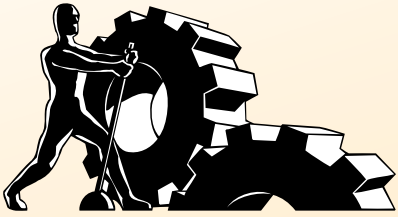


Check for Updates

Make sure you have the latest information!



TidBITS Publishing Inc.

Take Control of

v5.0

Running Windows

on a Mac

Joe Kissell

**FIFTH
EDITION**

\$15

[Help](#)

[Catalog](#)

[Feedback](#)

[Blog](#)

[Order Print Copy](#)

Click here to buy the full 178-page "Take Control of Running Windows on Your Mac" for only \$15!

Table of Contents

Read Me First 5

Updates and More.....	5
Basics	6
What's New in Version 5.0	9

Introduction 10

Running Windows Quick Start 12

Why Bother? 14

Decide How to Run Windows 17

Boot Camp	17
Virtualization Software	19
Joe's Recommendations.....	25

Collect the Ingredients 28

An Intel-Based Mac (Preferably)	28
Disk Space	29
RAM.....	30
A Windows CD or DVD.....	30

Install and Use Boot Camp 36

Assemble Your Tools	36
Prepare Your Mac	36
Run Boot Camp Assistant.....	39
Install Windows XP under Boot Camp	43
Install Windows 7 or Vista under Boot Camp	48
Install Boot Camp Drivers for Windows	53
Solve Input Device Problems	55
Switch between Mac OS X and Windows	58
Share Files across Platforms.....	59
Back Up a Boot Camp Volume	64
Get Rid of Your Windows Partition	69

Understand Virtualization Concepts 71

Virtual Machines	71
Virtual Disks	72
Using Boot Camp Volumes	73
RAM Usage	73

Networking Modes	73
Virtual Machine Drivers.....	74
Automated Installation	75
Install and Use Parallels Desktop 76	
Install Parallels Desktop	76
Install Windows under Parallels Desktop	77
Work with Windows in a Parallels Virtual Machine.....	81
Share Files between Windows and Mac OS X in Parallels	96
Upgrade to a New Version of Parallels Desktop	99
Install and Use VMware Fusion 100	
Install Fusion	100
Create a Virtual Machine in Fusion	101
Install Boot Camp Drivers	107
Use a Boot Camp Partition in Fusion	109
Work with Windows in a VMware Fusion Virtual Machine	110
Share Files between Windows and Mac OS X in Fusion.....	125
Install and Use VirtualBox 130	
Install VirtualBox.....	130
Set Up a New Virtual Machine in VirtualBox	130
Install Windows in VirtualBox	135
Install Guest Additions	137
Work with Windows in a VirtualBox Virtual Machine	138
Share Files between Windows and Mac OS X in VirtualBox.....	141
Back Up Virtual Machine Data 144	
Duplicate a Virtual Machine	144
Create Versioned Virtual Machine Backups	146
Run Windows Applications without Windows 148	
Wine.....	148
Darwine	148
CrossOver	149
Cider.....	150
ReactOS.....	150
Solve Printing Problems 151	
Create a Slipstream Installer Disc 153	
Why You Might Need a Slipstream Disc	153
Prepare Your Computer	154
Run nLite.....	156
Burn a Windows XP+SP2 or SP3 CD	161

Protect Your Windows Setup from Malware 164

Apply Windows Updates.....	164
Use a Firewall	166
Install Anti-Virus Software	168
Remove and Block Spyware and Adware.....	169
Get a Better Browser.....	170

Learn More 171

Appendix A: Windows on a PowerPC Mac 172

About This Book 173

Ebook Extras.....	173
About the Author.....	173
Author’s Acknowledgments	174
Shameless Plug	174
About the Publisher.....	175
Production Credits	175

Copyright and Fine Print 176

Featured Titles 177

Coupon for VMware Fusion 178

Read Me First

Welcome to *Take Control of Running Windows on a Mac, Fifth Edition*, version 5.0, published in February 2011 by TidBITS Publishing Inc. This book was written by Joe Kissell and edited by Caroline Rose.

Apple's Intel-based Macs offer several excellent options for running Windows alongside, or even instead of, Mac OS X. This guide covers Apple's dual-boot software, Boot Camp, as well as third-party virtualization software (particularly Parallels Desktop and VMware Fusion) and solutions for running Windows applications without Windows itself.

Copyright © 2011, Joe Kissell. All rights reserved.

If you have an ebook version of this title, please note that if you want to share it with a friend, we ask that you do so as you would a physical book: “lend” it for a quick look, but ask your friend to buy a new copy to read it more carefully or to keep it for reference.

Discounted [classroom and Mac user group copies](#) are also available.

Updates and More

You can find extras related to this book on the Web (use the link in [Ebook Extras](#), near the end of the ebook; it's available only to purchasers). On the ebook's Take Control Extras page, you can:

- Download any free updates that are available, or purchase any subsequent edition, usually with an upgrade discount.
- Download various formats, including PDF and—usually—EPUB and Mobipocket. (Learn about reading this ebook on handheld devices at <http://www.takecontrolbooks.com/device-advice>.)
- Read postings to the ebook's blog. These may include new information and tips, as well as links to author interviews. At the top of the blog, you can also see any update plans for the ebook.
- Get a discount when you order a print copy of the ebook.

Basics

Here are a few “rules of the road” that will help you read this book.

Mac OS X Versions

I sometimes refer to Mac OS X versions by the names Apple uses for them, as follows:

- **Snow Leopard:** version 10.6.x
- **Leopard:** version 10.5.x
- **Tiger:** version 10.4.x

Menus

Where I describe choosing a command from a menu in the menu bar, I use a compact description. For example, to create a new virtual machine in Fusion, you choose New from the File menu; I abbreviate this as “choose File > New.”

Finding an Application’s Preferences

I often refer to preferences that you may want to adjust in an application. Don’t confuse an application’s preferences with the systemwide settings found in System Preferences. To access an application’s preferences, choose *Application Name* > Preferences. For example, in VMware Fusion, you would choose VMware Fusion > Preferences. In some applications, all preference controls appear in a single window. In others (including Fusion), a row of buttons is located across the top, and you click a button to display a pane with that category of preferences. Instead of giving detailed directions each time, I may use an abbreviated notation such as “go to the General preference pane.”

Paths

I occasionally use a *path* to show the location of a file or folder in your file system. For example, Mac OS X stores most utilities, such as Terminal, in the Utilities folder. The path to Terminal is [/Applications/Utilities/Terminal](#).

The slash at the start of the path tells you to begin at the top level of the disk. Some paths begin with ~ (tilde), which is a shortcut for the current user’s home directory. For example, if the person currently

logged in has the user name `joe` and wants to install fonts that only he can access, he would put them in `~/Library/Fonts`, which is just another way of writing `/Users/joe/Library/Fonts`.

Windows uses a different convention for paths, so in cases where I'm talking about files in Windows, I start from the hard drive letter (usually `C:`) and use backslashes instead of regular slashes—as in `C:\Documents and Settings\Joe Kissell`.

Note: In either Mac OS X or Windows, when typing a path that includes spaces, you should enclose the entire path in quotation marks: `"C:\Documents and Settings\Joe Kissell"`. Alternatively, in Mac OS X, you can precede each space with a backslash and skip the quotation marks: `/Users/jk/My\ Folder\My\ Document`.

Right-Clicking

In Mac OS X, when you hold down the Control key and click, a pop-up *contextual menu* appears, with commands appropriate to whatever is under the mouse pointer. For example, if you Control-click a file in the Finder, you'll see commands such as Get Info, Duplicate, and Make Alias. Control-clicking nearly always works to open a contextual menu, but your mouse or trackpad might support a better method. The default behavior, the alternative methods, and the ways to set them vary depending on the type of input device; the typical alternative (for right-handed users) is to *right-click* with a mouse—click the right-hand mouse button—so that's the term this book uses by default for the action that opens a contextual menu.

In general, the user interface for setting mouse or trackpad behavior refers to a “primary” or a “secondary” button or click: the primary produces the usual click behavior and the secondary opens a contextual menu. The following list gives more details, depending on the input device.

- **Multi-button mouse:** If you have a multi-button mouse—the Apple Magic Mouse, the Apple Mouse (formerly known as “Mighty Mouse”), or a non-Apple mouse—you can configure it in System Preferences, in the Mouse pane (in Mac OS X 10.6 Snow Leopard) or the Mouse view of the Keyboard & Mouse pane (in 10.5 Leopard and earlier). For example, in the Mouse pane of System Preferences

in Snow Leopard, you can set Secondary Click to Right if you want right-clicking with your Magic Mouse to open a contextual menu.

Tip: I go into more detail about right-clicking in “Clicking the Right Button,” in *TidBITS* at <http://db.tidbits.com/article/10859>.

- **Newer Mac notebook or Magic Trackpad:** Mac notebooks released starting in October 2008 have a glass multi-touch trackpad without a separate button, and Apple’s Magic Trackpad has a similar design. You configure these trackpads in the Trackpad System Preferences pane. To open a contextual menu with a single click, check Secondary Click under “One Finger” and choose a bottom corner. Press the trackpad in the selected corner with one finger to open a contextual menu. Instead or in addition, you can check Secondary Click under “Two Fingers,” in which case pressing anywhere on the trackpad with two fingers displays a contextual menu.
- **Other Mac notebooks:** If you have a Mac notebook computer that lacks the newer glass multi-touch trackpad, you can configure the trackpad to display contextual menus when you tap with both fingers, or when you put two fingers on the trackpad and click the button. To configure this setting, open the Trackpad view of the Trackpad preference pane (in Snow Leopard) or the Keyboard & Mouse pane (in Leopard and earlier). If Clicking is selected (meaning you can tap on the trackpad to click), check Tap Trackpad Using Two Fingers for Secondary Click. Otherwise, check For Secondary Clicks, Place Two Fingers on the Trackpad Then Click the Button.

Windows, too, has contextual menus that are accessed with a right click. (All mice included with Windows PCs—in fact, virtually all non-Apple mice—have at least two buttons.) In virtualization programs such as Parallels Desktop and VMware Fusion, you can right click even if your mouse has only one button: Control-click, just as in Mac OS X, and the virtualization software translates that into a right click.

In this book, when I tell you to right-click in Windows, that means: click the right mouse button if you have one (or whichever button you’ve designated as “secondary”); Control-click if you have a desktop Mac with a one-button mouse; or, on a Mac notebook or Magic Trackpad, use the gesture(s) you’ve configured with Mouse or Trackpad preferences.

System Tray

In Windows, the right-hand side of the taskbar at the bottom of your screen may contain various icons providing alerts, information about background processes, and shortcuts to access certain programs. Microsoft officially calls this the Notification Area, but in this book I follow the more common usage of referring to it as the System Tray.

(My) Terminology Difference

In Windows XP, certain folder names begin with “My”: My Computer, My Pictures, My Music, and so on; in Windows 7 and Vista the “My” is no longer used (it’s just Computer, Pictures, Music). In this book, rather than spell out which wording to look for based on which version of Windows you have installed, I use a shorthand notation, as in “Choose Start > (My) Computer.”

What’s New in Version 5.0

This new edition is a major revision that incorporates the latest information about running Windows on a Mac as of February 2011. The most significant changes are:

- Updated the descriptions of [Parallels Desktop](#), [VMware Fusion](#), and [VirtualBox](#) to reflect their current versions
- Refined and expanded [Joe’s Recommendations](#) for choosing a method of running Windows
- Revised the instructions to [Install and Use Boot Camp](#) to reflect the latest information from Apple as well as to update them for accuracy with Windows 7
- Thoroughly revamped my advice on how to [Back Up a Boot Camp Volume](#) and how to [Back Up Virtual Machine Data](#) based on the most recent edition of my book *Take Control of Mac OS X Backups*
- Made major revisions to the [Install and Use Parallels Desktop](#) chapter to account for changes in Parallels Desktop version 6
- Updated [Install and Use VMware Fusion](#) to cover version 3.1
- Modified the discussion of how to [Install and Use VirtualBox](#) to be current with version 4.0

Introduction

Anyone who knows me will tell you I'm a Mac fan through and through. As I type this, I can see six Macs within a radius of ten feet in my home office. I've written oodles of articles, books, and ebooks about Mac software, and for the past dozen years or so most of my income has resulted, in one way or another, from my work with Macs. If I had a nickel for every time someone referred to me as "the Mac guy," I could retire today.

And yet, although I've always been candid about my preference for Macs, I'm well versed in Windows, too; for years, I was deeply involved in developing and testing software for both platforms. Whether it's performing an exorcism on someone's virus-infected PC or walking a friend through a fiddly troubleshooting procedure over the phone, I know my stuff. Partly because I understand Windows so well, I'd always opt for a Mac if given the choice. But, like it or not, some things I want to do with my computer still require Windows. Even when working on something platform-neutral, such as a Web site, I want to be sure things look and work correctly on Windows.

In the days before Intel-based Macs, on occasions when I needed Windows I tried everything from running Virtual PC to visiting a library or cybercafé—everything, in other words, short of buying a Windows PC. That was the one step I hoped never to take, but other solutions were frequently awkward, slow, or otherwise annoying. Now, however, I can get the Mac OS X environment I love plus a *fast*, fully featured Windows installation, all in one box. I can even share files and network connections seamlessly between operating systems.

Achieving this state of computing bliss did require overcoming some time-consuming hurdles, however. For example, I had to figure out the pros and cons to using Apple's Boot Camp software versus third-party products such as Parallels Desktop and VMware Fusion (and, eventually, how I could use both approaches with the same installation of Windows). Before support for Windows 7 and Vista appeared, I had to find a way to create a Windows XP CD that had Service Pack 2 already integrated, even though my boxed copy of Windows XP was

manufactured before SP2 existed. And I had to make educated guesses about numerous configuration options that were documented poorly (or not at all).

Having wrestled with these issues and more, I'd like to save you that effort and offer you a set of easy-to-follow instructions. In this book, I tell you everything you need to know about your options for running Windows on a Mac, how to get around common annoyances, and what you should do to protect yourself from the big, bad world of Windows malware.

One thing I spend very little time on here is how to use Windows itself; I assume a basic familiarity with such features as the Start menu and Windows Explorer. If you've never used Windows before, you're bound to be somewhat disoriented, and in that case I recommend picking up one of the books listed in the [Learn More](#) chapter.

When I wrote the first version of this book, Intel Macs had been shipping for just a few months. Apple's Boot Camp software was in beta testing at version 1.0, and Parallels Desktop had only recently reached its final 1.0 release stage. Since then, Boot Camp has matured tremendously and is included as part of Mac OS X 10.5 Leopard and later, Parallels Desktop and VMware Fusion have both undergone enormous improvements, and an open-source virtualization environment called VirtualBox has appeared. CodeWeavers has been selling CrossOver Mac, which enables some Windows programs to run without Windows itself. And, after Windows Vista received a less than stellar response, Microsoft righted many of its wrongs with Windows 7.

In this edition, I assume that you're running Mac OS X 10.5 Leopard or later, since that's the minimum configuration that supports Boot Camp. Although much of the information I provide about virtualization software also applies to 10.4 Tiger, only Leopard and later versions offer the full range of options for running Windows on a Mac.

The Windows-on-Mac situation will likely remain in a state of flux for the foreseeable future. As the facts change, I'll update this book with the latest information. You can stay on top of recent developments by clicking Check for Updates on the [cover](#) (or see [Ebook Extras](#), near the end of the ebook).

Running Windows Quick Start

You need not read this book straight through; most people will pick one method for running Windows and read only the relevant chapters. But be sure not to skip [Decide How to Run Windows](#), which provides important background information.

Make initial preparations:

- Find out whether running Windows on your Mac is for you. Read [Why Bother?](#) for guidance.
- Determine whether the best approach is to install Boot Camp or virtualization software (or both), in [Decide How to Run Windows](#).
- Regardless of which method you choose, your next step is to [Collect the Ingredients](#) you'll need to install and use Windows.

If you decide to go with Boot Camp:

- Learn how to [Install and Use Boot Camp](#).
- Overcome common annoyances with mice and keyboards. Read [Solve Input Device Problems](#).
- Keep your data safe. Read [Back Up a Boot Camp Volume](#).

If you choose virtualization software:

- Learn the basic terminology and concepts about virtual machines. See [Understand Virtualization Concepts](#).
- [Install and Use Parallels Desktop](#), [Install and Use VMware Fusion](#), or [Install and Use VirtualBox](#).
- Protect your Windows installation against data loss. Read [Back Up Virtual Machine Data](#).

Solve irritating problems:

- [Solve Printing Problems](#) in Windows.
- If you have a pre-Service Pack 2 Windows XP CD, bring it up to date inexpensively. Read [Create a Slipstream Installer Disc](#).
- Keep Windows safe from viruses, spyware, and other malicious software. See [Protect Your Windows Setup from Malware](#).

Go further:

- Learn about Wine, Darwine, CrossOver Mac, Cider, and ReactOS in [Run Windows Applications without Windows](#).
- Discover additional resources in [Learn More](#).
- Find out how to run Windows (sort of) on a Mac *without* an Intel chip in [Appendix A: Windows on a PowerPC Mac](#).

Why Bother?

Most people reading this book are probably Mac users who nevertheless have a need or desire to use Windows in some circumstances. However, you may be a Windows user who's been tempted by the Mac but wants to know how hard it will be to use both operating systems on the same computer. You already know why you want to use Windows, and the question is what you gain by running it on a Mac.

If you're a Mac user already, you presumably feel that a Mac can meet most of your computing needs. And of course millions of people—including serious computer geeks, such as yours truly—happily get by without having a Windows machine on their desks. So you may wonder why anyone would choose to run Windows on a Mac. Never mind that it's possible, or even easy; is it something you should do?

For years, Mac users had to face the frequently voiced complaint that “Windows has far more software available.” However, although there are more Windows programs than Mac OS X programs (especially if you count viruses!), that doesn't mean there are more *useful* or *necessary* Windows programs. (Does it matter that Windows may have 27 different niche word processors or 305 versions of Breakout?)

There are Mac equivalents of almost every major Windows application. Apple and third-party developers make lots of fantastic programs for Mac OS X that have no Windows analogs. And Mac users have access to a vast array of software written for Unix. So in truth, there are very few things you can do on Windows that you can't do on a Mac—yet a few annoying exceptions remain. Here are some of the top reasons you might need to resort to Windows after all:

- **Games:** I've been told that many people enjoy playing games on their computers. I must try this one day. Rumor has it that some of the more popular games run only under Windows.
- **Interactive DVDs:** I have at least half a dozen DVD movies that feature enhanced content that requires a computer, and the labels

explicitly state that these features don't work on Macintosh computers. But I can use them on my Intel Mac running Windows.

- **Online video services:** The Amazon Unbox video player lets you watch downloaded videos from the Amazon Video On Demand service, but it runs only under Windows. (Amazon's Video On Demand service does offer Mac-compatible *streaming* videos, however.) If you want to download movies from Amazon and watch them at your leisure, even if your computer is offline, you can access them under Windows on your Mac for the time being.
- **Windows Web browsers:** You may run across Web sites that were designed expressly to require a Windows browser, usually Internet Explorer. Sometimes you can get these sites to work on a Mac by switching to a different browser or tweaking hidden settings to fool the site into thinking you're using Windows, but these tricks won't get you into every site. And if you design Web sites yourself, you'll likely want to preview them in Windows browsers, which sometimes display pages much differently than Mac browsers.
- **Microsoft Access:** This database software has no Mac equivalent. If you don't want to go rework your databases in FileMaker Pro or another Mac database, you'll appreciate having access to Access.
- **Microsoft Project:** Several excellent project management applications exist on the Mac, most of which can seamlessly read and write Project files. But in some cases, simply running Project under Windows may be the path of least resistance.
- **QuickBooks:** Intuit does sell a Mac version of this small-business accounting package, but it's widely regarded as inferior to the Windows version, especially when it comes to payroll processing.
- **Quicken online banking:** For personal accounting, Quicken also comes in versions for Windows and Mac OS X. But a few banks prevent the Mac version of Quicken from accessing account data online. If you have an account with such a bank, you may choose to run Quicken under Windows.
- **FrameMaker:** Often considered the best publishing tool for long or complex documents, FrameMaker is currently available for Windows or Unix—but not Mac OS X. (Adobe did sell a Mac OS 9 version for years, but it's been discontinued.)

- **ExamSoft's SofTest:** Some educational institutions (notably law schools) require students to use this software for taking exams. It runs only on Windows, and the company has stated unequivocally that there will never be a Mac version.
- **Library catalog software:** People who work in a library may need to run a Windows-based client for the online catalog system.
- **Internal corporate software:** Many companies develop special programs for internal use only, and if the company has standardized on Windows, chances are the software will be Windows-only.
- **PDA software:** Whether you have a Palm- or Windows Mobile-based PDA or smartphone, you may find synchronization support to be much better under Windows than under Mac OS X, even if you add a third-party product such as The Missing Sync (<http://www.markspace.com/>). In addition, installers for some PDA applications are packaged as Windows executable files.

Sad though it may be, I could go on and on with other examples of software that currently excludes Mac users. In an ideal world (or at least a nearly ideal world that still contains Windows!), all software would be cross-platform, but that day, if it ever comes, is far in the future.

In the meantime, if you need to run Windows for reasons such as these, you may well ask, "Why not just buy a Windows PC instead?" You may be asking a similar question if you're a Windows user considering switching to the Mac.

I can think of many reasons to opt for a Mac, but the biggest is that an Intel-based Mac gives you the best of both worlds. You can use Mac OS X most of the time, benefiting from its stability, security, and ease of use (not to mention Apple's fantastic industrial design and all that great Mac-only software, such as iLife and iWork) and still have access to Windows-only capabilities when you truly need them. The cost of adding Windows to an Intel Mac is less than that of buying a reasonably powerful stand-alone Windows PC. With Windows running on your Mac, you'll save desk space, reduce power consumption, and be able to share files between platforms more easily.

Once you've made the decision to put Windows on your Mac, the next thing to figure out is which of several methods you should use to do so. I explore your options in the next chapter.

Decide How to Run Windows

Broadly speaking, you can use either of two approaches to run Windows on an Intel Mac: dual-boot (using Apple's Boot Camp software) or virtualization (using third-party software such as Parallels Desktop or VMware Fusion). You can also use both approaches on the same computer, and you can even do so with a single installation of Windows. Further, software called CrossOver Mac can enable you to run certain Windows applications without a copy of Windows itself (see [CrossOver](#)).

In this chapter I discuss the differences between Boot Camp and virtualization software, and I describe the major virtualization options in detail.

Boot Camp

Apple's Boot Camp, included as part of Mac OS X 10.5 Leopard and later versions, enables you to divide the hard disk of an Intel-based Mac into both a Mac OS X partition and a Windows partition, install Windows to the Windows partition, and choose either partition as your computer's startup volume. Then, after choosing the Windows partition, you can run Windows on the Mac just as if you were running it on a PC.

The main thing to know about Boot Camp is that when you use it, you must make a choice: at any given time, your Mac can run either Mac OS X or Windows, but not both. Depending on which options you choose, you may or may not be able to access Windows files when running under Mac OS X. While running Windows, you can read (but not write) files on your Mac partition if you have 10.6 Snow Leopard installed; gaining write access—and read access if you're using Leopard—requires extra software (see [Buy MacDrive](#)). In any case, while running Windows you won't be able to use Mac software, and while running Mac OS X you won't be able to use Windows software.

Collect the Ingredients

Before you can begin setting up Windows on your Macintosh, you must be sure that you have the necessary hardware, software, and other materials.


An Intel-Based Mac (Preferably)

If you have a Macintosh with an Intel processor (in other words, any model introduced in 2006 or later)—which Mac OS X 10.6 Snow Leopard and later require—you have several great options for running Windows at (virtually) full speed, and I spend the bulk of this book describing those options.

Note: Certain Intel-based Macs released in 2006 are unable to run Windows 7 under Boot Camp; see <http://support.apple.com/kb/HT3986> for a list. These Macs can still run Windows 7 using virtualization software, or Windows Vista or XP under Boot Camp.

If you have an older, PowerPC-based Macintosh, you can still choose from among at least three different methods of running Windows (read [Appendix A: Windows on a PowerPC Mac](#)), but I can't recommend any of them earnestly. On a PowerPC-based Mac, the performance of Windows ranges from sluggish to glacial, whereas the performance of Windows running on an Intel-based Mac is generally superb, nearly matching (and in some cases surpassing) a PC with equivalent processor speed.

If at all possible, therefore, obtain an Intel-based Macintosh. You can find a Mac mini for as little as \$699, and in my opinion it's money well spent.

Not sure whether your Mac has an Intel chip or a PowerPC chip? Choose Apple  > About This Mac, and you'll see the speed and type of processor following the word "Processor" in the window that appears (**Figure 1**).

Install and Use Boot Camp

Apple offers an 18-page PDF guide to setting up Boot Camp, which, interestingly, contains considerably more detail than they provide for installing or upgrading Mac OS X. The setup guide (which you can download from <http://www.apple.com/support/bootcamp/>) is reasonably complete, accurate, and well written. Much of what follows in this chapter reiterates Apple's recommended steps; however, I've also included some warnings and clarifications.

Assemble Your Tools

If you followed the instructions earlier, in [Collect the Ingredients](#), you already have an Intel-based Mac (a necessity for Boot Camp) with adequate RAM and disk space, as well as a Windows 7, Windows Vista, or Windows XP disc with SP2 or later (see [Create a Slipstream Installer Disc](#) if you have an earlier version of Windows XP). In addition, for Boot Camp, you need the Boot Camp Assistant software, which is included with Mac OS X 10.5 Leopard and later, in [/Applications/Utilities](#).

Prepare Your Mac

Before installing Windows, you must make sure that your hard disk is properly configured and that the Mac has the necessary firmware, operating system, and software available. Follow these steps:

1. **Back up your computer:** Because you're about to run software that will alter the structure of your hard disk, you risk losing data if an error occurs (or if, say, the power goes out during the process). So, unless you're starting with a brand new Mac that has none of your own files on it, stop right now and do a full backup.

In this case, the best type of backup is a bootable duplicate, in which you copy your entire disk onto an external hard drive. For further guidance, see my book [Take Control of Mac OS X Backups](#) or [Take Control of Easy Mac Backups](#).

Understand Virtualization Concepts

The other way to make your Intel-based Mac run Windows is to install virtualization software. You'll get slightly slower performance and possibly lose access to some hardware devices that you can use in Boot Camp, but in exchange you get the convenience of running Windows and Mac OS X at the same time. Switching between them is as easy as switching applications, because that's exactly what you're doing!

While working with Parallels Desktop, VMware Fusion, or VirtualBox, you may encounter a number of unfamiliar terms and concepts. To help you get your bearings, here's an overview.

Virtual Machines

Each operating system you install requires its own virtual machine ([Virtualization Software](#), earlier, discusses virtual machines). If you like, you can install several different operating systems or several instances of the same operating system; you can even run multiple virtual machines at the same time.

Each virtualization environment can display a list of all the virtual machines you've installed, and you can double-click a virtual machine in the list to view all its settings. For example, in Parallels, the settings appear in a window called the Property Sheet (**Figure 16**). Most of these settings can't be changed while the guest operating system is running.

Install and Use Parallels Desktop

Parallels Desktop was the first virtualization environment for Mac OS X, and it's attracted a massive and loyal following. Like other virtualization software (and unlike Boot Camp), Parallels lets you run Windows without having to reboot your Mac. To learn more about Parallels, including features added in version 6, turn back to [Parallels Desktop](#).

Install Parallels Desktop

To install Parallels Desktop:

1. Download the software from <http://www.parallels.com/en/download/desktop/>, or buy it from your favorite online or brick-and-mortar retailer. You can use it for 15 days as a free trial or purchase it for \$79.99.
2. If you choose the free trial, follow the link on the download page to register and receive a trial activation key. (If you purchased the software, you should have received an activation key in the box or by email.) Without this key, the software will not run.
3. After mounting the downloaded disk image or inserting the CD, double-click the Parallels installer icon and follow the instructions to install the software. If the installer informs you that an updated version is available, click Download and Install the New Version.

Note: The remainder of this chapter provides instructions for using Parallels Desktop version 6. If you're using an older version, some of the procedures will be different, and some features discussed here won't exist at all.

Install and Use VMware Fusion

VMware Fusion, another virtualization environment that lets you run Windows on your Mac without rebooting, is neck-and-neck with Parallels Desktop in overall capabilities. (Read more about it in [VMware Fusion](#).) As with Parallels, using Fusion involves three main steps: install Fusion; set up Windows in a new virtual machine; and install the Fusion drivers (VMware Tools) within Windows.

Tip: In this chapter I cover only the basics of using Fusion. To learn more, read my free book *Take Control of VMware Fusion 3*, which goes into much greater detail about topics such as customizing virtual machines and Fusion's user interface, importing Windows installations from other environments, using AutoProtect to save snapshots automatically, and using some of Fusion's advanced features.

Install Fusion

You can buy Fusion on a CD in a retail box or obtain it online at <http://www.vmware.com/products/fusion/>. A [coupon](#) at the end of this book gives you 10 percent off the purchase price.

Before you can download Fusion, you must register, supplying your name and address. Be sure to note the serial number shown on the screen when you register; you'll need it in a moment. (If you're using the demo version, this serial number will be temporary; if you buy Fusion, VMware will supply you with a permanent serial number.)

To install Fusion:

1. Insert the Fusion CD, or open the folder containing the Fusion installer you downloaded.
2. Double-click the installer icon and follow the prompts.

Install and Use VirtualBox

The third major virtualization package for Intel-based Macs, VirtualBox, is somewhat behind Parallels Desktop and VMware Fusion in features and polish (see [VirtualBox](#) for more details), but it's still quite capable—and it's free! Using VirtualBox involves four main steps: install VirtualBox; set up a new virtual machine; install Windows in that virtual machine; and install the VirtualBox Guest Additions within Windows.

Install VirtualBox

To install VirtualBox:

1. Download VirtualBox for OS X Hosts from <http://virtualbox.org/wiki/Downloads>.
2. Double-click the installer icon and follow the prompts.

Set Up a New Virtual Machine in VirtualBox

Each operating system you install requires its own virtual machine. (You can, if you like, install several different operating systems or several instances of the same operating system.)

To create a new virtual machine for Windows:

1. Launch VirtualBox (in [/Applications](#)).
2. Click New to open the New Virtual Machine Wizard; then click Continue.

Back Up Virtual Machine Data

Backing up your virtual machine can range from trivially easy to painfully difficult, depending on a number of variables. Because backups are so important, I want to give you enough background to understand what the challenges are and what your options are for overcoming them.

Note: This information is largely taken from my book [Take Control of Mac OS X Backups](#).

Duplicate a Virtual Machine

Virtualization software stores Windows itself, and all your Windows data, in a file (or set of files) called a *virtual disk*. Although this isn't the only component of your virtual machine (you also have settings files and other supporting files), it's the most important one, and the one that most urgently needs backing up.

Note: Parallels and Fusion put your virtual disk(s) for each virtual machine, along with your other supporting files, in a *bundle*—a special folder that acts like a single file. Parallels stores these, by default, in `~/Documents/Parallels/virtual-machine-name`, whereas Fusion normally puts them in `~/Documents/Virtual Machines`. VirtualBox stores virtual disks by default in `~/Library/VirtualBox/HardDisks/virtual-machine-name`, in files with the `.vdi` extension.

Since a virtual machine disk image is, as far as Mac OS X is concerned, merely a file (or, in some cases, a series of files), the easiest way to back them up is simply to ensure that your Mac backup software copies them along with the rest of your documents. In other words, whether you create a duplicate or a versioned backup of your Mac data, you still end up with a bootable duplicate of your Windows virtual machine.

Run Windows Applications without Windows

As marvelous as it is to run Windows at full speed on a Mac, many of us would love to use just one or two crucial Windows applications without having to pay for a Windows license or dedicate numerous gigabytes of disk space to another operating system. When Apple first announced the switch to Intel processors, some people speculated that just such a capability would find its way into Mac OS X. So far, Apple has steadfastly maintained that the dual-boot scheme used by Boot Camp is their one and only official solution for running Windows software, with virtualization being a valid third-party option. But it's also possible, in some situations, to run Windows applications without Windows itself.

Wine

The story behind the black magic of running Windows applications without Windows begins with an open-source software package called Wine (<http://www.winehq.org/>), whose name is based on the recursive acronym Wine Is Not an Emulator. Wine began in 1993 as a way for Linux users to run Windows programs. It uses a technique similar to the way the Classic environment lets Mac OS 9 run on PowerPC-based Macs. Rather than emulate PC hardware, it translates messages sent between a program and the operating system in a way that programs written for one operating system can function in another—as long as the underlying processor (and other crucial hardware) is the same.

Darwine

It was only a matter of time before a group of programmers ported Wine to Mac OS X, using the X11 system to provide the user interface. This project was called Darwine (<http://darwine.sourceforge.net/>), after Darwin (the Unix core of Mac OS X). The switch to Intel helped, since applications designed to run on Intel chips could potentially run

Solve Printing Problems

If you're using Fusion, you're unlikely to encounter printing problems, assuming you've enabled Fusion's driverless printing feature (which is turned on by default). Simply select your virtual machine in the Virtual Machine Library window, click Settings, and click Printers; then verify that Enabled is checked. Fusion then uses your Mac's printer drivers, a process that's normally completely transparent to Windows.

In Parallels, VirtualBox, and Boot Camp, however, printing problems are more common. Because there are so many kinds of computers, and so many ways to attach them to a Mac, I can't provide solutions to every potential printing problem. I can, however, offer a few pieces of general advice.

In my experience, most printing problems can be resolved by following these tips (in this order):

- **Install the correct printer driver:** Mac OS X includes drivers for lots of printers, and so does Windows. However, because new printers are being released all the time, the correct driver is not necessarily built into your operating system; you may have to obtain a driver for your printer and install it yourself. Most printers that require drivers ship with a CD you can use to install them; alternatively, visit the manufacturer's Web site to download the necessary drivers. Follow the manufacturer's instructions to install them. Then proceed to the next tip.
- **Try the Windows printer setup mechanism:** The fact that you've set up a printer in Mac OS X doesn't mean it's automatically available to Windows. First, try the standard Windows procedure: in Windows 7 or Vista, choose Start > Control Panel > Printer (Printers, in Classic View) or, in Windows XP, choose Start > Printers and Faxes. Click the Add a Printer link and follow the prompts in the Add Printer Wizard. If that doesn't work, move on to the next tip.

Create a Slipstream Installer Disc

For our purposes, a slipstream installer disc is a CD or DVD with a customized version of the Windows installer that has certain additions, updates, or options preconfigured. It can make installation faster—and give you a way to install Windows XP in Boot Camp even if your CD contains a pre-SP2 version. In this chapter, I describe how to create such a disc. (If you already have a CD or DVD with Windows XP SP2 or later, Windows 7, or Vista—or if you're using virtualization software—you can skip this chapter.)

Why You Might Need a Slipstream Disc

I had an old, unused retail copy of Windows XP in my closet, and I figured I'd finally put it to use by installing it under Boot Camp. But when I looked at the CD, I saw that it was an early release of Windows XP from 2001—before SP2 and even before SP1. When using Windows XP, Boot Camp requires a Windows CD with SP2 or later already on it; you can't simply install an earlier version and then apply updates later. But I didn't want to repurchase something I already had.

By searching the Web, I found numerous instructions for creating a *slipstream* installer—one in which the components of a service pack (or other updates) have been merged with the original installer in such a way that the result is indistinguishable from a direct-from-Microsoft Windows XP-plus-service-pack CD. Unfortunately, to create an SP2 or SP3 slipstream installer, you must be running Windows already, and I had no Windows machines at my disposal. My solution was to install Parallels first, install Windows XP under Parallels second, and then use that Windows installation to prepare the SP2 slipstream installer disc that I could later use with Boot Camp.

Whether you are in my situation or want to save time later, should you ever have to reinstall Windows (not a bad idea!), you can create a slipstream CD on any Windows computer with a CD/DVD burner, or on a Mac that's already running Windows (with Parallels or otherwise).

Protect Your Windows Setup from Malware

As a Mac user, you've probably never lost sleep over viruses, Trojan horses, worms, spyware, adware, and all the other nasty stuff known collectively as *malware* (that is, malicious software). Such programs are few and far between on Mac OS X, but they're a gigantic problem on Windows. Now that you're running Windows on your Mac, you have to worry about malware too, especially since a program could conceivably cause damage not only to your Windows partition (or virtual disk) but also to your Mac files. You can learn more about malware in Wikipedia, at <http://en.wikipedia.org/wiki/Malware>.

Preventing attacks by malware (and repairing the damage they've caused) is a large and complex subject that could easily fill several large books. In this chapter, I outline just the basics, acquainting you with some of the most important steps you should take to protect your computer and a few good tools to help you.

***Already have malware in Windows XP?** If you're running Windows XP and already have malware that you don't know how to remove, one easy option is to use Microsoft's Malicious Software Removal Tool, available free from <http://www.microsoft.com/security/malwareremove/>. This program, which is updated monthly, does not prevent malware from being installed, but it can undo many types of damage.*

Apply Windows Updates

In addition to major updates like service packs, there are numerous smaller updates from Microsoft that fix bugs, plug security holes, and make Windows more resistant to malware. You should install these as soon as possible after installing Windows (and configure Windows to download and install new updates automatically as they appear).

Learn More

For more information about running Windows (on a Mac or otherwise), consult these books:

- *Windows 7 for Dummies* by Andy Rathbone (For Dummies)
<http://www.amazon.com/gp/product/0470523980/>
- *Windows 7: The Missing Manual* by David Pogue (O'Reilly)
<http://www.amazon.com/gp/product/0596806396/>
- *Windows 7 Plain & Simple* by Jerry Joyce and Marianne Moon (Microsoft Press)
<http://www.amazon.com/gp/product/0735626669/>
- *Windows Vista for Dummies* by Andy Rathbone (For Dummies)
<http://www.amazon.com/gp/product/0471754218/>
- *Windows Vista: The Missing Manual* by David Pogue (O'Reilly)
<http://www.amazon.com/gp/product/0596528272/>
- *Windows XP for Dummies*, 2nd Edition by Andy Rathbone (For Dummies)
<http://www.amazon.com/gp/product/0764573268/>
- *Windows XP for Starters: The Missing Manual* by David Pogue (O'Reilly)
<http://www.amazon.com/gp/product/0596101554/>
- *Windows XP Home Edition: The Missing Manual* by David Pogue (O'Reilly)
<http://www.amazon.com/gp/product/0596002602/>
- *Windows XP Pro: The Missing Manual* by David Pogue, Craig Zacker, and L.J. Zacker (O'Reilly)
<http://www.amazon.com/gp/product/0596008988/>

Appendix A: Windows on a PowerPC Mac

Even if you have an older Mac with a PowerPC processor, you can still run Windows, albeit slowly. I'm aware of three software packages that support running Windows XP as a virtual machine under Mac OS X 10.4 or later on a PowerPC Mac. The problem is that the software still has to translate instructions so that they can be understood by a different processor, and translation takes time. Even with a top-of-the-line PowerPC Mac and the most highly optimized virtualization software, the performance of Windows will be less than stellar. If you happen to have a slower Mac and a less capable software package, performance can be downright abysmal.

That said, if you use Windows only occasionally and you don't plan to run processor-intensive tasks (such as games and video-editing software), you may find one of these solutions perfectly acceptable.

PowerPC-compatible Windows emulators include the following:

- **Virtual PC for Mac:** Microsoft's Virtual PC for Mac was the best-known and most reliable emulation software for running Windows on a PowerPC Mac. It has been discontinued, but you may still be able to find it on eBay or elsewhere online.
- **Guest PC:** Regarded by some as superior to Virtual PC and by others as unusably slow, Guest PC has fewer features, but also less overhead—not to mention a lower price. (It also hasn't been discontinued!) Unlike Virtual PC, it's not bundled with Windows (<http://www.lismoresystems.com/en/>, \$69.99).
- **Q:** In the Intel version of Q, Windows runs slowly; in the PowerPC version, it walks—well, saunters (<http://www.kju-app.org/>, free).
- **OpenOSX WinTel:** As discussed in [OpenOSX WinTel](#), this virtualization software runs as an emulator on PowerPC-based Macs (<http://openosx.com/wintel/>, \$25).

About This Book

Thank you for purchasing this Take Control book. We hope you find it both useful and enjoyable to read. We welcome your comments at tc-comments@tidbits.com.

Ebook Extras

You can [access extras related to this ebook](#) on the Web. Once you're on the ebook's Take Control Extras page, you can:

- Download any available new version of the ebook for free, or buy a subsequent edition at a discount.
- Download various formats, including PDF and—usually—EPUB and Mobipocket. (Learn about reading this ebook on handheld devices at <http://www.takecontrolbooks.com/device-advice>.)
- Read postings to the ebook's blog. These may include new information and tips, as well as links to author interviews. At the top of the blog, you can also see any update plans for the ebook.
- Get a discount when you order a print copy of the ebook.

About the Author

Joe Kissell is Senior Editor of *TidBITS*, a Web site and email newsletter about Apple and the Internet, and the author of numerous print and electronic books about Macintosh software, including *Take Control of Mac OS X Backups* and *Take Control of Maintaining Your Mac*. He is also a Senior Contributor to *Macworld*, was the winner of a 2009 Neal award for Best How-to Article, and has appeared on the MacTech 25 list (the 25 people voted most influential in the Macintosh community) since 2007.



Joe has worked in the Mac software industry since the early 1990s, including positions managing software development for Nisus Software and Kensington Technology Group.

In his increasingly imaginary spare time, Joe likes to travel, cook, and practice t'ai chi. He lives in Paris with his wife, Morgen Jahnke, their son, Soren, and their cat, Zora. To contact Joe about this book, send him email at jwk@me.com and be sure to include the words [Take Control of Running Windows on a Mac](#) in the subject of your message. But *please* don't ask him to make sense of Windows!

Author's Acknowledgments

Thanks to Adam and Tonya Engst for recommending (and facilitating) this project, to Caroline Rose for her usual excellent and speedy editing, to Sandro Menzel and Glenn Fleishman for expert technical advice, and to Kevin van Haaren for helpful information in *TidBITS*.

Shameless Plug

Although I write about computers as my day job, I have a great many other interests, which I write about on several Web sites, including Interesting Thing of the Day (<http://itotd.com/>) and my personal blog. You can find links to all my sites, a complete list of my publications, and more personal details about me at JoeKissell.com. You can also follow me on Twitter ([@joekissell](https://twitter.com/joekissell)).

About the Publisher

Publishers Adam and Tonya Engst have been creating Apple-related content since they started the online newsletter *TidBITS*, in 1990. In *TidBITS*, you can find the latest Apple news, plus read reviews, opinions, and more (<http://www.tidbits.com/>).

Adam and Tonya are known in the Apple world as writers, editors, and speakers. They are also parents to Tristan, who thinks ebooks about clipper ships and castles would be cool.



Production Credits

Take Control logo: Jeff Tolbert

Cover: Jon Hersh

Editor: Caroline Rose

Editor in Chief: Tonya Engst

Publisher: Adam Engst

Copyright and Fine Print

Take Control of Running Windows on a Mac, Fifth Edition

ISBN: 978-1-61542-130-5

Copyright © 2011, Joe Kissell. All rights reserved.

TidBITS Publishing Inc.

50 Hickory Road

Ithaca, NY 14850 USA

<http://www.takecontrolbooks.com/>

Take Control electronic books help readers regain a measure of control in an oftentimes out-of-control universe. Take Control ebooks also streamline the publication process so that information about quickly changing technical topics can be published while it's still relevant and accurate.

This electronic book doesn't use copy protection because copy protection makes life harder for everyone. So we ask a favor of our readers. If you want to share your copy of this ebook with a friend, please do so as you would a physical book, meaning that if your friend uses it regularly, he or she should buy a copy. Your support makes it possible for future Take Control ebooks to hit the Internet long before you'd find the same information in a printed book. Plus, if you buy the ebook, you're entitled to any free updates that become available.

Although the author and TidBITS Publishing Inc. have made a reasonable effort to ensure the accuracy of the information herein, they assume no responsibility for errors or omissions. The information in this ebook is distributed "As Is," without warranty of any kind. Neither TidBITS Publishing Inc. nor the author shall be liable to any person or entity for any special, indirect, incidental, or consequential damages, including without limitation lost revenues or lost profits, that may result (or that are alleged to result) from the use of these materials. In other words, use this information at your own risk.

Many of the designations used to distinguish products and services are claimed as trademarks or service marks. Any trademarks, service marks, product names, or named features that appear in this title are assumed to be the property of their respective owners. All product names and services are used in an editorial fashion only, with no intention of infringement of the trademark. No such use, or the use of any trade name, is meant to convey endorsement or other affiliation with this title.

This title is an independent publication and has not been authorized, sponsored, or otherwise approved by Apple Inc. Because of the nature of this title, it uses terms that are trademarks or the registered trademarks of Apple Inc.; to view a complete list of the trademarks and of the registered trademarks of Apple Inc., you can visit <http://www.apple.com/legal/trademark/appletmlist.html>.

Featured Titles

Click any book title below or [visit our Web catalog](#) to add more ebooks to your Take Control collection!

Take Control of Exploring and Customizing Snow Leopard (Matt Neuburg): Learn how to customize your Mac's interface, navigate quickly around your disk, and use special features like a pro. \$15

Take Control of Mac OS X Backups (Joe Kissell): Set up a rock-solid backup strategy so that you can restore quickly and completely, no matter what catastrophe arises. \$15

Take Control of Maintaining Your Mac (Joe Kissell): Learn a commonsense approach to avoiding problems and ensuring that your Mac runs at peak performance. \$10

Take Control of Screen Sharing in Snow Leopard (Glenn Fleishman). Figure out which type of screen sharing to use when and how to get the most out of screen sharing. \$10

Take Control of the Mac Command Line with Terminal (Joe Kissell): Learn the basics of the Unix command line that underlies Mac OS X, and get comfortable and confident when working in Terminal. \$10

Take Control of Users & Accounts in Snow Leopard (Kirk McElhearn): Find straightforward explanations of how to create, manage, and work with—and among—user accounts. \$10

Take Control of VMware Fusion 3 (Joe Kissell): Use Windows on your Mac effectively by taking advantage of the full power of VMware Fusion 3. *Free!*

Take Control of Your 802.11n AirPort Network (Glenn Fleishman): Make your AirPort network fly—get help with buying the best gear, setup, security, and more. \$15

Take Control of Your Paperless Office (Joe Kissell): With your Mac, scanner, and this ebook in hand, you'll finally clear the chaos of an office overflowing with paper. \$10