



# The VoiceActor's Guide to Professional Home Recording

2nd edition

An easy-to-understand  
technical resource for  
equipping, setting up  
and using your home studio

**James R. Alburger**

Author of "The Art of Voice Acting"

# The VoiceActor's Guide to Professional Home Recording

Revised 2nd Edition  
2013



by James R. Alburger

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**James R. Alburger**

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# A Note About the Links in this Ebook

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As you read through this ebook, you'll notice a LOT of [links](#), colored in blue and underlined. There are two types of links in this book:

1. Links to other locations within this PDF document, and
2. Links to websites on the Internet.

## Internal Links

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One of the advantages of an ebook such as this is that it is possible to actually give you a LOT more information without having to write it all down. Internal links within the book allow you to quickly reference a term or move from one location in the book to another. For example, the link . . .

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. . . will appear under every section heading. Just click on the link and you're whisked off to the table of contents, or to wherever the link will take you. Let's see them do THAT in a printed book! Internal links will take you to the page for that information, but you may need to scroll down if the actual link destination is near the bottom of the page.

## Internet Links

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The links to various Internet websites require that you are on-line in order to open the link. If you're off-line, it won't hurt to click on them – it's just that one of the following things will happen:

1. nothing
2. your Internet browser will open and you'll get an error message
3. your auto-dialer will attempt to connect you to the Internet and open the web page.
4. If you're on a cable or DSL connection, you're most likely on-line all the time, so clicking on a link will take you directly to the web page.

## Navigating the Links

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No, this isn't about traversing a golf course . . . it's about how to get back to where you were! At the top of your Acrobat Reader view, there is a menu with buttons for navigating through your PDF document. If the navigation buttons aren't visible, simply right-click on the menu bar and check the "navigation" item. The navigation button menu should appear. After clicking on an internal link, click on the ◀ (previous view) button to return to your previous location in the ebook. Close your browser to return from a web link.

◀ (first page) ◀ (previous page) ▶ (next page) ▶ (last page) ◀ (previous view) ▶ (next view)

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# Introduction:

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This ebook is all about your home studio! My reasons for writing this ebook, teaching a workshop on “How to Build Your Own Home Studio,” and creating the VoiceActing Academy “Studio Savvy Seminar Series” is quite simple. As a voiceover talent in today’s market, you *must* know how to use a computer and record on your own equipment. It’s not a matter of wanting to know how, or even thinking it might be a nice idea to know how to do it . . . if you are going to be a successful voice talent in today’s talent marketplace, you *need* to know how to record high-quality voice tracks on your own equipment.

The development of broadband Internet services combined with the availability of very inexpensive, yet sophisticated and extremely high quality audio equipment has resulted in a major shift in the way voiceover talent get bookings and handle recording sessions. The days of a voice talent driving to a recording studio to record an audition or a booked project are all but gone, except in the major voiceover markets. More and more, producers today are requesting the voiceover talent they hire to record on their own equipment – and that means a “home studio.” If you don’t have a computer and the ability to record your voice, you will be tremendously limited in the bookings you can take as a voiceover talent.

There are many reasons why producers are moving toward having their hired talent record at home: faster turn-around and no studio fees are two of the primary reasons. By using the Internet, a producer can email a script to their voice talent and, within minutes, receive a professional quality recording that can be used in the final production.

Now, this doesn’t mean recording studios will be going away anytime soon. On the contrary, a high quality recording studio with qualified recording engineers will remain a requirement for almost all types of production. It’s at the recording studio where all the pieces of a project are assembled – including the voice track that was recorded at the talent’s home studio.

As a voiceover talent in today’s market, you not only need to be an excellent performer, but you also need to know some basic engineering and production techniques. And that’s what this ebook, my workshop, and our webinars will teach you. I’m going to explain in simple English everything you need to know to construct a basic “home studio.” Since most people just starting out in voiceover don’t have the budget for high-end, “studio quality,” digital equipment, I’ll be focusing on things you can do and equipment that you can buy that are relatively inexpensive, but will get the job done nicely.

If you’ve ever assembled a home stereo system, you’ve taken the first brave steps to building a home studio. OK, it’s not quite that easy, but the concept is the same: One piece of equipment connects to another and that to another. When everything is connected properly to a computer, you’ve got a “home studio” capable of recording your voice or music. If you aren’t comfortable with computers or hooking up electronic equipment, please don’t let that scare you. It’s really not as difficult as you might think. I’ve worked with many people who are afraid they’re going to break something if they plug it in wrong! Don’t worry! It really takes a lot of effort – or incredible carelessness – to damage the equipment. And as for plugging in the equipment . . . it will either work . . . or it won’t. There’s really not anything in between. And if you’ve plugged something in wrong, it’s not going to explode or throw off sparks. Today’s

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electronic equipment has built-in protection that makes it very difficult to damage the equipment by simply hooking it up incorrectly.

I promise you won't regret learning how to put together your own "home studio." You may even find that you gain a new appreciation for the technical marvels of our business.

"So", I hear you ask, "Just what qualifies you to teach about building a home studio?"

Glad you asked!

If you've read the introduction to my book "[The Art of Voice Acting](#)," you know that when I was about 12 years old, I started performing as a magician. I was uncomfortable speaking in front of an audience, so I taught myself how to edit music using a grease pencil, scissors, and scotch tape. I quickly figured out how to build a small "recording set-up" so I could transfer records (anyone remember vinyl!?) to tape and edit the music for my magic act. My small "set-up" gradually grew to the point where I had the capability to record my voice and handle complex audio production. In short, I built my own "home studio" from scratch – without the benefit of a course such as this. I made lots of mistakes along the way and learned a lot about how different audio components worked, and – more importantly – how to get the results I wanted from each piece of equipment.



During my 25 year tenure at NBC in San Diego, I designed and specified the equipment for 3 audio control rooms and a custom vehicle for mixing audio on-location for live television news and entertainment programs.

From the time I entered high school until today, I have had a "home studio" of one sort or another at my parent's house, my college dorm room, each apartment I've lived in, and every house I've owned. Today my "home studio" is a professional-quality recording studio and the center of my production company, [VoiceActing Studios](#).

Let's just say, I've had a home studio since before it was called a "home studio" and I know what I'm talking about. OK?

So, now it's time for you to build your own home studio, and I'll do whatever I can to help you understand what you need to know. Since most of us have limited funds with which to purchase the nifty toys that comprise a home studio, I've included some rough prices to help guide you through the process. Any prices you see are based on current retail prices at the time this ebook was written. As with most technology, it's quite likely that many of the prices will change over time. However, one of the nice things about home recording equipment and computers is that as the technology improves, prices tend to get lower.

Even if you're technologically challenged . . . if you want to play in the world of professional voiceover, you need to know the stuff in this eBook. You're about to learn the basics for building a home studio. When (or if) you are ready to take it further, there are literally dozens of books on the subject and tons of free information available on the Internet. You deserve a hearty "Congratulations" for being brave enough to jump in, and I promise you it's not as difficult as you might think.

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# The Basics of a “Home Studio”

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## Your Studio's Purpose

The first thing you need to do before you even think about putting a “home studio” together is to ask yourself this question:

“What do I intend to do with my home studio?”

Your answer to that question will determine the complexity, the versatility, the sophistication, and ultimately, the cost of your “home studio.” Do you plan to simply transfer your old vinyl or cassette recordings to MP3 files or CD? Is basic voice recording for auditions your objective? Or do you need the computer power and sophistication to handle multi-track music recording? Regardless of how you plan to use the equipment, a home studio can be built to perfectly meet your needs. And it doesn't need to cost a lot!

There are many different philosophies for home studio design. At the higher end of the scale is a home studio that closely resembles a mainstream professional recording studio – complete with custom-designed rooms, perfect acoustics, and completely sound-proof walls. At the lower end of the scale is a home studio that consists of a personal computer in a corner of an apartment. The typical voice actor's home studio falls somewhere in between, but the essence of all home studios is the same: to record something. The purpose depends on what is being recorded.

Determine exactly what you want to do with your home studio first. Then you can work from there to select the proper equipment to meet your objectives. You'll save a lot of headaches and money if you carefully answer this question before you begin. Don't worry if your purpose changes in time – and it probably will. You can always upgrade your computer or purchase new equipment later. One nice thing about the technology of this business is that the equipment keeps getting better and better, while the prices get lower and lower. But you've got to start someplace, and my purpose with this course is to help you understand exactly what you need so you can meet your initial goals without spending a lot of money.

If (or when) you need to learn more about acoustic design, studio fabrication, equipment wiring, and everything else that goes with a high-end studio, you'll find [links at the end of this course](#) for more information and resources than you'll ever need.

## Essential Ingredients and Equipment for a Home Studio

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Every home studio has the following basic requirements. How you satisfy these requirements will partially determine the overall cost of your studio. Here are the things you need to consider when putting together your home studio:

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1. An appropriate location that is quiet and suitable for open-mic recording. This can range from a quiet corner of a room on up to a custom-built and acoustically perfect recording facility. Depending on where you locate your recording area, it may be necessary to purchase acoustic control materials.
2. One or more high-quality microphones suitable for the kind of recording being done. Microphones for recording certain musical instruments may be different than microphones used for recording the human voice. Different microphones will produce a different sound from the same instrument. As a voice actor, you will want a microphone that makes your voice sound the best it possibly can, while simultaneously minimizing ambient room noise.
3. A microphone stand to support your microphone. This can be anything from a small desk-top mic stand to a boom-stand. I know one person who used duct tape to attach a microphone to the vertical pipe of a floor lamp as a temporary mic stand. Not pretty!
4. A copy stand, usually a music stand, to hold your script as you record. It's not a good idea to hold a script in your hands when doing voiceover. Paper makes noise, and holding a script limits your physical movement.
5. A means for controlling the audio signal being recorded (a "control surface"). This can vary from something as simple as a knob on a recording device or the "record" control menu for your computer's sound card, on up to a complex external digital audio mixer and computer interface.
6. A way to monitor yourself as you record. Usually in the form of closed-ear headphones. You may also eventually want a pair of good quality speakers for monitoring playback during editing. Although computer speakers will do the job, they are generally not designed for high-quality voice monitoring.
7. A way to get the audio signal into the recording device. This includes cables, wires, plugs, patch cords, adaptors, signal routing devices, analog to digital converters, etc.
8. A suitable recording device. Over the years, there have been many recording formats, including cassette tape, reel-to-reel tape, mini-disc, and various digital recorders. Today's standard is digital recording on a computer, an iPad<sup>®</sup>, or similar digital device. Anything less than digital is unacceptable in today's voiceover market. For the purpose of this course, we'll only consider recording on your personal computer.
9. Recording media. This can include audio cassette, digital tape, or other recording media. Most common for voiceover recording is the hard drive of a computer.
10. A way for clients to hear you as you record your voice. Holding the telephone while you record can work, but it will limit your movement. Wearing a bluetooth telephone headset connected to your cell phone is better, but still not ideal. A better solution is to have a way for clients to listen directly to the same audio that's going into your computer (a "phone patch").
11. A computer capable of handling audio recording. Although most computers are able to record audio, some older computers will have problems or crash unexpectedly.
12. Computer software (when recording on a computer) that is capable of meeting the needs for the purpose of the studio. For basic voice recording, the software can be relatively simple. For extensive multi-track music recording, the software is far more complex. When selecting software, look at your overall needs, and keep in mind that all computer-based recording software will have a learning curve. In most cases, you

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want that learning curve to be as short as possible. Even the simplest voice-only home studio will require the ability to record high-quality audio, edit the recordings, and convert the audio to an MP3 format for distribution.

13. A system for organizing your computer files and audio recordings.
14. A way of delivering final recordings – either as electronic files or on CD media.
15. A system for tracking your work and getting paid.

These essentials, and more, will be covered in detail throughout this guide to building your home studio.

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# About Technical Information

## Why Technical Information is Important

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We seem to live in a world that is becoming more and more technical in nature. The days of simplicity appear to be all but gone – everything is “technical.” In a perfect world, we would be able to record our voice simply by pressing a button. Well, with advances in computer and audio technology, it’s almost that simple . . . but you do need to understand how the technology works. And that’s where it begins to get technical.

It’s really not all that bad . . . once you understand a few things. The problem is that technology has a language of its own, and some people manage to convince themselves that the language of technology is just too hard to learn. But it really isn’t.

Understanding the technology of sound recording can be made easier if you don’t think of it in terms of being something hard to understand. It really is quite simple and logical. Honest! Look at the technology - or terminology - as being the tools in a toolbox. As with any toolbox, there are some tools you’ll use a lot and others that you’ll rarely touch.

Consider the first time you were in your kitchen cooking a fancy meal. OK, for some guys, that’s opening a can of baked beans or putting an avocado in a blender to make guacamole . . . but you get the idea. When you are cooking from a recipe you’ve never cooked from before, there are certain things you need to do as preparation, the language or ingredients in the recipe may be unfamiliar, and it may take a time or two before you get it exactly right. But once you get it, you never forget.

In your kitchen (your cooking toolbox) you’ve assembled everything you need to prepare that meal: pots and pans; cooking utensils; a stove or oven; a microwave oven; a refrigerator; spices; a blender; and all the ingredients for the meal. Until you put everything together in the correct proportions, it’s just not a satisfying meal. But when cooked according to the recipe . . . mmmmmm – delicious!

Your home studio is just a different toolbox. Your studio tools include things like: a microphone; a control surface; a computer; software; and wires and cables. The terminology used to connect everything together, operate the equipment, and run the software comprises the recipe for running your studio.

In the next section, I’ll explain many of the technical terms you’ll encounter in as non-technical a manner as possible. Those of you who are “techno-nerds” may find this approach somewhat beneath you, but you’ve probably already got your studio wired . . . so what are you doing reading this?

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## Important Technical Terms You Need to Know

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If you've been using a computer for awhile, or if you've ever hooked up a home stereo system, you've already come across some of the following terms. However, much of what follows may be new to you. Please feel free to take a break or lie down if this is too much for you. You might even want to skip this section for now and [go here](#) until it feels safe to attempt technical talk.

Welcome back.

A basic understanding of the technical side of your home studio will give you an edge when talking to people about purchasing equipment or setting up your studio. Whether you really do understand or not, at least you'll sound like you know what you're talking about! You may want to review this section a few times if you don't get everything the first time through.

There are two primary technical areas to your home studio: 1) your [audio system](#), and 2) your [computer](#). OK, if you want to get "technical," you can probably throw in 3) [room acoustics](#), but that goes beyond the scope of this course (although I will discuss how to "fix" a bad sounding room later on and give you all sorts of resources for dealing with poor room acoustics.)

An important note, here: I encourage you to browse through the following lists of audio and computer terminology. You may think you know the meanings of these terms. However, I've included in my definitions how these terms directly relate to recording voiceover.

Let's start with your audio system. This section is basically just a glossary of terms, so you can refer here often if you need to. Only the most common terms are included here, and these definitions are intentionally simplistic. For the most part, you only need to have a general idea of what these mean in order for them to be of use to you. If you find a hunger for more, I've included some links to websites with enough definitions for technical terminology to keep you going for weeks:

### Audio Terms Worth Knowing

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Adaptor	An adaptor is simply a small device for connecting two dissimilar connectors
Analog Audio	Referring to conventional audio equipment that does not utilize any <a href="#">digital</a> conversion or processing. The human ear is an analog device.
AUX	A secondary, or alternate input or output on an audio device. On a mixer, the AUX volume control can provide a secondary mix of the selected audio inputs. Depending on the sophistication of the mixer, an AUX volume control may be selectable for <a href="#">PRE FADER</a> or <a href="#">POST FADER</a> .
Balanced	(cable) A balanced cable has 3 wires that carry the audio signal. One wire carries the positive (+) side of the signal <a href="#">waveform</a> while a second wire carries the negative (-) side of the signal <a href="#">waveform</a> . These two wires are surrounded by a braided Shield (the 3 <sup>rd</sup> wire) that insulates the wires carrying the audio signal from RF and other electrical interference. All

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professional audio is designed for balanced wiring. Balanced connectors can be either XLR-3 or 1/4" stereo, since these connectors are designed for 3 wires.

Buss	A grouping of input or output controls that have a common destination. A typical <a href="#">mixer</a> will have a series of volume controls for the various inputs (the main mix buss), and one or more <a href="#">AUX</a> busses for providing different combinations, or mixes, of the various sources.						
Cable	Usually used when referring to a microphone cable or other "balanced" connecting cable.						
Channel	INPUT: An input channel is comprised of the input <a href="#">connector</a> , <a href="#">gain</a> trim control, <a href="#">EQ</a> , <a href="#">AUX</a> level controls and other functions that might directly affect a specific input source. On most mixers, input channels are aligned in a vertical configuration. OUTPUT: An output channel is a dedicated destination to which one or more input sources are assigned. For example a microphone on Input #7 might be assigned to OUTPUT Ch #1 and AUX Out #3. An output channel can also be referred to as an output <a href="#">buss</a> . The number of output channels on a <a href="#">control surface</a> will depend on the sophistication of the device.						
Compressor	A piece of equipment (or software component) that is designed to increase low <a href="#">level</a> (low volume) audio to a pre-determined and louder volume. The result is a perceived increase in overall volume, even though only the softer portions of the sound have been increased. The process is often referred to as "compression" or "audio compression."						
Compression	(as in Digital or Data Compression) The process of removing unnecessary data from a digital audio file to make the file smaller. Typically an uncompressed .WAV or .AIF audio file is 10MB (megabytes) per stereo minute. Digital compression used to convert the file to an MP3 file can result in a new file that is roughly 1/10 <sup>th</sup> the size of the original, with no noticeable difference in sound.						
Connector	A " <a href="#">plug</a> " (male connector) or " <a href="#">jack</a> " (female connector). <a href="#">Connectors</a> are the things at the ends of the wires, and come in a variety of designs.						
Control Surface	Any external piece of equipment that is capable of controlling the volume (or loudness) of an audio signal as it is being recorded.						
Decibel (dB)	Refers to the electrical output of an analog audio device, such as a microphone, computer sound card, or tape player that describes the general volume (loudness) of sound at a standard reference level. Here are some typical dB references: <table><tr><td>Microphone</td><td>-65 dB</td></tr><tr><td>Consumer audio equipment</td><td>-10 dB</td></tr><tr><td>Professional audio equipment</td><td>+ 4 dB</td></tr></table>	Microphone	-65 dB	Consumer audio equipment	-10 dB	Professional audio equipment	+ 4 dB
Microphone	-65 dB						
Consumer audio equipment	-10 dB						
Professional audio equipment	+ 4 dB						
Digital Audio	Refers to the process or equipment that utilizes audio that has been converted from analog. A digital converter (AD converter) will sample an audio waveform many thousands of times per second. The sampling rate for a CD is 44.1 KHz, or 44,100 samples per second (1 KHz = 1 kilohertz, or 1,000 times per second), which is more than adequate for recording voice. Other common sample rates are 48KHz (television audio) and 96KHz (high-						

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quality music recording). A higher sample rate will require more storage space on the hard drive.

In addition to the sample rate, digital conversion also employs a “bit rate,” which determines the ultimate quality of the sampled audio – the higher the bit rate, - 16 bit or 24 bit – the higher the quality. 44.1KHz 16 bit is the common standard for most digital audio recording software.

Each sample converts that point of the analog signal to a digital equivalent that can be stored on a computer hard drive. The advantage of digital audio is that it is not susceptible to [RF](#) or other electrical interference, and can be easily manipulated with properly designed computer software.

Digital Zero	The point at which, when exceeded, a digital recording will begin to sound distorted. Digital Zero is the maximum possible recording level for digital audio. Above this point, the audio signal loses data bits, resulting in a form of distortion. The optimum recording level for digital audio is between -9 and -18 on the digital meter. -18 digital is the equivalent of 0VU on an analog recorder or mixer.
Driver	A small file that tells a computer how to properly communicate with a device or program.
Dynamics	Refers to the overall range between loud and soft during a performance.
EQ (Equalization)	Refers to the adjustment of specific portions of an audio signal. Think of EQ as the tone control on your stereo system. Adjusting the Bass is equivalent to adjusting Low Frequency EQ, etc. EQ devices come in many forms, but all will allow for specific frequencies to be adjusted louder or softer. The resulting change in EQ can have a radical effect on the overall sound.
Fader	The volume control knob or slider on a mixer or other control surface.
Gain	Another word for “volume”. A “Gain Control” is simply the knob or slider used to control an input source or monitor volume.
Ground	An electrical “ground” is the connection point for a wire’s <a href="#">Shield</a> . A ground has zero electrical potential (zero volts) and serves as a stabilizing common point for all electronic components that results in the elimination of electrical and <a href="#">RF</a> interference. Connection to “ground” is achieved through a common connection of the shield of all connected equipment that is then isolated to the “ground” plug of the electrical connector for a piece of audio equipment.
Headroom	The amount of difference between normal operating level (volume) and the point at which the audio signal begins to distort. For analog recorders, 0VU (volume unit) is considered to be the optimum recording level. Most analog equipment will have approximately 18-20 dB of headroom to allow for transient spikes or sudden changes in volume to be recorded without distortion. Digital audio references -18 dB as the optimum recording level, which provides roughly 18 dB of headroom. Digital Zero is the point at which data loss (distortion) begins to occur.
Impedance	Refers to the electrical resistance of a circuit – measured in Ohms. For the purpose of this guide all you need to know is that professional microphones (with an XLR connector) are Lo-Impedance [150 – 600 ohms], and most

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consumer equipment, including microphones that use a ¼” connector are high-impedance [10,000 – 20,000 ohms].

Jack	A female counterpart to a <a href="#">plug</a> .
Level	Referring to the overall volume of a performance (voice level) or the output of a piece of audio equipment (signal level). When an audio engineer asks you for a level, you should deliver your lines with all the dynamics of loud and soft that you intend for your recorded performance.
Limiter	A limiter prevents (controls) the loud spikes of an audio signal (your voice) from exceeding a pre-set maximum volume or level. The result is that distortion is avoided during a recording.
Line Level	Referring to the electrical output of audio equipment. Consumer line level is generally -10 dB, while line level for pro equipment is usually +4 dB.
Microphone Level	Referring to the electrical output of a microphone. Mic Level is typically -65 dB (decibels), which is extremely weak.
Mixer	A <a href="#">control surface</a> designed to accept a variety of audio sources including microphones and line-level audio equipment.
Monitor	Speakers or headphones used to listen during recording or playback. There is usually a separate volume control on a mixer labeled “Monitor” that adjust the listening volume independently of the signal being recorded.
Normalize	The process of adjusting the overall volume of a digital recording so the loudest parts are just below <a href="#">digital zero</a> . This provides maximum volume level without distortion.
Phantom Power	Condenser microphones require a power source: a battery inside the mic, or a voltage that comes down the mic cable from a <a href="#">mixer</a> or <a href="#">USB</a> interface. Some mics require 48 volts +/- 4 volts, while other mics will work with anything from 11 to 52 volts. Check the mic spec sheet to make sure your mic and other equipment are compatible.
Phone Patch	Refers to the connection of an audio mixer to a <a href="#">telephone coupler or “hybrid”</a> for the purpose of monitoring a mix over the telephone.
Plug	A male connector at the end of a wire connecting two audio devices. A ¼” is commonly found at the end of a pair of headphones. Many ¼” headphone plugs conceal a 1/8” (or mini) plug. ¼” and 1/8”Mini connectors can be either MONO or STEREO.
Plug-and-play	The ability to simply plug a device into your computer and have it work immediately. The device and computer automatically handle any configuration or setup necessary for proper operation.
Pop Filter	Also, “Pop Stopper,” “Pop Screen,” or “Wind Screen”: Often a small round open frame covered with stretched nylon or a tight-fitting foam covering that is placed over the head of a microphone. The purpose is to break up the air created from “plosives” during speech. When spoken in certain words, the letters “P,” “G,” “K,” and “T” can create excessive breath that can sounds like a “pop” or “blast” when striking the microphone diaphragm. A “pop filter” dissipates the air, thus reducing the potential for “popping.”
Pot	Another word for the knob or slider used to control volume or loudness.

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- Post [Fader](#) When selected, the audio source for that input will be monitored after the main volume control for that source.
- Preamp A microphone preamp is used to amplify the extremely low signal coming from a microphone so it can be used by a mixer or other control surface.
- Pre [Fader](#) When selected, the audio source for that input channel (usually a microphone) will be monitored before the main volume control for that source. In other words, if the main volume control section is sending audio to a recorder (computer), selecting Pre Fader on an [AUX](#) input will allow monitoring of that input channel's source without having to turn up the main volume control. This is very useful for providing a completely separate mix or audio feed to a secondary recorder or to a telephone coupler.
- RCA [connector](#) The common connector found on most stereo system components, also known as a "pin connector".
- RF Radio Frequency interference exists everywhere and can be a serious problem if not controlled. RF interference often manifests as a "buzz" or "hum" that occurs when a cable or wire is too close to a source of high electrical voltage (such as a television set, electrical extension cord, etc.) If there is a break in the connection between a wire and its connector, the wire may act as a radio antenna and can receive a local radio station. Shielded cables minimize the possibilities for RF interference, but careful attention must still be paid when laying out audio wiring. To minimize interference, avoid running audio cables or wiring parallel or adjacent to electrical wiring. Try to keep electrical cords and wiring at least several inches apart from audio wires and cables whenever possible.
- Room tone The inherent ambient sound that exists in any recording environment.
- Shield Braided wire that surrounds other wires in a cable or wire. The purpose of the shield is to insulate the wires that carry audio signals from outside electrical or [RF](#) interference. If a shield is broken (either a broken connection at a connector, or a break in the shield within the wire) the result may be a severe "buzz" or "hum" in the audio. Unless you are adept at soldering or repairing wiring, the best solution for a broken shield is to replace the wire or cable.
- Telephone Hybrid A device used to connect an audio system to a telephone. A [Phone Patch](#) is a type of telephone hybrid.
- Trim (also [Gain](#) Trim) A volume control positioned as the first place an audio signal reaches upon entering a control surface or mixer. Gain Trim is used to optimize the signal coming from a microphone or line-level device so as to provide adequate control of the source volume using the input and AUX volume controls. If Gain Trim is set to "hot", the input source may distort or it may be difficult to adjust the volume during recording or playback.
- Unbalanced (wire) A wire that has only a single wire surrounded by a shield is considered unbalanced. The negative (-) of the audio signal is carried on the shield. This shortcut results in a greater susceptibility to interference and the requirement for shorter cable runs. Consumer stereo equipment typically uses unbalanced wiring.

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- Waveform** Refers to the visual representation of an audio signal. A pure tone creates a sinusoidal waveform that does not waver. The human voice creates a highly complex waveform. All audio waveforms have a positive (+) side that is viewed above a horizontal center line, and a negative (-) side that appears below the center line.
- Waveform Editing** Most audio recording software uses waveform editing. The software will show a waveform representation of the recorded audio. With a little practice it is relatively easy to locate specific edit points along this waveform for making changes in the recorded audio. Waveform editing does not directly affect the original recording on most software.
- Wire** Usually used when referring to wiring or cabling that connects audio equipment. Wires can be either [balanced](#) or [unbalanced](#).
- XLR connector** A 3-pin connector used for microphone cables. XLR connectors come in both male and female. A professional microphone will have male XLR connector built into it. The female XLR-3 end of the microphone cable plugs into the microphone and the male end of the cable plugs into a [mixer](#) or other device.

And for those you who want more . . .

Here are some websites that have definitions of audio terminology:

[www.audiolinks.com/glossary.shtml](http://www.audiolinks.com/glossary.shtml)- a comprehensive glossary of audio terminology

[www.angelfire.com/ca/stereophile/glossary.html](http://www.angelfire.com/ca/stereophile/glossary.html) - audio and electronic glossary

## Computer Terms Worth Knowing

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You may encounter some of the following terms as you work with your computer to record audio.

- Bit rate (depth)** Refers to the structure of digital data. In digital audio, bit depth (or bit rate) defines the number of discrete measurement values available to describe the amplitude (or loudness) of a single audio sample. Each bit effectively represents 6dB of dynamic range. So a recording at 24 bit resolution would have a potential dynamic range of 144dB (the range from softest to loudest sound in a recording). A common audio CD has a [sample rate](#) of 44.1KHZ 16bit. High end recording studios will often record at 44.1KHZ 96bit or higher. Common bit rates are 8, 16, 24, 96 and 192.
- CPU** Central Processing Unit. The brain of your computer. The faster your computer's CPU speed, the more efficiently your computer will work for recording or playing audio and video.
- Desktop** The top level of the hierarchy file structure on your computer. Think of your computer desktop like the top of your office desk. It's a place to hold things (files you're working on) until they are stored in other areas of your computer.
- Directory** The index of all folders and data files that are on your computer. Think of your computer's directory structure like an office filing cabinet. A simple

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directory structure will start with the Desktop at the top (the filing cabinet itself); many different drawers (the hard drive, CD-R drive, DVD drive, etc.); folders within those drawers (computer “folders” hold programs, pictures, music files, data files, etc.); and the paper within the folders (the data files stored on your computer. On a computer, there can be folders within folders within folders.

- Email A means for delivering text messages, images, audio files, and other data between computers. Images, audio, and other [files](#) can be “attached” to an email for delivery along with the basic text message. The largest file size suitable for delivery with an email is approximately 8MB (megabytes). Considering that an uncompressed .WAV or .AIF audio file is 10MB/stereo minute, it becomes clear that email is not a good way to deliver uncompressed audio files.
- File A single related collection of records. An audio file contains all related audio data for a specific voice track or song. A database file might contain all names and addresses for a list of customers. An image file would contain all the data needed to reproduce an image.
- Firewire (1394) Firewire is a very fast form of bi-directional data communication between a computer and an external device. Also referred to as 1394 (the technical specification for Firewire). This protocol is commonly used for video devices, external hard drives, and other data communication. Not all computers have a Firewire 1394 port.
- Flash Memory A fast form of either temporary or long-term storage of data. Flash memory is finding a home with [USB](#) memory devices that make for fast and easy transfer of data between computers.
- Folder As the word implies, this is a place on your computer in which data files, or other folders are stored.
- FTP File Transfer Protocol. A standard Internet protocol used for transferring data from a computer to a website and back again. Most websites have a dedicated FTP area that can be used for file transfer. A typical FTP Internet address replaces the www with ftp. Some FTP websites are protected and require a username and password to gain access. FTP is an ideal way to send large data files between computers. The length of time necessary to transfer a file will depend on the file size and the speed of the Internet connection.
- Hard Drive A storage device for computer data. Hard drives can be either internal (inside a computer) or external (portable). The speed of the drive’s disc rotation is an important factor to consider when recording audio or video. Many basic drives have a speed of 4800 to 5400 RPM. Although a 5400 RPM drive can record audio, it may experience problems during recording or playing large files. The problem is caused because the computer may be attempting to write (record) or read (play) the data faster than the drive can work with it. When recording audio or video it’s best to use a hard drive that runs a least 7200 RPM. High-end drives for video production currently operate as fast as 10,000 RPM.
- RAM Random Access Memory. A place within your computer for temporary storage of data. As a general rule, the more memory your computer has, the

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better. A computer with minimum memory (generally 128MB) will be fine for word processing and other basic computer functions. However, audio and video recording software may require additional memory to properly function. For recording voice, a minimum of 512MB is recommended. Any information stored in RAM will be lost when power is turned off.

Render	Refers to the process of compiling the independent components of a project into a single file. For example, an audio project consisting of voice track, music and sound effects files originally in different formats might be rendered to a single MP3 file.
Sample rate	Refers to how frequently an audio signal is "sampled" in one second as it is being converted from analog to digital. The higher the sample rate the better the quality. The sample rate for a standard audio CD is 44,100 samples per second, or 44.1Khz. The highest frequency the human ear can perceive is considered to be roughly 22.5KHz (2,500 cycles per second). By sampling an audio source at twice this frequency (or 44.1KHz), the majority of detail in an audio signal can be effectively reproduced. Sample rates can range from 8KHz (telephone quality) to 48KHz (video). Each sample consists of data bits stored at a specific <a href="#">bit rate</a> .
Sound Card	An analog device on your computer intended to provide audio inputs and outputs. A sound card will take an analog audio source from a <a href="#">microphone</a> or <a href="#">line-level</a> source, and convert it to a digital signal that can be used by your computer.
USB	Universal Serial Buss. Newer computers will have a minimum of 2 USB ports intended to connect add-on devices like a mouse, keyboard, joystick, scanner, printer, etc. USB devices are "plug & play," meaning there is no additional setup required in order to use the device. A <a href="#">USB Memory device</a> is a popular tool for transferring data between computers, effectively replacing floppy discs and other transportable media.
USB Interface	An outboard (external) analog-to-digital converter designed to convert an analog microphone or line level audio signal to a digital signal for recording on a computer.
USB Mixer	An audio mixer with a built-in <a href="#">USB interface</a> . Inexpensive USB mixers are basically a high-quality analog mixer with conventional line-level outputs and a USB interface that converts analog to digital at the mixer output. High-end digital mixers convert each analog source to digital at the input and maintain a digital audio signal path through the mixer and on out to the computer.

Still need more computer terminology definitions? OK, here ya go . . .

Here are some websites that have definitions of computer terminology:

<http://www.sharpened.net/glossary/index.php>

<http://whatis.techtarget.com/>

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

<http://wombat.doc.ic.ac.uk/foldoc/>

[http://www.sheppardsoftware.com/web\\_games\\_vocab\\_computer.htm](http://www.sheppardsoftware.com/web_games_vocab_computer.htm) - a web-game for learning computer terminology

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# Audio Basics

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This section explains some of the terminology in the [About Technical Information](#) section a bit more fully. You'll also learn some basics about acoustics, the electrical aspects of recording sound, and a few other things I'm sure you'll find fascinating. All of this information will be useful as you assemble the component parts of your home studio, hook everything together, and start recording. Don't worry, though . . . you don't need to remember all of this. That's why you have this guide!

Let's start with an elementary discussion of sound and what happens during the process of being recorded on your computer.

## A bit about sound, or... ...a short lesson in the physics of sound

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Sound is a function of the movement of air molecules that reach the human ear and are translated by our brain into something we can recognize. Sound travels in waves and is made up of several very definable component parts, among them: frequency, amplitude, attack, and decay. Audible sound, detectable by the human ear, falls within a **frequency** range of roughly 20 Hz (herz, or cycles per second) to 20,000 Hz. The **amplitude** of a sound is its relative volume or loudness, measured in [decibels](#) (see [below](#)). **Attack** refers to the start of a sound wave. For example, the sound of breaking glass has a very abrupt, or sharp attack, while the sound of a pillow falling to the floor has a very soft attack. **Decay** refers to the duration of the sound and how long it takes for the sound to completely disappear after the initial attack.

Each of these four aspects of sound is important when selecting the microphone and other equipment for your home studio. Let's take a brief look at each one:

**Frequency:** Your voice produces sounds that fall within a specific frequency range. Some people have a higher pitched voice and some are lower than yours. You want your microphone to reproduce the sound of your voice in as accurate and natural a manner as possible.

**Amplitude:** Depending on the kinds of voice work you will be doing, you may at times use a delivery style that ranges from very soft to very loud. For your low level (soft) delivery, you want your microphone to be very clean, with an absolute minimum of inherent noise.

**Attack:** Certain words have a hard attack, such as words that begin with "K," or "T" and other consonants. Words that begin with vowels have a softer attack. Your microphone should be able to handle sounds that have a sharp attack without "splattering" or distorting in any way. Condenser microphones, due to their design, have a crisper and faster response than most dynamic microphones.

**Decay:** For voice recording, decay refers more to the acoustics of your room than anything else. A perfect example of decay is to listen to how you sound in an empty tile room. As you speak, you'll hear an "echo" or "reverberation," which is really nothing more than the sound waves of your voice being reflected off the tile or walls of the room. The longer the reflected sounds bounce around, the longer the decay. For recording voice, you want a recording environment that is as quiet or dead as possible with little or no decay.

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When recording your voice, sound waves are picked up by the microphone and converted into electrical energy. As a sound wave strikes the diaphragm of a microphone, the movement of air molecules causes the diaphragm to move from its center point. This results in a very weak, but positive (+) electrical voltage. As the diaphragm returns to its original position, the resulting change in voltage is negative (-). The combination of positive and negative movement creates an electrical equivalent of the acoustic sound wave. This electrical energy (or audio signal) travels through a wire or cable to a [control surface \(mixer\)](#) where it may be combined with the signal from other sources.

Upon entering a computer or AD converter (analog to digital), the electronic audio signal is [sampled](#) and converted to data bits of binary information (hence the clever title for this section.)

There are two basic types of sources that create electrical energy for recording audio: Microphones and Line Level sources.

### Microphone vs. Line

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“So,” I hear you ask, “what’s the difference between a microphone and a line level source?” OK, so maybe you weren’t asking . . . but I’ll tell you anyhow.

Here’s the difference between [Mic Level](#) and [Line Level](#) sources. Both of these terms refer to the electrical voltage resulting from the conversion of acoustical energy (sound waves) into electrical energy.

Obviously, Mic Level relates to the output voltage of a microphone. This is a very weak and unaffected signal that represents the specific amount of movement produced in the microphone’s diaphragm by the movement of air molecules. The amount of air movement is referred to in terms of **sound pressure level** (SPL). And sound pressure level is measured by the [decibel](#) (dB). Remember the decibel?

A one dB change in sound pressure is the smallest change in volume that can be detected by the human ear. But 0dB is not the absence of sound. 0dB is only near total silence and represents a standard sound pressure for the threshold of hearing. As you know, there are many animals capable of hearing sounds well below the human threshold of hearing.

The decibel is a logarithmic progression – meaning that an increase of 1dB results in a 10 times increase. Thus the origin of the term decibel: deci (10) and bel (the unit of sound pressure). A 10 dB change in volume is 10 times as powerful, 20 dB is 100 times, and a 30 dB change in volume is 1,000 times more powerful than the original sound.

You don’t really need to remember the following examples, but it is interesting to see how the loudness of certain sounds compare:

0 dB	Near total silence (threshold of hearing)
15 dB	A Whisper
60 dB	Normal conversation
90 dB	A lawnmower
110 dB	A car horn

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120 dB	A rock concert or jet engine
140 dB	A gunshot or firecracker

The term decibel is also used to refer to changes in an electronic signal that ultimately will create a change in sound pressure. Since a microphone changes acoustic energy to electrical energy, the decibel works well to compare the relative volume of audio signals. The record volume indicator on your equipment or software indicates the relative volume of the incoming audio as referenced to a standard of 0dB.

Acoustic dB and electrical dB are not the same thing. While the reference for 0 dB acoustically is the roughly threshold of human hearing, the electrical equivalent of 0 dB refers to a specific voltage that is used as a reference standard. All equipment references to dB refer to the electrical voltage, not the acoustic energy. If you're really brave and want a more detailed (and highly technical) explanation of our friend the decibel, go [here](#).

All microphones produce a very low electrical signal that carries the audio waveform, usually in the area of -60 dB. This is referred to as "[Microphone Level](#)". Because this electrical signal is extremely low, it must be amplified before it can be used by any audio equipment. A piece of equipment called a [microphone pre-amplifier](#) boosts the weak electrical mic signal up to a level that can be used by audio equipment ([Line Level](#)). A microphone pre-amp is the first place an audio signal reaches when entering a [mixer](#) or other control surface such as a [USB](#) analog to digital interface.

Once amplified, the mic signal can then be combined or "mixed" with other audio sources on an audio mixer, or within audio recording software.

Electronic audio equipment (both consumer and professional) produce an already-amplified [Line Level](#) signal. The reference output level for this equipment is expressed in dB.

Consumer equipment is generally -20 or -10dB  
Professional equipment is usually 0 dB or +4 dB

## Connectors and Adaptors are Your Friend

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**RESOURCES:** [www.radioshack.com](http://www.radioshack.com)








So, now you know that there are two basic types of electrical signals for audio: mic level and line level. The next question is "how can you tell the difference between a line level connector and a microphone connector." Unfortunately, there is not easy answer to this question, simply because the same type of audio connector can be used for either mic or line level devices. This will become more clear as you read this section. As you can tell by its name, an audio connector is designed to connect two wires or pieces of equipment. Consumer audio uses [unbalanced](#) wiring and connectors, while professional equipment uses [balanced](#) audio wiring.

**Unbalanced** connectors will have only one (1) wire for the positive side of the sound wave, surrounded by a [shield](#) that carries the negative side of the sound wave, and which is also connected to [ground](#). Unbalanced audio wiring is generally used for [high-impedance](#) equipment and can only handle relatively short cable runs (10-15 feet) before noticeable loss.

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**Balanced** connectors will have two wires for the audio signal – one for positive and one for negative – which are surrounded by a neutral [shield](#) that is connected to [ground](#). Balanced audio is used for low-impedance equipment and microphones and has the advantage of being able to handle extremely long cable runs up to several hundred feet with little or no signal loss. Balanced audio wiring for microphones also has the ability to carry phantom power, which is necessary for condenser microphones to function.

Here's a chart of the most common audio connectors and adaptors and how they are used:

Connector/Adaptor:	How it's used:	Characteristics:
 <p><b>XLR-3 Male and Female</b></p>	<p>Lo-impedance microphones (microphone has a Male connector built in) Professional audio equipment line in &amp; out</p>	<p>Pin 1 – ground/shield Pin 2 – audio signal + Pin 3 – audio signal -</p>
 <p>1/4" Mono Male</p>	<p>Unbalanced hi-impedance microphones Unbalanced line level audio</p>	<p>Tip of connector is positive audio signal. Sleeve (the longer part of the shaft) is connected to the shield.</p>
 <p>1/4" Stereo Male</p>	<p>Stereo headphones and Unbalanced stereo audio Balanced lo-impedance audio</p>	<p>Balanced audio will use the Tip and Ring of this connector for the positive and negative audio signal, and the sleeve for the shield. Unbalanced stereo will use the Tip for Left, the Ring for Right, and the shield for ground.</p>
 <p>1/8" Mini – stereo and mono</p>	<p>Usually used for small consumer audio equipment using an unbalanced audio signal. Use a stereo Mini plug for stereo headphones. Use a <b>Radio Shack 275-368</b> 1/8" Stereo Jack to Mono Plug to monitor only the LEFT input of a USB device.</p>	<p>A MONO connector will have only Tip and Sleeve A STEREO connector sill have Tip, Ring and Sleeve</p>
 <p>RCA Male</p>	<p>Unbalanced audio cables commonly used to connect consumer audio equipment.</p>	<p>Connector has a single pin that extends through a circular sleeve. The positive audio signal is on the pin.</p>
 <p>RCA – Female to Female</p>	<p>Used to extend two RCA-M to RCA-M wires</p>	<p>Also called a "turn-around"</p>
 <p>RCA-F to 1/4" Male</p>	<p>This adaptor will adapt an RCA-M plug to a 1/4" input jack. Commonly used to connect consumer audio equipment to a line input on a mixer or USB interface.</p>	<p>Has an RCA-F connector on one end and a 1/4" mono connector on the other end.</p>

Most audio connectors and adaptors come in Male and Female types. Generally, an audio signal will travel in the direction of the pointing pins. In other words, a male connector at the base of a microphone indicates that the signal is coming FROM the mic. A male connector on the end of a wire indicates that the audio signal is coming FROM the other end of the wire. The Male connector (the plug) will plug into a Female connector attached to a piece of equipment or may be on the end of an extension cable. In some cases a "turn-around" adaptor will be used to connect two of the same type connectors. For example, a typical RCA-RCA cable for a stereo system will have an RCA-Male connector at both ends. To extend the length by connecting to another RCA M-M cable requires the use of an RCA-F to RCA-F adaptor.

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# How Microphones Work

## The Critical Component

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Your home studio will only be as good as the weakest component. One of the most critical components is your microphone. The mic you choose should make you sound great. You don't want to sound "boomy" or overly "bright" – you want your recordings to sound natural and clean. An inexpensive microphone can color the sound of your voice or cause it to sound unnatural, distorted, "boomy," or "tinny".

When shopping for a microphone, you'll find a vast assortment to choose from. To determine the proper microphone for you, try to arrange for a test of the mic to hear how it sounds with your voice. Take a pair of headphones that you are familiar with to the dealer and use them to monitor your voice through the mic. If at all possible, test several different mics before making your purchase. If you can't test a mic, or you purchase it over the Internet, make sure that you can return it or exchange it if you discover it isn't the right mic for you.

You may be tempted to go for the least expensive microphone, but beware that doing this may easily result in the need to purchase a better microphone fairly soon. Or you may think that a USB mic is the way to go. I'll talk about that [here](#). The best place to shop for a mic is a dealer specializing in music equipment, like Musician's Friend, or Guitar Center. These dealers have professional microphones and other audio equipment at very good prices. You'll find many options in the Home Studio section of [www.VoiceActing.com](http://www.VoiceActing.com).

Let's get one thing out of the way right up front. The word impedance (symbolized by the letter Z) – it's a confusing term that is used when referring to microphones and audio equipment. Microphones fall into two categories: Low-Impedance (Lo-Z), and High-Impedance (Hi-Z). Basically, the impedance of a device has to do with the way it reacts in an electrical circuit. For our purpose here, all you really need to know is that low impedance equipment is going to be less susceptible to problems from interference – and will generally cost a bit more. When it comes to microphones, though, the savings you'll see from purchasing a less-expensive high-impedance mic will not be worth it. Don't even waste your money!

A Hi-Z mic uses an unbalanced connector (usually a ¼" mono phone plug or a 1/8" mini plug), which means it can only handle a short cable run of about 20 feet before noise and other problems become apparent. Also, Hi-Z mics are cheaply made and are mainly intended for use with inexpensive consumer equipment.

Lo-Z mics, on the other hand, use a balanced cable and 3-pin XLR connectors. These mics are rugged, durable, and can handle extremely long cable runs. The balanced wiring insulates the audio signal from external noise and [RF](#) interference.

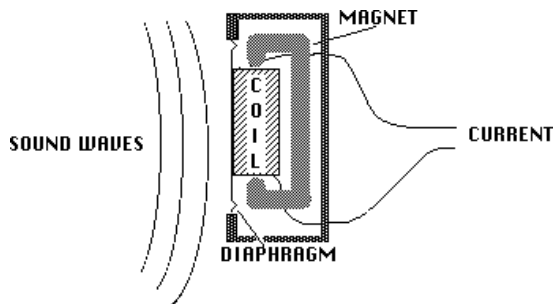
The simplest and clearest explanation of impedance I've found is at this link (you'll need to scroll down the page a bit to find the beginning of the article):

<http://www.electronics-tutorials.com/basics/impedance.htm>

## Microphone Basics

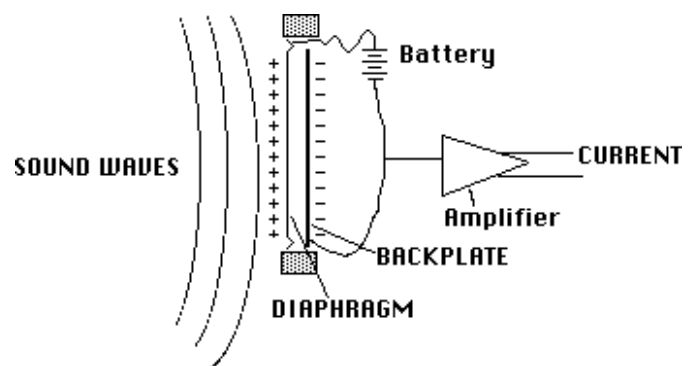
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Before you can use a microphone effectively, it is helpful to first have a basic understanding of how these marvelous instruments work. The basic purpose of a microphone is to convert acoustical energy (sound waves) to electrical energy that can be manipulated and recorded. There are several designs for each of these types of microphones, *dynamic* and *condenser* being the most popular.



*Dynamic* mics use a moving coil attached to a diaphragm (much like a loudspeaker in reverse) to convert acoustic energy to electrical energy. Dynamic mics are relatively inexpensive and rugged. Sound quality is generally better with the more expensive models. Simply plug it in to the appropriate equipment and start talking.

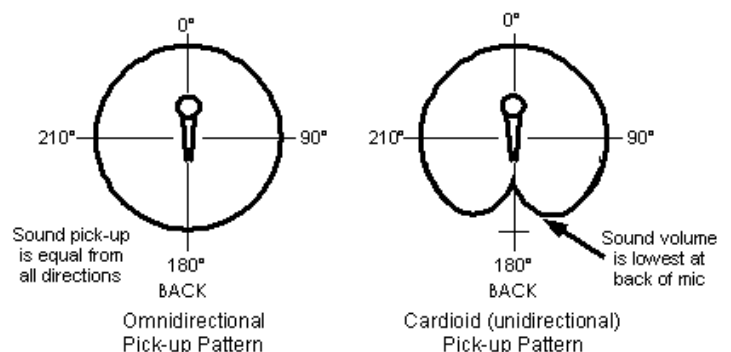
*Condenser* mics use two fixed plates very close to each other, but not touching. A constant voltage is placed across the two plates, provided by a power supply (usually from a battery or external power supply) generally referred to as [phantom power](#). As sound waves strike one plate, a change in the electrical energy is the result. Condenser mics are more expensive, far more sensitive and more fragile than dynamic mics. The sound quality of a condenser mic is generally cleaner and “crisper” than that of a dynamic mic. USB mics are always condenser.



Microphones come in two primary pickup patterns: *omnidirectional* and *cardioid* (*unidirectional*). Of these, the most common type of microphone for recording is the cardioid. Omni and cardioid mics can be either dynamic or condenser.

*Omnidirectional* mics will pick up sound equally from all directions and are not very common for high-quality voice recording. They are, however, usually the least expensive and most rugged.

*Cardioid* mics (also called unidirectional mics) come in a wide variety of designs, but virtually all of them pick-up sound best from directly in front of the mic. The sound pick-up reduces or fades as you move off-axis of the front center of the mic. The back of the mic is the point of maximum sound rejection.



A *bidirectional* mic is a single mic that has the pick-up pattern of two cardioid mics placed back to back. With a bidirectional mic, maximum rejection is from the sides at 90° off-axis.

## Microphone Technique: Using the Microphone

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*Microphone technique* is a subtle but powerful way of enhancing your character or the emotional impact of your delivery. Mic technique refers to how you use the microphone to your advantage while in the booth.

In a recording studio environment you will generally be standing in front of a music stand (copy stand) with a microphone on a boom at about head level. Studio microphones are very sensitive and often have a “[pop](#)” screen positioned between the mic and your mouth. The pop screen prevents blasts of air from hitting the microphone’s diaphragm. Studio microphones are usually *cardioid* (directional), and most engineers position the mic off to the side or perhaps in front of the performer, above the copy stand at about forehead level about 6-8 inches from the mouth. The acoustics of the voice booth are *dead*, meaning there are no reflected echoes. The result is a very clean sound.

As a starting point, you should position yourself so your mouth is about 6-8 inches from the mic. You can easily estimate this by extending your thumb and little finger; place your thumb against your chin, and the mic at the tip of your little finger.

### Working the Microphone

Microphones really don’t care where they are in relation to your mouth - as long as the diaphragm is aimed directly at your mouth. Six inches off to the left will pick up your voice exactly the same as six inches directly in front of you or six inches above your mouth (at about eye level). You should always position yourself so you are talking across the microphone and



never directly into it. Speaking directly into the mic can blast the diaphragm. Although this is rarely harmful to the mic, the resulting “popping” sounds can be a serious problem for the recording and are something that can be difficult to fix later on.

As you physically move closer to a studio microphone, your voice increases in lower frequencies (bass) and the overall tone of your voice will be more intimate. This phenomenon is called *proximity effect* and is a common characteristic of all directional microphones. As you move away from a studio mic, the mic picks up more of the natural ambience of the room. This results in a more open sound, which is cooler and less intimate. Don’t be afraid to experiment, but if you’re in a professional studio, do let the engineer know what you are doing because he or she will need to adjust recording levels accordingly.

While performing, keep your head in a constant relationship to the microphone. The rest of your body can move as much as you need, provided you aren’t making any noise. But your head must remain relatively stationary. If your position drifts on- and off-mic, your voice will appear to fade in and out. This drives engineers crazy because the overall volume of your performance is constantly changing. Even with the best equipment, moving off-mic is extremely difficult to deal with simply because a change of just a few inches can result in a very noticeable change in the *room tone* or ambience picked up by the mic.

## Never Blow Into a Microphone

Your microphone is a critical component of your home studio. Blowing into a microphone can cause severe damage. When testing a mic or setting your recording levels, always speak in the actual volume of your performance. If you're in a studio and the engineer asks you to read for levels, consider it an opportunity to rehearse your performance.

Tapping the mic, although not usually harmful, is annoying to most engineers and really serves no purpose other than to know if the mic is on or not. As a general rule, get into the habit of always testing a mic by speaking into it at a normal volume.

## Let the Engineer Adjust the Microphone

At your home studio, you are the engineer. But when you go to a recording studio, it's important to respect the equipment and the engineer running the session. Always let the engineer adjust the mic to where you will be standing or sitting. Do not move or adjust the mic yourself. The same goes for the pop stopper. After positioning your mic and returning to the control room, the engineer will ask for your level, and may ask you to physically change your position relative to the mic. You may be asked to *move in* on the mic (move closer to the mic), or *back off* a bit (move an inch or so away from the mic). These physical adjustments should be minor, and are intended to help produce the right sound for your voice. If you are popping, you may be asked to change the angle of your face in relation to the mic, or to turn slightly off-mic to prevent your breath from hitting the mic.

## Holding the Microphone

You'll rarely need to hold the mic during an actual session. However, it may be necessary for some auditions or if your studio configuration doesn't have the space for an upright mic stand. If it ever happens to you, you need to know how to properly hold the mic for the best sound.

The correct handheld mic technique is to hold it vertically or at a slight angle, with the top of the mic at chin level, about an inch below the lips and slightly away from the chin, not touching the face. In this position, you will be speaking across the top of the mic rather than directly into it. Talking across the mic minimizes breath pops. You can test for proper mic placement by pursing your lips and blowing straight ahead or saying "puh, puh." Slowly raise a finger from below your chin up to your lips and you will know where to position a mic to avoid being hit with your breath.

If you need to hold the mic, please don't play with the cord. Just let it hang from the end of the mic. Wiggling the cable can cause noises in the mic that can affect how you are heard. You may not hear anything as you perform, but cable noises can be heard by the producer later on, and may cover up parts of an otherwise good audition.

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# Choosing the equipment that's right for you

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As you can see, there are many factors that go into selecting the proper equipment for your home studio:

- What is the purpose of your home studio?
- What level of quality do you need for your voice recordings?
- What level of versatility do you need from your equipment and software?

Each of these considerations, and more, will determine the equipment you purchase, how you set up your home studio, and its ultimate out-of-pocket cost.

Let's take a closer look at what you need to do as part of the process of choosing your equipment:

## Your Home Studio Location

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The physical location of your home studio can be a major factor in how good your voice recordings will sound. Chances are you've already got an idea where you are planning to set up your equipment. There's much more to setting up your home studio than just putting the equipment in the corner of the kitchen or in an extra bedroom. You not only need a certain amount of space to work comfortably, but you also need to take into consideration the acoustics of the recording environment. Try to locate your home studio in a quiet place where you can have as much control over the environment as possible.

Here are a few things to keep in mind as you choose and prepare your home studio location:

## Find a quiet place to record

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You don't want to be distracted either when recording a paid project or when rehearsing – your kids and pets are great to have around, but not when you're doing business. Turn off your phone, close the door, and get to work!

An ideal recording area will not color the sound of your voice, thus allowing the microphone to reproduce your voice accurately. A perfectly "clean" sound is the way your voice will sound when you speak outdoors in a large, quiet, open area.

- a. To learn how your voice should ideally sound, begin by finding an open, quiet area.
- b. As you speak, listen closely to the sound of your voice.
  - i. Notice that there is no echo or reverberation.
  - ii. Also notice that there is no coloration of either high or low frequencies.
  - iii. This open-air sound quality is the ideal starting point for a voiceover recording.

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1. This is extremely difficult to duplicate accurately in a small room because there many acoustic factors that create subtle coloration.
2. The best we can do in a home environment (without extensive remodeling) is to create a relative quiet and uncolored recording environment.
2. A room with hard walls, lots of glass, solid wood doors, big windows, or hardwood floors will have many reflective surfaces that will affect sound quality.
  - a. Move through your planned area while speaking, clapping your hands sharply, or clicking your tongue. Listen for echoes, reflected sounds, or subtle changes in the quality of your voice.
  - b. If you cup your hands behind your ears, you'll be able to better hear the reflected sounds from walls, solid furniture, and even your computer monitor screen.
    - i. If you hear a lot of echo (or even a little,) you'll need to do something to [correct the room acoustics](#).
    - ii. Stand very quietly for a few moments and listen intently for any sound entering the area from outside. Any outside noise can easily leak into your microphone and affect your voice recordings.
    - iii. Single pane windows, hollow wood doors, and the open space beneath or around doors are all entry ways for unwanted sounds.
    - iv. Position your recording area as far from external sound sources as possible.
  - c. Listen for places in your room that have a "boomy" sound, or an excessive low frequency boost.
    - i. Corners of walls or between walls and ceiling tend to amplify lower frequencies.
    - ii. Excessive low frequencies will create a muddy coloration for voice recordings.
3. To get the best recordings, your recording environment should be as quiet as possible.
  - a. Prepare the recording environment to deaden reflected sounds as much as possible.
  - b. A room with lots of furniture or angled walls will usually sound pretty good.
  - c. Heavy furniture, drapes, and sound-absorbing wall hangings will help break up reflected sound, creating a quieter environment for recording.
  - d. A completely "dead" room can result in an unnatural sound. If the room is very small (like a small closet), the deadening material may kill the echoes, but may not be of much help to reduce low-frequency resonance or boominess which may a factor of the small room size.

## "Fixing" Bad Room Acoustics

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If you did the outdoor test suggested earlier, you should have a fairly good idea of what an uncolored environment should sound like. Likewise, if you did the walk-through test, you should be acutely aware of the differences in how the rooms in your house sound. If you're like

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most people, you were most likely never consciously aware of the room echoes and coloration of sounds throughout your house.

Although the [hand-clap test](#) will help you discover some basic reverberation issues that might exist, it won't tell you everything you need to know about any acoustic problems you might have in your room. This section will discuss some basic and inexpensive ideas for "fixing" some acoustic issues. For a very comprehensive article on acoustics, see [Ethan Winer's articles linked at the end of this section](#).

No matter where in your home you are planning to locate your home studio, if it's going to be in your existing home, you will need to address some "acoustical corrections" in order to improve your recording environment. The cost of "fixing" your room acoustics can range anywhere from nothing on up to several hundred or thousands of dollars. It just depends, again, on what you are planning to do with your studio. Keep in mind that as long as you are recording in a home environment, the acoustics will never be perfect. The best you can hope for is to create a recording environment that is the best possible to meet the purpose of your studio.

Many professional musicians and even some professional voice talent will go to the extreme of having a studio designer remodel an existing area, or build a completely separate recording studio for their work at home. These are usually a room addition to the house, or a major conversion of a garage or other large room. The cost for this type of construction can be up to \$100,000 or more! If you're just getting started in voiceover, I wouldn't recommend this – there are many other, far less expensive ways to improve the sound of your home studio.

Let's take a look at some of your options: Of course, you could invest in a major remodeling of your home, or you can purchase a prefabricated sound isolation booth (see the links below).

One voice talent I know lives in an upper floor apartment in New York. He needed to be able to do voice track recording from his apartment, but since he is renting, he couldn't make any major changes to the rooms or walls. His solution to creating a quiet place to record was to go to Home Depot and purchase a fairly large plastic garden shed. Of course, he measured off his room first, and made sure the garden shed was tall enough that he could stand inside. After assembling the garden shed in his apartment, he cut some small holes near the floor to allow for microphone, headphone, and power wires to be fed through. Next he went to a local carpet supplier and purchased a quantity of carpet remnants (at a very good price, mind you). The carpet scraps were then glued to the inside walls, doors, and ceiling of the garden shed, and a throw rug laid out on the floor. A small fluorescent light (much cooler than an incandescent light) was installed in the ceiling, and a mic stand and copy stand positioned inside. His computer and other equipment were placed outside the garden shed to minimize any noise that might be picked up by the mic. And there you have it . . . for only a few hundred dollars, my friend was able to build a relatively quiet voiceover booth for his apartment.

My New York friend is only one example of how you can come up with a creative solution to meet your needs for quality recordings. Here are some resources for professional sound isolation booths and baffles that aren't your average garden variety. These aren't cheap, but they do get the job done!

[Clearsonic.com](#)  
[Primacoustic Voiceover Booth](#)  
[SoundSuckers.com](#)

[VocalBoothToGo](#)

[Vocalbooth.com](#)

[Wenger Practice Rooms](#)

[WhisperRoom.com](#)

But, let's say you don't have that kind of space or money available, or that you want your home studio area to be somewhat less conspicuous than a garden shed or a recording booth in the middle of the room!

For most home studios, what it comes down to is figuring out ways to inexpensively correct for the acoustic problems in your room. Here's a [discussion board on home vocal booth construction](#).

The simplest solution may be to rearrange the furniture, or close the drapes. Heavily padded furniture will absorb some sound, thus reducing echoes. Replacing light fabric drapes with heavier drapes can also make a big difference. Even simple changes in a room can make a difference, but these minor changes are usually not enough to "fix" an acoustically poor room.

One of the major problems in most rooms is solid, parallel walls. Basically, most rooms are a box with 3 sets of parallel surfaces: two pair of walls that face each other, at least one of which probably has a glass window; and a parallel floor and ceiling. Hard surfaces will reflect sound, no matter where in a room the sound originates. Parallel surfaces tend to bounce the reflected sound waves back and forth, resulting in the echo you hear in your bathroom and in large rooms with uncovered walls.

In order to correct for reflected sounds, it's necessary to break up the reflective surfaces. For the walls, this could mean hanging fairly large wall hangings that are sound-absorbent and have texture or angles that will re-direct acoustic reflections so they don't bounce around the room. If your home studio is going to be in a fairly permanent location, like an extra bedroom, you might consider attaching acoustical material to the walls of the room. Several manufacturers make acoustical foam for exactly this purpose (see the [VoiceActing.com](#) website.)

Another option for treating the walls is to use large, uncut, fiberglass acoustic ceiling tile, also known as "rigid fiberglass." [Owens-Corning](#) (the Pink Panther fiberglass people) is probably the best known manufacturer and hence the material is often called "Owens-Corning 705" much like we refer to facial tissue as Kleenex no matter who makes it. True OC 705 is at the high end of the price scale, but there are others that cost much less - some even have better specs! Owens-Corning is probably best known for their pink fiberglass insulation. However, their website <http://owenscorning.com> has an area devoted to reducing noise in a home environment.

But one of the most cost-effective and acoustically effective sources we've found is Producer's Choice Sound Blankets from [VocalBoothToGo.com](#). These are large 8' x 7' oversized, and overstuffed furniture blankets that are specifically designed for acoustic treatment. The blankets come with grommets along one edge that allows for hanging from a wall or ceiling. There are also free-standing booths, ceiling mounted installations, and even a portable booth - all designed from the same Producer's Choice Sound Blankets. And the best part is the price. You can order Vocal Booth To Go products through [VoiceActing.com](#) or direct from the manufacturer. Please tell them we sent you.

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Four our booth, we use an spare 8' x 8' bedroom. As the primary acoustic material, I've used the Armstrong "painted nubby" fiberglass ceiling panels from [Acoustic Materials Services](#). These 4' X 8' sheets come in boxes of 4 sheets with either an open fiberglass back or a foil-covered backing. Sheets can be either ¾" or 1" – either will work well to kill room echoes, but the 1" sheets will offer a bit more sound absorption and will be easier to work with in their 4' X 8' form. The edges are raw fiberglass, so it's advisable to also get enough border trim for your panels. A special mastic cement will be needed to attach foam and fiberglass panels to the walls of your room. This results in a permanent installation, so be sure this is what you want to do before purchasing the product. Or figure out another, less permanent way to mount your acoustical materials.

Two walls have Producer's Choice Sound Blankets hung from the ceiling with a roughly 6" gap between the blankets and the fiberglass on the walls. The air gap provides a trap for any unwanted reflected sounds. The result is an incredibly "dead" sounding booth.

Here are some links to resources and manufacturers of acoustic materials.

[Vocal Booth to Go](#) – Producer's Choice Sound Blankets, VO Booths, and more

[Gretch Ken Industries](#) – suppliers of acoustic materials

[FoamByMail.com](#) – Eggcrate foam material at discount prices.

[Acoustic Materials Services](#) – suppliers of acoustic materials and fiberglass ceiling panels.

[Owens-Corning](#) – acoustic insulation and sound-reduction materials

[Primacoustic.com](#) – foam products for complete room treatment

[Auralex](#) – available through VoiceActing.com – click on the link for acoustic materials

[Sonex](#) – acoustic foam

[Soundproof Foam](#) – acoustic foam

[Markertek.com](#) – look under "Acoustic Foam & Soundproofing"

[Real Traps.com](#) – manufacture bass traps and other acoustic treatment panels

An even less expensive alternative to making major changes to the walls of your room is to construct one or more portable acoustic baffles. [Appendix 2](#) explains how you can build a small, portable acoustic baffle frame for under \$25. This frame can be covered with a [Producer's Choice Sound Blankets](#) and placed between your microphone and reflective surfaces to minimize echoes and improve your recording quality. Constructing a 3-panel frame will result in an "instant booth" that creates a relatively quiet environment for recording.

If you've got a desktop computer that has a noisy fan – and you can't isolate the computer - you can build a smaller frame to cover the computer during your recording sessions. Construct your computer "blimp" so it is about 3 inches wider than your computer case on all sides and on top. When you cover the frame with a blanket or heavy fabric, make sure you leave an opening at the back for air to enter. The "blimp" will kill most of the computer noise, considerably quieting your recording environment.

If you're looking for something more substantial, you might consider following the lead of [Geoff Bryan](#). Geoff is a professional voice talent in Los Angeles who needed to upgrade his home studio acoustics. Based on a design by [Steven Klein](#), Geoff built a 3-panel "booth" for under \$100 that uses inexpensive materials and greatly improved his room. Geoff's complete design and building instructions are on his website at [www.geoffbryan.com/booth.html](http://www.geoffbryan.com/booth.html).

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Treating the walls or constructing a movable baffle will handle only part of your acoustic problems. These will mainly affect the mid-range and high frequencies, and room echo. The other issue that needs to be addressed is the lower frequencies. A build up of low frequencies in a small room can result in a muddy sound that simply has too much bass. Although EQ can correct for this problem, it will also tend to defeat the purpose of your high-quality microphone, and you'll lose a lot of the warmth of your voice. One of the easiest ways to address this problem is to build one or more "bass traps." A very simple bass trap can be built by filling a plastic trash can with fiberglass.

Ethan Winer is a contributor to EQ Magazine and has written several excellent articles on correcting room acoustics and explains in easy-to-understand language how to deal with acoustic issues. Ethan's company "[Real Traps](#)" sells a variety of materials for correcting room acoustics. Here are links to some of Ethan's on-line articles:

[Acoustic Treatment and Design for Recording Studios and Listening Rooms](#)  
[www.ethanwiner.com/acoustics.html](http://www.ethanwiner.com/acoustics.html)

[Build a Better Bass Trap](#) (correcting low frequency resonance problems)  
[www.ethanwiner.com/basstrap.html](http://www.ethanwiner.com/basstrap.html)

The complete bass trap parts list and construction notes at the following web pages:

Parts list: <http://www.ethanwiner.com/BTParts.html>

Plans: <http://www.ethanwiner.com/BTPlans.gif>

But what if you don't have the room for a large VO booth? And what if you need something that you can take with you on the road when you travel? Treating walls or constructing a large vocal booth are simply impractical ideas for many voice talent who have limited space for their recording area.

In his book "[Voice Actor's Guide to Recording at Home and on the Road](#)," Harlan Hogan describes several options for improving room acoustics. Among them is the "Table Top VO Box" originally designed by Douglas Spotted Eagle. Harlan took that basic design and improved upon it with his original PortaBooth. Several improved "portable" voiceover booth designs have appeared over the years, including Harlan Hogan's redesigned PortaBooth Pro, and the Carry On Vocal Booth (COVB Pro) by [VocalBoothToGo.com](#).



Carry On Vocal Booth Pro  
[VocalBoothToGo.com](#)



Harlan Hogan's  
PortaBooth Pro

Portable VO booths are designed to be just that... portable. They are lightweight, have a relatively small footprint and serve the purpose of providing a relatively isolated and acoustically "dead" space surrounding the microphone. But not all portable VO booths are the same.

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Harlan Hogan's original PortaBooth was among the first to fill the need for a small-footprint, portable VO booth. It did the job, but was a bit awkward to use. Harlan's improved PortaBooth Pro from

[www.voiceoveressentials.com](http://www.voiceoveressentials.com) does an excellent job of reducing room reflections entering the mic. However, being constructed of 2" acoustic foam covered with heavy rip-stop nylon, it is a bit bulky. The PortaBooth

**Pro consists of three sections that zipper together and pack into a separate case that can be used as carry-on luggage when traveling by air.** Assembly and break-down can take up to several minutes and there is very little internal storage space when the unit is packed for travel. When assembled, the PortaBooth Pro requires a flat surface and is not easily attached to a microphone stand, although it can be done. This limits its ability to be used while standing to perform. Also, the 2" acoustic foam takes up a lot of space, resulting in a relatively small internal space for the microphone, the script and a small clip-light.



My personal favorite in the portable booth arena is the Carry On Vocal Booth Pro from [www.VocalBoothToGo.com](http://www.VocalBoothToGo.com). We like these so much that we sell them through our website at [www.VoiceActing.com](http://www.VoiceActing.com). As with all other Vocal Booth To Go products, the COVB Pro is constructed from their famous Producer's Choice Sound Blankets (PCSB) originally developed for the sound departments of Hollywood's film studios. Hollywood's sound teams needed a better way to kill reflected sounds and improve the acoustics of sound stage and location sets during film shoots. For years, they had used conventional off-the-shelf furniture blankets. But the standard furniture blanket is too thin and too small to really be of any value when it comes to dealing with room acoustics. The Producer's Choice Sound Blankets are essentially oversize furniture blankets with a more dense filling and special stitching that are designed to specifically deal with acoustic

reflections. The blankets are 8' x 7' with grommets along the short side so they can be easily hung from a grid or ceiling. This makes them perfect for covering a standard wall from floor to ceiling, creating a very large acoustic baffle. Hang a few of these blankets in a room, and you've got a voiceover booth. And, finally, the blankets are available in black both sides, or black and white.

The Carry On Vocal Booth Pro has several big advantages over other portable voiceover booths on the market.

- Weighing in at about 8 pounds, the COVB pro packs flat for travel in its own lightweight, durable case that will easily fit in an aircraft overhead compartment. The case becomes the outer cover of the booth when opened.
- There is plenty of room inside the COVB Pro to store everything needed for a portable studio, including the computer - without adding any additional thickness to the unit.
- A single zipper allows for the COVB Pro to be opened or closed in less than 30 seconds.
- The sound blanket design creates an ideal acoustic space that effectively kills room reverberations from entering the microphone without creating any "boominess" or low frequency resonance.

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- The mic is deep enough into the booth to pick up more of the voice than room reflections. Other portable booths position the mic only a few inches from the front of the booth which tends for the mic to pick up more room sound.
- The COVB Pro comes with a built-in, concealed rigid table base and is ready to mount to any standard microphone stand, or it can be used on any flat surface. A specially designed "lock-down" allows for the COVB Pro to be adjusted to a comfortable working height independently of the mic stand and microphone, which makes it perfect for working either standing or sitting.
- The sound blankets are roughly 1/2 inch thick, compared to the 2" thickness of acoustic foam found in other portable booths. When opened, the flexibility of the lightweight blanket design allows for plenty of internal space for hanging a script, and ample room for even the largest professional microphone. Working space inside is roughly 17" x 20".
- A special mounting bracket is included for mounting your microphone on the mic stand inside the COVB Pro. This bracket allows you to position the mic for the optimum horizontal placement inside the booth - closer to the front or deeper into the booth.
- The COVB Pro also comes with a small lamp that can easily be mounted to its support frame. This provides plenty of light for your script.
- And for a little variety, the COVB Pro is available in blue or black.

Coming from a background of having to deal with on-location audio for television and many years of being confronted with challenges when it comes to recording voiceover in less-than-ideal conditions, I consider the COVB Pro to be a major improvement in the options for recording high-quality voice tracks outside of a regular studio. Of course, nothing can compare to recording in an acoustically perfect studio designed for that purpose, but for a home studio on a limited budget, the COVB Pro comes about as close as it possibly can.

Obviously, this discussion of "fixing" the acoustics of a bad sounding room only scratches the surface. I haven't addressed any of the issues regarding frequency response – only those of reducing room reflections that can affect your recording quality. As you experiment with adjustments to your room acoustics, you'll begin to discover what will work for your needs.

If you don't have the time, energy, or desire to do it yourself . . . you can always hire a studio designer to help build your recording environment. Studio designers will offer services at a variety of levels – anywhere from a simple consultation to full-blown design, contracting, and construction of a home studio. Through [VoiceActing Academy](#), we offer consulting services for helping you determine the equipment that's right for you, how to put it all together, and basic design considerations for your room. If you need more substantial assistance, a simple Google search for "studio design" will bring up several thousand resources. If you're in the Los Angeles area, our friend George Whittam at [VOStudioTech.com](#) may be of assistance.

Acoustic design is an art in its own right, and a well-designed recording environment will pay off in the long run. However, for most voice talent, simple and inexpensive solutions, like those described in this chapter, will make a big difference until the money rolls in and you can afford acoustic upgrades and improvements.

## Choose a Good Microphone

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Now that you've selected your working area and dealt with correcting some of the acoustic issues that may exist, it's time to start taking a serious look at your home studio equipment.

Let's start with the microphone.

You'll need a good microphone – one that accurately reproduces the best qualities of your voice. To review: there are two basic types of microphones that are good for voiceover: Dynamic and Condenser.

Given a choice between a dynamic mic and a condenser mic, I will always recommend a condenser. The human voice has a frequency range of roughly 80 - 3,500 Hz. Everything above 3,500 Hz is overtones and harmonics. This is where the subtlety and nuance of communication resides. Because the diaphragm of a dynamic mic must physically move and faces resistance from a fixed magnetic field, it literally cannot reproduce the detail of higher frequencies that a condenser mic can. By design, a condenser mic will have a much faster response to sound waves, which will result in a far more accurate reproduction of the voice.

## USB mic vs. Condenser mic

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For any of several reasons, you may be tempted to go with a USB microphone. After all, they are kinda spiffy. Some are really cute, they connect directly to the USB port on your computer, and they cost about the same - or sometimes a lot less - than some condenser mics.

There may be some voiceover home studio consultants out there who might recommend a USB microphone for your home studio, but I'm not one of them. For portability and compact travel, a USB mic can absolutely have some advantages over a regular condenser mic when you need to record "on the road." But for a more-or-less permanent home studio setup, a USB mic has several disadvantages.

- Although all USB microphones are condenser mics at heart, a USB mic has been designed to have the analog-to-digital converter built inside the mic. Depending on the manufacturer, this may mean that some short-cuts were taken somewhere during the design process either in the microphone design, or with the digital converter. This could result in compatibility or quality issues.
- Some USB mics will only work on Mac computers and not on a PC.
- Some USB mics cannot be mounted on a mic stand or may be awkward to use.
- Some USB mics have limited or no control of the signal being sent to the computer and may or may not have a headphone connector and headphone volume control.
- Placement of a USB mic will be limited by the length of its USB cable to the computer. Most USB mics use a standard USB A-B cable (like a printer USB cable). Although USB extension cables are available, an "extension" USB cable may result in enough loss of signal to seriously affect the quality or functionality of a USB microphone.

For the best voiceover recordings I recommend a mid-quality condenser mic to start, which will generally be in the two hundred fifty dollar neighborhood. A dynamic microphone will be less

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expensive, but it will "hide" lots of vocal issues, and be a bit flat in its sound. A condenser mic will give a crisp sound, but will often pick up every little sound you make. Try to test different microphones, if you can, to find one that sounds best with your voice. Not all microphones will sound the same.

If you're planning to be recording "on the road," you'll want a microphone that is easily portable, yet high quality and rugged enough to handle storage in a computer case. There are several excellent handheld condenser microphones that fit that bill. If you're recording your voice tracks at home – and the mic never moves off the stand – you might want to look at a large diaphragm condenser microphone. These are bigger and bulkier, but they often produce a sound quality that is hard to match with smaller microphones.

Plan on spending around \$100 to \$900 for a good condenser microphone up to \$4,000 for a top-of-the-line Neumann U87 (the Rolls Royce of microphones).

## Monitoring Your Audio

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You'll need speakers or a pair of headphones to monitor your recordings. Don't expect your computer's speakers to give you the detail and quality you need for professional work. Computer speakers will work in a pinch for basic editing, but you won't hear the detail necessary for "fine-tuning" your edits, removing breaths, cleaning up clicks and mouth noise or mixing tracks. Cheap speakers in a laptop hide many flaws that will "pop" when you listen under headphones or on good studio monitors.

If you need to avoid bothering the neighbors or work a lot on the road, you'll probably want to find a good pair of closed-ear headphones that are comfortable for extended wear and relatively compact so you can pack them in your "road case." Ear buds can work, but they don't provide very good isolation.

In a home studio environment, you'll probably want to connect your computer to a pair of good monitoring speakers. These come in a wide range of prices starting at a few hundred dollars per speaker. Self-powered monitors are generally sold as a pair and have a built-in amplifier, which is nice because you don't need to worry about hooking up another piece of equipment. If you're on a budget, you can connect your computer to your stereo system. Using the proper adaptor cable, your computer's headphone output can feed most audio equipment, although you may need to turn up the volume a bit more than you normally would.

Plan on spending about \$20 to \$150 for a good pair of headphones

Plan on spending about \$300 to \$800 for high-quality self-powered monitor speakers

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## Analog or Digital . . . How Will You Get Audio Into Your Computer?

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Before you purchase your computer, determine how you are going to get audio from your microphone into the computer. This is important!

You have two choices as you shop for the electronic components for your home studio. Which way will you go? Analog . . . or digital? Just because you will ultimately be working in a digital medium (on your computer) does not necessarily mean you need to use all digital equipment to get there. Actually the term “all digital recording studio” is a bit of a misnomer. Both the microphone and monitor speakers are analog devices. However, everything else can be digital.

If you're working on a budget (and who isn't, these days?) you very well may want to invest in a small analog mixer or an analog-to-digital converter that connects to your computer, commonly referred to as a USB interface. Analog equipment is considerably less expensive than digital equipment, and the quality of today's analog gear is extremely good. An analog mixer can be used to control your microphone level and even mix it with other mics or line level sources. The output of the mixer can then be plugged directly into your computer to result in a relatively inexpensive home studio. Many of today's mixers have a built-in USB interface that makes them ideal for both controlling your recording levels and monitoring playback.

Although the soundcard on your desktop computer may work well and can be used to accept an analog stereo line level input from a mixer, it's not a good idea to use this soundcard for high-quality recordings. Although most desktop computers have a line level input that can handle a mixer's audio signal, the motherboard sound card is simply not designed to provide the quality needed for professional voiceover work. For the best quality, you'll want to invest in an external analog-to-digital converter in the form of either a USB interface or a USB mixer.

Laptops are a different story! Laptops don't have a line-level input - they only have a mic input. Analog audio mixers have a line level output, so this means that if you use an outboard mixer to control your audio signal, you'll need to convert the mixer's line level output (-10) to microphone level (-65) before it will be useable. Coming directly out of a mixer into the mic input of your laptop will result in a very “hot” (loud) signal that can be difficult to control, and will quite likely be very distorted. Making the conversion from line level to mic level means reducing the overall volume by about 55 dB . . . and that's often easier said than done. If not done properly, this conversion can add a lot of noise to your recording, making it unacceptable. It's simply not worth the trouble.

A much better approach for both desktop and laptop home studios is to use a small, computer-powered, USB interface, like the M-Audio Fast Track, a ProTools MBox, or any of several other brands. These devices convert your mixer's analog signal to digital and connect to your laptop or desktop as a digital source through a USB port. You can connect a microphone directly to the USB interface, or take the Line Level output from an analog mixer into the USB interface. Either way, your audio signal will be converted to digital before it ever reaches your computer. Audio from a USB device is very clean and easy to control.

Your recording software will need to be set to “see” your USB interface as the audio source for recording.

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Plan on spending around \$150 or more for a USB interface that has phantom power, and volume controls. An inexpensive USB device that does not have phantom power, and has no volume controls is available for under \$50 (but I don't recommend it).

Some manufacturers of USB analog-to-digital converters (USB Interface) are listed below. Current prices for these units are in the product catalog of the VoiceActing.com website:

[M-Audio](#) (owned by Digidesign) – 2 mic and 2 line inputs, with headphone monitoring  
[Digidesign M-Box](#) – 2 mic & 2 line inputs, headphone monitoring, ProTools LE software  
[CEntrance](#) – Mic Port Pro USB converter for professional microphones

## Purchasing Your Studio Equipment

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The [Home Studio](#) area of the VoiceActing.com website has several different equipment configurations at various price ranges. You'll also find all the support equipment for your home studio. Only you can determine the best system for your budget and recording needs.

As you research and shop for your equipment, always keep in mind the purpose of your home studio. If you don't plan your studio purchases carefully, you can end up spending a lot of money on equipment that far exceeds your needs - or worse... that you never use.

I speak from experience on this! I was moving my studio from analog into the digital world and decided I would purchase a digital audio system that came complete with a digital mixer, Firewire 1394 connection (very fast), and all the software. The system cost several thousand dollars. My first problem was that it took several months after purchasing the equipment before I ever got around to opening the boxes. And, although the physical hook-up was extremely easy using only a single Firewire cable, installing the software was another matter entirely. It took more than a day and several phone calls to "customer support" (and I use the term loosely!) before I got the software installed and operational – not a fun experience.

Then there was the issue of learning how to use the software! Now, up to that time I had been working on a digital audio workstation for many years doing sound for picture at a television station, so I was quite familiar with the processes and very good at waveform editing. But this software turned out to be far more complex than I needed and had a very long learning curve. It was designed for simultaneous multi-track recording for music and all I wanted to do was record voice tracks and do some relatively simple production work.

After working with the system for about a month, in between other session work on my older system, I packed it up, removed the software, and put it in storage. In the meantime I found other software that more closely met my needs while giving me the expanded capability I needed for my production work. Within 6 months after purchasing the expensive digital system, I had upgraded my studio with a software-only solution that cost less than ¼ the price. About a year later, I replaced my 10-year old analog mixer (which still worked great) with a newer, and far more versatile mixer and USB digital interface to complete my conversion.

I made the common mistake made by countless other home studio voice talent: I didn't do my homework, and I didn't have a well-defined plan for my studio. I mistakenly thought that if I had a digital system that was a standard of the professional studios, that somehow I would be able

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to do better work, or that if I needed to collaborate with other studios my projects would be compatible. Turns out... none of that made any difference.

It's the "ifs" that got me! The simple fact of my studio is that I don't collaborate with other studios – I do everything in-house that I need to do to deliver a completed project to my client. When I do, on rare occasion, work with another studio to deliver dry tracks, or even parts of larger projects, I simply deliver my part of the project in a format that they can work with. If I had really thought through the purpose of my studio, I would have saved a LOT of money and time. Fortunately I was able to find a buyer for that fancy digital system, and the new owner loved it. But it wasn't right for me.

More recently, I've upgraded our VoiceActing Studios facility with a fully digital audio console with far more capability than I currently require. However, because of the work we do in our studio, I'll be able to expand easily as our business grows.

If you are just beginning your voiceover adventure, I strongly recommend taking a close look at what you want to do, and how much you want to spend on putting your home studio together. As you've learned so far, a home studio for quality voice recording is much more than simply a microphone connected to a computer. But you don't need to spend a lot of money when you're just starting out. Your computer will be the most expensive part of your studio. Everything else can be assembled for a few hundred dollars.

Here's a complete list of what you'll need for your home studio. Sure, you can "make do" without some of these, but you'll find that you will be able to work much more efficiently when you have the proper equipment. I've included my thoughts and recommendations for some of the items in this list as well as approximate prices so you can plan your equipment budget. You'll find specific equipment recommendations in the Home Studio area at [VoiceActing.com](http://VoiceActing.com):

1. **A desk** or other comfortable working area – Make sure your working area is large enough to hold whatever equipment you might need to put on the desk. You may also want a telephone on the desk along with your computer monitor, keyboard, mouse, and speakers. It can get crowded – fast! Don't forget a comfortable chair.
2. **Microphone** (\$100 - \$900) – select a mic that enhances the best natural qualities of your voice. If you're going to use your mic both at home and in a portable laptop setup, make sure the mic is rugged enough. Don't waste your money on an inexpensive microphone or a USB mic. Get a professional mic with an XLR connector.
3. **Microphone stand** (\$15 - \$35) – Use a table-top desk stand if you have a confined space and need to sit, but keep in mind that the stand will need to be close to you and may get in your way. A better option is a floor tripod-base mic stand with a boom arm that you can swing toward you. This keeps the stand out of your way and the boom stand can be used either seated or standing.
4. **Copy holder** or music stand (\$15 - \$35) – Remember . . . you will perform better when you are standing. If at all possible do NOT hold your script. For a small space, a collapsible music stand is ideal. For a larger area a full-size music stand will provide more space for your scripts and a better writing surface for making script corrections. An inexpensive copy holder can also be used in a pinch.

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5. **Control surface** [[analog mixer](#) or USB mixer] (\$50 - \$\$\$) – An analog mixer is an excellent way to control the volume of your recordings at the source. A mixer can handle multiple microphone and line level inputs allowing different sources to be combined (mixed) during the recording process. Although an analog mixer can be connected to a desktop computer through the line input on the sound card, a [USB device](#) will provide superior quality. See the sections on [Using an Analog Mixer](#) and [Using USB](#) for more information and connection details.
6. **USB device** [in addition to, or instead of a mixer] (\$99 - \$\$\$)– Most USB devices designed for connecting audio to your computer will have one or two microphone or line level inputs (switchable), each with its own volume control. The simplest USB device uses a 1/8" mini jack for consumer line level sources (tape players, CD player, etc.). If you are working on a very tight budget, a line-level only USB device will serve to convert your mixer's line output to digital, but you won't be able to use a microphone directly into the USB device. If you are using a condenser microphone, be sure your USB device mic input provides phantom power.
7. **Monitoring** [speakers or headphones] (headphones: \$20 - \$200; speakers: \$300 - \$900/pair) – You need to hear your work for quality control and editing. A good pair of headphones is essential when using a laptop, and good speakers in your home studio will make your recording and editing work much easier.
8. **A telephone connection** [phone patch] (\$50 - \$\$\$) – If your client needs to hear you during the session – and they aren't at your home studio – you'll need some way for them to listen over the phone. There are several ways to do this: an analog or digital telephone hybrid (a fancy name for a device that connects an AUX line output of your mixer to your telephone line); an inexpensive telephone coupler; a speakerphone unit (commonly used for table-top conferencing); or simply hold the phone as you speak into the mic (I don't recommend this technique as it limits your ability to move and holding the phone takes your attention away from your performance.) NOTE: Unless you specifically have clients that need to hear you as you record, you probably do NOT need a phone patch at this time. Save your money... use your cell phone and a Bluetooth headset.
9. **Wires and mic cable** (\$10 - \$50) – Don't forget the wires necessary for hooking everything together. Some equipment come with cables or wires, but some don't.
10. **Recording software** (free - \$\$\$) – Your audio equipment and computer are worthless for recording audio unless you have software installed. If at all possible try to test software before you buy. Most software manufacturers offer a free trial period for their software, or a version with restricted capabilities.
11. **Blank recording media** – If you'll be burning CDs, you'll need a supply of blank recordable CD media. CD media comes in two types: CD-R (recordable) and CD-RW (re-writable). CD-R is less expensive and will work nicely for delivering completed tracks, if that is the preferred format. Don't forget about CD Jewell Cases or paper sleeves to hold your recorded CDs.

In the Home Studio area on the [VoiceActing.com website](#), you'll find a variety of equipment configurations at price ranges to fit every budget. Appendix 2 has similar examples of how you might configure your home studio at different price ranges (prices may not be accurate.)

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# Your Computer

## The Heart of Your Home Studio

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Your computer is the key to a successful home studio in today's voiceover market! It will be to your advantage to understand a few things about your computer as you begin to assemble the equipment for your home studio.

Whether you're a PC person or a Mac person really makes little difference with today's technology. It used to be that audio recording software would restrict you to staying with one platform or the other, but that is no longer the case. With today's faster computers, both operating systems are very stable, and both can record or render files in multiple formats resulting in cross-platform compatibility. Each platform has its unique capabilities that make one a better choice than the other for high-end applications. However, for a basic home studio, the choice, now, is largely one based on personal experience or a preference of one operating system instead of the other.

So, the choice of a computer platform is up to you. Most of what follows in this section will be applicable to both PC and Mac systems for either desktop or laptop computers.

There are a few operational aspects of your computer that you will need to know in order to identify or use some of its capabilities. In addition to deciding which type of computer is right for you (desktop or laptop), you'll need to know:

1. How to locate your system information to identify your computer's component parts and their specifications.
2. How to control recording levels for an analog input, and output volume when playing back a file.
3. How to install or add new programs to your computer.
4. How to record or "burn" a CD (should you ever need to do that)

Perhaps one of the best ways to start learning about your computer and its capabilities is to investigate its System Properties (System Information on a PC). If you have the manual for your computer handy, most of the system information you need to know should be there.

If you can't find your computer's manual, use your computer's System Information or System Profile function to find out what's inside. The idea here is that if you're planning to use your computer to record audio, you really need to know what's in there. As you'll learn, a slow CPU, a slow hard drive, or a shortage of memory will all have the potential for creating problems with your recordings.

If you have a PC, you can download free system audit software from [Belarc.com](http://Belarc.com). This is a free downloadable program that will identify all the components of your PC computer in much greater detail than your computer's System Information program. Probably more info than you'd ever want, but a handy little program none the less.

## Choosing Between a Desktop and Laptop/Notebook Computer

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Most people are familiar with the common desktop computer, complete with its often bulky size, large monitor, keyboard, and mouse. Older desktop computers will sometimes have a somewhat noisy cooling fan at the back. Newer generation desktops are very quiet. Even if quiet, the noise from this fan, although constant, can be a problem when you need to record a pristine voice track. Many of the newer desktop computers are designed with special internal baffles that greatly reduce the fan noise. The bottom line is that a desktop computer can be an excellent choice for a home studio “audio workstation” but you may need to provide some additional acoustic treatment for the computer.

A laptop (or notebook) computer is generally a lot quieter than a desktop computer. A laptop has the advantage of giving you a great deal of freedom when it comes to recording audio for auditions and paid projects. With a properly equipped “laptop studio” you’ll be able to record your tracks just about anywhere. Newer portable devices like iPad<sup>®</sup> and Ultrabook<sup>®</sup> computers are ideal for recording audio. They have no moving parts and, so, are completely silent.

The determining factors for choosing between a desktop, a laptop, an iPad<sup>®</sup> or Ultrabook<sup>®</sup> are price and what you intend to do with your computer. If you really want to have maximum mobility, then one of the newer devices is the only way to go. However, if you want an inexpensive start-up system, you’ll probably be shopping for a desktop. On the other hand, if you need to be able to handle complex editing and production, you’ll need a more sophisticated desktop workstation, or a high-end powerhouse laptop or a notebook computer that effectively replaces a desktop computer.

Portable devices are becoming more and more popular (and for good reason!), so the tips that follow will generally be in the context of using a laptop computer for “home recording”. However, almost everything here also applies to a desktop computer and many of the newer designs. As you may be aware, the term “home studio” or “home recording” does not necessarily mean that the quality of the recording is anything less than that of a professional studio. It only means that the equipment being used is usually somewhat different (but often the same) as the professional gear, and that the studio is “at home.”

## Purchasing Your Computer

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In the world of computers, speed is good . . . the faster, the better!

Get the quietest, fastest CPU you can afford! And purchase a brand that you know and trust. Shop around, but don’t buy the least expensive computer you find. Some of the most reliable names are Dell, Sony, Toshiba, HP, Lenovo, Acer, Gateway, and Fujitsu. Any off-the-shelf laptop from one of these manufacturers will work well for basic audio recording, provided it has a fast enough hard drive (see “[Recording on a Hard Disk](#)” below). You can find excellent low-budget computers from many on-line computer dealers. If you need something more rugged, consider a desktop replacement notebook. These computers are heavier than a regular laptop and they’re built like a tank. They can be a bit pricey though, but they completely replace a

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desktop computer. Before purchasing ANY computer, be absolutely certain that it will do the job for you.

Some laptop computers may claim they are designed specifically for audio and video recording. Although there may be some truth in that claim, for basic voiceover recording you don't need to go to the expense of a custom built computer.

Here are a few other things to keep in mind as you look at laptop computers (and desktop computers, too):

- Make sure your computer has at least 2 USB ports. Most newer model laptops come with 4 USB ports, but some only have 2. If you need more, you can purchase an inexpensive USB expander that turns one USB port into 4 or more. If you're purchasing a desktop computer, make sure it has at least 4 USB ports, preferably 2 on the front.
- If you plan to "burn" CDs or DVDs, you'll need a CD/DVD drive. For Blue-ray discs, you'll need a drive that can burn this type of disc. Most desktop and laptop/notebook computers come with at least one CD/DVD drive. Newer solid-state devices don't have a built-in DVD drive.
- Know where the device soundcard mic input and earphone output are located. Desktop computers will usually have an additional "line in" and possibly a surround output. With some solid-state devices, the only way you can get audio in or out is to connect the device to a computer.
- Make sure you are comfortable with the keyboard and screen. If you will be using a laptop or solid-state device at home, make sure you have a way to connect the computer to an external monitor. The most common video output on newer computers is either an HDMI or DVI connector. If you are using an external monitor, make sure the monitor is compatible with the type of output provided by your computer.
- You may want to also invest in a wireless USB mouse.
- Make sure your computer is capable of connecting to the Internet. Nearly all computers today have wireless connectivity. Older computers may require a LAN or Ethernet connection to a router in order to connect to the Internet.
- If you plan to travel with your computer often, you'll want to invest in a suitable travel case. Make sure your case is large enough to hold everything you'll need for "on-the-road" recording sessions (mic, cable, hard drive, mouse, etc.)
- You might also want to consider purchasing a DC power adapter that will allow you to run your computer off A/C, your car's power adapter or from the computer power adapters available on some airlines (usually in Business Class or First Class only).
- If you spend a lot of time in airports, you should know about Table Tote (<http://tabletote.com/>), a collapsible, portable table for your laptop.

Plan to spend around \$800 to \$2,000 for a good desktop computer system.

Plan to spend around \$1,000 to \$2,500 for a good laptop/notebook.

Plan to spend around \$600 to \$2000 for a good solid-state device like iPad<sup>®</sup> or Ultrabook<sup>®</sup>

Computer prices are constantly changing, so shop around.

Plan to spend from \$50 to \$75 for a good laptop roll-around case

## Memory

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Get as much memory as you can afford - MINIMUM 512MB, but 1GB is better. If you plan to do complex audio production, you'll probably want to invest in a desktop workstation with multiple CPU cores and as much memory as you can afford or that the computer can support. Computer memory is used to hold programs that are running, and also work as a "buffer" when recording to a hard disk. If you don't have enough memory, your memory "buffer" might fill up too fast, and if your hard drive isn't fast enough to take the data stream from the buffer, you might start hearing problems with your recordings. The more memory the better!

While on the subject of computer memory, consider purchasing a "Jump-Drive," also known as a "Memory Stick," or "Flash Memory." These are small devices that plug into a USB port on your computer and can store up to several GB of data. They effectively replace the floppy drive and are universally compatible with any computer that uses USB 1.0 or 2.0. Over the years, Flash Memory devices have improved to the point where a very small USB Flash Drive can hold up to 16 or even 32 GB (gigabytes). This is more than enough to handle a considerable amount of raw audio files, not to mention MP3 files, Word documents, PDF files, and other data you might otherwise store on a hard drive. As with everything else, the larger your Flash Drive the better.

Plan on spending up to \$100 or more for additional memory (minimum of 512MB)

Plan on spending \$10 - \$50 for a Flash Memory device

## Recording on Hard Disk

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Once again, as with the CPU, the faster the hard drive, the better – at least when it comes to recording audio. Oh, and this is one case where bigger is definitely better – get the largest drive you can afford. Remember that a stereo audio file is about 10MB/stereo minute, so it eats up disk space pretty fast. Video is even more hungry. External hard drives are incredibly affordable and extremely useful for backing up your system and for storing your audio and video projects and files off your computer. If (or when) your computer's main hard drive crashes, your audio recordings and projects will stay safe.

The drive's "spin speed" is an important consideration. For audio or video recording, the hard drive should run at 7200RPM (high-end workstation computer drives will run at 10,000RPM). Some computers come equipped with a fast 7200RPM drive, but many less expensive systems and most laptops will come with a 4200RPM or 5400RPM drive. While a 5400RPM drive will be adequate for short recordings or listening to MP3 files, avoid anything slower. A slow drive will be susceptible to problems with recording and playback, especially with video.

With that said, many of the new high-capacity drives don't indicate what the spin speed is - and that's OK because virtually all of the newer external and portable hard drives are capable of handling audio and video files. Advances in hard drive technology and design have caused prices to plummet! Small, USB powered portable hard drives with a storage capacity of 1 to 2 TB (terabytes - that's a thousand gigabytes!) are common today with prices in the \$100 to \$150 range. Full size external hard drives using the faster USB-3 protocol and a storage

capacity of 3-4 TB are also available and can be found in the \$150 to \$200 price range. And higher capacity drives are just around the corner.

A USB drive connects to a USB port on your computer. Many of the larger capacity USB external hard drives require external power and are not powered by the computer. This limits their use to places where you have access to an AC outlet.

Plan on spending from \$150 on up for an external 7200 hard drive.  
Plan on spending about \$35 - \$65 for a Firewire PCI card.

## **How Will You Record Your Audio? Software for free, cheap, and pricey**

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You'll need recording/editing software. There are many different levels of recording software, from free to several thousand dollars. For entry level recording and for those with a minimal or non-existent budget for software, there are a few options to get you started:

[Audacity \(http://audacity.sourceforge.net\)](http://audacity.sourceforge.net) – Freeware - NOTE: Do NOT include the www in this URL – it won't work). All the basic recording and editing functions, versions for the PC, Mac, and Linux, a fairly simple learning curve, and it will even create MP3 files!

[N-track Studio](#) - \$49 or \$89, with a free limited-feature download

Audacity is by far the most popular entry-level audio recording software and is used by many professional voice actors as their preferred software.

Although Audacity is free - and it works extremely well, with excellent quality - it does have some quirks in the way it handles its editing functions. The learning curve is relatively short and once the operation of Audacity is understood, it will definitely do the job. However, you should know that most of the more expensive recording software will be faster and easier to work with in the long run.

As you develop your recording skills, or need additional recording capability, you might consider upgrading to one of these more sophisticated recording programs. The software you choose should be something you are comfortable with, fits your budget, and will handle the types of work you will be doing. Here are just a few:

[Sony Soundforge](#)  
[Sony Vegas Video](#)

[Adobe Audition](#)  
[ProTools](#)

[Cakewalk](#)

Some USB interface equipment comes bundled with recording software.

Plan on spending anything from nothing on up to several hundred dollars for your recording software.

## Using Your Laptop at Home

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As nice as a laptop computer, iPad<sup>®</sup>, MacAir<sup>®</sup> or Ultrabook<sup>®</sup> might be, there may be times when you wish the monitor screen was just a little bit larger. Not a problem. Most laptops have a Connector on the back that can be used to connect the laptop to an external monitor or LCD screen. It might be a Sub-D, HDMI or DVI connector depending on the computer. Many of the solid-state devices will be limited to their own monitor.

Assuming you have the ability to connect to an external monitor, it may be necessary to make some minor changes to the Display Setting in your Control Panel. There are two basic ways you can set your monitor display:

- 1) The computer's desktop can be extended to the 2<sup>nd</sup> monitor. This can give you 2 screens to work with, but it can become a bit confusing if you're not used to it.
- 2) You can "switch" the monitor display so instead of viewing on your laptop screen, you now view everything on the 2<sup>nd</sup> monitor. This is the way most people will set up their display when using an external monitor. However, to make the switch, it's usually necessary to press a function (F) key on your laptop keyboard. It may be tricky to find, but there should be a key (or key combination) that will open the external monitor port and send your computer's screen output to the 2<sup>nd</sup> monitor. Some computers will blank out the laptop screen completely, while others will keep both monitors visible.

Here's a summary of things you can do to make your laptop more functional at home:

- 1) Use a USB full-size keyboard to replace the laptop keyboard
- 2) Use a wireless mouse to replace the laptop touch pad
- 3) Use a USB Flash Memory device for temporary storage or transporting files
- 4) Use an external Monitor to replace or supplement the laptop's monitor
- 5) Use an external USB hard drive for additional storage and/or backup
- 6) Use a wireless router to increase portability for Internet access from a laptop

Virtually all of today's portable devices are designed for wireless connectivity. The newer operating systems make connecting to a wireless network or workgroup relatively simple, but on occasion, it may be necessary to call on someone to help out.

An important aspect of any wireless network is security. When setting up your WiFi access, make sure your connection is password protected and encrypted using WPA or WPA2.

Once your wireless laptop is set up, you'll have the freedom to roam your house to work on your computer wherever you want. You'll also be able to connect to the Internet through thousands of Hot Spots around the world. When on the road, visit <http://www.wififreespot.com> to find free WiFi Hot Spots.

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## Your Recording Environment at Home or On-The-Road a Review

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Your home studio will only be as good as the weakest part of the studio. In most cases, the weakest link is the acoustics of the room you are recording in. When recording at home, give a careful “listen” to the natural ambient “sound” of your room. If you hear some echo, you may want to look into ways to “kill” the reverberating sound waves and deaden the room. If you hear noise coming in from outside, you’ll want to do something to try and minimize it. Heavy furniture, drapes, or sound blankets will stop echoes from happening internally and will help to create a much quieter, warmer, and friendlier sound in your recordings. Eliminating sound from coming through walls, ceilings and floors may require an investment in home improvement.

If you are away from home, and need to record tracks in a hotel room, you’ll probably find lot of undesirable noise. One way to kill the noise and echo is to drape a blanket or bed spread over yourself when recording. It might be a bit awkward, but it does the job! There are many options for "Portable Studios" like the Carry-on Vocal Booth (COVB) from [VocalBoothToGo.com](#).

Wherever you record, avoid positioning your microphone so it is directly parallel or facing a flat wall or window. Glass windows are highly reflective and are a major source of outside noise. You’ll be wise to position your microphone as far away from windows as possible. If you must be near a window, position the mic so the BACK of the mic is aimed toward the glass. A directional (uni-directional) microphone will have a spot of maximum rejection. You want to aim this “dead spot” toward the loudest source of noise. That could be your computer’s fan or the birds chirping outside your window. Unwanted sound won’t be eliminated, but it will be reduced.

Here are some other suggestions to improve your voice recordings:

- 1) Turn off your telephone ringer, and turn down the volume on your answering machine.
- 2) Find the quietest part of the room. This is where you should be when you record.
- 3) If your room acoustics are too difficult to control, you can run your mic cable and a light into a coat closet for recording. Clothes tend to absorb reflected sound waves.
- 4) Build an acoustic baffle or hang sound blankets, positioned for maximum effect
- 5) Be careful of the clothes you are wearing. Nylon and leather are very noisy.
- 6) Don’t wear jewelry that can rattle or make noise
- 7) Learn how to use your microphone to your advantage. Know where the mic’s “hot spot” is and where its “dead spot” is.
- 8) Working closer to your mic in a noisy room will help to reduce the background noise.
- 9) Avoid “popping!” Be sure to always talk across the mic, never directly into the front of the mic. Position the mic above or to the side of your mouth. Sound waves exit your mouth equally in all directions and the mic really doesn’t care where it is, as long as it’s close enough and on-axis to hear your voice clearly without popping.
- 10) Use a microphone stand whenever possible. Holding a mic will introduce handling noise that cannot be easily removed from the recording.
- 11) Use a copy stand (music stand) whenever possible. Holding your script can result in paper rustling noise, and will prevent physical movement during your performance.

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# Setting up and Using Your Home Studio

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I may be taking a chance here, but I'm going to assume you've got your computer up and running, and that you are familiar with at least its basic operation. In this section, we're going to connect the audio equipment of your home studio to your computer and start recording.

I don't know whether you went for a low-budget analog connection or if you're using a USB digital interface. So I'll cover both.

## Using USB

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Aren't acronyms fun? Here's another one for your collection: USB stands for Universal Serial Buss. This is a "plug-and-play" connection for attaching a mouse, keyboard, game controller, storage device, or other external devices to your computer. "Universal" means that the connection is a standard that will work with any computer system using USB. "Serial" means that several devices can be connected, one after another – sort of like a string of Christmas Tree lights. And "Buss" (yes, there are 2 S's) refers to a path through which signals are carried to or from your computer.

A USB connection is far superior to an analog hook-up and eliminates many of the noise and hum problems associated with analog wiring. It's also a lot easier to work with, and not all that much more expensive than a basic analog equipment.

Connecting a USB microphone or analog-to-digital converter is a simple matter of plugging one end of a USB cable into the device, and the other end into a USB port on your computer. Don't worry about plugging the wire into a wrong place – you can't! Fortunately the people who came up with the standard also designed a connector (actually two types of connectors) for USB that are unique to USB cables. Most devices have a somewhat square connector (USB-B) for the device and a flat connector (USB-A) that plugs into the matching hole on your computer.

Here's what happens inside a USB analog-digital-converter when a microphone is connected:

1. The USB device provides "[phantom power](#)" for your condenser microphone through the mic cable. Phantom power is usually selectable with an on/off switch and is not necessary for dynamic microphones. It can't hurt a mic if left on.
2. The very low signal from the microphone goes through a mic "[pre-amp](#)" to boost its level.
3. The amplified audio signal is then processed through an A/D converter which "[samples](#)" the waveform 44,100 times each second and changes the audio into a digital signal of zeros and ones. Samples are stored as data bits. Depending on the "bit rate"
4. The digital audio signal is sent to your computer where it is further processed by your recording software.

Depending on the USB device you are using it may be necessary to install its [drivers](#) on your computer so it will operate properly. The drivers are normally on an installation CD that would come with your device. If there's no CD in the package, your device is most likely "[plug-and-play](#)".

It may be necessary to select the primary audio source within your audio software. Most systems default to the computer's sound card. With a USB device connected, you may need to change an option or preference setting so your recording software will "see" the USB device as being the source for its incoming audio signals.

When recording the volume control on your USB device will give you control over your recording volume as you record.

## Using an Analog Mixer

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An analog mixer is an incredibly versatile piece of equipment. With it you can not only control the volume of your microphone and other audio sources, but with a larger mixer you can also adjust the tonal quality of your voice (equalization) and even create isolated "sends" or outputs that include only selected sources. For example, you might want your mic to not only go to your computer, but also to a telephone interface so your client can listen to your session. A mixer with the proper AUX send capability will allow you to do that – and have completely independent control of the volume going to each destination.

Learning how to use a large-scale professional audio mixer can be a daunting task and is best left for the professional engineers at the recording studios. If you're very brave (or just curious), you can get a taste of what the "big boys" use by visiting [Digidesign](#) or [Solid State Logic](#). These consoles are huge by home studio standards, and have features and technology that far exceeds the needs of a basic home studio. Still, they're fun to look at.

No matter how sophisticated or simple your analog mixer is, there will still be three main sections that you should know about: The [INPUT](#) section, the [OUTPUT](#) section, and the [MONITOR/METERING](#) section. For the purpose of this guide, I'll keep the following explanations as simple as possible.

## Input Section

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This section starts where your mic or line level input connects to the back or top of the mixer. Most audio mixers designed for professional recording that are in the price range we're interested in (under \$1000) will have 3-pin XLR connectors for the microphones and balanced 1/4" connectors for line level inputs. We'll assume all line-level inputs on your mixer are 1/4" phone jacks and all microphone inputs are XLR-F.

Depending on your line-level source, the connectors may be either 1/4" mono (unbalanced), 1/4" balanced, or RCA (unbalanced). If your mixer has 1/4" jacks, and your source equipment uses RCA cables, you'll need an RCA-F (female) to 1/4"-M (male) adaptor in order to plug into your mixer's line input.

The path any given audio signal takes from the source to its destination is called "signal flow". Any given audio signal will travel through an Input Module, where it is assigned or "sent" to various destinations via the Output section. The Monitor section is where you select what you want to listen to: inputs, outputs, or effects. A typical mixer will have several identical Input

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Modules (sometimes referred to as Input Channels or an input channel strip), but only one Output section and one Monitor section. Depending on the mixer, the Output and Monitor sections may have very limited or very extensive capabilities.

Here's the basic signal flow for a microphone through a simple input module:

1. The audio signal starts at the microphone where sound waves are converted to electrical energy.
2. The signal travels through the mic cable to the XLR input on the mixer.
3. [Gain Trim](#) is the first place where the microphone's volume is adjusted (yes, there's more than one place to control input volume on most mixers.) The Gain Trim control is essentially a volume control for the [mic pre-amp](#) and allows for greater control of the input module's main fader and helps to minimize the chance of distortion from loud audio. The Trim control is usually at the top of the mixer or near the input connector for each module. Adjust between the TRIM and VOLUME controls so the VOLUME control is about  $\frac{1}{2}$  to  $\frac{3}{4}$  of full open. Most mixers have this location marked on the mixer surface.
4. Next stop is the Input Module's **SOLO** button. This button sometimes has a selector to choose pre-fader (before turning up the main input fader) or post-fader (following the level of the main input fader). The purpose of Solo is to isolate a specific input source for adjustment and monitoring.
5. The input module's **ON/OFF** or **MUTE** button is next. As the button implies, this turns an input module on or off, preventing any audio traveling through the module from going any further.
6. The **Main Volume Control or fader** is the knob or slider nearest to the front of the mixer and closest to you. The module's volume control adjusts the overall loudness of the audio as it travels through the mixer and can be affected by the Trim control. For example, if an audio source is extremely loud (Gain Trim turned up all the way), it may be difficult to accurately control the volume using the main input fader. A small change of the fader may result in a big change in volume. By adjusting the Trim control, you will be able to use much more of the main input fader to control your recording levels.
7. After being adjusted by the input module main level control fader, the audio signal moves on to a **PAN** control. This adjusts the position between the left and right speakers, or between output channel assignments. For a stereo line input, this control is referred to as the **BALANCE** control.
8. Next is the [Equalization \(EQ\)](#) section. Here, you can make adjustments to the tonal quality of your input source before it is recorded. Boosting the low EQ will increase low frequencies and can add warmth to your voice. Boosting the high frequencies can add a sense of crispness to a voice. EQ should be used sparingly and should not be considered as a "fix" for acoustic or noise problems. EQ should only be used to enhance the sound of your voice by correcting for minor deficiencies of the microphone or recording environment. EQ cannot make a bad microphone or recording sound good and anything done with EQ on the mixer will be a permanent part of the recording.
9. Following the EQ section (or sometimes before), comes the [AUX or Effects Send](#) section of the input module. Having several AUX send controls on your mixer will give you a great deal of versatility. Each AUX send [buss](#) is like a completely independent mixer. As you'll see in the section on [Using a Telephone Interface](#), using an AUX send for headphone monitoring and your Master output for recording, will allow you to listen

to your client as you record, but without your client's audio being recorded. This will make more sense when you get to that section of this guide.

10. From the AUX sends, the audio signal usually returns to a set of **Output Assign** buttons near or above the input module's main volume control. These buttons assign the input source to one or more specific Output Channels. By selecting the same Output Assign channels on various input modules, those inputs become grouped to a common Sub-Master level control.

One nice thing about analog mixers, and even digital mixers, is that once you understand how one input channel strip works, you understand all of them!

## Output Section

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The Output Section of an analog mixer consists mainly of **Sub-Master** faders that control assigned groups of input sources. Sub-master channels come in sets of 2 and are generally further assignable to either a Master (sometimes called a "board master") or a dedicated channel output for that specific sub-master. Depending on the mixer, the sub-masters (or group masters) may or may not be assignable as independent outputs, or to the **Board Master**. The Board Master is the final stage of volume control before an audio signal leaves the mixer. If all this sounds confusing, don't worry about it. It will make sense when you use a mixer.

Here's an example of a possible signal flow for a microphone:

1. A mic is plugged into the XLR connector on input #4, panned to center, no EQ, assigned to output sub-master channels 1 & 2, AUX 1 (post-fader), and AUX 3 (pre-fader).
  - a. Panning the input source to center will send an equal amount of the source audio to both of the assigned sub-master (or group) outputs. This equal distribution of audio signal creates a "phantom center" or the illusion that the sound is coming from the center point between the left and right speakers.
  - b. No EQ means that there will be no tonal quality adjustments made during the recording. This is known as "flat EQ". Unless you have a specific reason for using EQ, I recommend keeping the EQ controls at their 12-o'clock (or flat) positions.
  - c. AUX 1 set to post-fader might be used to control the overall volume of your headphones. Being post-fader means that what you hear in your headphones will follow what you do with the main volume controls on the mixer. All input sources with their AUX 1 volume turned up will be heard through the AUX 1 output.
  - d. AUX 3 set to pre-fader might be used to control the volume being sent to a telephone system for client monitoring of your session ([phone patch](#)).
2. If sub-master 1 is intended to be the Left channel of a stereo feed, then sub-master 2 will be the Right channel. Adjusting the balance between the two sub-masters will affect the Left-to-Right balance of the overall output, much like a Pan [pot](#) adjusts the balance of a single source.
3. If a mixer has only 2 sub-masters, they will automatically be fed to a **Master fader**. If the mixer has 4 or more sub-masters, the individual group faders will have buttons for

assigning them to the master or possibly to other sub-masters, depending on the complexity of the mixer.

4. The Master Output Channel #1 will most likely be connected to the left input on a recording device, or to the left input (#1) of a USB device. Master Output Channel #2 would be connected to the right input on the same device. The result is a stereo feed from the mixer to the recorder.

## Monitor & Metering Section

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The Monitor section of your mixer serves two purposes: 1) it gives you a visual reference for the output volume of your audio mix (metering), and 2) allows you to control the volume for your speakers or headphone monitoring.

Most of today's newer analog and digital mixers use LED metering. LED (another acronym courtesy of our friendly design engineers) stands for Light Emitting Diode – the little green, yellow, and red lights that light up as audio goes through your mixer.

When adjusting audio levels at each of the four stages of volume control (Gain Trim, Input Level, Sub-master, and Master), make sure the LED indicator doesn't turn red. A red indicator means that the audio signal is "clipping" and will be distorted, or – worse yet – drop data bits.

At each stage of volume control, adjust the controls so the metering indicators on your mixer and computer software just reach the Yellow area. Analog mixers have about 18 dB of "[headroom](#)" so you might be able to get away with some of your metering going "into the red." However, any time your levels go red you'll be taking a chance on your recording not sounding the way you intend.

## Using an External USB Hard Drive

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As mentioned earlier, there are several good reasons why you should consider using an external USB hard drive for your audio recordings. Using an external hard drive protects your primary hard drive by separating your audio projects from your program files. This offers a level of security in that if your primary drive crashes, you won't lose your audio recordings. Another advantage of an external drive is that with today's technology, the drives are inexpensive enough that you can use them for long-term storage.

When you do use a hard drive for long-term storage and it is sitting on a shelf someplace, here's a little trick you should know: If you let a hard drive with data on it just sit idle for a long period of time, you might actually lose data. To prevent this, make a habit of once a year putting your long-term storage drives through a thorough disc scan or disc degrab so that each file is read. This keeps the files "alive" to help prevent data loss.

For more about recording on external drives, see the discussion on "[Recording on Hard Disk](#)" on page 36.

## Using a Telephone Interface (phone patch)

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Producers and clients are very busy people! With voiceover talent recording at their home studios – sometimes across the country – and with traffic the way it is in many cities, its often not practical for the producer or client to travel to the talent's home to supervise a session. There are several technological solutions to this problem. Two of the most common both use telephone lines: a [Phone Patch](#) and [ISDN](#).

Another option that is becoming more and more popular is to use the Internet as the pathway for either recording or monitoring a session.

Of these, a phone patch is the simplest and least expensive way for a client to “listen-in” on your recording session. The absolute simplest, and most basic, form of phone patch is to simply hold up the phone as you record your tracks. Although this will work, it's not the most practical solution for several reasons: you need to hold the phone, which limits your ability to move; you're thinking about holding the phone, which is a distraction from your performance.

A much better solution is to purchase an inexpensive telephone coupler that will allow you to connect an AUX output of your mixer to your phone system. [BSW-USA](#) has an assortment of inexpensive phone couplers including the line of [JK Audio phone interfaces](#). For analog phone hybrids the JK Audio [Inline Tap](#), or the [AutoHybrid](#) Digital hybrids like the [JK Audio Host](#), will give better separation and thus a cleaner sound on your headphone monitoring.

Here's how you use a phone coupler:

1. Your client calls you on your regular phone line (turn off “call waiting” if you have that service).
2. You press a button or flip a switch on your phone coupler.
3. Your client is now connected to your studio via your mixer AUX output.

It's really just that easy! Your client can hear you, you can hear them, and you can record and play audio for their approval. Having the ability to bring your telephone line into your mixer will enable you to easily record teleconferences and other phone conversations or use your audio system like a speaker phone.

You're about to learn the secrets for connecting your mixer and phone coupler so you can simultaneously record audio on your computer and receive direction over the phone – all through the same mixer – *without* the phone hook-up caller being recorded. In the world of broadcast audio, this set-up is called a “Mix-Minus” feed. Mix – referring to the output of your mixer, and Minus – referring to the fact that a source is eliminated from the mix. For a home studio set-up, the Mix-Minus feed will be used for your recording, and a selective mix will be sent to your phone patch.

When I first started working with mix-minus feeds for television remotes, it took me a few days to figure it all out – but they were a lot more complicated than this. Once you understand the signal flow, it's really quite simple. I'm going to attempt to explain it to you here, so you can completely understand it in about 5 minutes! Are you ready? It's not as bad as it sounds.

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The first secret to setting up a mix-minus feed is that you need a mixer capable of providing that function. Many small, inexpensive mixers simply are not capable of doing this, so if you think you'll want to have a client on the line at the same time you are recording, make sure your mixer meets these requirements:

You need to start with a mixer with at least the following capabilities:

1. One AUX control with a selector button to choose [pre-fader](#) or [post-fader](#).
2. At least one line level input.
3. At least one microphone input.

If you already own a mixer that *doesn't* have an AUX control with pre-fader send, or a separate sub-master output that you can isolate from your recording feed, you might want to consider upgrading. Although it may be possible to work around the limitations of your mixer, the time and trouble it would take will probably not be worth it.

Connect your phone coupler to the mixer as follows:

1. Connect a telephone wire from your wall to the "wall" input on the coupler.
2. Connect a telephone desk set to the "phone" connector on the coupler.
3. Connect a wire from an AUX output to the "audio in" connection on the coupler. (pre/post selection is *not* critical for this output)
4. Connect a wire from the "audio out" connection on the coupler to an available Line Input on your mixer.

Here's how to set-up your mixer so everything works for mix-minus recording:

1. Assign your microphone in the normal manner as you would for recording on your computer.
2. Set your monitoring section to listen to an AUX send for headphone monitoring. It is critical that you use an AUX buss with pre/post-fader select for the AUX level control.
  - a. Assign the AUX pre/post select button to POST for your microphone
  - b. Adjust the volume controls for a comfortable recording level and listening volume on headphones.
3. Also assign your mic to the AUX buss that is connected to your phone coupler's "audio in". You'll later be adjusting the volume for this AUX send so your caller can clearly hear your audio.
4. On the input channel strip for your phone coupler do the following:
  - a. Turn the input module ON
  - b. Leave the main input fader all the way OFF or down.
  - c. Leave the AUX volume OFF on the buss that sends to the phone coupler.
  - d. On the AUX buss you are using for headphone monitoring, select PRE-FADER and adjust the volume so you can clearly hear your caller on your headphones. NOTE: DO NOT bring up the input level control for the phone coupler if you are also sending an AUX feed back to the coupler. If you do, you'll get some nasty feedback.

Here's what happens:

When your coupler is switched in, your caller will be able to hear you and anything else you bring up on your mixer input controls provided the AUX level controls for those inputs are also turned up. This means that if your computer is connected to your mixer, you'll be able to play back your recordings through the mixer for your client to hear.

Your computer will be recording the normal master output. Since you have "minused" out your caller by leaving the phone coupler input fader OFF, your master output is technically a "mix-minus" (a mix of your mic, minus the caller).

On headphones, you'll be hearing yourself (as usual) and your caller both coming through the mix you create on the AUX buss with pre/post fader select that is assigned for headphone monitoring.

The other commonly used telephone hook-up is [ISDN](#).

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## Long Distance Digital Recording:

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With today's digital technology, it's possible to live in one city and have your voice tracks recorded thousands of miles away. Two of the current technologies used are ISDN and Source Connect. They both have the same purpose: to allow for extremely high quality real-time recording at a remote location, but the way they work – and their related costs – are completely different. As computer and Internet technology develop, there will likely be other contenders for long distance recording which will eventually replace ISDN.

## ISDN

### Is it Really Necessary – and Just What is it Anyway?

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OK . . . here we go again! Another Acronym! And this one's a doosey!

ISDN literally stands for "Integrated **S**ervices **D**igital **N**etwork". It's a way to transmit and receive high-quality digital audio virtually anywhere in the world using the telephone system.

But is ISDN really necessary for a home studio?

Depending on the level of your voiceover work, the answer can be either "yes" or "no." When it comes to ISDN, there is no "maybe."

For many years ISDN was the only game in town for long-distance, studio quality digital recording. ISDN uses special telephone lines that must be leased from the telephone company. Since the phone company has control of the phone lines, they can also control the price, which means ISDN can be expensive.

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An ISDN connection requires special digital telephone lines from your phone company, and not all parts of the country have this capability. In addition to these special phone lines a device called a CoDec is required at both ends of the connection. CoDec is another acronym that stands for “Coder – Decoder”.

Much like a USB interface for your computer, a CoDec is essentially an analog to digital converter for the phone system. It takes the output of your mixer and converts (Codes) it to a unique digital signal that can be transmitted in real-time anywhere in the world to a recording studio that has a compatible CoDec at their end. At the receiving end, the digital signal is converted back to an analog signal (Decoded) that can be used in a recorded project.

ISDN lines and CoDecs can work bi-directionally, so the result is just like a telephone conversation . . . except that the quality is extremely good and it sounds like the person on the other end of the line is in the studio next door.

Two things about CoDecs: 1) not all CoDecs are the same, and some have a difficult time “talking” to other CoDecs. And 2) the average price of an inexpensive ISDN CoDec is around \$2500 - \$3500. (There is a software CoDec that costs about \$1,000.)

Remember those special digital phone lines you get from your phone company? Well, they're not free. If you're installing ISDN in your home studio, you'll need to pay your phone company to install the special lines in your home - assuming ISDN service is available in your area. Then you'll pay a monthly service charge for maintaining ISDN service – even if you don't use it. Depending on your service agreement, you may have a certain amount of time included with your monthly maintenance fee. But after that, you'll be charged a per-minute fee when using your ISDN line for outgoing calls.

And if your CoDec can't “talk” to the CoDec at the other end of the line, you'll need to go through a company that provides a “bridge line” to enable a clean ISDN connection.

So, is ISDN for you? Do you really need it? If you're just starting out, you definitely don't need ISDN. Even if you're a working professional, ISDN may not be necessary. To justify the overhead of ISDN you need to be working at a level where you have consistent work coming in and clients who demand that service.

A very practical alternative to having ISDN at your home studio is to locate a recording studio in your area that has ISDN, and establish a good relationship with that studio. Find out what their studio rates are with and without ISDN, and when you get a call for an ISDN session, you'll have the information you need to quote a reasonable price and pass the cost of ISDN studio time on to your client.

Producers who book ISDN sessions know that it is expensive, and they are generally willing to pay the extra cost. These producers are usually under an extremely tight deadline and demand the highest possible quality for their voice recordings. They know that with ISDN they will hear exactly what your performance sounds like, unlike a phone patch that is limited by the quality of standard telephone lines.

However, there is an increasing number of producers who expect the talent to cover the cost of the ISDN connection at no increase in the talent fee. Whether you charge an additional fee for your ISDN sessions or absorb the cost is up to you.

Now you know what ISDN is . . . but only you can decide if you need it.

## **The Next Generation of Long Distance Recording ISDN Alternatives**

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A number of new technologies are being developed that provide an affordable alternative to ISDN. Unlike ISDN, these newer technologies use the Internet as the medium for long-distance sound recording. Basically, the process uses what is known as "peer-to-peer" communication to communicate between two computers over an Internet connection.

Internet ISDN alternatives offer studio quality audio just like ISDN, but that's where the similarity ends. Some services also include webcam, instant chat, and other features that ISDN can only dream about. Some of these alternatives include [Source Connect](#) and [Audio TX](#). Just as ISDN requires CoDecs at both ends that can "talk" to each other, the Internet alternatives also require matching systems at both ends. Because ISDN is still accepted as the "standard", there is often a reluctance by studio owners to install a new technology until there is enough demand for it.

There are also a variety of lower-end Internet VOIP chat and meeting services that can provide adequate two-way communication similar to a phone patch (but at much higher quality), but are not suited to long-distance recording. Some of these include [Skype](#), [Oovoo](#), and [Zoom](#). Although the technology for these options is very good, they generally are not considered to be serious players as a potential replacement to ISDN.

As with ISDN, only you can determine if or when you will need an Internet based system for long-distance recording. In the meantime, a little research into the VOIP options might give you a good and inexpensive alternative to a phone patch for those times when it might be needed.

Here's a chart comparing ISDN versus the main features of Internet alternatives.

	<b>Internet Alternative</b>	<b>ISDN</b>
Type of Codec	Software based	Hardware and Software versions
Studio quality	YES	YES
Real-time recording	YES	YES
Requires telephone lines	NO	YES
Uses the Internet	YES	NO
Low latency	YES	YES
Webcam	YES (depends on system)	NO
Instant chat	YES (depends on system)	NO
Easy to use interface	YES	Depends on hardware
High quality duplex audio (both directions)	YES	Requires two phone lines
CoDec or matching software	YES	YES

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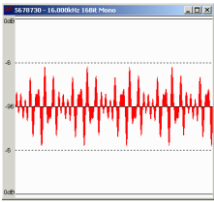
required at both ends		Not all CoDecs work together
Bridge lines needed	NO	Only when using incompatible CoDecs
Portable	YES	NO
Hardware cost (CoDec)	- - - -	\$1,000 to \$3,500
Software cost (CoDec)	\$800 - \$1,500	- - - -
Installation costs	NONE	\$150-\$185 average installation
Monthly charges	varies	\$25 or more per line (usually requires 2 lines)
Service availability	Anywhere a high-speed Internet connection is available.	Limited availability, mostly in larger cities. Not available in all cities.
Wireless capability	YES Will work on wireless Internet connection.	NO Must connect to phone lines.

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# The Recording Process

## How to Record Good Audio Levels

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All audio recording software works in basically the same way: You open an audio track in the software, arm the track for recording, and click on the record button. While recording, you will see a waveform representation of the audio that is being recorded. A digital representation of the incoming audio is stored to a hard drive or other media for future use. In and of itself, that's pretty simple.

However, the challenge we face is making sure that the waveform for our recording meets certain standards. If the wave form is too small, it means our recording volume (or level) is too low. If the waveform is too large, it could mean our audio will be distorted and unusable.

All electronic equipment has what is known as a "noise floor". The noise floor simply refers to the amount of inherent noise that is generated by the electronic components in your system. The amount of inherent noise is referenced as a negative dB number. Look at the section on [mic vs. line level](#) to get an idea of how soft and loud different decibel levels are. Note that the threshold of hearing is considered to be 0dB. So a noise level of -70dB is going to be inaudible. Now, consider that if you are using a condenser microphone, there is a pre-amp inside the mic. Your USB interface or mixer has additional pre-amplification on the analog side. Once the audio is converted to digital, there is effectively no noise, but there can be other digital issues that can present themselves as noise. All of these stages of just getting the audio from the mic to the computer can add very small amounts of noise to your recordings. Because this internal noise is inherent in the analog electronics, it does not get recorded as part of the modulated audio signal - but it will still be there, lurking at a very low volume in the background of the recording.

But even though internal electronic noise from analog sources might be effectively inaudible, it can be a potential problem. If you record your audio level too low, at some point in time the volume will need to be increased. When you record at a low volume, the internal electronic noise is going to be recorded at a level consistent with and proportionate to your voice. The actual volume level of the internal noise will never change regardless of how loud your voice is recorded, but it will be stored in the recording at a consistent level. The exact ratio of optimum record level to noise is known as the Signal to Noise ratio. When the overall volume of a low recording is increased, not only will the loudness of your voice be increased, but so will all that noise.

The above example is really not very realistic, however, because our real-life recordings use an open microphone in a room that has its own inherent noise, or "[room tone](#)." When you add room tone to the mix, things can get pretty ugly. Your room tone (or ambient noise) is going to be part of every recording you make. And, just as internal electronic noise will be at a constant volume as part of your recordings, so will your room ambience. When you work closer to your microphone, you increase the Signal to Noise ratio between your voice and the room tone. In other words, if you are 4" from the mic, your voice will be recorded proportionally louder when compared to the room tone than if you are speaking 10" from the mic. The further you are from the mic, the more ambient room tone will be picked up in the recording. Additionally, the higher quality the mic, the more room ambience will be picked up due to the mic's increased sensitivity.

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The solution to this potential problem is to make sure your recording level is loud enough so that your primary audio, or Signal (your voice) is recorded in such a way that it masks or covers up any electronic or acoustic noise that might also be recorded. As you look at your software during recording, the ideal record level is when the wave form fills about 2/3 of the wave form recording window. With audio recorded at this level, there will be no need to increase the volume later on, so the inherent noise will stay inaudible, as it should be.

Two additional points about noise needs to be mentioned here. The introduction of electronic noise will be directly related to your audio signal chain. That's simply the number of pre-amplification stages your audio must go through before getting to the computer. For example, if you use a USB mic connected directly to the computer, you have only a single pre-amp in the circuit. However, if you use an analog mixer connected to a USB interface, you might have up to four or more various stages of electronics, all of which might contribute to the inherent electronic noise.

Additionally, with the sophistication of today's electronic equipment and incredibly small circuit designs, most analog and digital conversion equipment is extremely quiet with a very high Signal to Noise ratio. However, not all devices work equally well with all microphones and some devices simply don't play nice with other devices. This can mean that even an expensive piece of equipment might exhibit a lot of noise simply because it isn't perfectly matched to the output level of a microphone or doesn't play nice with another piece of equipment in the path. Unfortunately, when this happens, the usual solution is to replace the noisy piece of equipment.

## A Brief History of Audio Levels

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Let's go back in time for a moment, to the days of analog audio. This short trip will help you understand why digital audio works the way it does and why we need to be very aware of our recording levels.

Way back in the day when analog audio was being developed - actually not all that long ago, in the 1920's or so - equipment designers realized that they needed to have some "headroom" if they were going to be able to record clean, undistorted audio. So they cleverly designed their early audio amplifiers, broadcasting and recording systems to allow for roughly 20dB of "headroom," or cushion, above the optimum volume for their recordings. What that meant was, a recording could easily accommodate big changes in the loudness of the original sound, allowing to be recorded without going into distortion. This cushion gave the early broadcast and recording engineers a sort of comfort zone that made their lives a lot easier.

In order to visualize what was happening during the recording process, they developed what became known as the "VU" or Volume Unit meter. The VU meter used a moving needle to indicate the approximate loudness in decibels at any moment in time. The technology of how a VU meter works requires a discussion and understanding of electronics that I don't need to cover here. Suffice to say that the left of the meter started at -20dB. The meter moved to 0dB, then up to +3dB. At the 0dB point, the meter was colored red to indicate that anything recorded above this point was exceeding the optimum level. Newer



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analog VU meters added a "peak" LED to indicate the point at which the audio was exceeding the headroom ceiling.

The roughly 20dB of headroom built into analog audio becomes very significant as we shift from analog to digital recording.



Today's digital audio software uses bar meters that are divided into three colored sections: green, yellow, and red. If you look closely at the meters on your software, you'll notice that the transition from green to yellow will

be someplace in the neighborhood of -18db to -12dB. And the transition from yellow to red will usually be around -6dB. In digital audio 0dB is at the top end of the meter. When you hit digital 0dB, you have exceeded the capability of the computer to record clean audio. When digital 0dB is exceeded, you are literally losing data bits. The result sounds like distortion, but it's really the sound of lost data.

So why is this important? Well, when you know that when your recording levels start to move into the yellow, you can understand that you are venturing into dangerous territory, and this knowledge will help you keep your recordings under control. As with analog audio, you've got about 20dB of headroom from that green-to-yellow transition until your audio becomes damaged. Allowing your levels to reach into the yellow is OK, but be careful to keep out of the red. Ideally, your recording levels should be peaking just at that green-to-yellow transition with occasional peaks into the higher yellow and rare peaks into the red. That green-yellow transition point on a digital meter is the rough equivalent of the 0dB point on the old analog VU meter.

By maintaining appropriate recording levels, you will be reducing recorded noise, and reducing the need for your clients to have to make adjustments to your recordings. Should they choose to make some adjustments (and they likely will), they will be working with a clean file that gives them the ability to do what they need to do. A poorly recorded file with low levels can easily cause a world of problems down the line.

Now that you know a bit about the recording process, let's take a look at the dreaded "audio processing."

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# Audio Processing

## To Process or Not to Process

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Audio signal processing is one of the great mysteries of universe for many entering the world of home recording and voiceover. A mere utterance of the words "audio processing" or "signal processing" can bring the most talented performer to their knees. But, as with most things technical, the fear of dealing with audio processing has more to do with a lack of education than anything else.

When it comes to audio processing for voiceover, the bottom line is this: If you have done your job in setting up your home studio by investing in good equipment and learning how to use it, your recording environment is quiet with no room reflections, you understand mic technique, you have learned how to use your recording software, and your recording levels are correct... you should not need to do ANY audio processing.

Now, does that mean you won't apply some minimal audio processing from time to time? Perhaps. Perhaps not. Whether or not you apply any processing to your voice track recordings will largely depend on several factors:

- Your depth of understanding of how the various types of processing will affect your recordings and what might be an appropriate use in a given situation.
- Will your client accept audio processing in the files you deliver?
- Known deficiencies in your home studio environment, equipment and/or recording process that might only be corrected through some sort of audio processing.

Until you have enough experience working with audio processing, my recommendation is to NOT apply any audio processing to your auditions or paid projects. Leave the processing to the client's engineer.

The best way to get the experience you need is to start "playing" with various processing tools and learn by experience. Don't worry... you can't break your computer or hurt the recordings (unless you save over your original master tracks.) Don't rely on only your ears to determine whether what you are doing is correct or not. When you are just learning how various types of processing will affect your audio, what you think sounds "great" might, in fact be completely inappropriate in the real world of audio production.

If you really want to know how to use processing correctly, find someone who is experienced with recording and audio processing and enlist their help. Some local recording studios offer classes in audio production, as do many colleges and trade schools. One thing you can do is call recording studios in your area and ask if you can "sit in" on some sessions. Be sure to explain that you are learning how to record the best voice tracks from your home studio and that you'd like to see how the pros do it. You may be surprised to find that many studio engineers will be very helpful. Engineers love to "talk shop" and share what they know. Just be careful to not overstep your bounds and if you are sitting in on a session, don't say a word... just observe and take notes. Wait until you have some time alone with the engineer to get your questions answered. And, most important, be very respectful of their time and assistance.

If that approach isn't your cup of tea or isn't practical in your community, you should know that we offer a complete home studio consulting service as part of VoiceActing Academy. All the details are under the Consulting menu at [VoiceActing.com](http://VoiceActing.com). Also, as a member of our [Conductor's Club](#) membership support service, you will have access to us to get your questions answered.

In the rest of this section, I'll discuss the most common type of audio processing used with voiceover work and give you some ideas as to when their use might be appropriate. To understand audio processing, we need to begin with the recording process itself.

If you learn nothing more from this section, remember this: When you apply any sort of audio processing to your audio recordings, that processing becomes a permanent part of the file and cannot be removed. This means, if you are using a mixer to control your microphone and you add some EQ or Reverb to your voice as it is recorded, those effects will be part of the recording, potentially making the work unusable. Although it might be possible to apply additional processing later on that could give the appearance of reversing the original processing, this will almost always result in unwanted audio artifacts which just create more problems.

So, once again, my best advice is to avoid the temptation to add any processing to your submitted files until you have a working knowledge of what you are doing and how the processing will affect your recordings.

## Normalizing Tracks

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One of the most commonly misused audio processing tools is Normalization. I say this is misused, because if your recording levels are good to begin with, you don't need to Normalize your tracks. Yet many uneducated voice actors will indiscriminately Normalize everything without really understanding what they are doing. So, allow me to explain.

Normalization is a process of increasing the overall loudness of a recording. Depending on the software, Normalization can be applied to an entire track or only a portion of a track.

The way Normalization works is this:

- A preset maximum volume is set in the recording software settings. This is usually anywhere from -.1dB to -3dB below digital 0.
- During the Normalization process, the software scans the audio track or selected portion, seeking the loudest transient spike in the audio.
- Once the loudest transient spike has been located, the software will proportionally increase the volume of the entire track or selection so that the loudest spike reaches the pre-set level.
- The result is that the entire track or selection has been proportionally increased in volume and this increase is indicated by a change in the wave form viewed in the software.

That's it. That's all it does!

When used properly, Normalization can be a useful tool for increasing the overall volume of a recording. But improperly used, it can be tricky and can potentially ruin your edits. For example, let's say your original recording was recorded a bit lower than you would like. Let's also say that some portions of your performance were at a slightly lower volume than other parts - maybe you whispered part of a line or you simply weren't speaking at a consistent volume. And finally, after you have recorded your track, you will need to go back and do some editing.

Here's where Normalization can be a problem. If you edit your tracks first, before Normalizing, you can end up with a whole bunch of small segments, or elements, in your track. (note: some software, like Audacity, can stitch edits together as you do them, so you always have one basic track.) If you now Normalize all those separate elements, the Normalization process will be searching for the loudest spike in each segment. This can result in your audio levels bouncing all over the place and a final Normalized track that has absolutely no continuity of volume. If you must Normalize your tracks, please make sure you Normalize BEFORE you start editing.

Most software has an independent "[gain](#)" or volume adjustment that can effectively serve the same purpose as Normalization. The difference is that with a simple gain adjustment, the louder spikes in your track might easily exceed digital zero, with the result of clipping.

But, as I've said, if your record levels are good to begin with, you really have no reason to use Normalization. In fact, many clients will specifically ask that you do NOT normalize your tracks.

## Compression and Limiting

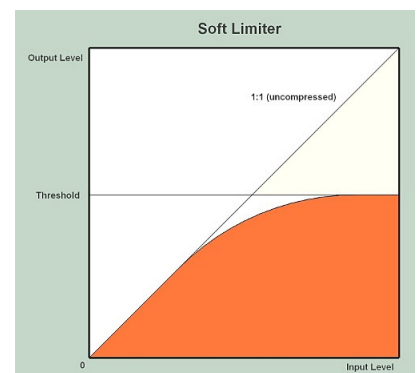
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I remember a time in High School when a friend of mine told me he was building a compressor. I had absolutely no idea what he was talking about! Even as I started working in radio, recording studios and television, it took a while for me to really understand audio compression. So, if you don't get this the first time around, that's perfectly OK with me.

Let's start with Limiting first. This concept is pretty easy to grasp and by understanding what Limiting does, the concept of Compression will be a bit easier to understand. Actually, Limiters and Compressors are basically the same process, but the process is referred to as Limiting when a certain effect is desired.

Basically Limiting is an audio process whereby the system prevents (or limits) the audio from exceeding a pre-set maximum level. A threshold volume is set, at which point Limiting kicks in, preventing the audio from exceeding the pre-set threshold.

Regardless of how loud the original source audio might be, the output will never be louder than the pre-set threshold. You can look at it this way: You've got your hand on the volume control and the sound is at a comfortable listening volume. Whenever the sound gets a little bit loud, you quickly turn the volume down, so the sound stays around the comfortable volume. As the



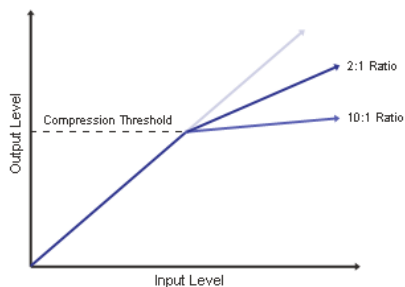
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loud sound softens, you gradually turn the volume back up to maintain a consistent comfortable listening level.

That's Limiting in a nutshell. A limiter keeps loud volume changes under control by very quickly adjusting spikes in loudness to keep the overall volume consistent. You may remember in the section on the [physics of audio](#) where I talked about Attack, Decay, Frequency and Amplitude. These can all be aspects of how a limiter is set to respond to changes in audio volume. Two other components can be added here: Sustain and Release.

The Attack setting determines how quickly the limiter reacts to a change in volume. The Decay setting determines how quickly or slowly the limiter releases after changing the volume. Sustain refers to how long the reduced volume level is maintained before being released. And Release indicates the duration of time before the Limiter stops affecting the sound. In the chart above, you'll also notice a ratio. A 1:1 ratio means what goes in is what comes out. Most audio engineers consider a ratio of 10:1 or more to be Limiting. It is not uncommon for a Limiter to have a ratio of 60:1.

A Compressor is a bit more complicated, but it pretty much works very much like a Limiter. Where a Limiter works to affect loud volume in a recording, a Compressor works to affect the low volume portions of a recording. Since Limiting and Compression work hand-in-hand, most audio equipment and software combine the two functions into a single plug-in or device.



The same Attack, Decay, Sustain, and Release settings can be part of the audio compression process. And just as a Limiter has a pre-set level at which it becomes active, a Compressor also has a pre-set threshold at which it starts to work.

Audio compression is referenced by a ratio like 3:1 or 10:1. For example, with a 3:1 compression setting, for every 3dB of audio change that goes in, there will be 1dB of change going out. The bigger the ratio, the more noticeable the compression.

If you listen to much music, you heard the effect of audio compression. When heavy compression is applied, the dynamic range of a recording becomes squished. So a voice recording that originally had a dynamic range of 30dB might end up with a 10dB dynamic range after heavy compression. The result of heavy compression is that everything in the recording sounds the same volume.

Used properly, compression is a useful tool for tightening the sound of a recording by bringing up the lower volume portions, while not changing the louder parts. when combined with a limiter, the effect can be a dramatic alteration of the recording.

Compression/Limiting is different from Normalization in that Normalization simply adjusts the overall volume of an entire recording where Compression/Limiting affects the dynamic range of a recording by increasing lower volume portions (compression) and preventing the loud parts from getting too loud (limiting).

As with other audio processing, I generally don't recommend using any compression or limiting on submitted audio tracks unless you know what you are doing. Some voice talent will

automatically add a 3:1 compression to their files simply to "tighten" the sound of their recordings. But keep in mind, that any processing you apply to a recording cannot be removed.

I would encourage you to experiment with the compression feature in your software, but I also encourage you to be very judicious in your use of compression and limiting in your edited work.

## Equalization

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Old analog audio amplifiers, receivers, tape recorders, and even old radios used to have a control called "Tone." Adjusting this control would either boost the high frequencies or boost the low frequencies. The more expensive units would have three Tone Controls, one each for low, mid, and high frequencies. The idea was that by adjusting the Tone Controls, one could tune the audio coming out of the speakers to create the most pleasing sound.

Well, those tone controls still exist today in your audio software and on audio mixers. But today, they are known as Equalization or simply EQ. Depending on your equipment or software, your EQ can be pretty simple or very complex.

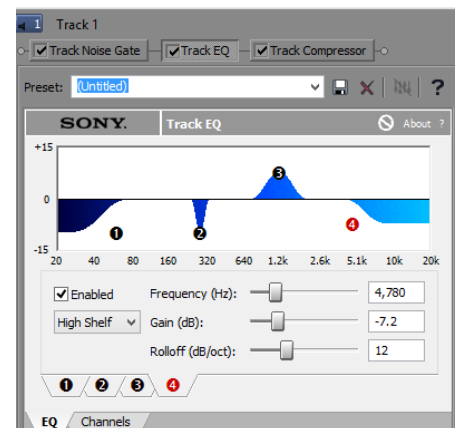
Basically, Equalization functions as a filter for specific frequencies that exist in a recording. The filter can be used to reduce (roll-off) or increase (boost) any audible frequency. EQ is almost exclusively used to either compensate for deficiencies in a recording where there is either too much or too little of a specific frequency, or to enhance a specific frequency range for adding warmth (boosting lower frequencies), or adding brightness (boosting mid-range and higher frequencies). For example, if a recording exhibits a boominess quality in the lower frequencies, an EQ setting rolling off frequencies below 100Hz might substantially clean up the recording.



Audio mixers will usually have three EQ controls, each with its own pre-set center frequency for lows, mids and highs. Adjusting the knob primarily affects the center frequency, but will also have a noticeable effect on adjacent frequencies.

Audio software EQ works differently in that there can be several pre-set frequencies, but those pre-sets are almost infinitely adjustable along the frequency spectrum. And each adjustment point can be used in a

variety of ways. The most common EQ parameters are low-frequency shelf, high-frequency shelf and frequency band. Additional variables in software EQ are the specific center frequency, the gain, and bandwidth (or frequency range) being adjusted. Some software EQ even allows for adding additional EQ points and layering EQ adjustments on top of one another to create an enhanced effect.



As with other types of audio processing, you will be wise to experiment with EQ before jumping in and applying the process to your recordings.

## Noise Reduction

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No matter how good your equipment is... no matter how quiet your home studio is... no matter what steps you take... there will always be some level of noise in your recordings. \\\

Sorry... but that's just the way it is!

If you read the section on [Recording Good Audio Levels](#), you already know two of the most common types of noise: electronic and acoustic. But there are many other sources of noise that can affect your recordings. Mouth noise, clothing noise, paper rustling, noise coming through walls, ceilings or floors, and even breathing can all contribute to noise in your recordings. Obviously, it is near impossible to eliminate all noise in your recordings. Even the multi-million dollar big box recording studios must deal with noise.

The general idea of home studio recording for voiceover is to keep your recording quality as high as possible. This means keeping noise to a minimum and correcting noise problems in your recordings as much as possible.

So, just how are you going to do that? That depends on what your specific noise issues are.

If your primary noise sources are external and acoustic, like leaf blowers, helicopters, and other external noise sources, the simplest solution is to simply stop recording and wait for the noise source to finish or go away before proceeding. It may be necessary to off your air conditioning, furnace, and other sources of noise when recording. Although some acoustic noise sources can be reduced in volume through the careful use of [Equalization](#), the side effects of EQ may not be desirable.

Many noise sources that appear when you are recording, like mouth clicks and awkward breaths, can be removed from your recordings with careful editing. But if these problems are extensive, you may need to take more drastic measures to clean up your audio. I'll get to that after I give you some solutions to the most common audio noise problems.

A common symptom of electronic noise is hum or buzz that might appear in your recordings, but which you might not hear in your headphones while recording. Hum and buzz are symptomatic of electronic issues that can commonly affect a home studio setup. A broken ground wire in a mic cable can allow RF (radio frequency) interference to enter your audio signal path. This interference can appear as a buzz or even as a local radio station. The only way to eliminate this type of RF noise is to correct the problem by replacing the offending cable. RF interference can only be removed from your recordings by using extremely sophisticated noise removal software.

Another common type of electronic noise is a low-frequency hum at about 60Hz or 120Hz. The cause of this is often simply because a mic cable is parallel to or coiled on top of an electrical power cord or power strip. This type of noise can also be caused by having different components of your home studio system being plugged into AC outlets in different parts of your room. This type of noise is the result of the electrical magnetic field produced by a power cord entering your audio cables. It can usually be eliminated by simply making sure that your audio cables are separated from your power cables by about 4"-6" of air space. Another solution is to make sure that all of your equipment is plugged into a common power strip that is

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plugged into a grounded electrical outlet. This can be a challenge if you live in an older home that may not have grounded outlets. In this case, it may be necessary to enlist the services of an electrician to bring a grounded circuit into your home.

If your home studio doesn't have any serious acoustic or electronic issues, but you still find that you have an excessive amount of hiss or noise in your recordings, you most likely need to replace your USB interface or you need to take a look at how you are adjusting your audio levels on the way to your computer. If you are using a mixer as the first destination for your microphone, start by setting your gain trim to maximum, then adjust your input fader knob, followed by the sub-master, and finally the master output gain control. If not properly adjusted, each of these stages can add noise that can sound like background hiss.

Another source of noise can be your condenser microphone. If the power supply from your computer, mixer or USB Interface is not giving your mic the right amount of power, the mic's internal pre-amp might not be able to properly to convert your analog sound waves to electrical energy. The problem could be with your mic, the USB interface, the mixer, or even with your computer. To fix the problem, try swapping out each component to see if it makes a difference. Quite often the problem can be fixed with a service call or simply changing to a different mic.

OK... let's assume you've done everything you can to reduce and eliminate external and electronic noise sources, and no matter what you've done, you still have some underlying noise in your recordings. What to do? What to do?

My first recommendation would be to go back and check again. If everything is working properly and your recording environment is quiet, there should be almost no audible noise in your recordings, other than some minimal room tone - and the ambient room tone should be masked by your voice when speaking and be almost inaudible when you are silent.

So, let's get back to solving those noise problems that appear when you are recording. These are most often mouth noise, clothing noise, paper rustling, breathing, unacceptable ambient noise, and even some electronic noise. Much of human generated noise like mouth noise, clothing noise, and awkward breathing, will be removed as part of your editing process. But there may be some other noise in your recording, like background room ambience or a slight hiss, that you just want to get rid of.

There are two forms of noise reduction available in audio software that are designed to do the job of reducing or eliminating unwanted noise. The most common of these is a "Noise Gate," and the other is simply labeled "Noise Reduction." Although the desired result from using either of these is the same, their operation is completely different. And, as with any other audio processing, I strongly suggest you experiment with these tools before applying them to your recordings.

A Noise Gate is an audio process in which low-volume sound in a recording is effectively turned off. Where a limiter will automatically reduce the volume of loud sounds that reach a pre-set threshold to prevent them from getting louder, a noise gate will reduce (or turn off) low volume sounds that are below a pre-set threshold.

Picture a home with a picket fence with a gate blocking access to your yard. The gate is located at a certain point along the path to your front door. This is the equivalent of the noise gate threshold. Anyone outside of the gate cannot get into your yard until they reach the gate. With a noise gate, any audio that is below the threshold volume is silenced.

Once your visitor reaches the gate, the gate opens to allow him into your yard. The rate of speed at which the gate opens is the Attack speed. A short (or fast) Attack opens the gate quickly, allowing for a quick entrance to your yard. A slow attack allows for a slow, gradual entrance because the gate is opening slowly. When an audio noise gate opens, any audio louder than the threshold becomes audible.

Your gate is special and has a sensor that keeps the gate open as long as your visitor is moving along the path. When your visitor stops moving, he is instantly moved outside the gate. And the design of the hinge of your yard gate will determine how quickly it closes when your visitor stops moving. With an audio noise gate, the gate will remain open, allowing audio to be heard, as long as the volume is louder than the pre-set threshold. When the volume falls below the threshold, the gate closes. As with the speed at which the gate is opened, the speed for the gate closing can also be adjusted. With a noise gate, a slow Release time results in a gradual decrease in volume. A fast release time produces an abrupt closing of the gate.

You might think that a noise gate is a logical and practical solution to removing noise from your recordings. And you might be right if it wasn't for one thing. We live our lives in a very noisy world. Removing all remnants of noise from a recording can result in a very unnatural sounding audio track. Also, if your settings for Attack and Release are not correct, using a noise gate can easily allow occasional unwanted sounds to enter and the trail-off sound of a breath to be truncated or clipped. The result can be a choppy sound that can be difficult to listen to.

A noise gate has its place, but as with other audio processing, its use should be limited.

The other form of noise reduction, usually just referred to as "Noise Reduction," uses an entirely different process to remove unwanted noise from a recording. Basically, a sample is taken of a portion of the recording that contains the noise to be removed. The Noise Reduction software uses this sample as a template for noise to be removed from the entire file, so the sampled noise must exist throughout the entire recording. The software scans the file and through a process of digital manipulation and magic, effectively removes anything that matches the sample. Voila! A clean audio track that retains the essential breaths and most other natural elements of the recording. Just the desired noise is gone!

[Audacity](#) has a Noise Reduction option that can work pretty well, but it has some limitations. There are also extremely sophisticated software plug-ins that are designed to work with your recording software as effects processors. One of these is [Izotope RX2](#). Izotope has an entire line of audio mastering and repair plug-ins that work with most audio software to remove ambient noise, hum, buzz and more. There are other components that work extremely well to remove mouth clicks and other types of noise. But this stuff doesn't come cheap! You will pay a price for the sophistication of high-end audio plug-ins and you will need to spend a fair amount of time learning how to use these tools properly.

Depending on the quality of your recordings and the needs of your client, you may or may not need to consider applying some form of noise reduction to your final recordings. But keep in mind that digital noise reduction is a complex process that demands a huge amount of CPU processing from your computer and can take a considerable amount of time. If you use it, make this one of the final steps in your recording process, just before your final render.

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# Organizing Your Computer

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I'll keep this short! Understanding and using a computer can be challenging. But, you already knew that!

If your computer is not organized, you can end up wasting a lot of time trying to find files or important documents. You might also unintentionally delete files that are needed for your audio projects.

I'm going to assume that you already know how to use your computer for basic functions. If you're already computer literate, this section may be a review for you, and if you've already got a system for organizing your computer, you can skip this section. However, if you're just learning how to use your computer, or you've had problems understanding how to organize it, you may find some of these ideas will help you.

Organizing your computer is not difficult . . . it just takes a little planning to save a lot of time and wasted effort. Starting from a new computer or an empty USB/Firewire drive is quite easy. But if you're reorganizing an older computer, this may take some time.

In this section, I'll talk about organizing your computer for audio production, but you can apply these ideas to other types of work as well. Begin by thinking of your computer as an electronic filing cabinet with drawers; folders within the drawers; and documents within the folders.

Your hard drive, DVD drive, and USB ports are like a drawers in the file cabinet – the more drives and ports you have connected, the more drawers you have in your cabinet. Some drawers are used for storing information, while other drawers are used for special purposes, like playing CDs or DVDs. If your computer is on a network, you even have drawers that give you access to other file cabinets - the computers and network drives on your network. If you have one of the newer PC operating systems, your network might be referred to as a "home group" or "work group."

Your computer is already set up with several FOLDERS in your main file drawer, referred to as DRIVE C:. Many of those folders have SUB-FOLDERS which can go for several levels. The content of the FOLDERS or SUB-FOLDERS is data in the form of documents, image files, program files, audio files, video files, and many other types of data.

For your home studio, I recommend separating your system files and programs from your documents, photos, audio projects and videos. Putting your personal documents and other files on an external USB hard drive has several benefits:

- Your data files are protected from any failure of your system hard drive. If you store everything on your C: drive - and your drive fails - you will likely lose everything.
- You will have portability of your data. An external USB drive can easily be moved from one computer to another.
- By using more than one external USB drive, you can easily create a local backup of your data. Of course, there are many online options for data backup as well, like

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[Carbonite](#), [Mediafire](#), and similar data backup services. I definitely recommend subscribing to an off-site backup service, at least for your drive C: data. But having a local backup of your personal data files on an external drive just makes life easier in the event of a problem. For more on backing up data, see the next section on "[Backing up Your Projects](#)."

As you begin to record audio on your hard drive, keep some of these ideas in mind:

1. Create a separate top-level folder for each client
2. Set up a separate folder within a client folder for each project you are working on for that client
3. Within each folder, create sub-folders for different projects or component files.
4. Include a sub-folder for storing rendered files (MP3 or other audio formats) that are intended for delivery to your client.
  - a. For example: in your Auditions folder, you might have sub-folders for Agent A, Agent B, and Pay to Play auditions.
  - b. Each of those sub-folders would contain audition files or sub-folders for each project you do for that client, and each project sub-folder would contain all the files needed for that particular project.
  - c. An additional folder within each client folder would hold your completed MP3 files. This folder could be named UPLOADS, or DELIVERY, or whatever name works for you.

Your recording software will give you the ability to save your files wherever you want on your computer hard drives. As you open your software to record tracks, get into the habit of assigning your storage locations at the start of each project. If you wait until you have begun, you could easily have necessary files for the project scattered over several different locations. Your software may not identify the specific locations, and you may not become aware of the problem until you backup the project, only to find parts of it are missing.

The next few pages give you a visual example of how I structure my computer drives. I've put my comments in **RED** to demonstrate more specifically the reasons why I structure my folders the way I do. The basic idea is to create a folder that contains everything for a given project all in one place. This reduces the margin for error and makes it extremely easy to back up projects to CD or DVD.

The system I use may or may not work for the way you handle your voiceover recordings and audio projects. If my structure format works for you, great! If not, I would still encourage you to devise a method for organizing your computer files to keep everything in one place and make your workflow as efficient as possible. You won't regret it.




There's a little trick you can use that will allow you to put important folders or files at the top of your folder view. You can use some of the special characters like "!", "\_", "@", and "#" to identify or group related folders or file names. If you put the special character at the beginning of the file name, it will move that file (or folder) higher in the view hierarchy. For example, a file name with three underscores ("\_\_\_") before the text will place that file higher than a file with only two "\_\_\_". An "!" will put the file at the top of the list. The more special characters you use, the higher the file will be in the hierarchy.

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Here's how I structure my computer:

- Computer
  - Local Disk C: MyComputer System Files
    - \_\_ Installation Files [The "\_\_" will put this folder at the top of the hierarchy list.]
      - Purchased Software
        - [Create a separate folder for each downloaded program.]
          - Purchase receipt with date (copy of email receipt). [You can copy/paste the email content to a Word document or save the email as an HTML file.]
          - Program activation or license key (copy of confirmation email)
          - Downloaded software - executable or .zip file
          - Folder for unzipped files - in most cases, you'll run your installation from the "setup" file in this folder. If the download is an executable file, you will install it from the level above this.
      - Free-Trial Software
        - [Use the same type of structure as for Purchased Software]
    - Downloads
      - [Use this folder for Internet downloads. Set your browser to prompt you for a download folder location. By putting your Downloads folder in the root director of your C: drive, you will always have easy access to your downloaded files. Use sub-folders as desired.]
    - MyDropbox
      - [If you use [Dropbox](#), you can easily share files with other computers, family and friends. I recommend setting up your Dropbox so the primary folder is in the root of drive C:.. This makes it very easy to locate your Dropbox folders for sharing files.]
  - Project Files (M:) [This drive is dedicated to audio and video projects.]
    - \_\_ Auditions
      - Talent Agent A
        - Audition.mp3 [All audition files are stored for at least 6 months.]
        - Voices.com
        - Voice123.com
    - Client A [All projects for a given client go inside this folder.]
      - Project A - [This is how I set up folders for an audio project]
        - \_\_ Uploads [This folder is for completed files that are uploaded to client. Notice the "\_\_" puts the folder at the top of the folder hierarchy.]
          - Project\_A\_Version-1\_MMDDYY.mp3 (or .wav, .aiff, etc.)
          - Project\_A\_Version-2\_MMDDYY.mp3
          - Invoice.doc (copy)
        - Project Files [This folder is where you save your audio project.]
          - Project A - project file [Set your software to save your project here.]
        - Raw audio Files [Set your audio software to record raw audio to this folder.]
          - Project A - raw audio files, unedited
        - Script\_021713 [I generally do not put the script in a folder, but instead, keep it in the root folder for a project. This just makes it easier to get to the script when I need it. I always use a 6-digit date MMDDYY in file names.]

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- Project B - **[This is how I set up folders for a video project]**
  - Uploads
    -  Project\_B-audio\_only-MMDDYY.mp3 (or .aiff, .wav, etc.)
    -  Project\_B-video-MMDDYY.avi (or .mp4, .mov, etc.)
    -  Invoice (copy)
  - Animations **[pre-produced video animation files]**
  - Images **[.jpg and .png images used in the project]**
  - Music **[.wav, .mp3, and .aiff music files used in the project]**
  - Raw audio **[voice track recordings and other VO elements]**
  - SFX **[sound effects used in the video production]**
  - Video elements **[video clips for the project.]**

As you can see, the general idea is to keep related files together in their own folders, and to keep all folders associated with a given project within a single Project Folder. By organizing your hard drive to keep common files in one place, you'll be able to more easily find your projects, back-up projects, and delete old files.

One other trick you may have noticed is that I will add a six-digit date format MMDDYY to the end of the file name. This is just to make it faster and easier to identify the most recent file versions, instead of having to check the file data for the most recent modification. By putting the date at the end of the file name, I can see the most recent file at a glance.

## Backing-up Your Projects

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If you are using an external USB drive, you can store a huge amount of audio data for a very long time. However, if you do this, you'll eventually need to purchase another external drive . . . and another . . . etc.

It can be a lot more efficient to archive your projects as they are completed. This will keep your hard drive free for new projects, and give you long-term hard copy storage for your data.

There are many data storage formats available, including DAT, zip drives, flash memory devices, removable hard drives, CD-R, CD-RW (re-writable), DVD, and even Blue-ray. Perhaps the least expensive and most efficient ways to back-up data are a CD-R disc or a DVD disc. With a CD-R data disc, you can store up to 800 MB of raw data. A single-layer single-sided DVD can store 4.68 GB. If you ever wanted to know how DVD's work, [you'll find it here](#). I don't recommend using a CD-RW disc (re-writable) primarily because the blank media is more expensive than a standard CD-R and for long-term storage, you don't need the ability to erase and re-write the disc.

Blank recordable discs for both CD-R and DVD are relatively inexpensive, so they both work well as an economical means for storing data. These recordable media have effectively replaced the old floppy disc and zip drives for long-term storage. They are reliable, durable, and compatible with the various computer operating systems.

CD-R media is excellent for backing-up short projects or for building a library of projects you've done for a specific client. After copying data files, you'll have the option to close the CD or leave it open for adding more files. Leaving the CD open gives you the ability to continue

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adding additional project folders to the data CD until it is filled. However, an open disc can only be used on the original computer used to create the disc. Once the disc is finalized, it should work as a data disc on any computer. Storing data on DVD works the same as with CD-R. Just keep in mind that you cannot create an Audio CD using a DVD disc.

You'll need the appropriate software on your computer to allow you to "burn" CD's or DVD's, and, of course, you'll need a CD or DVD drive that is capable of recording to the media. A CD-R drive can only burn CD's, but a DVD-R drive will be able to burn both CD's and DVD's.

There are many resources for CD/DVD burning software - some free, some very inexpensive, and some more costly. Most computers come with some very basic burning software, but if you plan to back up your data to CD or DVD, you'll probably want something more functional. As with anything else on the Internet, a Search in your favorite browser will reveal all sorts of options. Here are just a few:

- [Ashampoo](#)
- [Free CD Burning Software](#)
- [Roxio](#)
- [Nero](#)

When backing up your projects, there are two formats to keep in mind: Audio and Data. If you're only delivering raw, unedited, and un-produced voice tracks, you'll probably want to back-up as data only. However, if you are delivering a complete production, you will probably want to keep a copy handy that you can play on your CD player or incorporate into your demo. For this you'll need to burn an Audio CD. When backing-up your projects, it's a good idea to burn separate CD's for data and audio. Although some software will allow for "mixed-media" or "enhanced" CD's, the combination of data and audio on the same CD can create problems for retrieving data or playing on a CD player.

From my experience, I've found it more efficient to back-up everything in a client's project folder to one or more Data CD's or DVD's. I'll then burn a separate audio CD for the client and for my archives if necessary, but most of the time I deliver completed recordings electronically and keep my archive as .mp3 or .wav files. The data back-up CD will include everything that relates to the project: the main project file, all the recordings for that project, any sound effects files, music files, and all the .mp3 or .wav files that are delivered to the client – everything in it's appropriate folder, which is inside the client's project folder. This CD is strictly data and cannot be played on an audio CD player.

Once everything is verified as being copied to the back-up CD, the original files can be deleted from the hard drive. Since I use a very large external drive for my projects, I'll usually keep the project folder there for a long-term storage so I have easy access to it in case any changes are needed. However, if a file on my hard drive gets corrupted, it's a very quick process to simply copy the project folder from the Archive CD or DVD back to the hard drive. Since everything related to the project is in one place, the project will re-open just as if it was never moved.

It's a good idea to get into the habit of backing-up your project folders either immediately following your session, or on a regular basis. If you don't . . . you'll quickly discover that you'll be spending the better part of a day (or more) just doing back-ups of old projects.

As I've mentioned, an alternative to backing up on CD or DVD is to simply invest in an additional external USB drive. The smaller, USB powered portable drives are usually intended primarily for versatility in transporting files and may not be the best choice for long-term storage. Larger, full-size external drives that require A/C power are a better choice and almost always come with backup software. It's a relatively simple process to set up multiple external drives so that one is your primary drive and the other is a mirror backup. Just make sure your backup drive is at least the same storage size as your primary drive.

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## Everything You Need to Know About MP3

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Well . . . almost everything.

If you have spent any time any time at all with computers, you are familiar with MP3 files . . . MP3 files are the standard format for easily transportable audio files. But do you really know what they are? Would you like to? Do you care? Well, read on, and learn, [Grasshopper](#). Sorry for the innocuous 1970's television reference, but I just had to do that – and congratulations if you remember what that refers to. (If you don't, just click on the link).

[Here's a link to the long version of how an MP3 file works.](#)

Here's the short version of what an MP3 audio file is all about. In the early days of digital recording and editing, a group of engineers got together to come up with a standard. The name of the group was the **M**otion **P**icture **E**xperts **G**roup (MPEG). Their task was to create a way to compress digital files to fit them into smaller spaces. You see, an uncompressed digital file is huge and extremely difficult to manage for editing or copying.

As a result of this group, several "levels" of standard were created to achieve data compression for a variety of purposes. MPEG Level 1, and MPEG Level 2 are two common standards for video production. As with film, the audio portion of a video is a completely separate entity. So, within these standards a sub-set was created to handle the data compression for the audio portion of a video production. That sub-set standard is known as MPEG 1 Audio Layer 3, or simply MP3.

The MP3 standard effectively reduces ([compresses](#)) the size of an audio file to roughly 1/10<sup>th</sup> the size of the original uncompressed raw data file. Not only will the MP3 standard allow for tremendous data compression, but it also allows for a range of data [bit depths](#) that will affect the overall quality of the MP3 conversion. Some of the typical bit rates for MP3 audio are (all referenced in Kbps – Kilobits per second):

- 64 Kbps – FM radio quality
- 96 Kbps – near CD quality
- 128 Kbps – CD quality
- 192 Kbps – transparent quality
- 256 Kbps – transparent quality
- 320 Kbps – transparent quality

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A higher bit rate produces a higher quality audio file with greater resolution of detail and frequency response. The tradeoff for improved quality is a larger file.

When you record audio on your computer, your software will save the data in an uncompressed format, usually as a .wav ([Windows Audio Video](#)) file on a PC, and as a .aiff ([Audio Interchange File Format](#)) on a Mac. Some software will use a proprietary file format.

The raw, uncompressed file size for all audio files will be roughly 10MB per stereo minute, regardless of format. That's a lot of data to deal with, especially if you need to deliver your recording to someone.

Data compression is an interesting process. Basically, all binary digital data consists of zeros and ones in various combinations. In any given data file, there will be lots of places with identical combinations of zeros and ones. During the conversion process to compress a data file (for example, compressing a .wav file to an MP3 file), all the matching data bytes are flagged and most are removed. For audio, the result is a compressed file a fraction the size of the original. It's sort of like letting the air out of a balloon . . . you've still got the same balloon, only it's a lot smaller.

As good as MP3 data compression is, there is one thing to be aware of: If you compress a file that has already been compressed, you're asking for trouble. A high-resolution MP3 file of 128 Kbps or higher can be used in a project that will later be converted to MP3, and there won't be much, if any, noticeable degradation to the quality of those parts that started as MP3 files. However, after two or three conversions, some serious changes in the audio become apparent. This is why your audio software works in an uncompressed format – to retain the highest quality possible.

When you've completed recording a voice track or finished with the production work for a project, you will have several options for "[rendering](#)" to create the final data file. Some software will allow you to create an MP3 file or even burn a CD directly from within the editing software, while others may require that you save the audio to a .wav or .aif format file that a 3<sup>rd</sup> party CD burning program can use. Some software does not include the ability to create MP3 files, so if you think you'll need it (and you will), you should check for that option when you are shopping for your audio recording software.

There are many rendering options available in most software. What you need to decide is what will be the best format to meet the needs of you or your client. If your recording is short, and your client needs the highest quality possible, you may want to save it in an uncompressed format. On the other hand, if your client needs the file delivered via email, you'll most likely need to compress it to an MP3 file. The [next section](#) covers the various ways of delivering your audio files after you've recorded or converted them.

Because the MP3 format is so versatile, and of such high quality, it has become a standard of its own for audio files.

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# Delivering Your Audio Files

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OK, you've recorded your tracks and you've saved them as MP3 files in a folder that you can easily access. Now what? How will you get that completed audition or paid voice track to your prospect or client? Somehow, some way, you've got to be able to get the file out of your computer and into their hands!

You have several options: hard-copy media, e-mail, FTP, or the Cloud.

## Delivering via Hard-copy Recordable Media

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You can burn a CD and drop it in the mail: That's fine if your client is not in a hurry and can wait a few days for the Post Office to deliver your package. But most clients want their tracks yesterday!

If you are burning a CD for yourself or your client, you'll need the appropriate software. An excellent resource for researching software and hardware is [CNET.com](#). Just enter what you're looking for in the search field, click "go", and you'll get a list of vendors and prices.

Keep these things in mind when you burn a CD and deliver it to your client:

1. Ask your client or prospect if they want an audio CD or a data CD, and if they request a data CD, don't forget to ask what audio format they prefer: .wav, .aiff or MP3.
2. Label the CD clearly, making sure to include your name and contact information on the label. [Avery.com](#) has a free software download for creating lots of different types of labels, including mailing labels, and CD labels (click on the "templates and software" menu tab).
3. Pack your CD in either a paper sleeve or a Jewell case. A Slim-line Jewell case works extremely well for delivering project CD's. A full-size Jewell case is much bulkier and more susceptible to damage during shipping – especially if sent unprotected in a FedEx or bubble envelope. There are also a variety of soft plastic CD cases available.
4. If you ship the CD in a paper sleeve, make sure you reinforce your shipping envelope with cardboard to prevent damage.
5. Label all envelopes "Do Not Bend: Media Enclosed" to minimize damage to contents.
6. Depending on the weight of your package, and it's contents, you may be able to use the US Postal Service "[Media Mail](#)" rate, which is considerably lower than First Class. The trade off is that it might take longer to arrive at its destination.
7. Other shipping options include [FedEx](#), [USPS Express Mail](#), and [USPS Priority Mail](#). Your client may have a preference for the shipping method used. If they request FedEx, they will probably have their own FedEx number for payment of shipping.
8. Regardless of how you ship your CD or other media, you should be charging the shipping fee back to your client (unless they are providing the billing number). Either include shipping as an additional fee, or work it into your rate.

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## Delivering Your Recordings via Email

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You might think that attaching an audio file to an email for delivery is a good idea. Well, if the file is small enough, it could be.

The maximum size for an email attachment is about 8MB. When you consider that 1 stereo minute of audio in .wav or .aiff (uncompressed) is 10MB, it becomes very clear that you don't want to send an uncompressed audio file as an email attachment – it's just too big! So, you'll need to compress your raw audio into a format that is more manageable. The ability to email relatively long audio recordings is another reason why the MP3 format is so popular. A two-minute project in MP3 is only about 1.6MB, where the same audio in its uncompressed form is about 16MB. Another thing to consider when sending a project via email is that you'll need Internet access. If you're on a dial-up connection, it can take a very long time to send even a small MP3 file. Fortunately the days of the slow dial-up connection are mostly behind us and high-speed broadband cable and DSL Internet is commonplace and very affordable.

## Delivering Your Recordings via FTP

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FTP stands for "[File Transfer Protocol](#)". OK, now that the technical part is done, we can get on to how to use FTP as a way of delivering your files. As with most "computer-ese" the terminology is the worst part. An FTP site can sound like something pretty intimidating, but it's really quite simple.

Basically, many websites have an area that is set up for transferring files using a special protocol already built-in to the website. If you have a hosted website, you most likely already have an FTP site waiting for you even if you aren't aware of it. If you don't have a website yet, or yours doesn't have an FTP area, your client may have an FTP site that they use for receiving files.

You can look at an FTP site as just another hard drive for storing data. Only, instead of this hard drive being on your computer, it's just on a different computer. And the connection to that other computer isn't through a wire, it's through the Internet. Pretty simple, right?

There are two basic ways to use an FTP site for either uploading (sending to) or downloading (retrieving from). The simplest way to access an FTP site is to find out what the name of the site is, and log on. Let's say you've been asked to deliver a file to your client, and their main website is [www.clientsite.com](http://www.clientsite.com). Their FTP area simply starts with ftp instead of www. So to get to the FTP site, you'd type in [ftp.clientsite.com](ftp://clientsite.com). Depending on how the FTP site is set up, access may be either open to anyone, or it may be restricted to people who are specifically given access with a username and password. If it's a secure FTP site, you'll be greeted with a dialog box asking for your username and password (which your client would have given to you). If it's an open FTP site, when the site opens it will look like a folder on your computer with a list of files. Nothing very fancy. After all, remember this site is only used to store files that are being transferred from one computer to another.

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Once you've logged-on to an FTP site you should be able to simply copy a file from your computer and paste it to the FTP site (upload). You can also "drag and drop" the file from a folder on your computer to the FTP site. With an FTP site, the original files will stay on your computer, or the FTP site, after they are copied. Depending on your access privileges, you may or may not be able to upload, download, or delete files on an FTP site. Some FTP sites will restrict downloading and you'll only be able to upload files to the site.

The other way to access an FTP site is to use an FTP client (or software). The software approach is considerably more technical than simply opening the site from your Internet browser, but it can allow you to use your website just like an extension of your computer.

If you have a website and you want to use its FTP capabilities, you'll need to open your site's Admin area to learn what you need to do. There should be Help screens along the way, or if you really can't figure it out, you can call your web hosting company for support.

## Using the 3rd Party Services

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Over the years, the need to deliver larger and larger files has grown. Although basic email and FTP are still options, they are not always the preferred or most efficient choice. To meet the file transfer needs of a technologically growing client base, there has been a rapid development of third-party online delivery services that are faster and more efficient than ever before.

The general idea for all of these third-party services is that they serve as a middle-man when it comes to delivering files. Here's how they work:

- You open an Internet browser and go to the delivery service website
- You select the files you want to deliver
- You enter an email address for one or more recipients
- You enter your email address and a short note
- You click "send"
- Your file is uploaded to the delivery service servers
- Your recipient(s) receive an email notification with a link to your stored file
- On clicking the link, your recipient is taken to the delivery service website where they can download your file.

The whole process is extremely efficient and there are literally dozens of these third party delivery sites. Most are absolutely free for basic service, delivery of files up to a limited size, and limited storage on their servers. Some have a monthly fee for upgraded service that provides for delivering larger files and even long-term storage.

Here are just a few of the dozens of third party delivery services. Do an online Search for more:

- [WeTransfer.com](http://WeTransfer.com) - (my personal favorite) Up to 1GB per delivery, 14 day storage, free
- [YouSendIt.com](http://YouSendIt.com) - (one of the better known sites)
- [TransferBigFiles.com](http://TransferBigFiles.com)
- [SendThisFile.com](http://SendThisFile.com)

## Using the Cloud

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The "Cloud" is simply another way of referring to storage on the Internet. The word "Cloud" is a softer, gentler, more friendly way of saying that your data is being stored on an impersonal, cold hard drive located on a server someplace on the Internet that you have absolutely no idea where it is. See why they use the term "Cloud?"

The basic difference between a delivery (or transfer) service and a Cloud service is that Cloud sites are specifically designed for storing and sharing files. Cloud sites have become very popular for file sharing among family and friends. But they can also serve a useful purpose for business and delivery or sharing of your voiceover work.

As with the third party delivery services (which are all located on the "Cloud," by the way), there are many providers of this type of service. And, as with the online delivery sites, most Cloud services have a free account with limited options and a paid service with expanded capabilities. Some sites have as much as 50GB of free storage, so you may actually be able to keep your usage free for a very long time.

The general idea of a Cloud service is that you will upload files to your account and those files can be shared with anyone you choose. Some Cloud services require that the other party also have an account while others will allow access to files through only a link. Most Cloud services have two options for file sharing: Private and Public. Public files are accessible to anyone who has a link to the file, often without any login required. Private files are just that... Private. Depending on the service and how you set up your folders, you can restrict access to folders and files to specific people with whom you choose to share the folders. Different folders can be shared with different people. This can make a Cloud service an ideal way to deliver files to ongoing clients.

Here are just a few of my favorite Cloud storage and delivery services. Keep in mind that the functionality and options offered by these sites will vary:

- [Mediafire.com](http://Mediafire.com) - 50GB free storage or sharing
- [Dropbox.com](http://Dropbox.com) - up to 8GB free storage or sharing
- [Google Drive](http://Google Drive) - Google's Cloud service- 5GB free storage
- [Sky Drive](http://Sky Drive) - Microsoft's Cloud service
- [Pogoplug.com](http://Pogoplug.com)

For even more file sharing and Cloud storage resources, try searching the Internet for the following:

- file sharing
- Cloud sharing services
- Cloud storage

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# That's a Wrap

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There you have it!

If you've made it this far, you now know more about working with a home studio than most voice talent and many recording engineers. And if you just arrived here to see how this ebook ends, [click here](#) to go back to the beginning and read what you've missed.

In this short tome I've attempted to give you enough of the basics to get you started working effectively – and within a reasonable budget – to record and deliver voice tracks from your own home studio.

You've learned about microphones, room acoustics, digital recording, file formats, and a whole lot more. Most importantly, you know that building your own home studio isn't all that difficult, and that if you are planning to be a professional voice artist, you will need to have at least a basic understanding of the computer technology and equipment that is rapidly becoming an essential part of our work.

I've designed this ebook and the [VoiceActing.com](http://VoiceActing.com) website to be as comprehensive as possible and to provide as much information as possible for someone getting started in the business of voiceover. The components for professional recording are readily available from retail outlets, through Internet dealers, and through [VoiceActing.com](http://VoiceActing.com).

If you need help understanding some aspect of your home studio, we're here to help. You can always contact us by email at <mailto:info@voiceacting.com> or by phone at 858.484.0220. If your question is short, we'll do what we can to answer it for you. However, if you're in need of assistance in putting your home studio together, you may want to consider our Home Studio Consulting Services. You'll find all the details under the Consulting menu tab at [VoiceActing.com](http://VoiceActing.com).

And when you are ready to get serious about your voiceover work, we invite you to consider our membership support service, the [Conductor's Club](#).

I wish you much success with your voiceover work and your new home studio.

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Appendix 1

# Internet Resources for More Information

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The “[Home Studio](#)” area of VoiceActing.com has a lot of information and equipment options for you to choose from.

If you've really got time on your hands – and you'd like to learn more about home studio design and equipment – you'll find a wealth of information at the links below. The information on these links ranges from simple and straightforward explanations, to complex calculations, to resources and recommendations for equipment. On some of these sites, you can even search for still more information.

[www.audiotools.com](http://www.audiotools.com) - general info with links to manufacturers

[www.homerecording.about.com](http://www.homerecording.about.com) - home studio basics

[www.andyneill.com](http://www.andyneill.com) - home studio basics. Click on the "Build a Home Studio" menu item

[www.humbuckermusic.com/jul5th20buil.html](http://www.humbuckermusic.com/jul5th20buil.html) - home studio basics

[www.tweakheadz.com/guide.htm](http://www.tweakheadz.com/guide.htm) - guide to home studio

[www.tweakheadz.com/choosing\\_a\\_mixer\\_for\\_your\\_studio.html](http://www.tweakheadz.com/choosing_a_mixer_for_your_studio.html) - choosing a mixer for a home studio

[www.tweakheadz.com](http://www.tweakheadz.com) - main site with tons of information on audio and recording

[www.homerecordingconnection.com/news.php?action=view\\_story&id=28](http://www.homerecordingconnection.com/news.php?action=view_story&id=28) - Part 1

[www.homerecordingconnection.com/news.php?action=view\\_story&id=29](http://www.homerecordingconnection.com/news.php?action=view_story&id=29) - Part 2

[www.homerecordingconnection.com/news.php?action=view\\_story&id=30](http://www.homerecordingconnection.com/news.php?action=view_story&id=30) - Part 3

[www.homerecordingconnection.com](http://www.homerecordingconnection.com) - home page focusing on home recording

[www.backstagemagazine.com](http://www.backstagemagazine.com) - an article on setup a home studio for recording voiceover.

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Appendix 2

## How to Build a Simple Acoustic Baffle for Under \$25

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These plans are for a single acoustic baffle frame that will stand a little over 5 feet high by 3 feet wide. This frame can be built in about an hour for about \$25. (prices may vary over time)



A single baffle can greatly reduce room echo when positioned so it is between your microphone and reflected sound from a wall, glass doors, or windows. Using 2 or more baffles to surround your recording area will help you to control acoustics in most rooms. If your room is very reverberant, it may be necessary to build a small “room” using 3 or more frames that are covered with a top piece.

Feel free to adjust dimensions to fit your recording environment. Using the design ideas described here, a small “acoustic cage” can also be built to enclose your computer to help reduce noise. If you build a baffle for your desktop computer, you’ll probably want to put the computer on the floor to allow room for the cage. Make the frame at least 3-4 inches larger than your computer case. When you cover the cage with a blanket, leave an opening at the back to allow airflow ventilation for your computer. Completely covering your computer for any length of time will prevent proper ventilation and can cause potentially serious problems due to excessive heat building up inside your computer case.

Black ABS pipe is recommended instead of white PVC pipe. ABS is a more rigid plastic and will provide a sturdier frame for your baffle. The following ABS pipe and fittings are available from any plumbing supplier. For convenience, Home Depot SKU numbers and prices are provided.

A heavy blanket or other absorptive fabric will complete your baffle and help to kill echoes in a room and “deaden” your recording environment. The fabric you choose should be fairly dense to absorb sound. Multiple layers of thinner fabric or blankets will also do the job. Use “bull-dog” clips, available from any office supply store, to hold the fabric around the frame. Several frames can form a 3-fold “booth” by removing the inside legs and using Velcro® straps to tile the middle supports together. Every room is different. With a little experimentation, you’ll be able to find the acoustic materials and placement that work best for your room.

### Parts required: (prices may not be accurate)

Qty:	Part ID:	Home Depot SKU:	Unit \$	Sub-Total \$:
3	ABS 1 ½” X 10’ pipe (black)	198-798	\$ 3.98	\$10.94
2	ABS 1 ½” 90° Elbow 	737-563	\$ .69	\$ 1.38
6	ABS 1 ½” Tee 	188-757	\$ 1.19	\$ 7.14
1	ABS Cement (optional)	333-159	\$ 1.99	\$ 1.99
4	PVC 1 ½” end caps (optional)		\$ .73	\$ 2.92
			TOTAL	\$24.17

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### Construction (see the exploded diagram on page 3):

NOTE: Cutting to exact length is not critical. Adjustments can be made when pipes are connected to fittings. A PVC cutting tool is recommended for clean cuts, but the pipes can be cut using a hacksaw or table saw. Rough edges should be sanded smooth to allow ends to easily slide into fittings.

It is not necessary to cement any of the joints. However we do recommend cementing the base support legs (C), "T" (E), and the short spacer (D). Building the frame without cement will allow it to be easily disassembled for storage. For greater stability, consider cementing other joints.

### Cutting the pipes (a taller frame will require additional pipe, cut into longer lengths):

1. Cut one of the 10' ABS pipes in half:  
Cut each of the 5' lengths in half to end up with 4 @ 2.5 feet (A)
2. Cut a second 10' ABS pipe to the following lengths: 3 @ 3 feet (B)  
1 @ 1 foot  
From the 1' piece: cut 2 lengths of 3 inches 2 @ 3 inches (D)
3. Cut the 3<sup>rd</sup> 10' ABS pipe to the following lengths: 4 @ 1.5 feet ©  
You'll be left with some extra pipe: 1 @ 4 feet
4. Gather the following fittings: 4 – Tee fittings (E)  
2 – 90° Elbow fittings (F)

### Building the support base for your frame:

NOTE: ABS Tee fittings have the "T" opening slightly off center. When assembling these steps, align the "T" fittings so they are positioned the same on both sides of the frame. If not positioned the same, the completed frame might lean slightly to one side.

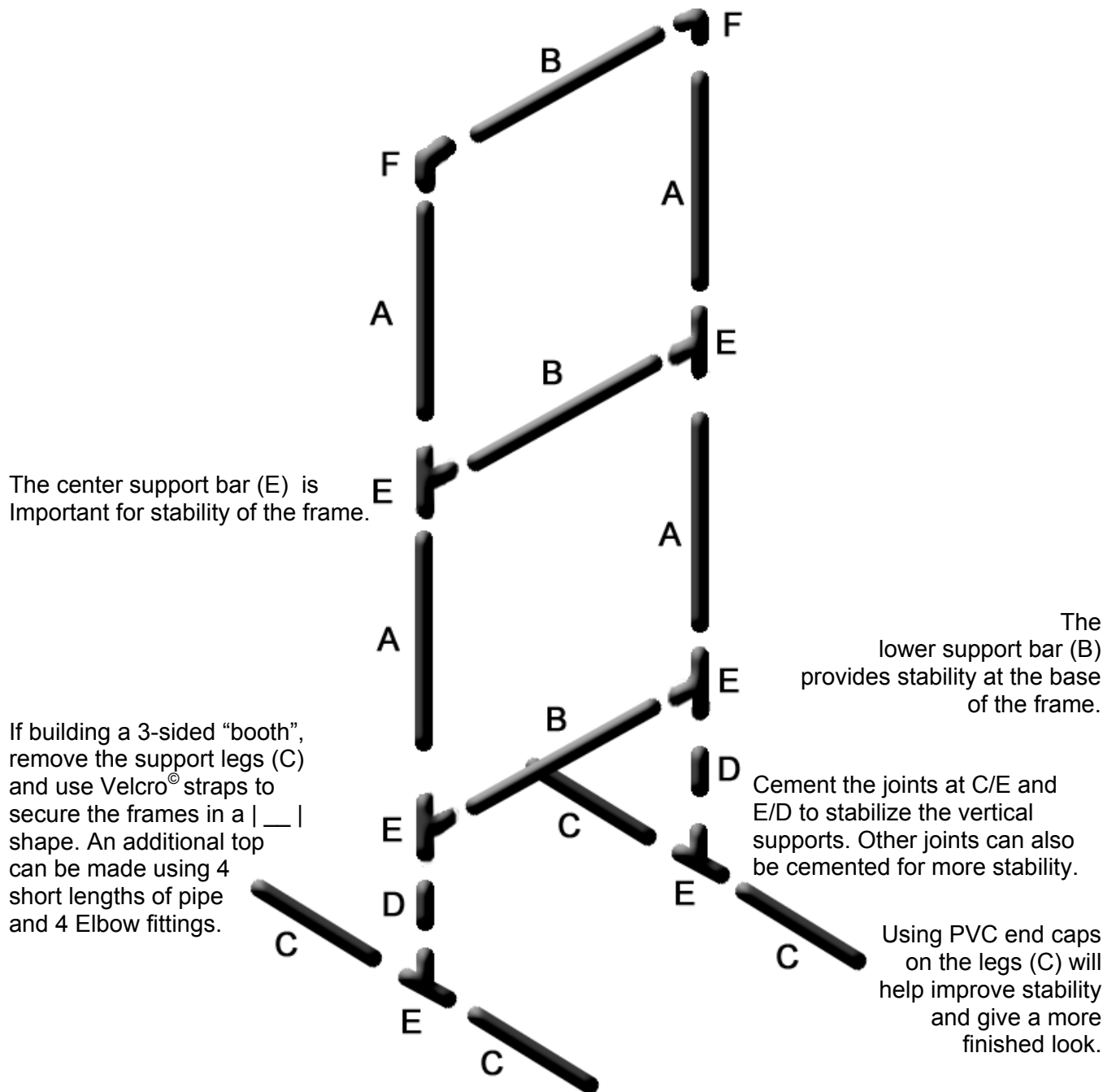
5. Connect 2 lengths of 1.5' © to opposite ends of a Tee fitting (E)
6. Repeat with remaining 2 1.5' lengths © and a Tee fitting (E)  
These will be the support legs for your frame.
7. Connect a 3" piece (D) into the open "T" hole of each Tee fitting (E)
8. Connect one end of a Tee fitting (E) to each 3" lengths (D)  
Turn the "T" opening of the fitting so the opening is at a 90° angle to the pipes and make sure both "T" fittings are positioned the same way.
9. Connect one 3' pipe (B) between the two base supports

### Assembling the upright frame:

10. Insert a 2.5' length (A) into each of the open ends of the base Tee fittings (E)
11. Connect one end of Tee fitting (E) to each of the upright pipes. Rotate the Tee fitting so the "T" opening faces the opposite vertical pipe. Make sure both "T" fittings are positioned the same way.
12. Connect a 3' length (B) between the two Tee fittings (E) on the upright pipes as a center stabilizing bar.
13. Insert a 2.5' length of pipe (A) into each of the open ends of the Tee fittings (E).
14. Connect a 90° Elbow (F) to each end of the remaining 3' pipe (B) to form the top bar.

15. Attach the final 3' length (B) with Elbow fittings (F) to the upright pipes (A) to complete the frame.

## HOME STUDIO ACOUSTIC Baffle FRAME



Cover your Acoustic Baffle Frame with a heavy blanket or quilt and use inexpensive "bulldog" clips (available at any office supply store) to secure the fabric around the frame.

Frames can be built to any size to meet your personal needs or to baffle noise or reflected sound in certain parts of a room.

Using these basic components, you can design a small "sound cage" to enclose your computer for short periods of time.

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Appendix 3

# Home Studio Equipment Configurations Low Budget

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The following configurations include everything you need to equip and set-up your home studio in less than an hour. Acoustical treatment, computer, and retail recording software are not included. All packages can be purchased through the [VoiceActing.com website](http://VoiceActing.com).

Prices change often, so the prices indicated are estimates only. Please call for current prices.

### PACKAGE #1 - A Very Basic Analog Home Studio (not recommended):

This system, although workable and inexpensive, may be challenging to hook up primarily because you will be connecting directly to the sound card of your computer. This is strictly an analog hook-up, so there is an increased likelihood for noise getting into your audio.

Item:	Comment:	Price:
Audio Technica DR VX-1 Microphone	Dynamic Cardioid	39.99
Behringer UB-502 Analog Mixer	1 mic/2 stereo line – no AUX send	49.99
Sony MDR V150 headphones	Headphones	19.99
Music Stand – Collapsible	Black or Chrome	15.99
Desktop mic stand	Table top desk stand	15.00
Microphone cable	20 feet	15.00
Software	Audacity – <a href="#">FREE DOWNLOAD</a>	0.00
Adaptors	¼”-M to RCA-F – need 4	7.00
Adaptors	Stereo RCA-M to Stereo 1/8” mini – need 2	5.00
Cables	RCA-M to RCA-M Stereo – need 2	7.00
<b>Estimated total:</b>		<b>174.96</b>

### PACKAGE #2 - An Inexpensive, Yet Very Workable Low Budget Digital Home Studio (still not recommended, but better than #1):

What makes this system better for a low-budget studio is the use of a USB Mic Pre-amp interface that replaces the analog mixer, and the use of a condenser microphone. Consider purchasing a Radio Shack 1/8” Stereo Jack to Mono Plug (#274-368) if you are using only one mic and want to monitor in both ears of your headphones.

Item:	Comment:	Price:
MXL-990 microphone	Condenser Cardioid microphone	89.99
M-Audio Fast Track (mono)	USB Interface replaces the mixer (1 mic/line)	99.99
Sony MDR V150 headphones	Headphones	19.99
Music Stand – Collapsible	Black or Chrome	15.99
Tripod Mic Stand with Boom, Mic & Cable	Tripod base floor stand – 20’ cable – handheld dynamic mic	25.99
Microphone cable	20 feet (if purchased separately)	15.00
Software	Audacity – <a href="#">FREE DOWNLOAD</a>	0.00
<b>Estimated total:</b>		<b>176.96</b>

## Mid-budget Home Studio Configurations

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### PACKAGE #3 - An Excellent Mid Budget Home Studio:

This is an excellent mid-budget setup with an excellent sound and ease of use. The external hard drive can be deleted if your computer already has a fast drive and you have plenty of space for recording.

Item:	Comment:	Price:
Audio Technica AT-2020 microphone	Condenser Cardioid	99.99
M-Audio Fast Track	USB Interface	99.00
Sony MDR V150 headphones	Headphones	19.99
Music Stand – Manhasset	Black	35.99
Tripod Mic Stand with Boom	Floor stand – tripod base	35.99
Microphone cable	20 feet	15.00
Software	Audacity – <a href="#">FREE DOWNLOAD</a>	0.00
External hard drive	External USB HD	150.00
<b>Estimated total:</b>		<b>455.96</b>

### PACKAGE #5 - An Excellent Mid Budget Laptop Studio:

This is basically the same as PACKAGE #4, but without the microphone stand and a different copy stand.

Item:	Comment:	Price:
Audio Technica AT-2020 microphone	Condenser Cardioid	99.99
M-Audio Fast Track (mono)	USB Interface	99.00
Sony MDR V150 headphones	Headphones	19.99
Music Stand – collapsible	Black or Chrome	15.00
Microphone cable	20 feet	15.00
Software	Audacity – <a href="#">FREE DOWNLOAD</a>	0.00
Firewire PCI card	Plug-in PCI Firewire card (if needed)	35.00
External hard drive	External USB HD	150.00
<b>Estimated total:</b>		<b>303.97</b>

### PACKAGE #6 - An Alternate Mid Budget PC Home Studio With Phone Patch Capability:

This configuration allows for a mix-minus phone patch through the analog mixer.

Item:	Comment:	Price:
Audio Technica AT-2020 microphone	Hand-held Condenser Cardioid	99.99
M-Audio Fast Track (mono)	USB Interface	99.00
Behringer 1204USB	12 input analog mixer with USB output	179.99
BSW – JK Audio Podcast Host	Phone hybrid	425.00
Sony MDR V150 headphones	Headphones	19.99
Music Stand – Manhasset	Black	35.99
Tripod Mic Stand with Boom	Floor stand – tripod base	35.99
Microphone cable	20 feet	15.00
Software	Audacity – <a href="#">FREE DOWNLOAD</a>	0.00
External hard drive	External USB HD	150.00
<b>Estimated total:</b>		<b>830.95</b>

## A Mac Mid-Budget Home Studio Configurations

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### A Mid Budget MAC Home Studio – Shopping List:

The main difference between a PC and MAC home studio is the software used for recording. Any of the above PACKAGES using a USB interface will work with a Mac, This package is specifically designed to include the Digidesign Mbox, which includes ProTools LE for the Mac.

Item:	Comment:	Price:
<b>Audio Technica AT-2020</b>	Condenser Cardioid	99.99
<b>Digidesign M-Box</b>	USB Interface for MAC	274.50
<b>Music Stand – Manhasset</b>	Black	35.99
<b>Tripod Mic Stand with Boom</b>	Floor stand – tripod base	35.99
<b>Microphone cable</b>	20 feet	15.00
<b>External Hard Drive</b>	External USB HD	150.00
	<b>Estimated total:</b>	<b>611.47</b>

[Next page – Upgrade options and additional equipment](#)

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## Additional Equipment to Upgrade any Home Studio System

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The following equipment are just a few examples that will upgrade any of the above packages. There are many other options available, but these are known to be of very high quality. As with all audio equipment, we highly recommend doing your homework and, whenever possible, checking the equipment first-hand before purchasing. For software, we always recommend downloading the free trial version first to find out if the software is something you like and can use.

Item:	Comment:	Price:
<b>MICROPHONES:</b>		
Audio Technica AT-4040	Condenser Cardioid mic	299.99
M-Audio NOVA	Large diaphragm condenser	129.99
Neumann TLM-102	Large diaphragm condenser	699.95
AKG 414-C	Large diaphragm condenser	799.99
<b>USB INTERFACE:</b>		
M-Audio FastTrack (two channel)	USB Interface	149.99
<b>ANALOG MIXERS w/USB</b>		
Behringer UB1204Pro	Analog mixer with 2 AUX sends and USB out. Allows for mix-minus send for isolated phone patch	179.99
<b>HEADPHONES:</b>		
Sony MDR 7506 headphones	Headphones	99.99
<b>MIC/COPY STANDS:</b>		
Music Stand – Manhasset	Black music stand	35.00
Tripod Mic Stand with Boom	Floor stand – tripod base	35.00
<b>SOFTWARE:</b>		
Audacity	Audacity – <a href="#">FREE DOWNLOAD</a>	0.00
Avid ProTools LE bundle	Comes with Digidesign Mbox 3	274.50
Sony Soundforge Audio Studio	Audio editing with video	69.95
<b>EXTERNAL 7200RPM HARD DRIVE:</b>		
Various	External USB HD	150.00

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