



DO-IT-YOURSELF

Build Your Own PC **FOR** **DUMMIES®**

Discover how to:

- ✓ **Design and build your dream PC**
- ✓ **Choose and install the components that fit your needs**
- ✓ **Super-charge your graphics, crank up your sound, and install the memory you need**

Mark L. Chambers

*Author of PCs All-In-One Desk
Reference For Dummies*



DO-IT-YOURSELF

Build Your Own PC

FOR

DUMMIES[®]

DO-IT-YOURSELF

Build Your Own PC

FOR

DUMMIES®

by Mark L. Chambers



WILEY

Wiley Publishing, Inc.

Build Your Own PC Do-It-Yourself For Dummies®

Published by
Wiley Publishing, Inc.
111 River Street
Hoboken, NJ 07030-5774

www.wiley.com

Copyright © 2009 by Wiley Publishing, Inc., Indianapolis, Indiana

Published by Wiley Publishing, Inc., Indianapolis, Indiana

Published simultaneously in Canada

No part of this publication may be reproduced, stored in a retrieval system or transmitted in any form or by any means, electronic, mechanical, photocopying, recording, scanning or otherwise, except as permitted under Sections 107 or 108 of the 1976 United States Copyright Act, without either the prior written permission of the Publisher, or authorization through payment of the appropriate per-copy fee to the Copyright Clearance Center, 222 Rosewood Drive, Danvers, MA 01923, (978) 750-8400, fax (978) 646-8600. Requests to the Publisher for permission should be addressed to the Legal Department, Wiley Publishing, Inc., 10475 Crosspoint Blvd., Indianapolis, IN 46256, (317) 572-3447, fax (317) 572-4355, or online at <http://www.wiley.com/go/permissions>.

Trademarks: Wiley, the Wiley Publishing logo, For Dummies, the Dummies Man logo, A Reference for the Rest of Us!, The Dummies Way, Dummies Daily, The Fun and Easy Way, Dummies.com, Making Everything Easier, and related trade dress are trademarks or registered trademarks of John Wiley & Sons, Inc. and/or its affiliates in the United States and other countries, and may not be used without written permission. All other trademarks are the property of their respective owners. Wiley Publishing, Inc., is not associated with any product or vendor mentioned in this book.

LIMIT OF LIABILITY/DISCLAIMER OF WARRANTY: THE PUBLISHER AND THE AUTHOR MAKE NO REPRESENTATIONS OR WARRANTIES WITH RESPECT TO THE ACCURACY OR COMPLETENESS OF THE CONTENTS OF THIS WORK AND SPECIFICALLY DISCLAIM ALL WARRANTIES, INCLUDING WITHOUT LIMITATION WARRANTIES OF FITNESS FOR A PARTICULAR PURPOSE. NO WARRANTY MAY BE CREATED OR EXTENDED BY SALES OR PROMOTIONAL MATERIALS. THE ADVICE AND STRATEGIES CONTAINED HEREIN MAY NOT BE SUITABLE FOR EVERY SITUATION. THIS WORK IS SOLD WITH THE UNDERSTANDING THAT THE PUBLISHER IS NOT ENGAGED IN RENDERING LEGAL, ACCOUNTING, OR OTHER PROFESSIONAL SERVICES. IF PROFESSIONAL ASSISTANCE IS REQUIRED, THE SERVICES OF A COMPETENT PROFESSIONAL PERSON SHOULD BE SOUGHT. NEITHER THE PUBLISHER NOR THE AUTHOR SHALL BE LIABLE FOR DAMAGES ARISING HEREFROM. THE FACT THAT AN ORGANIZATION OR WEBSITE IS REFERRED TO IN THIS WORK AS A CITATION AND/OR A POTENTIAL SOURCE OF FURTHER INFORMATION DOES NOT MEAN THAT THE AUTHOR OR THE PUBLISHER ENDORSES THE INFORMATION THE ORGANIZATION OR WEBSITE MAY PROVIDE OR RECOMMENDATIONS IT MAY MAKE. FURTHER, READERS SHOULD BE AWARE THAT INTERNET WEBSITES LISTED IN THIS WORK MAY HAVE CHANGED OR DISAPPEARED BETWEEN WHEN THIS WORK WAS WRITTEN AND WHEN IT IS READ.

For general information on our other products and services, please contact our Customer Care Department within the U.S. at 877-762-2974, outside the U.S. at 317-572-3993, or fax 317-572-4002.

For technical support, please visit www.wiley.com/techsupport.

Wiley also publishes its books in a variety of electronic formats. Some content that appears in print may not be available in electronic books.

Library of Congress Control Number: 2008940688

ISBN: 978-0-470-19611-3

Manufactured in the United States of America

10 9 8 7 6 5 4 3 2 1



WILEY

About the Author

Mark L. Chambers has been an author, a computer consultant, a BBS sysop, a programmer, and a hardware technician for more than 20 years — pushing computers and their uses far beyond normal performance limits for decades now. His first love affair with a computer peripheral blossomed in 1984 when he bought his lightning-fast 300bps modem for his Atari 400. Now he spends entirely too much time on the Internet and drinks far too much caffeine-laden soda.

With a degree in journalism and creative writing from Louisiana State University, Mark took the logical career choice: programming computers. However, after five years as a COBOL programmer for a hospital system, he decided there must be a better way to earn a living, and he became the Documentation Manager for Datastorm Technologies, a well-known communications software developer. Somewhere in between writing software manuals, Mark began writing computer how-to books. His first book, *Running a Perfect BBS*, was published in 1994 — and after a short decade or so of fun (disguised as hard work), Mark is one of the most productive and best-selling technology authors on the planet.

Along with writing several books a year and editing whatever his publishers throw at him, Mark has also branched out into Web-based education, designing and teaching a number of online classes — called *WebClinics* — for Hewlett-Packard.

His favorite pastimes include collecting gargoyles, watching St. Louis Cardinals baseball, playing his three pinball machines and the latest computer games, supercharging computers, and rendering 3-D flights of fancy with TrueSpace — and during all that, he listens to just about every type of music imaginable. Mark's worldwide Internet radio station, *MLC Radio* (at www.mlcbooks.com), plays only CD-quality classics from 1970 to 1979, including everything from Rush to Billy Joel to *The Rocky Horror Picture Show*.

Mark's rapidly expanding list of books includes *MacBook For Dummies*; *iMac For Dummies*; *Mac OS X Leopard All-in-One Desk Reference For Dummies*; *Scanners For Dummies*; *CD & DVD Recording For Dummies*; *PCs All-in-One Desk Reference For Dummies*; *Mac OS X Tiger: Top 100 Simplified Tips & Tricks*; *Microsoft Office v. X Power User's Guide*; *BURN IT! Creating Your Own Great DVDs and CDs*; *The Hewlett-Packard Official Printer Handbook*; *The Hewlett-Packard Official Recordable CD Handbook*; *The Hewlett-Packard Official Digital Photography Handbook*; *Computer Gamer's Bible*; *Recordable CD Bible*; *Teach Yourself the iMac Visually*; *Running a Perfect BBS*; *Official Netscape Guide to Web Animation*; and the *Windows 98 Troubleshooting and Optimizing Little Black Book*.

His books have been translated into 14 languages so far — his favorites are German, Polish, Dutch, and French. Although he can't read them, he enjoys the pictures a great deal.

Mark welcomes all comments about his books. You can reach him at mark@mlcbooks.com, or visit MLC Books Online, his Web site, at www.mlcbooks.com.

Dedication

This book is posthumously dedicated to my friend and teacher, LSU journalism professor Jim Featherston. Jim taught me everything I need to know — now I can put ideas to paper.

Author's Acknowledgments

I find that writing the acknowledgments is always the easiest part of any book because there's never a shortage of material. I always have a big group to praise.

First, a well-earned round of thanks to my knowledgeable technical editor, Jim Kelly, who checked every word for accuracy (while enduring every bad joke and pun).

As with every book I've written, I'd like to thank my wife, Anne, and my children, Erin, Chelsea, and Rose, for their support and love — and for letting me follow my dream!

Finally, I send my heartfelt appreciation to the hard-working editors at Wiley Publishing, Inc., who were responsible for the launch and completion of this new *Do-It-Yourself* edition — it takes a ton of work to produce a completely new edition, and they did an incredible job. Thanks are due to my project editor, Mark Enochs, my copy editor, Teresa Artman, and my acquisitions editor, Bob Woerner. They're talented, dedicated people, and I count myself very lucky that I had their assistance for this project — and many to come, I hope!

Publisher's Acknowledgments

We're proud of this book; please send us your comments through our online registration form located at <http://dummies.custhelp.com>. For other comments, please contact our Customer Care Department within the U.S. at 877-762-2974, outside the U.S. at 317-572-3993, or fax 317-572-4002.

Some of the people who helped bring this book to market include the following:

Acquisitions, Editorial, and Media Development

Senior Project Editor: Mark Enochs

Executive Editor: Bob Woerner

Senior Copy Editor: Teresa Artman

Technical Editor: James F. Kelly

Editorial Manager: Leah Cameron

Media Development Project Manager:
Laura Moss-Hollister

Media Development Assistant Project Manager:
Jenny Swisher

Media Development Assistant Producers:
Angela Denny, Josh Frank, Kit Malone, and
Shawn Patrick

Editorial Assistant: Amanda Foxworth

Sr. Editorial Assistant: Cherie Case

Cartoons: Rich Tennant (www.the5thwave.com)

Composition Services

Project Coordinator: Katie Key

Layout and Graphics: Carrie A. Cesavice,
Reuben W. Davis, Shane Johnson,
Jennifer Mayberry, Christine Williams

Proofreaders: Laura Albert, Amanda Graham,
Linda Quigley

Indexer: Sharon Shock

Publishing and Editorial for Technology Dummies

Richard Swadley, Vice President and Executive Group Publisher

Andy Cummings, Vice President and Publisher

Mary Bednarek, Executive Acquisitions Director

Mary C. Corder, Editorial Director

Publishing for Consumer Dummies

Diane Graves Steele, Vice President and Publisher

Composition Services

Gerry Fahey, Vice President of Production Services

Debbie Stailey, Director of Composition Services

Contents at a Glance

<i>Introduction</i>	1
<i>Part I: Preparations and Planning</i>	9
Chapter 1: A Screwdriver Is All You Need	11
Chapter 2: What Type of PC Should I Build?	23
<i>Part II: Assembling the Basics</i>	39
Chapter 3: Building the Foundation: The Case and Motherboard	41
Chapter 4: A Bag of Chips: Adding RAM and a CPU	61
Chapter 5: Installing Your Ports, Mouse, and Keyboard	77
Chapter 6: Adding Video Hardware.....	93
Chapter 7: Installing Your Hard Drive and Other Storage Devices	115
Chapter 8: Choosing and Installing an Operating System.....	135
<i>Part III: Adding the Fun Stuff</i>	151
Chapter 9: Installing an Optical Drive.....	153
Chapter 10: Let Your PC Rock!	169
Chapter 11: Modems and the Call of Broadband	187
<i>Part IV: Advanced PC Options</i>	207
Chapter 12: So You Want to Add a LAN?	209
Chapter 13: Input and Output: Scanners, Cameras, and Printers	223
Chapter 14: Building a Gaming PC.....	235
<i>Part V: The Part of Tens</i>	249
Chapter 15: Ten Tools and Tasks for a Power User's PC	251
Chapter 16: Ten Important Assembly Tips	257
Chapter 17: Ten Ways to Maintain Your PC.....	263
Chapter 18: Ten PC Pitfalls to Avoid Like the Plague.....	269
<i>Part VI: Appendixes</i>	275
Appendix A: About the DVD.....	277
Appendix B: The PC Builder's Glossary	279
<i>Index</i>	289

Table of Contents

<i>Introduction</i>	<i>1</i>
Why Build Your Own?	1
It just plain costs less to build your own PC!	1
Exercise your freedom of choice!	2
Enjoy the learning experience	2
Spare yourself the shipping and repair hassles	2
Dodge bundled software costs and get what you want	3
Avoid the computer sales experience	3
Select the brands that you prefer	3
About This Book	4
Conventions Used in This Book	4
Introducing Colossus	5
Foolish Assumptions	5
How This Book Is Organized	6
Part I: Preparations and Planning	6
Part II: Assembling the Basics	6
Part III: Adding the Fun Stuff	6
Part IV: Advanced PC Options	7
Part V: The Part of Tens	7
Appendixes: About the DVD and the PC Builder's Glossary	7
Icons Used in This Book	7
Where to Go from Here	8
 <i>Part I: Preparations and Planning</i>	 <i>9</i>
Chapter 1: A Screwdriver Is All You Need	11
Assembly 101	12
Building a better computer	12
The primary, number-one, all-important, absolutely necessary, required rule	14
The other primary, number-one, all-important, absolutely necessary, required rule	15
PCs Are Built with Standard Parts	15
Introducing the Major Parts	15
The metal mansion	15
The big kahuna	17
The eye candy	18
The places for plugs	18
The data warehouse	19
The bells and whistles	20
Connecting Your Computer Components	20

Chapter 2: What Type of PC Should I Build?	23
Interrogating Yourself on Your Computer Needs	23
Answering Your Computer-Needs Questions	25
Design 1: The Jack Benny economy class	25
Design 2: The Cunningham family edition	26
Design 3: The Wayne Manor Batcomputer	27
Getting Your Hands on the Special Stuff	28
Drafting, graphics, and pretty pictures	29
Home-office and small-business stuff	30
Mozart's musical computer	30
The ultimate bad-guy blasting box	31
Picking Up the Parts	32
Researching before you buy	32
I live for mail order	33
Ordering parts online	34
Choosing an Operating System	36
Introducing Colossus	37

Part II: Assembling the Basics **39**

Chapter 3: Building the Foundation: The Case and Motherboard	41
Choosing the Right Case	41
Space-saver cases: Pizza box and shoe box	42
Desktop case	44
Tower case	45
Other Case Considerations	46
Feeding power to your computer	46
Keeping your computer cool	46
Buttons, lights, and other foolishness	47
Your Motherboard Is Your Best Friend	48
Motherboard sizes	48
Motherboard features	49
And for Colossus, I Pick . . .	51
Installing Slot Covers	52
Installing Your Motherboard	54
Connecting the Power Supply	57
Connecting Lights, Switches, and the Speaker	58
Chapter 4: A Bag of Chips: Adding RAM and a CPU	61
FYI about CPUs	62
Family PC choices: Intel Celeron and AMD Sempron processors	63
The Cunningham model: Intel Core 2 Duo and AMD Athlon 64 X2 processors	64
Power user: Intel Core 2 Quad and AMD Phenom series processors	64
Add RAM to the Mix	65
And for Colossus, I Pick . . .	66
Installing Your CPU	67
Installing Your Fan and Heatsink	70
Installing Your RAM	72
Fire That Puppy Up!	74

Chapter 5: Installing Your Ports, Mouse, and Keyboard	77
Pursuing Your Port Preferences	77
Of Keyboards and Mice	82
The mouse has mutated	82
The key to keyboards	83
Check It Once, and Check It Twice!	85
And For Colossus, I Pick	85
Installing a Port Adapter Card	86
Connecting Built-In Ports	89
Installing a Keyboard	91
Installing a Non-USB Mouse (Or Other Pointing Thing)	92
Chapter 6: Adding Video Hardware	93
The Video Card Explained	93
Full speed ahead with accelerated graphics	94
Will 3-D video transform my entire existence?	95
Thanks for the memory	95
What's the bill, and what else do I need?	97
Hey, I Can Get TV on My PC!	100
Time to Meet Your Bus Slots	101
Staking Out Your Visual Territory	102
Deciphering monitor sizes and shapes (and choosing the one for you)	102
What else makes a great monitor?	103
And for Colossus, I Pick	105
Installing Your Video Card	106
Installing Your TV Tuner Card	109
Connecting Your Monitor	112
Checking Your Progress	114
Chapter 7: Installing Your Hard Drive and Other Storage Devices	115
Choosing Betwixt Hard Drive Technologies	116
Enhanced IDE (EIDE) hard drives	116
Serial ATA hard drives	117
Comparing EIDE and SATA hard drives	118
More stuff about hard drives	119
The Ancient Floppy Still Lives	120
Don't Forget Your Controller Card	120
Hey, You Just Removed Your Media!	121
Do you really need removable storage, or are you just fascinated by toys?	121
The Flash drive: Small but spacious	122
The REV has landed	122
And for Colossus, I Pick	122
Connecting Your Drive Controller	123
Installing an EIDE Hard Drive	125
Installing a SATA Hard Drive	128
Installing Your 3½-inch Floppy Disk Drive	129
Configuring Your PC and Hard Drive	132
Formatting Your Hard Drive	134

Chapter 8: Choosing and Installing an Operating System.....135

Become Your Own Consultant!.....	135
The Straight Talk on Vista.....	137
Linux: It's Not Just for Techno-nerds!.....	138
Before You Install Your Operating System.....	140
Even People Like You and Me Need Internet Security	142
Installing Windows Vista	143
Installing Ubuntu Linux.....	147

Part III: Adding the Fun Stuff..... 151**Chapter 9: Installing an Optical Drive.....153**

Discovering the Details about DVD and Blu-Ray.....	153
What You Need to Know about Optical Recorders.....	155
The great disc speed myth.....	156
Other read-only disc drive features to covet.....	157
What You Need to Know about DVD and Blu-ray.....	159
Choosing an Internal or an External DVD Drive.....	160
Internal drives.....	160
External drives.....	161
And for Colossus, I Pick. . .	162
Installing an EIDE Optical Drive.....	163
Testing Everything	167

Chapter 10: Let Your PC Rock!169

Sorting Out Sound Card Basics	169
PCI bus audio	169
Integrated audio	170
Don't forget the software part!	170
Why do I need 3-D for my ears?	172
"Send help! I'm surrounded by sound!"	172
MP3 fanatics, pay attention!.....	173
Uhh . . . Is This Microphone On?	173
Speaking of Speakers	175
The Subwoofer: Big Dog of Computer Speakers	177
And for Colossus, I Pick. . .	177
Installing Your Sound Card.....	178
Connecting Your Speakers	181
Testing Your Sound System.....	183
Adding a Microphone.....	185

Chapter 11: Modems and the Call of Broadband187

Figuring Out Whether You Need Broadband	188
Figuring Out Those Connection Charges	191
Locating an Internet Service Provider.....	192
A Modem Primer for Real People.....	193
The whole speed thing explained	193
Will That Be a Card or a Case?	194
Let Your Modem Speak!.....	195
Why Share Your Internet Connection?	196

Sharing through Hardware.....	197
Wired sharing devices	197
Wireless sharing devices	198
Installing an Internal Modem	200
Installing an External USB Modem	202
Sharing an Internet Connection through Software.....	204
Sharing an Internet Connection through Hardware.....	206
 Part IV: Advanced PC Options.....	207
 Chapter 12: So You Want to Add a LAN?	209
Adding the Network Advantage	209
Convenience.....	210
Communication	210
Cooperation	210
Contact	210
Ethernet Networking 101.....	211
Comparing client-server and peer-to-peer networks.....	211
Collecting What You Need for an Ethernet Network	213
More stuff about network interface cards.....	214
More stuff about cables and connections.....	214
There Are Always Exceptions!.....	215
Use your telephone wiring.....	215
Use your AC wiring.....	216
Use your USB port.....	216
Go wireless	216
Installing Your Network Interface Card	218
Turning Things On.....	220
 Chapter 13: Input and Output: Scanners, Cameras, and Printers.....	223
The Wide, Wonderful World of Scanners	223
Recognizing scanners in the wild.....	224
Diving into color depth.....	226
Resolving the right resolution	227
Digital Camera Details	227
One Word: Printers, Printers, Printers!	229
Will that be laser or inkjet?	230
Advantages of inkjet printers	230
Advantages of laser printers.....	231
Installing a Scanner or Printer with a USB Connection	232
 Chapter 14: Building a Gaming PC.....	235
Exotic Video Card Stuff Explained	235
Memory is number one	235
What's a GPU, anyway?.....	236
Overclocking 101	236
Running multiple cards with SLI.....	238
You Gotta Have Fans and Heatsinks	238
It's a RAID!	241
Adding Lights and Gauges	242

Customizing Your Case.....	244
Will You Move the Joystick, or Will It Move You?	245
Configuring SLI for Multiple Video Cards	247

Part V: The Part of Tens.....249

Chapter 15: Ten Tools and Tasks for a Power User's PC.....251

Forget Your Mouse	251
Guard That Power Supply!	252
Back Up, Back Up, Back Up	253
Diagnostics Software to the Rescue	253
Stick Your Keyboard in a Drawer!	254
Stop the Spread of Viruses.....	254
Organize Your Software.....	255
Use the Power of Your Voice.....	255
Everyone Needs a Good Image Editor	256
Keep It Clean!.....	256

Chapter 16: Ten Important Assembly Tips257

Read the Instructions First! (Rule Number One)	257
Build the Perfect Workspace	257
Keep Track of UTOs (Unidentified Tiny Objects)	259
Make Sure That You Have Everything You Need.....	259
Yell for Help If Necessary	259
Use a Magnetic Screwdriver	260
Start Your Own Parts Box	260
Take Your Time: The Zen of Assembly	261
Don't Cover Up Too Quickly	261
The Cable Rule: Check and Double-Check.....	261

Chapter 17: Ten Ways to Maintain Your PC.....263

Defragment Your Hard Drive	263
Get Connected with the Speediest Data Transfers	264
Keep Your Backgrounds Plain	264
Remove Resident Programs.....	264
Keep Your Drivers Updated	266
Use a Native File System	266
Check Your Drives for Errors.....	266
Uninstalling 101	267
Maintain Your System Registry	268
Clean Up after Windows	268

Chapter 18: Ten PC Pitfalls to Avoid Like the Plague.....269

It's "Refurbished" for a Reason	269
Looking for an Antique? Buy a Pentium 4 CPU.....	270
Never Depend on Floppies.....	270
Help Stamp Out Unnecessary Passwords!	271
Honor Thy Neighbor's Copyright.....	271
Your PC Is Not a Kindergarten.....	272
Don't Jump on the Pirate Ship.....	272

Keep Your Mitts Away from Monitors and Power Supplies	272
Don't Lease a PC for the Long Haul	273
Avoid Older Versions of PC Software.....	273
 <i>Part VI: Appendixes</i>	275
 Appendix A: About the DVD	277
System Requirements.....	277
Using the DVD.....	277
What You'll Find on the DVD	278
Troubleshooting.....	278
Customer Care.....	278
 Appendix B: The PC Builder's Glossary	279
 <i>Index</i>	289



Introduction

You've decided to build your own computer. Congratulations! That statement might seem a little like "You've decided to fly a 747" or "You've decided to teach yourself accounting" — but I'm here to tell you that this book was especially written to make it both *easy* and (believe it or not) *fun* to build your own multimedia computer with an Intel or AMD processor. (Oh, and don't forget that you're likely to save a significant chunk of cash as well, especially if you're building a powerful PC for applications such as gaming and video editing.)

To sum up, I explain the mysterious parts in the box in honest-to-goodness English, with a little humor and without the jargon — and then help you build the PC that's perfect for you!

Why Build Your Own?

Buying a PC from a retail computer store or a big mail-order company is easy: Out comes the credit card, the boxes arrive at your house, and installation is as simple as plugging in the keyboard, mouse, speakers, and monitor. Even the most experienced PC hardware junkie will have to admit that a novice can save time and potential headaches by buying a retail PC.

Therefore, you might be asking yourself, "Why don't I just travel the retail PC route like most people? Why go to the trouble of building my own computer?" There are several doggone good reasons why you should assemble your own machine:

It just plain costs less to build your own PC!

The first reason — and, for some people, the most important reason — for building a computer is to save as much money as possible over the cost of a retail PC (especially if you're buying a PC from a local retail store, or if you're building a super-fast gaming system). When you build your own computer, you're not paying for all the overhead tacked on to the original price of a computer, including a storefront, advertising, and a salesperson's paycheck.

Many retail PC packages don't include a monitor, so often the price that you see isn't for a complete system. And yes, you can save a hundred dollars or more over the price of a complete PC offered by a big mail-order company. It's simply a matter of searching for the right companies that sell computer components at rock-bottom prices. Remember, using a Web site such as www.pricewatch.com can bring you — in just a few seconds — the best prices available *anywhere*!

Even if you have to buy every single component from your computer case to your mousepad, you're still likely to save a considerable amount of cash by assembling your own computer.

Exercise your freedom of choice!

When you build your own computer, you can select special components that don't kowtow to the cookie-cutter mold of retail PCs. For example, don't expect to find specialized pointing devices (such as trackballs) on most retail PCs at your local computer store. If you buy a retail PC and you want to use a trackball rather than a mouse, you'll have to buy one separately (and then you're stuck with a mouse that you don't need). That might not seem like much of a hassle, but consider other specialized components, such as a high-end sound card with Dolby Digital support, a gamer's 3-D video card with 1GB of video RAM, or a TV/video capture card. Buying one of these adapter cards, removing the case, and substituting the adapter card that you *really* wanted in the first place becomes a big deal.

When you design and assemble your own computer, you buy precisely what you need, including any specialized hardware or peripherals. Even if the perfect computer that you were considering at the computer store doesn't have a FireWire port and a Blu-ray recorder, you can certainly build a computer that does have these extras! If you're considering buying a PC from a direct vendor (such as Dell or Gateway) and you need special hardware, the vendor can usually supply it — although you'll pay substantially more for the vendor's version of the part than you would have paid for the part through a mail-order catalog. Having a custom PC is nice, but unless you build it yourself, you'll *always* pay more.

Enjoy the learning experience

What do you learn when you buy a retail PC? The answer: Not much. Sure, you get a crash course in removing Styrofoam and plugging in cables, but most owners of a retail PC are still afraid to remove the case from their computer. If you buy a retail PC, you'll be left in the dark when the time comes to upgrade your system to extend its useful life or replace a broken component. (And you're likely to invalidate what's left of your warranty if you crack the case.)

On the other hand, when you build your own computer, you *know* what makes it tick. You'll blossom into a bona fide techno-wizard! With your assembly experience and your knowledge of PC hardware, you'll be better prepared to fix problems and upgrade hardware and peripherals. The technicians at your local PC repair shop will wonder what happened to you; perhaps you should visit them from time to time just to swap hard drive specifications.

Spare yourself the shipping and repair hassles

When you buy a retail PC from a store (or even from one of the big-name mail-order companies), you'll probably be presented with a technical support number and assurances that your computer will be promptly repaired if it breaks. You'll find that the word *promptly* has many meanings: waiting several minutes (or even an hour) to speak to a technical support representative, finding out that you'll be without your PC and the data that you need for several weeks, or making an appointment with a service representative to eventually drop by your house and bring a replacement part. Oh, and don't forget that this coverage usually lasts for only a year, unless you paid big bucks for the extended service contract when you bought your PC.

When you build your own PC, you can buy parts locally. And, if a part breaks, you don't have to pick up the telephone and start waiting. You'll never find yourself repacking your computer to send it halfway across the country. Instead, you can bring the faulty component back to the store for an immediate replacement.

Dodge bundled software costs and get what you want

Retail PC salespeople like to crow about the cool software that's included with their computers. You usually get a productivity suite (which includes a word processor, some sort of database application, and a spreadsheet program), a few Internet applications, and free hours on an online service. If you're lucky, you might also get a year-old game or two with your computer. Generally, these programs are stripped-down versions of larger packages.



Read between the lines when a PC manufacturer touts its bundled software. For example, you might get baby sister Microsoft Works preloaded instead of its full-featured, big sister Microsoft Office, which most retail PCs sold in stores don't include — unless you pay more for it.



Unfortunately, bundled software isn't free at all: You pay for it along with your hardware, the documentation is usually sparse, it's rarely exactly what you need, and you usually can't subtract it from the total price of your computer if you don't want it. Often, you won't even receive the original program installation discs, so you can't reinstall the software. In fact, many new computer owners end up uninstalling the bundled software to make room for the programs that they really want to run. If you build your own PC, you can select your own full versions of your favorite applications later and save additional money.

Avoid the computer sales experience

Although used-car salespeople seem to rank the lowest on the social totem pole, computer salespeople aren't much better. Many salespeople who I've encountered in retail computer stores either consider the customer an idiot or have little idea of exactly what they're selling (making them the perfect target for a few well-placed techno-questions — nothing's funnier than an embarrassed clueless salesperson who treated you like a computer novice just a few seconds before)! Others try to pass off a computer that's been returned as near the quality of a brand-new machine. (Look closely for the word *refurbished* the next time you shop for a computer, and you might see this technique in action.)

By building your own PC, you can circumvent your computer retail store and all the techniques that salespeople use to try to talk you into a specific computer. You end up with a better computer that is less expensive and *perfectly* suits your needs.

Select the brands that you prefer

Are you looking for specific brand-name components in your computer, such as a Western Digital Raptor SATA hard drive or a Sound Blaster X-Fi Titanium sound card

from Creative Labs? If you buy a retail PC, you end up with whatever hardware the manufacturer deems satisfactory (and you'd be surprised by how many big-name manufacturers of retail PCs use no-name parts). Often the only way that you can determine what you're getting is to open the computer's case on the sales floor (or, if you used a mail-order shop, when you receive it).

Even if you're buying a computer from a direct vendor that offers customized PCs, it's unlikely that you'll be able to ask for a specific brand for most of the components used to assemble your computer. Typically, these vendors do use brand-name parts but only those brands and models the vendor prefers. If you need a different model, you're no better off than you would be buying a computer in a chain store.

When you build your own computer, *you* select the parts required to build it, including any specific brand-name preferences.

About This Book

You'll find that each chapter in this book acts as a reference for each type of computer hardware that you can add to your computer; some are required components, and others are optional devices that add extra functionality to your PC. You can start at any point — each chapter is self-contained. The book also includes a glossary of computer terms and an appendix about what's on the DVD in the back of this book.

Each chapter also provides the general information you need to make a buying decision between different flavors of the same component. For example, in Chapter 10, I discuss both bare-bones and advanced sound cards (without resorting to engineer-speak).

If you're interested in buying and installing a particular component, such as a DVD drive or a video adapter card, you can jump directly to the chapter that describes the device and start reading. Most chapters end with general instructions that familiarize you with the installation process. (They don't replace the specific documentation that accompanies each component, although the generic steps that I provide give you an idea of what's involved.)

On the other hand, if you're interested in building a computer from scratch, start with Chapter 1 and follow the chapters in order; you can also skip to other chapters whenever necessary for information that you might need.

Conventions Used in This Book

From time to time, I might ask you to type a command within Windows (or whatever operating system you're using). That text often appears in bold like this: **Type me**. Press the Enter key to process the command.

I list menu commands with this format: File⇨Open. For example, this shorthand indicates that you should click the File menu and then choose the Open menu item.

From time to time, I mention messages you should see displayed onscreen by an application or the operating system. Those messages look like this: This is a message displayed by an application.

Although you don't really need to know a great deal of technical information to build a computer, you might be curious about the technical details that surround computers and the components that you're using. This technical information is usually formatted as a sidebar (in a separate box) to separate it from the stuff that you really *have* to know.

Introducing Colossus

Throughout this book, I recommend a number of specific components by brand and model number. If I were building my own PC at the time of this writing (and I actually do build this PC on the companion DVD), I'd pick these parts, and I'll always let you know why I chose them.



I should note, however, that time marches on, as does computer technology. The components I name in this edition will (of course) be supplanted soon enough with newer models, so make sure you check the manufacturer's Web site to see whether a new device with more features or better performance is available.

I named my dream PC *Colossus*, after the truly awesome sentient supercomputer that takes over the world in the cult 1970 film *Colossus: The Forbin Project*. (If you don't name your PC while building it, I strongly urge that you name it after it's completed. Consider it the human side of the assembly process!) This outstanding movie has a sizable following among techno-types. If you enjoy a good science fiction film about artificial intelligence, don't miss this flick.

Foolish Assumptions

Here's a friendly warning: You might run across one or two doubting Thomases when you announce that you're building your own PC. Those folks probably make lots of foolish assumptions about what's involved in building a PC, and you just might want to burst their bubble by telling them the following truths:

- ✓ You *don't* have to be a computer technician with years of training, and you don't need a workshop full of expensive tools. In this book, no assumptions are made about your previous knowledge of computers, the Internet, programming your DVD player, or long division.
- ✓ No experience? Don't let that stop you! I introduce you to each of the systems in your computer, what they do, and how you install them, including advanced technology that would make a technoid green with envy. (I can't fix spaghetti by myself, so you know that building a PC must be easier than it first appears!)

- ✓ Some people still think that you don't save a dime by building your own PC. If that's the case, why are there locally owned computer stores in your town building custom PCs? By assembling your own computer, you can save hundreds of dollars (and take advantage of used parts like a keyboard or modem from an older computer).
- ✓ Finally, some people might ask you what you plan to learn by building your own PC — and that's an easy one! By the time that you're finished, you'll be ready to add and upgrade parts yourself so that you'll save money in the future — and computer-repair techs will growl when you meet them.

Now that I've put those myths to rest, it's time for the good stuff!

How This Book Is Organized

I divided this book into five major parts, all made up of a number of chapters, and each chapter is further divided into sections. You'll find all the nasty acronyms and abbreviations, part names, and relevant items in the index; important topics and information that appear elsewhere in the book are cross referenced to make them easier to find. And do not overlook the companion DVD at the back of the book!

Part I: Preparations and Planning

In Part I, I introduce you to the tool (yes, only one tool) of the PC assembly trade (a screwdriver, which tells you how complex the hardware *really* is), what components make up a PC, and how they work together within your computer. You also determine what type of computer you should build by examining your current and future needs.

Part II: Assembling the Basics

In Part II, you assemble the required components to build a bare-bones PC — it won't play the latest 3-D shoot-'em-up game with all the visual bells and whistles, but it will have all the basic features that you need. You'll be able to load your choice of operating system after you finish this part.

Part III: Adding the Fun Stuff

In Part III, I cover the addition of hardware that makes a multimedia PC fun to use — such as a digital stereo sound card, a DVD drive, and a DSL/cable modem. After you've completed this part, you can use your new PC to access the Internet or watch a DVD movie while you work. Or you can finally play that latest 3-D shoot-'em-up game with every last audio-visual bell and whistle turned on.

Part IV: Advanced PC Options

In Part IV, I introduce you to advanced hardware that pumps up the performance of your PC, including home networking (both the wired and the wireless type), digital scanners, and USB devices. (If the acronyms sound like Egyptian hieroglyphics, read all about them here.) Not every computer owner needs the technology found in this part, but after you've read these chapters, you'll be familiar with the enhancements that you can add to create a power user's PC — including the ultimate gaming PC, which I cover in Chapter 14.

Part V: The Part of Tens

The four chapters in Part V are a quick reference of tips and advice on several topics related to the assembly of PCs. For example, you'll find a chapter devoted to potential problems.

Appendixes: About the DVD and the PC Builder's Glossary

Read about the companion DVD in the first Appendix. Then, the glossary lists all the computer components, terms, abbreviations, and acronyms you need to know about.

Icons Used in This Book

Some things that you encounter while building your PC are just too important to miss. To make sure that you see certain paragraphs, they're marked with one of the following icons.



These are important. Consider my maxims to be the stuff you'd highlight in a college textbook — these facts and recommendations would make a good tattoo because they're universal and timeless in scope. (You'll see!)



Information marked with this icon is the printed equivalent of those sticky notes that decorate the front of some PCs. You might already know this stuff, but a reminder never hurts.



The Tip icon makes it easy to spot information that will save you time and trouble (and sometimes even money).



As you can imagine, the Warning icon steers you clear of potential disaster. *Always* read the information under this icon first!

Where to Go from Here

Before you turn the page, grab yourself a pencil and some scratch paper for taking notes — or throw caution to the wind and write directly in the book. If you need help on a particular component, jump to the right chapter; if you need to start from the beginning, start with Part I. And check out the DVD if you want to see me install a component.



Enjoy yourself and *take your time*. Remember Mark's First Maxim of PC Assembly:

You're not running a race!™

(I told you that maxims were universal and timeless, didn't I?) Although the process of building your own PC might seem a little daunting now, it *really is* easy. Plus, nothing is more satisfying than using a computer that you built yourself or answering PC questions from friends and relatives because "you're the computer expert!"