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Mac and PC
versions

ABSOLUTE BEGINNER'S GUIDE

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Paul McFedries

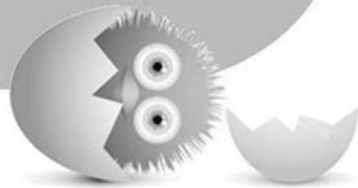
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Fixing Your Computer

**ABSOLUTE
BEGINNER'S
GUIDE**



Paul McFedries

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800 East 96th Street,
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Fixing Your Computer Absolute Beginner's Guide

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About the Author

Paul McFedries is full-time technical writer and passionate computer tinkerer. He is the author of more than 80 computer books that have sold more than four million copies worldwide. His recent titles include the Sams Publishing books *Windows 7 Unleashed* and *Windows Home Server 2011 Unleashed*, and the Que Publishing books *PCs for Grownups*, *Windows 8 In Depth* (coauthored with Brian Knittel), *Formulas and Functions with Microsoft Excel 2013*, and *My Office 2013 RT*. Paul is also the proprietor of Word Spy (www.wordspy.com), a website devoted to tracking new words and phrases as they enter the English language. Paul's web home is at www.mcfedries.com, and he can be followed on Twitter at twitter.com/paulmcf and twitter.com/wordspy.

Dedication

For Karen

Acknowledgments

In this book you learn that with a bit of know-how, a modicum of patience, and perhaps a screwdriver or two, you can repair a PC all by yourself. This makes repairing a computer a lot different from publishing a book. Oh, sure, I wrote this book all by myself, but the finished product you're reading now was a group effort, no doubt about it. For proof, go back a bit and read the credits page, which lists everyone who had a finger in this particular publishing pie, and I thank them all for doing such a good job on this book. Some of those people I worked with directly, so I'd like to take a second to thank them personally. Rick "Two Hats" Kughen was both the book's acquisitions editor and its development editor, and I'm mighty glad on both counts because this book was a hoot to write, and Rick's editorial direction and suggestions were right on the money and made this book many notches better than it would have been otherwise. Seth Kerney was the book's amazingly competent and organized project editor. Chuck Hutchinson was the book's copy editor, and besides dotting my i's and crossing my t's, Chuck gave the book a consistent style and tone, which requires concentration, confidence, and an eagle eye. Karen Weinstein was the book's technical editor, and I continue to be amazed at just how much Karen knows about almost all aspects of computing. Her experience and insights were very much welcome in this book. Finally, I'd be sorely remiss if I didn't also single out Karen Hammond, who took the wonderful photographs you see throughout this book.

We Want to Hear from You!

As the reader of this book, you are our most important critic and commentator. We value your opinion and want to know what we're doing right, what we could do better, what areas you'd like to see us publish in, and any other words of wisdom you're willing to pass our way.

We welcome your comments. You can email or write to let us know what you did or didn't like about this book—as well as what we can do to make our books better.

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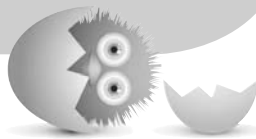
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INTRODUCTION



One of the hallmarks of our age is the decline of the do-it-yourselfer in favor of the hire-an-expert-to-do-it-instead. Toilet not flushing? Hire a plumber. Porch falling down? Hire a carpenter. Lights on the blink? Hire an electrician. You could argue, as many people have done, that a return to a DIY ethos would be good for society and good for the soul. The reality is that most of us don't have enough knowledge, skills, or time to repair a toilet, rebuild a porch, or replace a light switch without seriously electrocuting ourselves.

However, I would argue that one area where we almost always do *not* need to hire an expert is the digital domain of the PC. That statement might strike you as a tad crazy. After all, what could be more complicated, heck more *intimidating*, than a PC and all its mysterious electronics? Yes, it's certainly true that a typical PC is a head-scratchingly complex collection of transistors, chips, and diodes, a kind of Rube Goldberg machine for the digital age. But it's also true that when a PC fails in some way, it almost always fails in a relatively *simple* way. Most PC problems are solved just by tweaking a setting, updating some software, or by merely rebooting the computer! Other problems require replacing parts, but this is a task that's easily learned by any curious and motivated beginner.

I'm talking, of course, about *you*. Learning how to fix your PC is fun and nowhere as hard as you might think, for three reasons:

- All the parts you need—the power supply, memory, hard drive, expansion cards, and so on—are readily available online or from big-box retailers or electronics stores.
- All the tools you need—really not much more than a screwdriver or two—are part of most people's toolkits or can be easily obtained.
- All the techniques you need—inserting chips and cards, connecting cables, and tightening screws—are simple and straightforward.

Add to this the simple fact that repairing your own PC is better than hiring someone else to do it because it's cheaper, faster, and you get an empowering sense of ownership and accomplishment. Besides, repairing your own PC is both educational and just plain fun, so it's no wonder that so many people nowadays are going (or would like to go) the fix-it-yourself route.

FIY: Fix-It-Yourself

Welcome, then, to *Fixing Your Computer Absolute Beginner's Guide*, the book that will be your guide on this fix-it-yourself path. This book shows you everything you need to know to maintain, upgrade, and repair a PC. Even if you've never looked inside a computer and wouldn't know a motherboard from an expansion board or a CPU from a GPU, this book gives you the know-how and confidence to fix a PC with your bare hands.

To that end, the first part of the book shows you a few useful PC maintenance chores and techniques. You learn how to maintain the PC hardware (Chapter 1), maintain Windows (Chapter 2), and prepare your PC for any trouble that might come down the road (Chapter 3).

The second part of the book switches to troubleshooting and repair mode, where you learn some usefully universal troubleshooting techniques (Chapter 4), how to troubleshoot your PC's hardware (Chapter 5), how to recover from problems (Chapter 6), and how to get your network back up and running (Chapter 7).

Finally, the third part of the book lets you get your hands dirty (metaphorically speaking) by taking you through a number of PC upgrade and repair projects. After first showing you some basic repair skills (Chapter 8) and how to buy PC parts (Chapter 9), you learn how to upgrade or replace the power supply (Chapter 10), the hard drive (Chapter 11), the CD or DVD drive (Chapter 12), the memory (Chapter 13), the video card and monitor (Chapter 14), the sound system (Chapter 15), the processor (Chapter 16), the laptop battery (Chapter 17), and the network (Chapter 18).

Who Should Read This Book?

This book is aimed at budding PC fixer-uppers who want to try their hand at repairing a broken PC and at upgrading a PC to get more life or performance out of it. This book should also appeal to people who have tried other books in the same field, only to find them too intimidating, too simplistic, or too cutesy.

To that end, this book includes the following features:

- Buyer's guides that enable you to make smart and informed choices when purchasing hardware
- Easy-to-follow explanations of key concepts
- Extensive use of clear and detailed photos to illustrate hardware and all fixing and upgrading techniques
- Tips, tricks, and shortcuts to make fixing and upgrading a PC easier and faster
- A friendly and lightly humorous tone that I hope will help you feel at home with the subject and keep boredom at bay

Conventions Used in This Book

To make your life easier, this book includes various features and conventions that help you get the most out of this book and out of fixing a PC:

Steps	Throughout the book, I've broken many building, upgrading, and repairing tasks into easy-to-follow step-by-step procedures.
Things you type	Whenever I suggest that you type something, what you type appears in a bold monospace font.
Filenames, folder names, and code	These things appear in a <code>monospace</code> font.
Commands	Commands and their syntax use the bold font.
Pull-down menu commands	I use the following style for all application menu commands: <i>Menu, Command</i> , where <i>Menu</i> is the name of the menu you pull down and <i>Command</i> is the name of the command you select. Here's an example: File, Open. This means you pull down the File menu and select the Open command.

This book also uses the following boxes to draw your attention to important (or merely interesting) information:



NOTE The Note box presents asides that give you more information about the current topic. These tidbits provide extra insights that offer a better understanding of the task.



TIP The Tip box tells you about methods that are easier, faster, or more efficient than the standard methods.

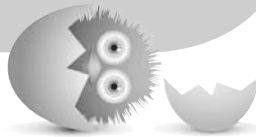


CAUTION The all-important Caution box tells you about potential accidents waiting to happen. There are always ways to mess things up when you're working with computers. These boxes help you avoid those traps and pitfalls.

IN THIS CHAPTER

- Solving device dilemmas with Device Manager
- Getting your head around device drivers
- Learning the fine art of locating device drivers on the Web
- Troubleshooting hardware problems by updating device drivers
- Troubleshooting *new* hardware problems by rolling back a device driver update

5



TROUBLESHOOTING DEVICE PROBLEMS

If you buy Windows-friendly devices, you should have a mostly trouble-free computing experience. Of course, *mostly* doesn't mean *completely* because hardware is not foolproof—far from it. Things still can, and will, go wrong, and when they do, you'll need to perform some kind of troubleshooting. (Assuming, of course, that the device doesn't have a physical fault that requires a trip to the repair shop.) Fortunately, Windows also has some handy tools to help you both identify and rectify hardware ills.

Troubleshooting with Device Manager

Device Manager (press Windows Logo+X and then click Device Manager) not only provides you with a comprehensive summary of your system's hardware data, but also doubles as a decent troubleshooting tool. To see what I mean, first start Device Manager:

- **Windows 8**—Press Windows Logo+X and then click Device Manager.
- **Windows 7 and Vista**—Select Start, type **device**, and then click Device Manager in the search results.
- **Windows XP**—Select Start, right-click My Computer, click Properties, click the Hardware tab, and then click Device Manager.

Check out the Device Manager window shown in Figure 5.1. See how the Other Devices branch has an Unknown Device item that has an exclamation mark superimposed on its icon? This icon tells you that there's a problem with the device.

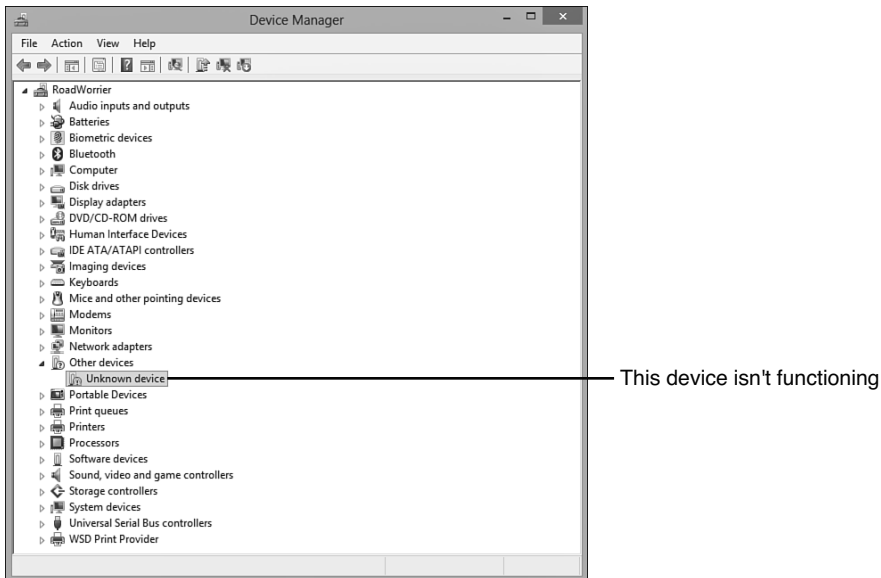


FIGURE 5.1

The Device Manager uses icons to warn you there's a problem with a device.

If you double-click the problem device to open its properties, as shown in Figure 5.2, the Device Status area tells you a bit more about what's wrong. As you can see in Figure 5.2, the problem here is that the device drivers aren't installed.

Device Manager usually offers a suggested remedy (such as the Update Driver button shown in Figure 5.2).

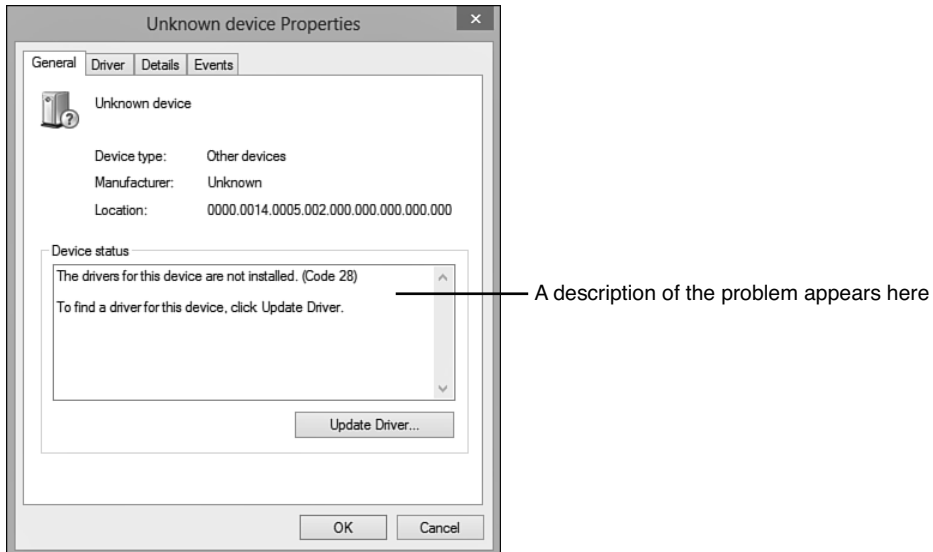


FIGURE 5.2

The Device Status area tells you if the device isn't working properly.

Device Manager uses three different icons to give you an indication of the device's current status:

- A black exclamation mark (!) on a yellow field tells you that there's a problem with the device.
- A red X tells you that the device is disabled or missing.
- A blue *i* on a white field tells you that the device's Use Automatic Settings check box (on the Resources tab) is deactivated and that at least one of the device's resources was selected manually. Note that the device might be working just fine, so this icon doesn't indicate a problem. If the device isn't working properly, however, the manual setting might be the cause.

If your system flags a device, but you don't notice any problems, you can usually get away with just ignoring the flag. I've seen lots of systems that run perfectly well with flagged devices, so this falls under the "If it ain't broke..." school of troubleshooting. The danger here is that tweaking your system to try to get rid of the flag can cause other—usually more serious—problems.

Troubleshooting Device Driver Problems

Device drivers are small chunks of software that Windows uses to contact and control (that is, “drive”) your PC’s hardware. As the middlemen brokering the dialogue between Windows and our devices, these complex bits of code perform a crucial task. After all, unleashing the full potential of your system is just not possible unless the hardware and the operating system coexist harmoniously and optimally.

Other than problems with the hardware itself, device drivers are the cause of most device woes. This is true even if your device doesn’t have one of the problem icons mentioned in the preceding section. That is, if you open the device’s properties sheet, Windows might tell you that the device is “working properly,” but all that means is that Windows can establish a simple communications channel with the device. So if your device isn’t working right, but Windows says otherwise, suspect a driver problem.

Basic Device Driver Troubleshooting

Here are a few basic techniques for correcting device driver problems:

- **Reinstall the driver**—A driver might be malfunctioning because one or more of its files have become corrupted. You can usually solve this problem by reinstalling the driver. Just in case a disk fault caused the corruption, you should check the hard drive where the driver is installed (usually drive C) for errors before reinstalling.
- To learn more about hard disk error checking, **see** “Dealing with Hard Disk Errors,” **p. 17**
- **Upgrade to a signed driver**—*Unsigned* drivers—that is, device drivers that don’t come with a security signature from Microsoft that verifies the drivers are safe to install—are accidents waiting for a place to happen in Windows, so you should upgrade to a signed driver, if possible. How can you tell whether an installed driver is unsigned? In Device Manager, double-click the device to open its Properties dialog box and then display the Driver tab. Signed driver files display a name (such as “Microsoft Windows”) beside the Digital Signer label (see Figure 5.3), whereas unsigned drivers display “Not digitally signed” instead.

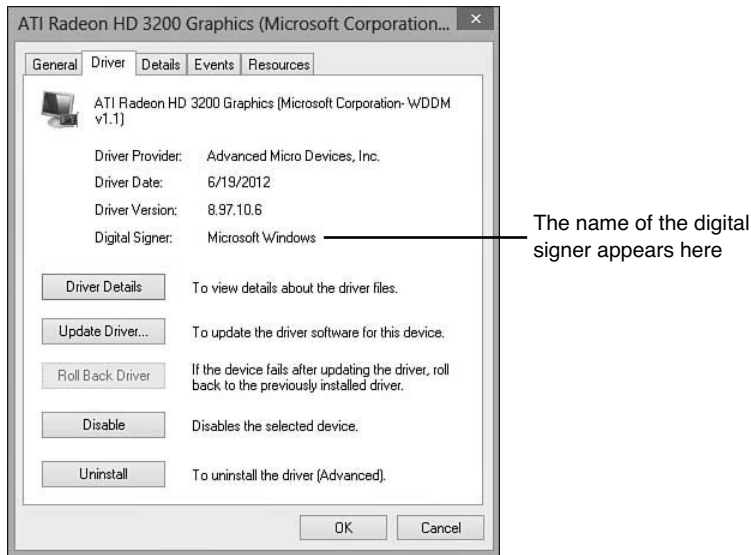


FIGURE 5.3

In the Driver tab, the Digital Signer label tells you whether the device driver is signed.

- **Disable an unsigned driver**—If an unsigned driver is causing system instability and you can't upgrade the driver, try disabling it. In Device Manager, double-click the device to open its Properties dialog box, click the Driver tab, and then click Disable.
- **Try the manufacturer's driver supplied with the device**—If the device came with its own driver (say, on a CD or DVD), either try updating the driver to the manufacturer's (see "Updating a Device Driver," later in this chapter) or try running the device's setup program from the disc.
- **Download the latest driver from the manufacturer**—Device manufacturers often update drivers to fix bugs, add new features, and tweak performance. Go to the manufacturer's website to see whether an updated driver is available. See "Tips for Downloading Device Drivers," next, for more info.
- **Roll back a driver.** If the device stops working properly after you update the driver, try rolling it back to the old driver as described a bit later in the "Rolling Back a Device Driver" section.

Tips for Downloading Device Drivers

Finding device drivers on the Web is an art in itself. I can't tell you how much of my life I've wasted rooting around manufacturer websites trying to locate a device driver. Most hardware vendor sites seem to be optimized for sales rather than service, so although you can purchase, say, a new printer with just a mouse click or two, downloading a new driver for that printer can take a frustratingly long time. To help you avoid such frustration, here are some tips from our hard-won experience:

- If the manufacturer offers different sites for different locations (such as different countries), always use the company's "home" site. Most mirror sites aren't true mirrors, and (Murphy's law still being in effect) it's usually the driver you're looking for that a mirror site is missing.
- The temptation when you first enter a site is to use the search feature to find what you want. This works only sporadically for drivers, and the site search engines almost always return marketing or sales material first.
- Instead of the search engine, look for an area of the site dedicated to driver downloads. The good sites will have links to areas called Downloads or Drivers, but it's far more common to have to go through a Support or Customer Service area first.
- Don't try to take any shortcuts to where you *think* the driver might be hiding. Trudge through each step the site provides. For example, it's common to have to select an overall driver category, then a device category, then a line category, and then the specific model you have. This is tedious, but it almost always gets you where you want to go.
- If the site is particularly ornery, the preceding method might not lead you to your device. In that case, try the search engine. Note that device drivers seem to be particularly poorly indexed, so you might have to try lots of search text variations. One thing that usually works is searching for the exact filename. How can you possibly know that? A method that often works for me is to use Google (www.google.com), Google Groups (groups.google.com), or some other web search engine to search for the driver. Chances are, someone else has looked for your file and will have the filename (or, if you're really lucky, a direct link to the driver on the manufacturer's site).
- When you get to the device's download page, be careful which file you choose. Make sure it's designed for your version of Windows, and make sure you're not downloading a utility program or some other nondriver file.
- When you finally get to download the file, be sure to save it to your computer rather than opening it. If you reformat your system or move the device to

another computer, you'll be glad you have a local copy of the driver so that you don't have to wrestle with the whole download rigmarole all over again.

Updating a Device Driver

As I mentioned earlier, one of basic troubleshooting techniques for hardware troubles is to update the device's driver to either the version that comes on a disc that shipped with the device, or a version that you downloaded from the manufacturer's website. Either way, follow these steps to update a device driver:

1. If you have a disc with the updated driver, insert it. If you downloaded the driver from the Internet, decompress the driver file, if necessary (which generally means double-clicking the file).
2. Open Device Manager as described earlier in this chapter.
3. Click the device you want to work with.
4. Select Action, Update Driver Software. (You can also click the Update Driver Software button in the toolbar or double-click the device, display the Driver tab, and click Update Driver.) The Update Driver Software Wizard appears.
5. You have two choices:
 - **Search Automatically for Updated Driver Software**—Click this option to have Windows check Windows Updates for the driver.
 - **Browse My Computer for Driver Software**—Click this option if you have a local device driver, whether on a disc or in a downloaded file. In the dialog box that appears, click Browse and then select the location of the device driver.



NOTE If your driver download comes packaged in a setup file, it's almost always best just to launch the setup file and let it perform the update for you.

Rolling Back a Device Driver

It's an unfortunate fact of computing life that sometimes the attempts we make at fixing a problem only lead to worse or different problems. Sigh. So if you updated a device driver as described in the previous section but that has only made things worse in some way, not to worry. Windows has tools that let you easily *roll back* the driver update, which means it reverts to using the previous device driver.

You have two ways to fix things:

- If updating the driver was the last action you performed on the system, restore the system to the most recent restore point.
- To learn how to restore your system, **see** "Recovering Using System Restore," **p. 95**
- If you've updated other things on the system in the meantime, a restore point might cause you to lose updates you want to keep. In that case, you need to roll back just the device driver that's causing problems.

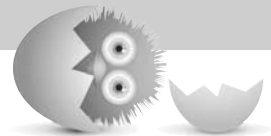
Follow these steps to roll back a device driver:

1. Run Device Manager as described earlier in this chapter.
2. Double-click the device to open its Properties dialog box.
3. Display the Driver tab.
4. Click Roll Back Driver and then click OK.

THE ABSOLUTE MINIMUM

This chapter continued your troubleshooting tour by looking at a few tools and techniques that you can use to get wonky devices back on their digital feet. Here are the highlights:

- Device Manager is the Windows troubleshooting tool of choice.
- In Device Manager's list of devices, look for a black exclamation mark (!) on a yellow field, which tells you that there's a problem with the device. Alternatively, a red X tells you that the device is disabled or missing.
- A device driver is a cute, little bundle of software that enables Windows and a device to communicate with each other.
- An unsigned device driver is one that doesn't come with a security certificate from Microsoft that verifies the driver is safe to install. Ideally, you should upgrade any unsigned drivers to signed versions.
- Device driver troubleshooting step #1: Reinstall the driver that came with the device.
- Device driver troubleshooting step #2: Update the driver to the one on the disc that came with the device.
- Device driver troubleshooting step #3: Download the latest version of the driver from the manufacturer's website and then update the driver to this new version.
- If the driver update causes more problems, roll it back either by using System Restore or by using the Roll Back Driver command in Device Manager.



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