"This book gives valuable knowledge on home recording for beginners or music professionals"

Joe Vitale Jr.
Digital Engineer for Stephen Stills
www.joevitalejr.com

The Complete HOME MUSIC RECORDING Starter Kit

Create Quality Home Recordings on a Budget!

SONY
CREATIVE SOFTWARE

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Buster Fayte

The Complete Home Music Recording Starter Kit: Create Quality Home Recordings on a Budget!

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Introduction

Want to set up a home studio so you can record fantastic-sounding music? Of course, you do! This book shows you how. No nonsense. No mind-numbingly technical concepts. No kidding.

But first let me step back a moment and paint a picture so you can determine whether you really need this book. Has this ever happened to you?

You want to record your music. You want to set up in your spare room or basement, so you start down the road to outfitting a home studio.

After a prolonged period of confusion during which you have no solid idea of where or how to start, you begin to look for answers. Every book you read, every website you visit, every salesperson you talk to barrages you with a dizzying array of options. And the price tag climbs. Specialized microphones (and several of them), equalizers, reverb units, fancy mixers, sound insulation, acoustical wall treatments…and the price tag climbs.

Then the technical jargon hits. Acoustical theories, signal-to-noise ratios, the logarithmic decibel scale—all of it leaves you confused and uncertain, and still the price tag climbs.

Soon the apparent complexity of what you need to learn overwhelms you, and the cost of what you're told you need to buy leaves the upper limit of your budget looking like a tiny dot in your rearview mirror. So you put your dreams on hold yet again. If you're lucky, you haven't spent much already. But probably you have. So you have a little more gear (though still not enough) and a lot less money. What you definitely do not have is a home studio capable of doing high-quality work. "Someday," you say, "someday…".

The Accessibility of Modern Recording Methods

If that story sounds sadly familiar, you've grabbed the right book! I've been there. In fact, I struggled in that frustrating cycle for years, scratching out substandard quality recordings as best I could with the gear I could beg, borrow, or (oh so rarely) buy. Don't get me wrong; I enjoyed every minute of every recording I've made over the years. But it sure would have been nice to end up with something of high enough quality that I would have felt good about releasing it. But I could never get there with the gear I had.

Well, I'm here to tell you, friend, that all this has changed in just the past few years. "Someday" has finally arrived! Suddenly, after being locked away from us mere mortals, the ability to make great-sounding home recordings without going broke—and going to college to study audio engineering—has become not only possible, but also affordable. Computers, software, and other fantastic technological advances have liberated all of us! Pretty dramatic, isn't it? Yes, as a matter of fact, it is!

Recording technique has come a long way since Édouard-Léon Scott de Martinville beat the commonly credited Edison by almost 20 years to the world's very first sound recording with his phonautogram in 1860.

EDISON REMAINS UNDIMINISHED!

Even though most people believe that Thomas Edison invented audio recording, it was actually Édouard-Léon Scott de Martinville, a French inventor/dabbler, who created the first audio recording device and the first audio recording itself. He called the machine the *phonautogram*. But if Edison happens to be your hero, don't worry! Turns out he was still a pretty smart guy.

As a twist to the bizarre story of the phonautogram, apparently Scott de Martinville, though having devised a way to record the sound onto paper as sound wave diagrams, had for some odd reason envisioned us *reading* recorded sound, not hearing it, and thus had developed no way to play it back audibly. Go figure.

Edison's recording of *Mary Had a Little Lamb* then remains by common consensus the first ever to be *heard* after it was recorded. Scott de Martinville's recording was not heard until earlier this year (2008!) when scientists devised a way to optically read the squiggles his device made and turn them into sound. The recording turned out to be of the French folk song *Au Clair de la Lune* and the audio quality was—well, let's just say you'll do far, far better with the techniques you learn in this book! But still, it was a lot easier to identify the song once we could *hear* the recording than it was when we could only *look* at it. On that score, Scott de Martinville got it wrong; Edison got it right.

We now find ourselves well into the digital age, and still it's surprising how few people have awakened to the new age of recording technology. It still isn't free to set up a home studio, but it's never been more affordable than right now. You're going to have to spend some money, but if you follow my advice, you'll be amazed at just how little we're talking about (compared to traditional recording methods) and equally amazed at the fantastic results you'll get from the gear you buy.

So prepare to be amazed, because I'm going to show you exactly how to do it. You'll be recording your music in no time.

Ten Assumptions

Throughout this book, I'm going to proceed under a certain set of assumptions. If even just a couple of these assumptions turn out to be true of you and your situation, you'll get something valuable out of this book. If you can live with most or all 10 of these assumptions, the potential exists for your recording output to explode!

As I discuss various topics throughout this book, I'll remind you of these assumptions so you have a complete understanding of why I make the recommendations that I do.

Here then I present my 10 assumptions:

1. You have a strong desire to record great-sounding music, mostly on your own, in a home studio.
2. You are not able (or willing) to set up a pro-level home studio environment. By this, I mean that it isn't practical for you to undertake a complete renovation of your basement to turn it into a state-of-the-art studio.
3. You can afford to—and are willing to—spend a reasonable amount of money on setting up your studio, but you need to make the most out of every dollar, euro, peso, or whatever it is that you spend. In other words, as we say in the United States, "You need to get the most bang for your buck."
4. You are not free to make unlimited amounts of noise during the recording process. For instance, you have roommates, parents, kids, neighbors, or others who might be less than appreciative if your power chords keep them awake at 1:23 a.m. or interrupt their viewing of *American Idol*.
5. You want the most control possible over the recording, editing, and mixing process, and you want as much flexibility as you can possibly get in how you create your projects. And, importantly, you are not afraid—or are at least willing to overcome your fear—of computers.
6. You're willing to be flexible and open minded and can set aside any purist attitudes toward gear in the interest of accomplishing great recordings in the less-than-great recording environment I mentioned in assumption 4.
7. You're willing to concede that sometimes, in the interest of getting something done given the realities of your home-studio setup and budget, it's okay to settle for techniques that the "pros" or purists might dismiss as not up to their standards. In other words, it's not the technique that obsesses you; it's the quality of the *results*.
8. You're not interested in sorting through the details of a bunch of different techniques that you might never use to find the one that might work for you. Rather, you want a clear, concise, proven path to getting your music recorded with very high quality.
9. You want to skip nonessential technical details and jargon in the interest of getting results quickly. You can—and should—learn all you can about recording technology, but I refuse to let your lack of expertise in technical areas stop you from recording music right now!
10. You're willing to record with mostly electric or electronic instruments whenever that's practical. You'll need to use a microphone for some things, but any time you can avoid a live mic, you avoid lots and lots of headaches!

Quick Guide to *The Complete Home Music Recording Starter Kit*

Throughout this book, I'll tell you exactly what you need to know to set up your home recording system. The techniques I talk about are not just theoretical; these techniques are the same proven, practical techniques that I've used to record my own musical projects. If you're interested in hearing the kind of results I get from the techniques I discuss in this book, check out my music at www.busterfayte.com. (As long as you're there, take a minute to sign onto my mailing list so I can keep you up to date with what I'm doing!)

Don't get hung up on whether or not you like my music or my singing or guitar playing. Instead, focus on the production and recording quality. Does it exhibit a level of production quality that would make a positive impression on your fans and industry contacts? Is the quality high enough to make you feel good about charging your fans $10 to buy a CD? Would you buy the music of your favorite artist if it exhibited this same recording quality? Although I know my own results will improve with every project, I'm proud to say that I think my recordings pass these tests—and my fans obviously agree! That's what we're after, and that's what this book teaches.

What We'll Discuss

The first step in the process involves basic organizational decisions and whether to go analog or digital. You've heard the arguments; here we'll discuss the realities and the logical, cut-and-dry, never-look-back, no-second-thoughts choice. The decision is really simple, and I'll show you why.

Next, we'll talk about your recording space. Remember, I'm assuming you don't have the producer's dream studio in your basement, so you have limitations. We'll talk about how you're going to not only live with, but actually thrive despite those limitations. We'll also discuss the computer gear you need and how to set all of it up.

After that, we'll lay down some guide tracks to get us started and then spend several chapters talking about the realities of recording different instruments.

We'll end with discussions of mixing, mastering, and delivery. After that, you're on your way to quality recording projects in your own studio.

Special Elements

Throughout this book, I'll sprinkle in four special elements: Notes, Tips, Cautions, and sidebars. Also, I'll end each chapter with a section called "Studio Log." The Studio Log summarizes the chapter and gives you the main points in easily reviewable form. Here's what each of these elements looks like:

NOTE

I'll use a Note when I want to give you some small piece of interesting information that doesn't really fit into the flow of the current text. It might be a resource you could look into for further understanding, a place where you can go to see or hear an example of what I'm discussing, or some other helpful tidbit.

TIP

I'll use Tips when I think I know of a way to make a task a bit easier or a way to give you better results. For instance, if I'm discussing recording a guitar, I might use a tip to remind you to make sure you're in tune.

CAUTION

I'll use Cautions when something I'm telling you to do has a potential danger toward your project, your gear, or you. For instance, if I'm telling you to play your recording back while wearing headphones, I might use a Caution to remind you to turn the volume down first so you avoid damaging your hearing.

SIDEBAR

I'll use sidebars when I have an interesting or amusing story to tell that's related to the topic I'm discussing, but not necessarily critical to the discussion. Sidebars provide a little bit of fun and color commentary. They're a lot like Notes, only longer.

You saw a sidebar earlier when I told the story of the first recording machine.

Studio Log

I'll end each chapter with a "Studio Log" section. Here I'll provide a short recap of what the chapter covered, just as you might enter a summary of what happened during a recording session into your studio log book. The Studio Log brings out the main points one more time to reinforce what you have learned in that chapter. If you want a quick summary of the entire book, you could cheat and read all the Studio Logs first.

Now that you know what this book's all about, let's get started with the details and the fun.

3

Setting Up Your Computer for Music Production

IN THIS CHAPTER

- Determining your minimum requirements for processing, memory, and storage
- Choosing your audio input/output interface (your computer audio interface)
- Assembling your audio monitoring system

In this chapter, we move into an area that doesn't have to be nearly as confusing or intimidating as many of us tend to believe it is. Here's where we'll talk about your computer and what you need to do to it to turn it into an audio-production powerhouse. When you're done with this chapter, you'll have transformed your ordinary computer into a complete Digital Audio Workstation (DAW) capable of recording great-sounding music. And it's a lot easier to do than you might think. This is an important chapter because a lack of understanding of this topic prevents far too many musicians from getting work done. That's a shame. And you're about to learn why it doesn't have to be that way.

Your Computer: Command Central

Your computer is obviously a critical component in your recording setup. As you'll see in the remainder of this book, it serves as your multitrack recorder, your storage medium, your mixer, your source for most (if not all) of your digital signal processing (DSP) work, your playback machine, your editing station, and your CD burning station. And it can even do email and your taxes! It's a wonderful thing.

Let's get down to the important details of how to make your computer serve all these important functions. The younger musicians among us have probably been using computers for most of their lives. You're most likely completely at home with the computer in general and might be tempted to skip over some of the preliminary topics in this chapter. I'd suggest you resist that urge at least enough to skim through everything to make sure you don't miss something audio specific that you haven't worked with before.

Others may very well have relatively little experience with computers in their daily lives. If that's the case, don't worry that you don't consider yourself a whiz on the computer; you *can* learn your way around. And, the truth is, you don't need to be a computer genius to make it all work for you.

In fact, computers these days are really quite reliable. Considering the complexity of what goes on inside the computer every time you push a key or click the mouse, it's amazing they work as reliably and seamlessly as they do.

Of course, that doesn't mean you won't run into problems with your machine, but hopefully you'll get comfortable enough working with it that you'll be able to overcome these issues, or more importantly, avoid them in the first place.

We discussed the Mac versus PC argument back in Chapter 1, "Laying the Groundwork for Recording," and we all agreed to put that argument to rest, so let's not rehash it here. As I mentioned, I work on the PC platform, so my examples are given on the PC. But remember, even if you use a Mac, most of what this chapter discusses applies equally to your platform too, so don't give in to the temptation to skip it.

Choosing Your Computer

There are several important considerations to keep in mind when you're choosing the computer that you're going to use for your musical projects. Understanding these issues will help you make a wise choice for what will be one of the most, if not *the* most, expensive pieces of gear you need to purchase for your studio. It's obviously also one of the most critical pieces of gear you need, so you'll want to make the right choice.

Even though you probably already own a computer, you'll be wise to consider purchasing a new one that you can dedicate solely to your recording studio. That way you can keep it clean of all the junk that everyday computing tends to pile onto your machine. It's particularly a good idea to keep your production computer away from the Internet as much as you can—totally away from it is the ideal! No one wants a virus to take down their entire production machine (and with it, the recording projects they've worked so hard on).

Minimum System Requirements

Virtually all software applications provide a list of minimum system requirements in their marketing information and packaging. The term refers to basic minimum standards in terms of storage space, random access memory (RAM), processor speed, operating system version, and so on that your computer must meet to run the software effectively.

Well, I've got great news for you: You don't need some sort of super-secret, ultra-special computer to set up your studio! In fact, if you already have a computer that you purchased within the past three years, you might just have all the computer power you need. That would obviously be great news, because you won't have the expense of a new computer to cover.

Naturally—as almost always with computers—the more powerful the machine, the better performance you'll typically get out of it. A computer that meets—but just barely—the minimum system requirements of your software may run the software, but it may not run it very effectively. You could easily become frustrated as you wait for the software to react to your commands.

If you decide that the computer you have now just won't cut it (or if you don't have a computer yet), the fact that you don't need some super tricked-out specialty machine means that you can get a great computer for a decent price. In my opinion, virtually any machine you buy new off the shelf or the website of your favorite computer retailer will make (with perhaps a few modifications that we'll discuss shortly) for a nice audio workstation. Certainly, any new machine will likely far exceed the minimum system requirements of the software you'll use to produce your music.

Obviously, a discussion of computer systems, processors, RAM, and so on can and does fill entire books, so we're not going to get too deep into that here. (Recall assumption 9 regarding technical details.) For now, suffice it to say that more power is pretty much always better. But it's also pretty much always more expensive. So, there's your trade-off!

When you're making your decision, first find out what the minimum system requirements are for all the software you'll be using. (In all likelihood, your DAW software will have the most stringent requirements.) Then make sure that the computer you're considering meets or preferably exceeds those requirements. Then buy the fastest processor you can afford (get multiple processors if you can), the most RAM you can afford, and the largest hard drive you can afford. And as long as you're at it, a second (perhaps external) hard drive is always a great idea for archiving your work.

For the record, I've done the majority of my recording on machines that I would consider standard. In fact, the machine in my studio is not nearly as beefy as anything you'll buy new today, but I'm still using it. I don't use any special high-performance audio-specific hard drives or anything like that. I've been perfectly satisfied with my basic machine. As long as your machine meets or exceeds the minimum system requirements of your software, you should be able to use it effectively for your projects, too.

The minimum requirements for the DAW I'll be using throughout this book, ACID Pro, look like this:

- **Operating system**—Microsoft Windows XP (SP2 or later) or Windows Vista
- **Processor**—1.8GHz x86
- **RAM**—1GB
- **Hard-disk space for program installation**—150MB
- **Sound device**—Windows-compatible (ASIO driver support highly recommended)

If you're using something other than ACID Pro, look for these same sets of numbers for your software. We'll talk about these requirements in more detail shortly.

Desktop and Tower Machines

Most of us think of these types of machines when we think of computers. These are the big boxes that sit either on our desks or alongside our desks on the floor. Generally, these are less expensive than laptops (discussed in the next section) yet offer more power and flexibility due to the extra space inside the box. That extra space provides room for more than one computer processor, more RAM, more than one hard drive, and computer devices that bring expanded functionality to the computer (not unlike the plug-ins we talked about earlier except that these devices are hardware instead of software).

Obviously, these systems are bulkier and not nearly as portable as a laptop. They're obviously bigger and heavier and, of course, they require an external computer monitor, keyboard, and mouse.

But the main deciding factor could be their price. You can get a nice one right off the shelf for $600 or $700 if you watch for the sales.

Laptops

Who wouldn't love to have a great laptop? The all-in-one portability they offer is absolutely fantastic. Of course, there are trade-offs for that portability.

Laptops tend to be pretty expensive (although their prices, too, are coming down). And, they're not as expandable as a tower, meaning that they provide no room inside for installing hardware devices like those I mentioned in the previous section. This may be changing, too, but generally you'll have to settle for a smaller hard drive, potentially less RAM, and a slower processor than you could get for the same money in a tower.

Still, if you want to do remote-location recordings, the new, powerful laptops can work wonderfully. More and more equipment uses fast USB and FireWire connections. This gives you a way to connect large external hard drives while easing the pain of not having room to install other hardware in your laptop. We'll talk about this in more detail a little bit later in this chapter.

Just as with tower machines, if the laptop you have (or are looking to buy) meets the minimum system requirements of your software, it passes the most critical test. I have often used a laptop to record parts of my various projects or to record live on location, and it's always worked just fine. In fact, I'll use a laptop to record the project that we'll work through in this book.

RAM, Processors, and Storage

I've mentioned processors, RAM, and storage several times already in this chapter, but what are they, and why are they important? At this point, I think it's probably safe to say that most of the people reading this book have at least some handle on these concepts, so I'm not going to go into them too deeply. There are many good resources that you can turn to for full explanations, but following are a few basic definitions for you.

The word *processor* is short for microprocessor. Another name for a processor is *central processing unit* (CPU). All three terms mean the same thing. The CPU is the brains of your computer and does all the complex calculations required by whatever it is you're doing in your software.

Therefore, processor speed is the big number everyone focuses on. The faster your processor, the more calculations it can handle in a given period of time. In other words, the faster your processor, the faster your computer does what you ask it to do. Obviously then, a fast processor makes your DAW run more efficiently, and you can get your work done faster.

You can add multiple processors to a tower machine for even more processing power, whereas a laptop typically has room for just one processor.

Fairly recently, we've seen the advent of dual-core processors, which basically means you get two processors in the space of one. This gives laptops a great source for faster processing.

Random access memory (RAM) refers to the memory available for your computer to use while it runs the operations that your software is asking it to run. For instance, when you play your project in your DAW, the application pulls from RAM memory to perform the task of transforming the computer information in your project into music that you can hear through your speakers. The more RAM you can get into your machine, the better your software should perform. For example, in ACID Pro, RAM has a direct impact on the number of audio tracks you can have playing simultaneously in your project. It also has an impact on the amount of DSP you can apply.

Think of RAM as short-term memory; whatever exists in RAM is lost when you close the application or shut down the computer.

Storage generally refers to the size of your computer's hard disc drive. This is where you store information on your computer for the long term. For instance, when you install software, the parts and pieces that make it work have to reside somewhere, and that somewhere is usually the hard drive. You also save all your files to the hard drive. For example, when you record your vocals, your DAW stores the information on the hard drive.

Drive speed can be important because you're asking your computer to pull information from the hard drive and do something with it without making you wait. For instance, when you play a file in your DAW, the computer has to read the file from the hard drive and play it in real time. Since full-resolution audio files (for example, the files that you create when you record something) can get pretty large, it's important to have the most storage space you can. A tower computer case can generally house more than one hard drive, while a laptop probably has only one. You can also connect extra hard drives to either type of computer via the USB or FireWire ports.

CAUTION

If, while you're setting up your computer, a buddy offers to do you a huge favor and "speed up the processor," just say no! Although it sounds great to think that you could get a faster computer without buying a faster processor, the extra speed comes with high risk. The technique, called *overclocking* the processor, is pretty much a jerry-rigged method of forcing your processor to run at a faster speed than that for which it was designed and tested. CPUs that have been overclocked create more heat than they were designed to handle. In turn, the extra heat might overpower the fan that cools the CPU. And excessive heat will almost certainly cause your CPU to fail. At the least, this will cause your computer to crash, and you'll lose any changes you've made to whatever you're working on. At the worst, you may destroy your CPU or other components in your computer. I know people overclock their processors all the time, but I'm not willing to take that risk, and I recommend that you avoid it, too.

Getting Sound Into and Out of Your Computer

Given the nature of what you're going to be doing in your studio, getting sound into and out of your computer could be considered a pretty critical task! Many new computers provide a method for doing this right off the shelf: the computer's *audio interface*. You might also hear the audio interface referred to as the *sound card* or the *audio device*. But whatever you call it (I'll use the term *audio interface*), many new computers have one built right onto their motherboards. Unfortunately, while that audio interface didn't cost you anything extra and it might do just fine for watching (and listening to) videos on YouTube, it's typically far from up to the task of high-quality audio work, so you're probably going to have to replace it. Let's talk about some of the issues and options involved in this decision.

Built-In Audio Interfaces

As I said, many computers have an audio interface built into them. Typically, this audio interface is actually a part of the computer's motherboard, so you can't really remove it.

Such audio interfaces are nearly without exception low-quality devices that the computer manufacturer has included simply to give you a way to hear or record audio onto the machine as soon as you unpack it.

To see if your computer has an audio interface, look for the holes (called *jacks*) into which you'd plug headphones or a microphone. The Record jack is usually red, and the headphone/speaker jack is often green or black. On a tower machine, you'll find these on either the back or the front of the machine and in some cases both. Figure 3.1 shows the jacks on the side of my laptop. Notice the little microphone and headphone icons next to the holes, which further identify their purpose.

Figure 3.1

Look for input and output jacks like the ones in this picture to see if your computer has an audio interface already.

We won't be using built-in audio interfaces, but pointing out some of their limitations helps identify important areas to consider when choosing a different one, so I'll spend a couple of paragraphs on some of those limitations.

Cheap audio devices typically have cheap components, such as their analog to digital/digital to analog (AD/DA) converters. AD/DA converters convert analog audio (such as the signal from your microphone) into digital audio that your computer can understand. Likewise they change the digital audio from your computer to analog signals that can play through your speakers.

These conversion points are absolutely critical to maintaining high quality, and that's one place inferior devices fall flat. No matter how good your microphone is or your speakers are, if you pass a great signal through low-quality AD/DA converters, your audio quality suffers.

Low-quality AD/DA converters can be very noisy, and that noise ends up in your recordings or coming out of your speakers. You'll usually hear this as a hissing sound in your recordings or the audio you play from your computer.

If you hear people talking about the *signal-to-noise ratio*, they're talking about this issue (along with other issues that cause noise). Basically, you can think of signal-to-noise ratio as how loud the noise your equipment makes is compared to the volume of the desired material. Put your headphones on and listen without playing anything through your audio interface. The amount of hiss you hear is noise that your equipment is making and noise that will end up in your recordings. Obviously, you want as little of this as possible!

To record yourself playing all the parts on a recording, the ability to listen to something that you've already recorded as you play along and record something new is critical. Most of us know this process by the term *overdubbing*. The process revolutionized music recording back in the 1940s, with the main pioneer being Les Paul. (Yes, my guitarist friends, *that* Les Paul!)

For an audio interface to pull off this simultaneous play and record magic, it must be a *full duplexing* audio interface. In terms of audio interfaces, full duplexing simply means that the device can play audio and record audio simultaneously.

Another factor, *latency*, refers to the time it takes for audio to run through the AD/DA conversions that we discussed earlier. Let's say you have your electronic keyboard's audio outputs connected to your audio interface's input jack. You press a key on the keyboard. It takes time for the audio to travel from the keyboard through the AD converter, through the software where it's being recorded, back out the DA converter, and finally to your speakers so you can hear what you're playing.

In other words, you never get instant feedback when you press that key. And if you're playing a part along with something that's already in your project, you don't hear what you play at the same time you actually play it. Obviously, you can't perform well like that!

Low-end audio interfaces will typically have unacceptably long latency; thus, even if they're full duplexing, they would still be virtually unusable for multitracking due to the latency issue. High-end audio interfaces have much lower latency.

Here's one area where you Mac users have the advantage over those of us who use the Windows operating system: The Mac operating system doesn't suffer nearly as badly from the latency problems as Windows machines do.

As you saw in Figure 3.1, built-in audio interfaces typically have 1/8-inch mini jacks. You probably know that most professional musical gear uses cannon (XLR) connections or 1/4-inch connections. Of course, you can get converters and adapters, but with all the other drawbacks for these devices, why bother?

Also, you typically get only one input and one output from these devices (although some multimedia machines will have multiple outputs so you can connect a surround-sound speaker system). That's limiting—especially on the input side—for anyone who wants to record two or more things at once. For instance, if you're recording a drum kit and want 12 microphones (not unheard of at all, but I'll show you how to avoid that nightmare later!), you're way out of luck with the built-in audio interface.

High-Quality Audio Interfaces

All right, if you can't use your computer's built-in audio interface, what can you use? Luckily, there are several great options from manufacturers who've developed audio interfaces specifically for professional music production. And you have a few different options to consider. According to assumption 8 (which I stated in the introduction to the book), you don't want me to dump a bunch of options on you and make you figure it out on your own, but there are a few times when I feel it's necessary to give you more than one option so you can pick the one that most closely fits your situation. This is one of those times. I'll try to keep the options straightforward so you can make a clear decision. Also, Appendix A, "Choosing Your Audio Interface," helps you organize your thoughts in this potentially confusing area to help you determine what type of audio interface you should purchase.

Before we start, I should note that higher-quality audio interfaces solve all the problems that I discussed earlier.

There are three common ways you can connect a new audio interface to your computer.

As I mentioned earlier, a tower-style computer has more room to expand your computer's functionality. Your computer's motherboard typically has three or more expansion slots called *Peripheral Component Interconnect (PCI) expansion slots*. These are built specifically to accept peripheral devices that use the PCI standard connection and bring some extra functionality to your computer. We talked about software plug-ins earlier. Well, these devices could be considered hardware plug-ins because they literally plug right into the PCI slots. Devices like modems, video devices, TV tuner devices, network devices, and others might use the PCI standard to connect to your computer. Audio interfaces can also use this standard.

Most of the professional-quality PCI plug-in audio interfaces have another component called a *breakout box*. The PCI device sticks out of a hole in the back of your computer that is designed specifically for it. The breakout box connects to the PCI device via some sort of cable that also comes with the package. The breakout box serves as your connection interface to the audio interface and through that to the computer. In other words, the breakout box has the input and output jacks into which you plug your input sources (microphones, mixer, and so on) and your output destinations (such as speakers, headphones, and mixer).

Figure 3.2 shows a PCI audio interface along with its breakout box. Naturally, you'll have to open your computer to install the PCI device. Make sure you follow the device's instructions carefully so that you don't damage your computer during the process.

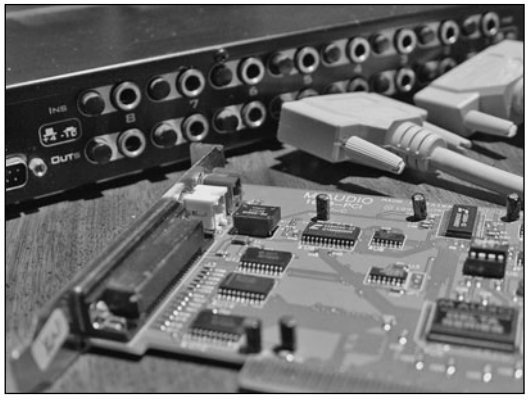

Figure 3.2

This audio interface has three hardware components: the PCI device, the breakout box, and the cable that connects them.

Although I've had good luck with the PCI audio interfaces that I've used over the years, they've fallen out of favor with me due to a couple of factors. First, although they're not really all that difficult to install, you do have to open your computer to do it. Once you do, that device is literally part of the computer, and it's not very portable. If you want to use it on a different computer, you'll have to open the box back up, remove the device, and then open the other computer to install the device there. Also, you obviously can't install one of these into a laptop since laptops don't have room for PCI slots and devices.

Another important negative I've found with the PCI devices that I've worked with involves the connections on the breakout box. For some reason, manufacturers only seem to supply 1/4-inch jacks for analog audio connections on these devices. That means that you can't plug a standard XLR microphone cable into the device without first going through a mixer or some kind of adapter. Compared to FireWire and USB devices, these limitations were enough for me to lose my enthusiasm for PCI audio interfaces.

FireWire audio interfaces combine the audio interface and the breakout box into one unit that connects to your computer via an IEEE-1394 connection, known commonly as a *FireWire* connection. More and more new machines come with FireWire ports built in. If your computer doesn't have a built-in FireWire port, you can buy inexpensive PCI devices with FireWire ports (many with two or even three ports on a single PCI device). Figure 3.3 shows a FireWire audio interface along with the FireWire cable that connects it to the computer.

Figure 3.3

This sound device connects to the computer via a convenient FireWire connection.

In my opinion, FireWire audio interfaces offer huge advantages. First, they're completely portable. Since many computers have FireWire ports, you can easily unplug the device from one computer and plug it into a different computer. If you have a laptop with a FireWire port in it (as more and more of them do), you can easily plug the same FireWire audio interface that you use in your tower machine into your laptop.

Even more importantly in my opinion is the connectivity provided by high-quality FireWire audio interfaces. Many of these devices use handy combination input jacks that accept either a 1/4-inch plug or an XLR plug coming from a microphone. This way you can plug something like an electronic keyboard that uses 1/4-inch plugs into the audio interface when you need it but then remove it and plug a microphone directly into the device when you need that.

FireWire devices have other great features that I'll talk more about later when we actually get to recording and working with audio.

Audio interfaces that use Universal Serial Bus (USB) connections have many of the same advantages and features as the FireWire devices I just discussed. The main difference is that they connect to one of your computer's USB ports. If your computer doesn't have a FireWire port, these devices are a great alternative because virtually every computer is built with a couple of these USB ports.

There are two types of USB: USB 1.1 and USB 2.0. USB audio interfaces generally require a USB 2.0 connection since USB 1.1 connections do not provide fast enough data transfer rates. Make sure that your computer's USB ports are USB 2.0 if the audio interface you're looking at requires that standard.

NOTE

I have used several types of both PCI and FireWire audio interfaces extensively and have some (though less) experience with USB devices. My preference is for FireWire, with USB coming in close behind, and my least-favorite is the PCI device. I've never had trouble with devices I've used in any of the three formats, but I've been most happy with the FireWire devices I've used, and that's the direction I suggest you look to first.

Regardless of the type of connection you choose, the audio interface you buy will come with its own software called *drivers*. The audio interface needs this software driver to communicate with your computer and DAW software. In reality, it's the software drivers, not the hardware components that are likely to cause you the most problems with the audio interface. For that reason, it's important to make sure you have the latest versions of the drivers for your operating system.

In fact, that's true for any software you install. By the time you buy the software (or audio interface and software in this case) and unpack it at home, there have probably been a couple of updates to the driver software. Manufacturers almost without exception post these updated drivers for free download on their websites. A company puts out new drivers for good reasons; the driver update may fix bugs in the old driver, add functionality that the old driver didn't have, or support a new operating system that the old one doesn't support.

CAUTION

Before you buy an audio interface, make sure it includes drivers that will work on your operating system. If you use Windows Vista, that sound device is going to be useless to you if it only comes with Windows XP drivers. Most audio interfaces include drivers for both Windows and the Mac, but you should still verify that just to make sure.

Also, if you're running on a Windows system, make sure the audio interface includes ASIO drivers before you buy it. These drivers provide low-latency performance, which is going to be important for your work.

You need to seriously consider how many inputs and outputs you want your sound device to supply. You can find devices with 10 or more inputs and outputs (like those shown earlier in Figures 3.2 and 3.3) as well as devices with fewer. Most devices have at least two of each.

FireWire devices offer a great advantage here because, on some of them, you can string two or more devices together. For this to work, all the devices must use the same software drivers, which pretty much means they all have to be the same make and model. Stringing devices together like this gives you even more inputs. To do this, you plug the first one into the computer and the second one into a second FireWire port on the first one. The two devices strung together appear in your DAW software as if they were just one big device, and you can assign all those inputs to separate tracks in your DAW for recording simultaneously.

Give some thought to what you're going to be doing with the device so you can determine how many ins and outs you need. If you're going to record all the parts one by one, you might be perfectly happy with just one input. (Actually, most devices have a minimum of two mono audio inputs.) However, if you plan to record your whole band simultaneously with several microphones, you're

going to need more inputs. And if you want to play back out of the audio interface to a surround-sound speaker system, you'll need more outputs.

Naturally, the more ins and outs your device features, the more you'll pay for the device.

Also, make sure to consider whether you need MIDI input and output. We'll talk much more about this issue in Chapter 7, "Utilizing MIDI in Your Projects." For now, just keep in mind that most higher-end devices supply MIDI input and output jacks, while lower-priced devices may not. If you don't know what MIDI is, hold off on your audio interface buying decision until you've read about it in the following chapter. Once you learn about MIDI technology, you may well want to make sure you buy an audio interface that features MIDI jacks.

Some manufacturers make audio interfaces that they combine with technology to create a multifunction piece of gear. For instance, the company Line 6 is famous for creating audio interfaces that also contain amplifier emulation technology. These devices enable you to plug directly into the audio interface and apply amplifier modeling sounds to the signal while you play or sing and record into your computer, thus eliminating the need for an actual guitar amplifier playing into a microphone or for a vocal preamp. Typically, these devices connect via USB.

Other devices combine the audio interface with a keyboard so that you always have a keyboard ready for transmitting and recording MIDI data. Still others combine the audio interface and a full hardware mixing console. In other words, there are a lot of options out there.

Such devices can provide great value, but be careful that you're not limiting yourself too much. For instance, if you need to record vocals, make sure the audio interface easily supports a microphone, not just a guitar. And make sure that the interface provides output to your speakers and that it is a full-duplexing unit.

> **NOTE**
>
> I've mostly used audio interfaces by three different manufacturers over the past 10 years. For a long time, I used a Delta 10-10 PCI device from M-Audio. I've also made extensive use of both PCI and FireWire devices from Echo. Finally, I've used several different FireWire audio interfaces made by Presonus. I've had great luck with each of these devices. As I mentioned earlier, I much prefer the FireWire devices over the PCI devices because of their portability and flexibility.

Setting Up an Audio Monitoring System

Obviously, you have to have some way to hear the audio that you play back from your DAW. The sound devices we just discussed are an important piece of that puzzle, but after the audio leaves the audio interface, you have to send it somewhere. There are a couple of different approaches you can take in setting up your audio monitoring system. In this section, we'll be talking specifically about monitoring through a stereo setup. If you're running some sort of surround-sound or other multiple-channel setup, the techniques will be essentially the same—you'll just have more outputs, cables, speakers, and so on to connect.

Routing Through a Hardware Audio Mixing Console

One way to get the audio signal from your sound device to your speakers is to run through a mixing console (mixer). A mixer makes it possible to control the volume and equalization of several separate audio input devices (your audio interface, a CD player, and so on) and send that signal to the same set of speakers or other device.

In a setup with a hardware mixer, the audio comes out of two output jacks on your sound device (one for the left audio signal and one for the right) and into two channels on your mixer. The audio then routes through to the mixer's outputs and from there to an amplifier. The amplifier sends an amplified signal to your speakers. The amplifier might be a separate piece of gear, or it might be built into each speaker you're using. Speakers that provide their own amplification are referred to as *self-powered* speakers.

Doing Without the Mixer

If space is an issue, or you just don't want another piece of hardware to worry about, you can do without the mixer. And, as I mentioned, if you have self-powered speakers, you can eliminate a separate amplifier, too.

This setup significantly reduces the amount of desk space you need to control your audio. In essence, your audio interface substitutes for the mixer, while the speaker's built-in amplifiers substitute for an external amplifier.

This is the way I prefer to have my studio set up because I need the extra space that the mixer takes up. If you're contemplating this type of setup, I suggest looking into an audio interface that has a few extra features that provide the control you'll be passing up by eliminating the mixer.

Choose an audio interface that has a control on its front with which you can adjust the volume of the device's main outputs. Since you don't have a mixer, you'll find this hardware control on your audio interface very valuable for easily changing the volume of the audio playback.

Since you don't have a mixer to control your audio input sources, you'll need to send those sources (like your electronic keyboard, your microphone, and so on) directly into the inputs of the audio interface. Since you'll probably be changing the devices you plug into the audio interface, it's unbelievably inconvenient to have your inputs on the back of your audio interface where you have to be a contortionist to get to them.

You'll also want to make sure that the inputs on the front of the device are universal connections that can accept either a quarter-inch plug that accepts line-level signal (from your electronic keyboard, for example) or an XLR plug that accepts a mic-level signal directly from your microphone.

It's also helpful to have at least one instrument-level jack on the front of your audio interface that can accept the signal directly from your guitar. This is especially crucial if you'll be using amplifier emulation software to achieve the sounds you want on your guitars (as opposed to playing through an actual guitar amp and recording with a microphone).

You'll really appreciate an audio interface that features *trim* controls on the front for each input channel. A trim control (usually in the form of a knob that you turn) enables you to adjust the volume level

of the input source. We'll talk more about input level in Chapter 5, "Creating Your Guide Tracks," but suffice it to say for now that it's critical to set your input levels properly to achieve the best sound quality while you're recording.

You'll want a device that supplies phantom power through the XLR inputs to your microphone and an easily accessible switch to turn phantom power on and off. In a nutshell, some microphones require power to operate. The power can be supplied by a battery that you insert into the microphone, or often by the gear into which you plug the microphone (in this case, the audio interface) through phantom power.

You'll want a device that enables you to monitor the incoming audio signal. Again, we'll talk more about input monitoring when it comes time to record in Chapter 5, but basically this capability enables you to hear what you're sending into the audio interface. For instance, it enables you to hear yourself singing while you record your vocals. A way to control the mix between input monitoring volume and computer playback volume is a nice touch, too.

It's convenient to have a headphone jack and headphone volume control on the front of the device. In fact, this can be critical to successfully doing the type of recording we're talking about in this book—that is, the type of recording that happens at 12:30 a.m. when the neighbors, kids, or roommates are asleep.

Deciding How You're Going to Hear the Music

Whether you decide to use a mixer or not and regardless of which audio interface you settle upon, ultimately the audio chain ends with sound coming out of a device that enables you to hear it. I've already referred to speakers and headphones, but let's talk about both of those topics in a little more detail.

Monitoring Through Speakers

Of course, you realize that a good-sounding pair of speakers is critical to making quality recordings. But it's not quite that simple. The speakers you want to use in your studio are not the same as the ones you want to use for your stereo. Home stereo speakers are designed to make the music sound as good as possible. For your studio, you want speakers that make the music sound as *accurate* as possible. In other words, you don't want speakers that color the sound. Instead, you want to hear exactly what you've recorded so you can know exactly what you've got. Your studio speakers should "tell it like it is," not as you'd like it to be.

Speakers made for musical production work are called *reference monitors*. You can choose from a dizzying array of monitor options, which can be categorized in a couple of different ways.

Reference monitors fall into three general categories: near-field, mid-field, and far-field. Mid- and far-field monitors hold no real relevance to the typical home studio for a couple of reasons. First, they're bigger and more expensive. Second, they're made to be listened to from a distance—generally 5 to 10 feet away or more. You've seen the picture of my studio and can tell that I couldn't get that far away from my monitors if I wanted to!

So you're left with near-field monitors. That's not a bad thing. (In fact, for your budget and space considerations, they're a good thing.) It simply means that you need speakers that give their best sound in a range from about 3 to 5 feet away—exactly right for listening to the monitors sitting on (or preferably on stands *near*) your desk while you're sitting in your chair. When you go looking for speakers then, stick to the near-field monitor choices.

Monitors can be either active or passive. I referred to this topic earlier when I mentioned that some monitors supply their own built-in amplification. These are referred to as *active*. Monitors that require external amplification are called *passive*.

Active monitors may give more accurate sound because the amplification is obviously designed specifically for the speakers.

Each active monitor has its own amplifier that needs to be plugged into the wall, so you'll need an extra outlet.

I prefer active monitors because they eliminate the need for a separate amplifier that I would need to store at my workspace.

You should make every attempt to properly place your studio monitors. Monitor placement can have surprising effects on the quality of the sound you get, so try some different locations if you can.

I mentioned in the previous chapter that you want to avoid placing a monitor close to a wall because of the quick audio reflection that results. You might think that you're safe in putting the back of the monitor up against a wall or in a corner because the sound comes out the front of the monitor. But sound also escapes from the back of a monitor, so even if its back is against the wall, you can run into problems.

You also want to do your best to create a perfect equilateral triangle with your two monitors and your head making up the triangle points. In other words, if your two monitors are three feet apart on your desk, they should be three feet away from your head, too. This puts you right in the *sweet spot*—that area where the monitors give the most accurate sound and stereo effect.

You'll want to angle the monitors in and angle them up if you have to so that their faces point directly at yours. Better yet, if you can, raise the monitors on stands off your desk so that their *tweeters* (the smaller speaker cones in each monitor) are level with your ears. Specially designed monitor stands often don't rest flat on the floor. Instead, they stand on small spikes to minimize their contact with the floor, thus sending fewer vibrations into the floor. That's a nice touch if you can afford it.

SELECTING YOUR MONITORS

I know you can often get better prices online, but I strongly urge you not to buy studio monitors solely on reputation or recommendation. Go to your local music retailer and listen to monitors before you buy. Take a reference CD along—something with which you're intimately familiar and has production quality that you would like to achieve in your own studio. Run some blind tests where you have the salesperson switch back and forth between different speaker models without your knowing which ones you're hearing. You might be surprised which ones sound the best to you. Then, once you know exactly what you want, you can go online to find the deals.

Monitoring Through Headphones

Don't scrimp when it comes time to buy a pair of headphones. If you don't have a quality pair, make room in your budget for one. There will be times in the home studio when you want to work but you just can't make a lot of noise due to factors such as sleeping babies, grumpy neighbors, or TV-watching roommates.

If you can't afford a nice pair of studio monitors, a good pair of headphones might be within your budget. You can do most, if not all, of your work monitoring through headphones. Some would argue that you shouldn't mix or master your music in headphones because they give a different experience than monitors. That may be true, and I tend to agree that I'd rather mix in monitors, but sometimes you don't have a choice. And mixing in headphones is better than not mixing at all!

We'll talk more about the issues involved with mixing and mastering your music in Chapter 10, "Mixing Your Song," and 11, "Mastering Your Song."

There are many good headphone choices, too. I'd use the same technique in choosing the headphones as I suggested for choosing studio monitors. Your ears have to be the final judge, not the product's reputation or recommendations from friends and online forums.

You can find good headphones in both enclosed and open-air styles. Enclosed headphones cover the entire area around your ears. They keep sound from bleeding through to your ears from your environment and keep the sound they make from bleeding out the other way. That's important when you're recording with a microphone because any sound that bleeds out from your headphones may very well be picked up by the microphone and end up on your recording.

On the other hand, the open style makes it possible to keep a little more in touch with what's going on around you. This is important if, for instance, you're the one who needs to jump when the baby starts crying.

Get Familiar with Your Gear

It's important to spend some quality time with your studio monitors and headphones. Listen to a lot of music on them. Get to know their attributes and characteristics. Listen at low volumes and higher volumes, but don't damage your hearing! Get to know how the music sounds at these different levels.

The more familiar you are with the sonic attributes of your monitors and headphones, the better you'll be able to judge your music when you hear it through them. And that will help the sound of the music you produce on them.

IN A PINCH

All this information on monitoring your audio might not do you much good at the moment if you don't have room in your budget for any of the gear you need. I found myself in this same situation a while back, and I worked around it by running my audio through an old stereo system. I wouldn't recommend such a setup for mixing and mastering, but it worked adequately for me when I was in the recording stage. If it comes right down to it, you can set your system up to run through a regular consumer stereo system and use that while you save up the money for proper gear.

Studio Log

We've covered a lot of ground in this chapter. First, you learned that you don't need the newest, fanciest, most powerful computer in the world to set up your studio. As long as the machine you have meets the minimum system requirements of the software you want to use, you're in business. Of course, faster is always better, but assuming you need to watch your budget, you can probably get by with a machine that's even as old as about three years.

We also discussed many audio interface issues. Audio interfaces that come built into most computers are inadequate for the task of multitrack recording, so you need something much better. I advocated for devices that you connect to your computer via a FireWire connection because of the portability and expanded feature set of many of these devices. I also ran down several features that I look for in an audio interface. Ultimately, the most important thing to me is the convenience. Since I prefer to work without a hardware mixer, my audio interface must give me easy access to all the features I need—features that the mixer would normally supply. These features include input jacks, input trim controls, master volume control, headphone jack and volume control, and so on.

Finally, you learned about issues related to monitoring your audio. Near-field monitors make the most sense for a small studio space, and I prefer active monitors because they enable me to eliminate a separate amplifier from my workspace. I also want a quality pair of headphones for when I can't make much noise. I prefer the enclosed style partly because they prevent sound from bleeding out into the microphone when I'm recording.

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