual Switch 68

printing 9, 43, 63

processor emulation 77

R

registering Virtual PC 19

releasing a floppy disk image 42

S

Serial Port 80

Settings 54

- CD-ROM 58
- COM1 and COM2 62
- deleting 65
- duplicating 32
- Floppy 59
- Hard Disk 1 56
- Hard Disk 2 57
- Hard Disk 3 57
- LPT1 63
- Memory 55
- modifying 30
- Mouse 61
- Networking 47, 64
- PC Name 54
- Shared Folders 60
- standard 31

Shared Networking 47, 48

sharing CDs 41

sharing files 50

sharing folders 9, 41, 60

sharing volumes 9, 42

shutting down a virtual machine 44

sound 43, 80

Sound Blaster 16 43

starting up a virtual machine 36

starting up Virtual PC 34

T

technical specifications

- BIOS 77
- CD-ROM 79
- Ethernet 80

- hard drive 78
- IDE controller 78
- keyboard 79
- memory 77
- motherboard 77
- mouse 79
- sound 80
- video 79

U

Undoable option 7, 45, 57

V

video 79

Virtual Disk Wizard 71

virtual machine

- backing up 44
- changing display 37
- components 6
- creating 10, 19
- deleting settings 65
- display 37
- duplicating 32
- floppy capture 42
- Full Screen mode 37
- installing VPC Additions 26
- integration with host PC 8, 40
- networking 47, 64
- pausing 38
- RAM allocation 44
- restarting 38
- resuming 38
- running multiple 7, 38
- setting up 19
- settings 30, 54
- shutting down 44
- starting up 36
- Windowed mode 37
- with standard settings 31

Virtual PC window 8, 34

Virtual Switch option 49, 64

Virtual Switch preference 51, 68

volume license 81, 83

VPC Additions 8, 26

- installing 26

VPC Toolbar 39

VPC Toolbar status lights 39

W

Windowed mode 37

Z

ZIP disk 42

