Upgrading & Fixing Laptops FOR DUMMIES®

by Corey Sandler

Wiley Publishing, Inc.

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About the Author

Corey Sandler has written more than 150 books on personal computers, business topics, travel, and sports. A former Gannett Newspapers reporter and columnist, he also worked as an Associated Press correspondent covering business and political beats. One of the pioneers of personal computer journalism, he was an early writer for publications, including *Creative Computing.* He became the first executive editor of *PC Magazine* in 1982 at the start of that magazine's meteoric rise. He also was the founding editor of IDG's *Digital News.* He has appeared on the NBC's *Today Show,* CNN, ABC, National Public Radio's *Fresh Air,* dozens of local radio and television shows, and been the subject of many newspaper and magazine articles.

He lives with his family on Nantucket Island, off the coast of Massachusetts at the very end of the information superhighway. From his office window, when the fog clears, he can see the microwave tower that carries signals from his keyboard to the mainland 30 miles away.

He has lugged his laptop across the United States and around the world. Recent trips have seen him searching for and sometimes finding WiFi web connections and cell phone signals in Machu Picchu at 14,000 feet in the Peruvian Andes, in New Zealand, Australia, the Canadian Arctic, and in Svalbard, the northernmost inhabited territory of Europe, with the Arctic Circle at the edge of the North Pole ice pack.

He can be reached through his web site, www.econoguide.com.

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Introduction

We are not far from the time when a fully functional laptop computer will be a hair smaller and a gram lighter than the book you're holding in your hands. But we are still lifetimes away from the day when we no longer need a well-written and organized sheaf of printed pages to reveal how to get started and help us understand how to make the best use of high technology.

This book requires no power source other than the human mind. It will operate in any temperature and weather condition. And, I hope, it will help you fix things when they are broken and improve things when they are lagging.

I was present at the creation of the PC and I assisted at the birth of the first portable computer, which was about the size of a microwave and came with a long electrical extension cord. Since then I have worked my way through at least six generations and more than a dozen models of steadily lighter, smaller, faster, and better.

About This Book

First of all, this book sees the world through the eyes of a laptop owner. Laptops can do everything that a desktop PC can do, and in much the same way, but are built very differently.

The important difference is the construction. This book explores all sorts of ways to replace or upgrade components that slide into, connect to, or attach onto a modern laptop. You open hatches and compartments, too. But you will not open the sealed box that encases the motherboard and holds in place the LCD screen; that's not a job for Dummies. . .or even for most experts. It's too complex, too tight a working space, and usually not an economically sensible thing to do.

My goal is to give you news you can use, information that will help you fix problems, replace parts, and add external upgrades and workarounds. Laptop computers are not quite like the one-horse cart that Oliver Wendell Holmes memorialized in poetry; that wonderful one-hoss shay, built in such a logical way, ran 100 years to a day before all the pieces fell apart at the same time. Different components have differing life expectancies. Part of this book is a lesson in economics; does a broken machine stay or go?

Conventions Used in This Book

You're going to see some specific conventions regarding content. New words are italicized and explained. The right arrow in commands just separates the things you click. (For instance, "Choose Start➪Control Panel" means you click Start, then click Control Panel.) Finally, and most specifically, *disk* refers to a floppy disk or hard drive; *disc* refers to a CD or DVD.

What You're Not to Read

You don't have to read the book from page one straight through to the end, although I'm sure you'll end up as a better person for the experience. If you know what you're looking for, you can dive right in at the section that deals with the problem you need to fix or the part you want to upgrade. You can also skip stuff accompanied by a Technical Stuff icon.

Foolish Assumptions

You're smart. You're smart enough to own and use a laptop, and you're smart enough to know you can use some expert advice on its care and feeding. And you're also smart enough to know that laptops are not the same as a desktop PC. If a video card fails on a full-sized personal computer, you or the technosavvy teenage child of your Cousin Arthur can run down to the nearest computer store, buy a $29.95 replacement, remove a few screws on the PC case, and plug in the replacement. Not so with a laptop.

Windows in this book refers to Windows XP, which is at this moment Microsoft's latest and greatest operating system. If you are still using an older operating system — no older than Windows 98, Windows ME, or Windows 95 — you'll find that the commands and screens are similar enough that you can make adjustments to the text on your own.

How This Book Is Organized

This book is divided into six parts:

Part 1: Putting a Computer in Your Lap

Part I presents a field guide to the common laptop, telling you how to spot its important distinguishing characteristics and how to handle it with care.

Part II: Explaining What Could Possibly Go Wrong

Part II moves on to a meandering through the minefields. I offer some emergency fixes for common predicaments and some words of wisdom about how to decide whether a major repair makes economic sense or whether it is time to go shopping for a new laptop.

Part III: Laying Hands on the Major Parts

Part III delves deeper into the soul of the machine, with a tour of the memory, BIOS, and the motherboard and instructions on how to use facilities of Windows to check on their status, perform troubleshooting, and make critical adjustments. I also go inside peripherals, giving the information you need to know about disk drives (hard, floppy, and CD/DVD), the keyboard, pointing devices, and the LCD display.

Part IV: Failing to Communicate

Part IV presents the essentials of communication, an increasingly important part of the laptop experience. I'll show you how to break out of the box with wired and wireless networks, modems, and ports (including USB, FireWire, PC Card, and serial) that connect to external devices.

Part V: The Software Side of Life

Part V explores the software side of life, including the operating system and applications.

Part VI: The Part of Tens

Part VI is the world-renowned and endearing "Part of Tens" for Dummies. You'll find lists of problems, cures, and some of my favorite laptop things.

Icons Used in This Book

Here's the sort of guy I am: If you ask me for a cold beer, I might start in on an explanation of Bernoulli's Principle and how a refrigerator is related to the aerodynamics of a Boeing 757. I love this stuff; you can stop and learn all sorts of useless technical stuff or you can use your random access eyeballs to skip to the Tips, Remembers, and Warnings.

Here you'll find smart shortcuts, clever workarounds, and cool ideas that come from years of practice, experience, and gigantic blunders made by the author, his friends, and kind strangers.

This is, of course, something you shouldn't forget. It's important enough to get its own icon.

Be careful out there. Failure to read these warnings could invalidate the author's warranty.

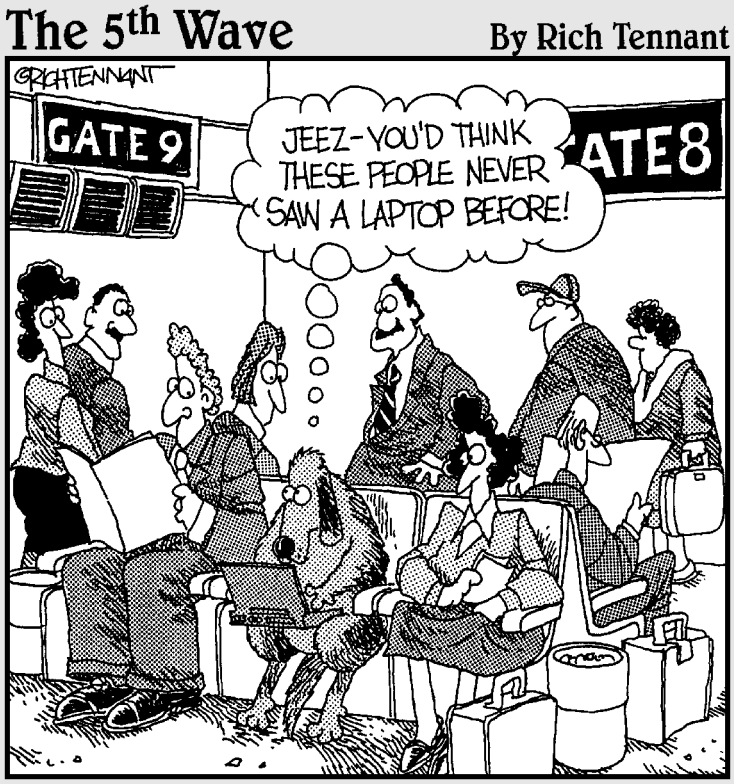
Where to Go from Here

For some of you, the best advice is to go to where the problem is: This book is organized by component and subsystem. If the hard drive is not spinning, go to the section about hard drives; that's not so difficult, right?

If all is well and you're just the inquisitive type, good on you. Read the book in any order that interests you and remember the old Boy Scout promise: Be prepared. (Works for girls, men, and women, too.)

Part I

Putting a Computer in Your Lap



In this part . . .

All laptops are computers, but not all computers are laptops. Size matters. Though the basic design of a PC applies to each, when it comes to laptop/notebook/portable devices, know the important differences: Don't drop them, don't let them get wet, and don't expect to easily plug in new internal parts.

This part of the book begins with an up-close tour of laptop design. By definition, a laptop is smaller, lighter, and tougher than a desktop machine. And it must be able to be unplugged from the wall and moved: to other desks, to cramped seatback trays on airliners, to factory floors, to classrooms, and all manner of places of convenience and peril. After the tour you explore ways and means to keep your machine in good working health.

Chapter 1

Fielding the Guide to the Common Laptop

In this chapter

- Taking the measure of a laptop computer
- Powering up for portable computing
- Viewing your work and pointing at words and icons

A laptop is just like a desktop computer, except that it has to be

- Smaller
- Lighter
- Tougher
- Much less demanding of electrical power

It also has to include

- A high-capacity, relatively lightweight battery that can be recharged over and over again
- A built-in high-resolution flat LCD color display
- An easy-to-use but unobtrusive mouse, trackball, or other pointing device

That's not too much to ask, is it? Actually, it's quite a lot — quite a lot in a very small package.

Calling Them Anything but Late for Supper

Way, way back in the ancient history of personal computers, when I was the first executive editor of *PC Magazine,* the high-tech world was stunned at the arrival of a class of suitcase-sized computers that came with a small built-in CRT monitor, a handle on top, and a long electrical cord. They were called "portable" computers and they were portable — in the same way that you can move a television set from room to room. We preferred to call them "luggable" or "transportable" computers. Later on, the first battery-powered computers using monochrome and later color LCD screens arrived; they were called *laptop computers.* Some assumed that the user had a rather ample laptop and they (the computer, not the users) barely fit on an airplane's seatback table.

As internal components became smaller, lighter, and more tightly packed together, manufacturers coined the term *notebook computer* to indicate a machine with roughly the dimensions of a thick pad of letter-sized paper. Over time, the difference in size between laptops and notebooks became a matter of no more than an inch or two in length and width, and a fraction of an inch in thickness. Today, users can choose to pay more for a machine with a larger LCD display or one that weighs a pound or two less.

In this book I use the terms *laptop* and *notebook computer* interchangeably. As far as I'm concerned, it's a distinction without a difference.

Smaller but mighty

Why is smaller better than larger? Here's the most common reason: "The captain has illuminated the seatbelt sign as we prepare for landing. Please place your seatback and tray table in the upright position and stow all personal items beneath the seat in front of you." Or, you may want a notebook computer that you can bring with you to college classes or research libraries. And some users just like the compactness of an all-in-one PC that can be used in the den, the kitchen, and occasional excursions into the living room to show DVDs.

The length and width of a laptop may have reached its minimum size because of the need to offer a full-size keyboard and the desire of most users for a large display. The smallest of the small are just a bit larger than a sheet of office paper: about 11.5 inches wide by 8.5 inches deep. Laptops with the largest LCD screens are about 14 inches wide and 10 inches deep.

The thickness of the laptop may make a difference to some when it comes to slipping it into a handsome leather briefcase or a cushioned shoulder bag. The thinnest of the thin are as little as 1.3 inches thick.

Buy the numbers

IDC, which counts laptops and most everything else electronic and sells information back to the industry, ranks HP/Compaq and Dell Computers neck-and-neck in market share. In 2004, the two companies between them sold just under 50 percent of all notebook computers worldwide. In third place was Toshiba with about 12 percent of the market, followed by IBM with about 9 percent. Apple, which marches to its own drummer in technology and operating system, had about a 5-percent share; Sony also had about 5 percent of the market, and Gateway about 3 percent. Other companies held onto pieces of the remaining 20 percent of market share.

Lighter than a feather

Placed on a desk or on the floor, the weight of your computer is not much of an issue. A full-featured tower computer can weigh 30 to 40 pounds, and an accompanying monitor another 30 pounds . . . but once they are installed they just sit there.

But, of course, the whole reason behind a laptop or notebook computer is *portability*, whether it is a matter of moving the machine from one room to the next or running down the seemingly endless corridors of O'Hare Airport to catch the 4:55 flight to LA.

Over the years, makers of laptop computers have been engaged in a frenetic weight loss program, shedding pounds, then ounces, and now every possible gram. Just a few years ago, a 12-pound laptop was considered a lightweight champion; today's hottest svelte models can weigh in at as little as 4 pounds.

The more you travel with a laptop, the more your shoulders, arms, and back will appreciate the missing pounds. The biggest gains (or should I say losses) have come in slimmed-down hard drives, batteries, and the computer case itself.

Tougher than nails

A desktop or tower computer doesn't get moved from place to place very often, and when it does change location it is almost always turned off and carefully handled while in transit.

It's just the opposite for a laptop. By design, these devices are meant to be transported and are often powered up and running while they are moved. If my personal laptop had an odometer on it, I estimate it would show several

hundred thousand miles by road, train, plane, cruise ship, and ferry boat to and from Europe, Asia, and every corner of the U.S. Truth be told, I've dropped the carrying case a few times and the computer itself has slid off several seat-back tables in its life. But it keeps on ticking. Why? Because it was designed for such a life.

A well-made laptop includes a sturdy case that shields the LCD and the internal motherboard from damage, and a hard disk drive with components that are capable of withstanding a reasonable amount of jolting and jostling.

Some makers protect the integrity of the notebook with internal braces, cushioning, and other design elements. And then there are the highest-tech solutions, including IBM's Active Protection System which includes a motion sensor that continuously monitors the movement of some of the company's ThinkPad notebooks; if the sensor detects a sudden change in direction—like the start of a tumble toward the floor—it can temporarily stop the motion of the hard drive and park its sensitive read-write heads within 500 milliseconds (which you and I might better understand as half a second.)

A well-made laptop also includes a carefully designed power supply and electrical components able to deal with a reasonable range of fluctuations in voltage. (Most modern laptops are able to automatically switch between wall current of about 110 volts as supplied in the United States, Canada, and a few other parts of the world, or 220 volts as you will find in Europe, Asia, and most everywhere else.)

Thinking like a Troubleshooter

When something doesn't seem quite right with your laptop, or if it flat-out refuses to compute, the first thing to do is to ask yourself this critical question: What has changed since the last time the machine worked properly?

Did you add a piece of software or make a change (an update, perhaps) to the operating system? Not all improvements leave the laptop in better shape than it was before you "fixed" it. Did you add new hardware, or a software *driver* to identify the component to the system? Computer techies invented a wonderfully dweebish word for this sort of situation: They'll suggest you *uninstall* something you installed and see if the machine works properly. Did you drop the machine, spill a gallon of lemonade on the keyboard, or run the laptop through an airport X-ray machine 877 times in a row? You may have some physical damage to repair.

I cover each of these situations, and many more, in the sections of this book.

Making a High-tech Power Play

Over the history of laptops, designers have been pulled in two directions:

- Machines with faster and faster processing speeds, more and more memory, higher-speed hard drives, CD and DVD drives, and bigger and brighter LCD screens. All of these require bits and pieces of the stored electricity in a laptop's battery.
- Requirements by users that their machines run for hours between recharges.

The solutions to this push-and-pull problem have included great advancements in the capacity of batteries and tremendous reductions in the consumption of electricity. On the battery side the solution did involve larger and heavier cells; modern batteries are lighter and smaller than ever.

Demanding less power

On the demand side, the newest class of processors including the Intel Pentium M are designed to take less energy to operate and to automatically step down their speed and power requirements whenever possible. Tight integration of chipsets on the motherboard also reduces power demand, and the chipsets themselves include sophisticated circuits that can reduce power consumption when possible and put the laptop into a sleep mode if nothing is going on at the moment.

Think about the life of a computer: Unless you are managing something extremely complex and doing it in real time — like controlling your personal space shuttle or calculating hundred-digit prime numbers, most of the time your machine is using just a small portion of its power. For example, while I'm writing this sentence, Microsoft Word is requiring only about 4 percent of the attention of my magnificent Pentium 4 processor. When I stop to admire the previous sentence, CPU usage drops to close to zero.

If you want to check the performance of your machine, go to the Windows Task Manager of Windows XP or Windows 98 by clicking the Ctrl+Alt+Del key combination and then selecting the Performance tab. CPU usage is displayed. See Figure 1-1 for a sample reading from a modern laptop; at the moment I took that screen shot, there was a streaming video image from a baseball game coming over the Internet, the laptop's WiFi adapter was searching for a connection, and the system's antivirus and system monitor utilities were active.

WiFi, about which you read a great deal more in Chapter 14, is the most common form of wireless communication used by laptops. WiFi, as well as wired networks, make a large demand on the system's microprocessor and other components. When they work well, everything is just peachy; when there's a problem with communication, it can spread like melted chocolate throughout your machine, slowing everything down to a sticky crawl.

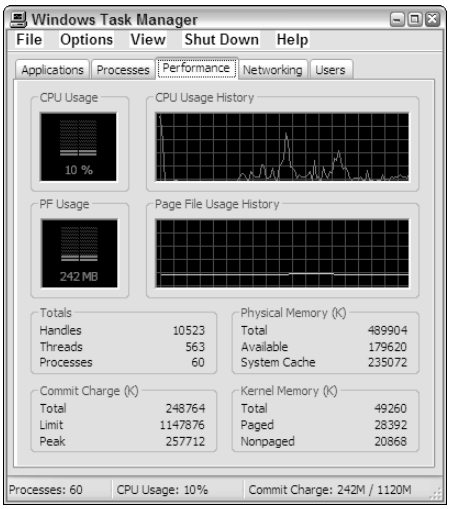


Figure 1-1: A performance report from a laptop under a moderate load. The CPU is lightly loaded and the system has plenty of working room available.

On a desktop machine, the difference between a hard-working processor and a more efficient system costs a few hundredths of a penny more per minute in operations, but the bucket of power is kept full by the plug that leads to the wall socket. On a laptop, though, every electron drawn from the battery is gone from the bucket until you get the chance to recharge.

Packing battery power

You don't have to be a molecular scientist to come up with the specifications for the ideal laptop battery: It should be as small and lightweight as possible, be able to accept and hold enough power to allow use for several hours or more (many business people define acceptable battery life as six hours or a coast-to-coast airline flight, whichever ends first), and be rechargeable dozens or hundreds of times before giving up the ghost.

The most common technology for laptop computers today uses a lithium ion solution; it replaced an earlier design based on nickel metal hydride (NiMH). Lithium batteries weigh less, which is good, and do not suffer from *memory*

effect like NiMH units; that doesn't mean that the older batteries would know you by name — it means that they used to lose their ability to accept a full charge if they were recharged before they were fully drained.

Lithium ion batteries act more or less the same throughout their entire lives, and then just die. Running the display at its brightest, with no provisions for auto-dim or hibernation, depletes the battery much faster than other settings.

Many laptop manufacturers provide a power management utility that allows you to make settings that adjust screen brightness, hibernation times, and even the speed of certain classes of microprocessors to allow users to eke out every last drop of power from a battery. On most utilities you can also set audible or on-screen alarms for low power and instruct the system how you want it to act if the battery reaches a critically weak level. An example of a Toshiba utility is shown in Figure 1-2, along with a detailed report on the battery in use; a handful of laptops allow users to install a second battery in an internal bay.

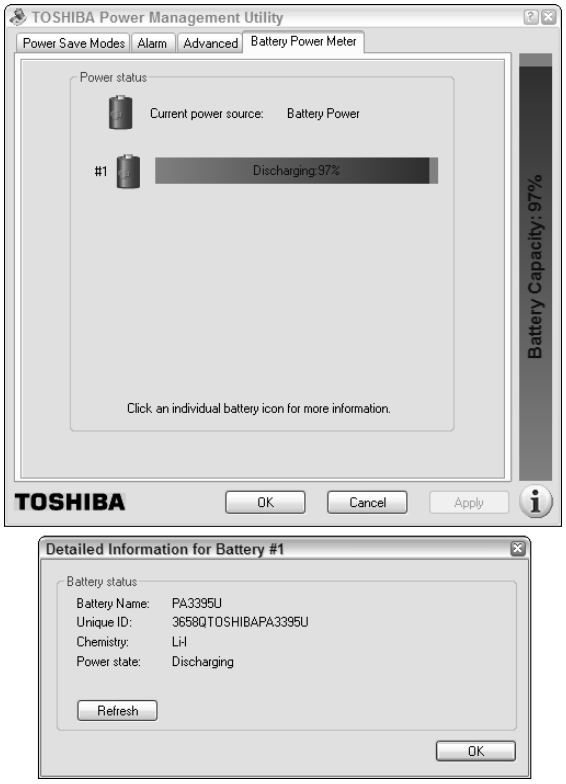


Figure 1-2: A power management utility permits adjustments in the way a laptop uses the battery.

Viewing with Clarity, Pointing with Precision

Okay, I admit it: I'm not just an author, I'm a technogeek. I bought one of the very first IBM PCs (paying nearly $4,000 for something that would not compare very well today to the processing power of my cell phone). And I also owned several of the very first luggable, then portable, computers. One of the first true laptops I worked with was an Epson PX-8, which was blessed with a very dim 8-line monochrome screen. It was capable of displaying text only, in one size and yes, all I could look at was eight lines of text at a time. But in 1983 this machine was the bee's knees; I wrote several books on my daily rail commute to work.

Consider now a high-end notebook of 2006. You could buy a machine with a 17-inch color display with resolution as high as 1,440 × 900 pixels, or a slightly smaller but sharper 15.4-inch display with 1,920 × 1,200 resolution. And you'd pay hundreds or even thousands of dollars *less* for the privilege.

I explain more about resolution a bit later in the book, but here's the bottom line: More is better. As far as screen size: Bigger is more beautiful and may be easier to read, but a laptop with an oversized screen can be very inconvenient to use on a seatback tray in airliner and in general is that much more difficult to move from place to place.

One of the breakthroughs of Microsoft Windows was the use of a mouse and a graphical user interface, allowing you to have the feeling of reaching into the screen to pick up and move objects and to issue commands by clicking. (Yes, I am aware Apple Computers beat them to the punch with the innovative but unlamented Lisa and then the Macintosh, but the idea actually goes back even further to research at Xerox Palo Alto Research Center and even before then to the Stanford Research Institute.)

And actually, my first experience with a pointing device was Miss Frank's three-foot-long varnished oak stick, which she used to specify pictures on the corkboard, show examples of cursive writing on the blackboard, and rap my knuckles when my head would droop forward. The only electrical presentation and educational tools in my ancient grade school were a record player, a filmstrip projector, and a creaky 16mm film projector. (And yes, I admit it: I was on the AV squad.)

We've progressed from mice to other devices, which are generically called *pointing devices:* trackballs, joysticks, tracking sticks, and touch pads among them. Laptop designers have done a good job of integrating a pointing device into the keyboard or beneath the thumbs in front of the spacebar. You can also purchase an add-on mini-mouse or use a full-size pointing device that connects to one of the laptop's ports.