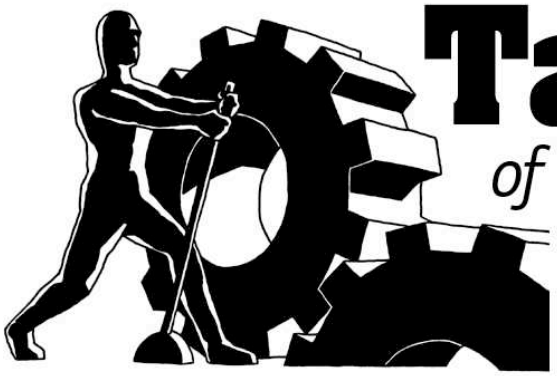

Take Control of Podcasting on the Mac

by Andy J. Williams Affleck

Table of Contents (Version 1.0)

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Read Me First

Welcome to *Take Control of Podcasting on the Mac,* version 1.0.

This ebook gives you all the information you need to begin your first podcast quickly and without spending much (if any) money. The ebook suggests which software and hardware to buy for better results. This ebook was written by Andy J. Williams Affleck, edited by Glenn Fleishman, and published by TidBITS Electronic Publishing.

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Basics

In reading this ebook, you may get stuck if you don't know certain fundamental facts about audio settings on your Mac or if you don't understand Take Control syntax for things like working with menus or finding items in the Finder. Please note the following:

- **Finding an application's preferences:** I often refer to preferences in an application that you may want to adjust. Don't confuse an application's preferences with the system-wide settings found in System Preferences. To access an application's preferences, choose [Application Name] > Preferences from the menu

bar. For example, in the program Audacity, choose Audacity > Preferences. Within some applications, all preference controls appear in a single window. In others, a bank of tabs is located across the top. In those cases, click a tab to display a pane with that category of preferences. Instead of providing detailed navigation to reach application preferences each time, I use an abbreviated notation such as “go to the Audio preference pane.”

- **Menus:** When I describe choosing a command from a menu in the menu bar, I use an abbreviated description. For example, the abbreviated description for the menu command that saves a file from GarageBand is “File > Save.”

Introduction

I discovered podcasting before it had a name. In August 2004, Adam Curry, a former MTV VJ, began producing a daily show from his home in the Netherlands in which he talked about topics that interested him and played music he felt like sharing. While others had produced "audio blogs" before, Adam was the first to create a system for both subscribing to and automatically downloading these audio shows.

I was immediately fascinated, and it was only a few months later that I began producing my own show. I did it in part to see if I could and because I've always been something of a sucker for new technologies. My Web log has been continuously active since 1994, making it one of the oldest out there, and I had always dreamed of making it richer. Podcasting opened that door for me. I wrote this ebook to open the door for you as well.

A *podcast* is a downloadable audio file that someone has made available online. It could be as simple as a song they wanted to share or it might be a full-blown audio show in the style of a radio program that they edited together. Podcasting lets you subscribe to somebody's show, usually at no cost—though for-pay podcasts do exist—and have the most recent podcasts downloaded to your computer. These features make podcasting new and interesting compared to audio files linked from Web sites.

An individual podcast, also known as an *episode*, is typically retrieved using software, sometimes called a *podcatcher,* that automatically and regularly checks for newer episodes. A podcast file is usually in MP3 format, though other audio formats can be used as well. The publishing side of podcasting is *syndication*; the retrieval side is *subscription*. Podcasts can be downloaded manually as well.

Note You do not need an iPod to listen to podcasts. If another MP3 player were the cool toy everyone had to have, podcasting would have been given a different name. Some people use the term *audio blogging*, which does not encompass the variety of material found in podcasts.

Podcasting combines elements of several disparate existing technologies—audio recording and editing, content syndication, and Internet file transfers—into a single seamless process that retrieves

audio from a Web site onto your computer and, usually, synchronizes it to an external MP3 player. It can be as simple as clicking one button to initiate this whole process.

NOTE You can read about the history and origins of podcasting as well as the basics of subscribing and listening to podcasts in TidBITS #766 in an article I wrote entitled "Podcasting: The People's Radio" (http://db.tidbits.com/getbits.acgi?tbart=07986). See also my follow-up article that details using Apple's iTunes podcatching features (http://db.tidbits.com/getbits.acgi?tbart=08160).

Creating your own podcasts can be highly rewarding. I enjoy pulling together music, my writings, random thoughts, and interviews with people into a single show. Other people create actual radio shows in the classic style of old-time radio theater. Some use podcasting as another outlet for their writing.

Educators and academic institutions like Stanford University and Harvard University Graduate School of Education are beginning to examine how podcasts can enhance learning. Major companies now use podcasting as a way to get their content out to a much wider audience. As you can imagine, you can find a great variety of shows.

The shows themselves certainly don't need the professional veneer of a commercial radio broadcast; most people opt for something with less gloss. In fact, some podcasters feel it's almost antithetical to the podcasting spirit to be overly professional about it.

Just start recording and don't worry too much about it. If your content is worthwhile, you'll find an audience. You can always improve your production as you get your feet wet and see what works and what doesn't. The key is to enjoy yourself.

Quick Start to Podcasting

This ebook shows you how to create, publish, and promote your podcast. The basic steps are Plan, Record, Edit/Encode, and Publish. You can learn about these in any order but I encourage beginners to read through the material in order.

Plan your podcast:

- Understand the process; see Plan Your Podcast.

Record your podcast:

- Make sure you have the hardware and software that fits your needs and budget; see Set Up Your Studio.
- Avoid common microphone mistakes; see Use a Microphone Well.
- Record your podcast; see Record with Audio Hijack Pro, Record with GarageBand, or Record with Audacity, or Record with SoundStudio.

Edit and encode your podcast:

- Edit your podcast; see Edit Your Podcast with GarageBand, Edit Your Podcast with Audacity, Edit Your Podcast with SoundStudio, or Edit Your Podcast with Audion.
- Decide what encoding settings you want to use; see Encode Your Podcast.
- Encode your podcast for uploading; see Encode Your Podcast Using iTunes.

Publish and promote your podcast:

- Understand bandwidth so you don't go broke if you become popular; see Understand Bandwidth Costs.
- Upload and host your show in a Web log; see Tools to Publish Podcasts.
- Syndicate your show; see Understand Syndication Formats.
- Promote your show; see Promote Your Podcast.

Plan Your Podcast

Proper planning produces podcast prosperity.

Decide What You Want to Say

This may sound obvious, but knowing what you want to say is a critical step, and it will inform much of what follows. Do you want to talk politics? Music? Cooking? Just have an audio version of your Web log? There's no set rubric for what a podcast should and should not be. Podcasts cover a wide range of territory.

While you are by no means required to have a single topic, it does help if it can be summed up in a single sentence. More people will sample your show if it fits in a category in a podcast directory—like that found in iTunes—than if it ends up lumped in a generic catchall list. For instance, I will listen to a podcast of the random thoughts of a person I've never met only if the podcast has been strongly recommended. However, I do sample non-recommended shows that connect to an interest of mine.

Pick a Format

Decide how simple or complex you want your show to be. Do you want a standard opening (called the *intro*) and closing (*outtro*)? Do you want music to segue between topics much the same way NPR's *All Things Considered* does? Do you want the show to be just you talking or will you have multiple hosts in a round-table format? Will you interview people, either in person or over the phone or Internet? Will you play a lot of music? Maybe your show will change with each episode and be all these things and then some. Whatever you decide, do realize that a fixed format will simplify producing your show and help your audience know what to expect.

Decide on Spontaneity vs. Polish

Is it better to write a script and produce a podcast through editing than it is to talk off the cuff and let the chips fall where they may? This is an ongoing debate in the podcasting community. Some believe an ad hoc show is more honest. With unscripted and unedited shows, you have a less intermediated portrayal of who your host is and what views he or she represents. Many people think that approach is better than the more highly produced content found on broadcast radio.

I think both sides of the debate are right. I look forward to podcasts that are more professional and have higher production values (in the lingo, they are more *produced*) especially in the area of "radio dramas," such as the Adventures of Dr. Floyd (http://www.doctorfloyd.com/). At the same time, I never want to lose those wonderful, spontaneous moments that arise when working without a net. I strive for a mix of the two when producing my show.

While I am certainly not attempting professional-level production values—I don't have the equipment or the time for that level of effort—I also try to maintain at least some level of quality. I tend to re-record any major flubs, especially if it's a technical gaffe such as sound levels being too far off or a botched song queue. But I leave smaller gaffes alone, and I don't mind if my 5-year-old wanders into the room while I'm recording.

Your audience will dictate what level of quality you will strive to achieve. They will let you know what they like and do not like and they will make suggestions. Also important is your own level of involvement. You must decide for yourself.

A critical tool for improving your shows over time is to listen to a program a few weeks after you produce it. You will be amazed at what you notice with a little distance between yourself and a particular show. When I listen to my earliest shows again, I recoil at how often I say "um." My revulsion at hearing myself say "um" has helped me stop saying that filler word.

Set Up Your Studio

The format for your podcast will determine the technical setup. Some people want to be mobile and record as they are out and about. However, for most people, podcast tasks are carried out sitting in front of a single computer with a single microphone and mixing in sounds from other applications, including iTunes, Skype, and iChat.

Choose a Microphone and Supporting Hardware

The only truly essential tools are a computer and a microphone. A breakout box designed to provide external inputs of various kinds, including those used in more traditional audio, may be a helpful addition. Some podcasters find a mixer for modifying multiple sound inputs useful as well. Let's start with the mic, however, and see whether your needs encompass the other two kinds of hardware.

Pick the kind of mic

For podcasting, two types of microphones are important: a *directional* mic, which records sound from one specific direction; and an *omnidirectional* mic, which picks up sound in all directions.

- **Directional:** This kind of mic, sometimes called *unidirectional,* filters sound from all areas except the primary direction it's designed for. It's great for general speech because you can focus it on your voice and have all other sounds, including your computer's fan, not be as intrusive. But for interviews, each subject or speaker needs his or her own directional mic to have it work.

  These microphones are more likely to pick up wind noise and *plosives*, which are strong blasts of wind from your mouth when you say sounds like *S* or *P*. (Plosives can be prevented by the use of a windscreen, discussed in Use a Microphone Well.)

- **Omnidirectional:** An omnidirectional mic works well for podcasts where you are recording ambient sounds outdoors, such as when you create a soundseeing tour. It's also good for an interview if you only have a single mic. But it picks up sounds from all around including room noise, computer fans, and chair squeaks.

Pick a mic at the appropriate price

You can find many different kinds of microphones, and they range in price from cheap to astoundingly expensive. The main difference, of course, is sound quality. Low-end microphones pick up only the most basic sounds and provide adequate, but not great sound. The higher-end microphones capture a much wider spectrum of sounds that are rich, deep, and sound truly amazing. For example, podcast pioneer Adam Curry uses a $2000 microphone. Mine retailed for about $12.

NOTE "Great sound" is highly subjective. What one person hears as fantastic may sound terrible to another. For example, some people prefer the sound of old LP albums to CDs because they believe the sound quality is better than that of CDs. Others think that Apple's encoding of songs in the iTunes Music Store sounds great (I'm one of them), but others find it unacceptable and prefer a CD. (Of course, a CD is a lower-quality transfer of master recordings, too.)

When I write that something produces great sound, I mean that the majority of people would agree that it sounds good to them. Some people will never accept the quality in any compressed format.

When I write that something sounds bad, I can identify certain characteristics that most people would agree reduce the quality of the sound. The audio may be noisy with hisses or strange high-pitched warbles or there may be a lot of odd noises like loud popping or static. Great sound starts with audio that is free from these defects.

I use an old Labtec headset with a built-in microphone attached to a 1.25MHz 15-inch PowerBook G4, along with a Griffin iMic (http://www.griffintechnology.com/products/imic/). Both are directional.

For away-from-the-computer podcasting, I use an iRiver iFP-790 (http://www.iriveramerica.com/prod/ultra/700/ifp_790.aspx) and a Griffin Lapel Mic (http://www.griffintechnology.com/products/lapelmic/), also directional.

In the interest of not spending any money and using what I already have, I have also employed my digital camcorder's built-in microphone as a sound input device to interview people in the same room with me as it has a good quality directional microphone (See the tip, later in this ebook).

For my tastes, my audio is just fine. Then again, I was never a professional deejay and probably have much lower standards than Adam does. As always, you need to decide for yourself and your needs what level of quality you desire.

If you want to learn more about choosing the right mic, read the excellent article "What Microphone Do I Need?" by Jeff Towne at Transom Tools. The article goes into great detail over types and uses of different microphones (http://www.transom.org/tools/recording_interviewing/200106.microphones.jtowne.html).

Decide on a breakout box or mixer

If you want to ramp up to more expensive professional tools, you can find other hardware appropriate for advanced podcasters including mixers and breakout boxes. A breakout box puts the audio in and out of your computer in a convenient form factor—a separate box—which keeps you from having to get to the back of your computer. This is especially useful with desktop machines or computers that are located far away from your workstation to reduce noise. Breakout boxes often provide jacks for advanced audio like a connector that accepts a professional microphone plug. Breakout boxes are handy for people who do not have a sound input port on their computer. Many breakout boxes use USB or FireWire to bring the sound in and you can shop for various models based on your own needs.

TIP A *plug* is the male end of a cable and a *jack* is the female receptacle, usually a port on your computer or on an external device such as a breakout box. Generally, a microphone *plugs* into a *jack* or *port*.

External mixers provide inputs and output jacks as well, but also allow you both to manage multiple input devices and control each device's volume and equalizer settings. For example, if you need to have more than one microphone because you have multiple people speaking, or if you want to record audio that is not already on your computer but on another device, then you want a mixer to bring these

different sources together into your computer. If you are all alone and all audio is coming from your mouth and from your one computer, then you do not need a mixer.

More advanced microphones require the use of *phantom power*, electricity that runs along the same wire the audio signals travel on, which can be provided by a mixer or pre-amplifier. These mics can't plug directly into a computer. For more information on phantom power, see http://www.sounddevices.com/tech/phantom.htm.

Unless your podcast is 100 percent your voice and no other sounds, you need a software-based mixer to handle mixing your voice with other audio on your computer. I cover these programs ahead in Audio Software You Need.

For this ebook's purposes, I limit discussion of breakout boxes to the Griffin iMic, a simple unit that takes a single 1/8-inch stereo input and converts it to data carried over the USB connection. I cover this item because it is the simplest and least expensive option for the many Macs with no analog audio input port. (If you have a sound input port, then you can connect a 1/8-inch–jacked microphone directly to your computer unless it needs phantom power.)

SIDEBAR TAKING YOUR SHOW ON THE ROAD

Many podcasters like to take their show on the road, bringing their setup to do an interview face to face outside their home studio. Others like to conduct "soundseeing tours" by walking through a place and narrating what they see and hear. Mobility can be an exciting way to spice up a podcast.

Methods for handling these road trips vary. Some people rig complicated setups where they carry a laptop and record directly to disk as they walk around. This is highly risky given that moving a laptop while data is being written to the disk can permanently damage the hard drive. Other podcasters use small devices such as Sony MiniDisc recorders—common among print reporters for recording interviews.

Many podcasters recommend iRiver audio devices, so I bought one. For about $90, you can get the iRiver iFP-790, a 256 MB flash-based player that records directly to MP3 format. Other players in the iFP-79x series include more memory, but 256 MB gives me over 2 hours at the highest quality setting, which is more than sufficient for my needs. http://www.iriveramerica.com/prod/ultra/700/ifp_790.aspx

I pair the iRiver with my Griffin Lapel Mic for an extremely portable setup that gives me excellent-quality audio. I have taken this assemblage to several locations to perform audio tests and look forward to performing my first real soundseeing tour in a future podcast soon.

If you own an iPod and don't mind sacrificing audio quality, you could record audio directly to your iPod with a Griffin iFM or a Belkin Voice Recorder.
http://www.griffintechnology.com/products/ifm/
http://catalog.belkin.com/IWCatProductPage.process?Product_ID=158384

The downside here is that pre-fifth generation iPods (those before the iPod with video) are limited to low-quality audio recording, too low to be useful for podcasting. The fifth-generation models finally support full CD-quality sound sampling, but no plug-in microphones are available for those models currently.

Audio Software You Need

Next you need software. Some podcasters record only their voice—or multiple voices all sitting around the same microphone—and do not mix in any other audio sources. Others record music, sound effects, or remote voices coming in over Skype or iChat AV.

What recording software has in common

The four main recording programs I cover—GarageBand, Audacity, SoundStudio, and Audion—have certain features in common. Each displays your audio as a linear waveform moving forward in time from left to right; each enables you to select any part of that waveform and copy, cut, or delete that part; and each can paste any copied or cut pieces anywhere else.

GarageBand provides the most extensive *non-destructive* modification of the sound in which the original file remains untouched. You can add reverb and echo, throw in audio effects, and modify the volume without changing the underlying recording at all.

In the other three programs, making modifications changes the actual recorded audio file and represents a one-way street. To that end, always save a backup copy before editing audio in these programs so you can restore the original audio if you make the wrong changes.

Each program has varying support for the two main forms of recording audio:

- **Live recording:** In a live recording show, you queue up every audio clip you intend to play, hit record and then play clips and talk all in one long continuous stream from beginning to end much the same way a DJ on the radio works. You do have some limited ability to edit after the fact, usually to remove unwanted sounds.
- **Planned recording:** In a planned recording, you pull all the clips you want to play into a program that lets you manage multiple tracks of audio and record your voice as needed. You repeat these recordings over and over again until you get it right. You then manually adjust all transitions. These shows have far less spontaneity to them, but they sound much more polished when completed. Both methods work well and I have found uses for each

depending upon what kind of show I was producing—or even what mood I was in at the time.

All of that said, when I produce live recorded shows, I use Audio Hijack Pro to record the show and SoundStudio for any final editing that may be needed, either to remove unwanted content or to mix in any audio I missed or thought of after the fact. For planned recording shows, I use GarageBand for the complete show.

Choose among recommended audio software

For recording and/or editing audio, I recommend one or more of the following programs:

- **Audacity:** Audacity is a full-featured program that can handle live recording, multiple tracks (overlaying audio onto each other), and a wide range of audio effects. You can use Audacity to edit out the surprisingly many "ums" you utter (unless you were born to radio and don't have that, um, terrible, um, habit). It cannot mix live audio from multiple sources without additional software (see Pull Audio from Multiple Sources with Soundflower), and suffers from stability problems. I have heard many stories of podcasters who recorded a brilliant podcast, and, at 25 minutes into their magnum opus, Audacity crashed and they lost the entire recording. That said, many more people swear by it than at it, and you certainly can't beat the price.
  http://audacity.sourceforge.net/ (open source, free)

- **GarageBand:** Apple Computer's GarageBand is really a music composition/noodling program, but it offers fantastic audio-input capabilities. GarageBand can record live from multiple sources, which lets you mix different input devices on the fly. It includes audio effects as well. It cannot mix multiple software inputs such as microphone and Skype and iTunes without additional software (see Pull Audio from Multiple Sources with Soundflower).
  http://www.apple.com/ilife/ (part of iLife '05, which is bundled with all new Macintoshes; suite sold separately for $79).

- **SoundStudio:** Freeverse's SoundStudio is similar to Audacity. It enables recording from a single input source, supports the mixing of multiple tracks, and offers the capability to edit the actual sound data. Although I have found it somewhat unstable—crashes are not uncommon—it does do an excellent job of recovering from crashes

and I have never yet lost more than the last few moments of work. It cannot mix multiple software inputs such as microphone and Skype and iTunes without additional software—see Pull Audio from Multiple Sources with Soundflower. (The new 3.0 version will be covered in a free update to this ebook; unfortunately, I couldn't work in into this version.)
http://www.freeverse.com/soundstudio/ (2.x versions included with some Macintosh systems, 3.0 available for $79.95).

- **Audio Hijack Pro:** From Rogue Amoeba, this Pro big-brother of Audio Hijack is my personal choice for creating live, mixed podcasts. Both versions enable you to record any sound on your computer whether it be audio from a DVD you are playing, streaming music from an Internet radio station, live microphone sounds, or the sounds of whatever video game you may be playing. Where Audio Hijack Pro really shines is in its ability to "hijack" the audio from multiple applications and audio sources all at the same time. With Audio Hijack Pro, I can record what I'm saying in my microphone, what I am playing in QuickTime Player, and what somebody else is saying in Skype all at the same time.
http://www.rogueamoeba.com/audiohijackpro/ ($32).

- **Audion:** Panic Software's Audion is actually an MP3 player like iTunes. It used to be a commercial product but has been abandoned by the developer and released free on the Internet. It is of interest to us only because it can perform simple edits to MP3 files.
http://www.panic.com/audion/ (free)

Consider extra audio software tools

For some tools, you need some extra freeware tools to handle the audio inputs.

- **Soundflower:** Soundflower provides a shared sound space for sound from multiple sources. Think of it as a large bucket into which you pour the sounds from multiple sources: microphones, applications, and so on. This is an essential tool for the programs listed above that cannot record multiple input sources simultaneously. (See Pull Audio from Multiple Sources with Soundflower.)
http://www.cycling74.com/products/soundflower.html (free)

- **SoundflowerBed:** SoundflowerBed provides a simple menu in the menu bar at the top to quickly change your Soundflower settings (available from the same page as Soundflower). http://www.cycling74.com/products/soundflower.html (free)
- **Line In:** Rogue Amoeba's Line In offers a soft play-through of sound from your microphone that routes the sound to an output device you choose. Many of the tools I described earlier need this function in order to work with Soundflower, because it lets you route your microphone into the Soundflower space. (Audio Hijack Pro has this function built in and does not require it.) http://rogueamoeba.com/freebies/ (free)
- **SoundSource:** Also from Rogue Amoeba, SoundSource allows you to change the settings you normally set in the Sound preferences pane in System Preferences from a handy menu instead (available from the same page as Line In). http://rogueamoeba.com/freebies/ (free).

Record phone and voice-over-IP interviews

Finally, if you want to conduct any interviews with somebody not in the room with you, you need software that lets you conduct an audio chat over the Internet

- **iChat AV:** Apple's iChat AV (versions 2 and 3) provides a decent audio chat capability. You can chat with other iChat AV users with little effort. If you need to speak to somebody using Windows, you can do so provided they are using a recent version of America OnLine Instant Messager (AIM). The audio quality is OK but you can do much better using one of the next two programs. http://www.apple.com/ichat/ (included with Panther and Tiger)
- **Skype:** Skype provides surprisingly good audio quality and has proven itself quite useful for conducting interviews over the Internet. It can call telephone numbers, which lets you interview people who are not running Skype. http://www.skype.com/ (free for Skype-to-Skype calls, per-minute rate for Skype-to-telephone calls)
- **Gizmo:** Gizmo is similar to Skype in most areas that matter to podcasters. However, Gizmo can record any call directly to an MP3 file. This means that you can record interviews directly without having to work with another audio recording program as you

would with Skype and iChat AV. As of this writing, however, the quality of the MP3 is too poor and not adjustable for better quality. http://www.gizmoproject.com/ (free for Gizmo-to-Gizmo calls, per-minute rate for Gizmo-to-telephone calls).

TIP If you want to record audio from a cell phone or land line, it's not impossible to get high-quality results, but it's not cheap. An $80 CellTap adapter from J.K. Audio lets you take an 1/8-inch audio feed out of a cellular conversation, but it can cost several hundred dollars for a good landline extractor. If you're willing to spend the money, consult J.K. Audio's catalog (http://www.jkaudio.com/): they're working hard now to serve podcasters.

Set Up Audio

In most cases, you should be able to simply plug in an audio device and start recording.

However, the computer's current settings for audio input may create recordings that sound awful, like bad static over your voice. If that happens, some other software on your computer is controlling your audio input jack (line-in or USB or other), and it is capturing 8-bit audio samples instead of 16-bit samples.

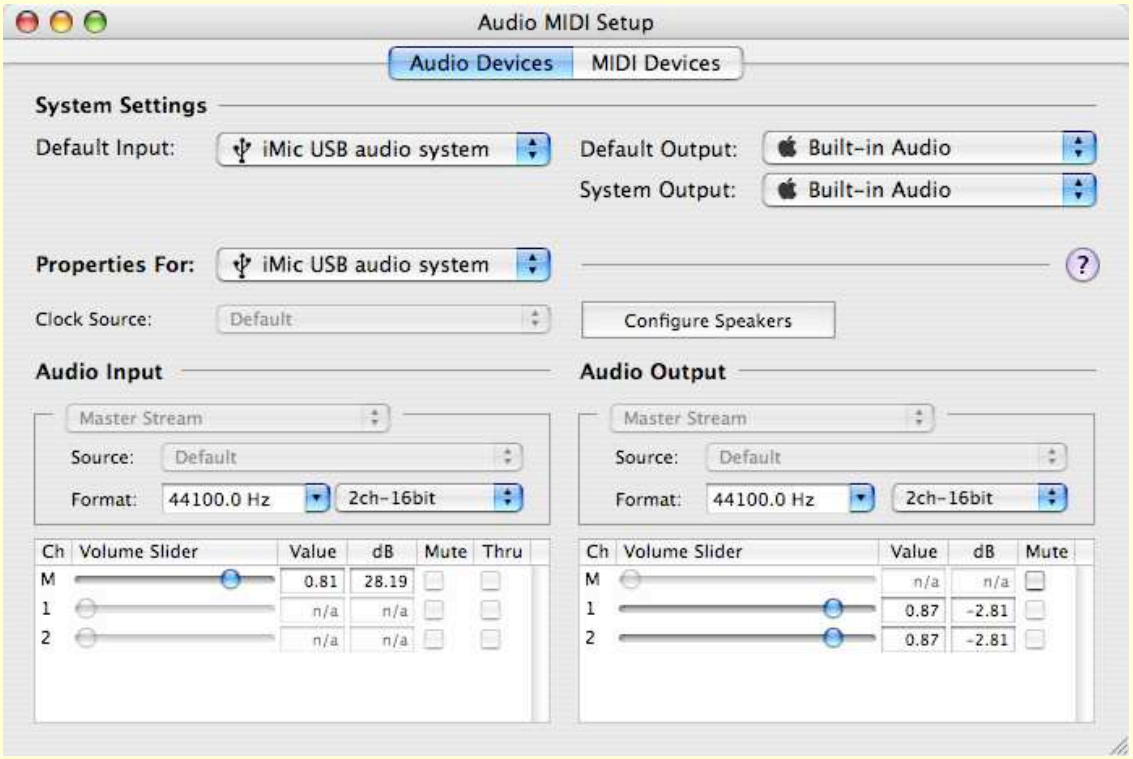
TIP Samples are tiny, rapidly taken digital "snapshots" of an analog stream of audio. For example, a typical CD-quality recording uses 16 bits to represent any of 65,536 different audio tones, captured 44,100 times per second. In contrast, an 8-bit sample, no matter how rapidly it's captured from source audio, has only 256 tones.

Luckily, the fix is simple using Apple's Audio MIDI Setup utility:

1. Launch Audio MIDI Setup utility (found in the **`Applications/Utilities`** folder).
2. Choose the audio input you are using from the Properties For pop-up menu on the middle left.
3. Further down the window, set Audio Input and Audio Output both to "44100.0 Hz" and "2ch-16Bit" (**Figure 1**).

These settings remove the static from your recording.

FIGURE 1



Set Audio Input and Output both to "44100.0 Hz" and "2ch-16bit".

TIP Even though I have a mono mic I leave my audio input settings set to "2ch-16bit" rather than "1ch-16bit" because I also connect external stereo devices. I don't want to change this setting back and forth. All software referenced in this ebook works just fine with a mono mic on a stereo setting.

Record Your Podcast

Ultimately, recording a podcast is about capturing audio. You may record your voice, include a song, interview somebody over Skype or iChat, or play sound effects. No matter what the source of the sound, it has to be captured and recorded by software on your computer.

In this section, I walk you through several software programs that I recommend using for audio capture: Audio Hijack Pro, GarageBand, Audacity, and SoundStudio, and then pull it all together with tips on Soundflower, a shared audio space that makes all these other tools work better with multiple audio streams.

Warning! Be careful about the rights to the music you play. If you play music to which you do not have the rights, you could be sued for a great deal of money. Some podcasters have gotten around this by obtaining licenses that provide them the right to use music in their podcasts.

Tracks that the artists have granted anyone the right to use, provided they are given credit are called *pod safe*. The Podsafe Music Network (http://music.podshow.com/) is a great source of pod-safe music.

You can pay for a license to use music, but it can cost a fair amount of money and require contacting multiple organizations, principally but not exclusively BMI (http://www.bmi.com/licensing/webcaster/, click Website Music Performance Agreement) and ASCAP (http://www.ascap.com/weblicense/). These two clearinghouses charge a minimum of about $300 a year each to use songs in their rights catalogs—and that's just the minimum.

Bret Fausett has posted the results of his research into rights licensing for podcasts in podcast form on his site (http://blog.lextext.com/blog/_archives/2005/1/4/225172.html).

Use a Microphone Well

Before recording, let's talk a little physical reality: Setting up and talking into a mic. There's an art to using a microphone that requires years of experience. Nevertheless, a few quick tips cover most of what you need to know:

- **Keep the mic away from your mouth:** You do not want the microphone up against your mouth. It is best if the microphone is a few inches away and somewhat above or below your mouth so that you do not breath directly into it. This helps prevent plosives or popping sounds, usually generated by the letter P, and helps reduce S sounds, which I generally eliminate by playing with the equalizer.
- **Angle the mic:** If possible, point the microphone down toward your mouth from above to reduce plosives, nasal tones, and lip-smacking sounds. In my case, I use a headset that does not really allow me to position the microphone above my mouth. Instead, I place mine down nearer to my chin and angle it outward so it is not in the direct path of the wind from my mouth. (If I had my druthers—and the budget—I would get a freestanding microphone and place it a few inches away and pointing downward toward my mouth.)
- **Use a windscreen:** If you can get a microphone with a windscreen—a foam shield that covers the microphone—that helps a great deal in preventing plosives or wind noise when used outside.

> **TIP** Some people also swear by a variation on the windscreen made by stretching a piece of nylon pantyhose over a hoop in front of the microphone to reduce plosives. These can be made at home easily enough and are also available commercially.

Record with Audio Hijack Pro

Audio Hijack Pro enables you to manipulate complicated streams of audio on your computer. At its simplest, it can take the standard audio input and record it to a file. But has much greater capabilities: the program can take in audio from multiple sources, mix those tracks together, post-process the sound with any number of inter-

esting (or scary) audio effects, and then encode the audio directly to an MP3 format file (see Encode Your Podcast).

With Audio Hijack Pro, I can do lots of recording tasks—record interviews using Skype, play music, create voiceovers, and more. The application has never crashed on me, and switching applications while recording does not result in any dropouts or other weird problems.

Install programs at first run

The first time you run Audio Hijack Pro, it suggests that you let it install three extras.

- **Instant Hijack:** This system utility allows Audio Hijack Pro to grab audio from any running program. Without installing Instant Hijack, Audio Hijack Pro needs to quit and re-launch a running program to hijack its sound. This gets in the way of setting up all your sound sources in advance (see Make a podcast).

WARNING Instant Hijack belongs to a category of software known as *haxies,* which many believe can cause random system crashes. I have not had any troubles with crashes, but if you are concerned, don't install it. Instead, accept that you need to let Audio Hijack Pro launch each program when you hijack those programs' audio outputs.

- **Soundflower:** You may or may not need Soundflower depending on the complexity of your podcasts (See Pull Audio from Multiple Sources with Soundflower). There is no harm in installing this extra; it may well come in handy.
- **Schedule Helper:** This utility makes scheduled recordings without Audio Hijack Pro already launched. Without it, you have to leave Audio Hijack Pro running all the time or set as a startup program (Launch System Preferences, open the Accounts preference pane, and use the Login Items tab). If you plan on scheduling recordings then you should install this extra. For instance, I use this feature to record CBC Radio's *The Vinyl Cafe* every Sunday at noon (http://www.cbc.ca/vinylcafe/).

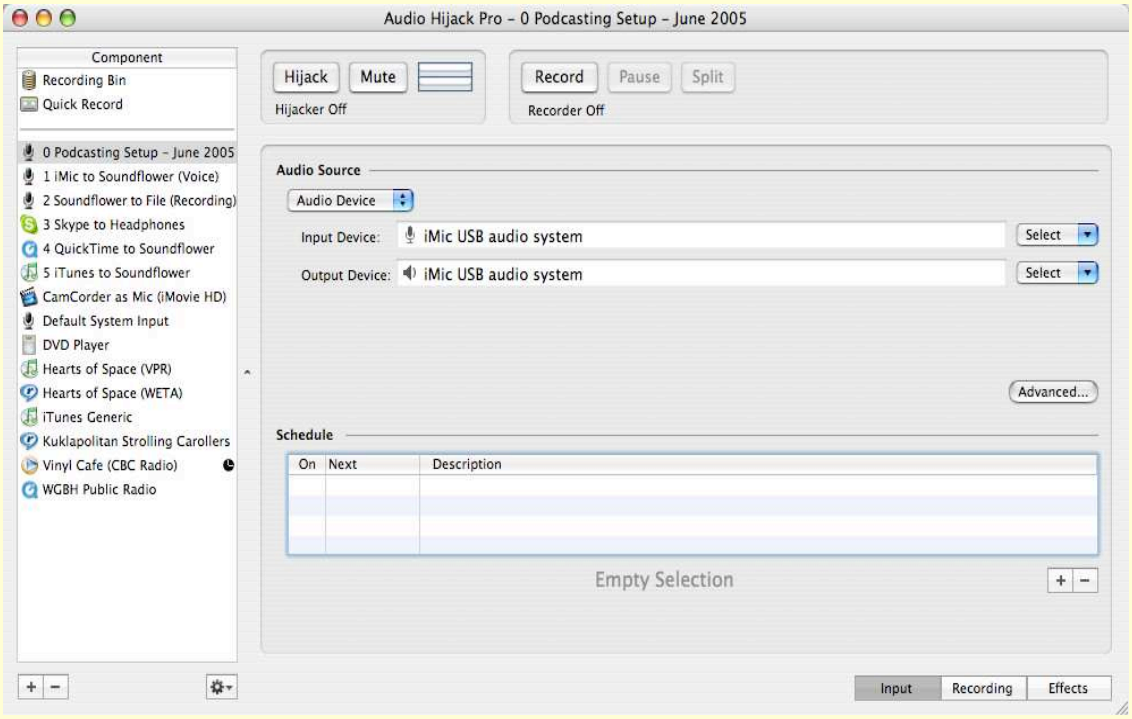
Set up Audio Hijack Pro

To set up Audio Hijack Pro for your podcast, launch the program, and then carry out the next steps:

1. At the bottom left, click the + button to start a new session. Name the session whatever you want. I put a 0 (zero) at the beginning of the stream name in **Figure 2** to keep it sorted at the top of my list.

2. Click the Input tab (if you're not already viewing the Input pane). Set your audio input to your current microphone by selecting it from the Input Device pop-up menu. **Figure 2** shows the settings for my iMic USB from Griffin. You may be using line-in or even the built-in mic.

FIGURE 2

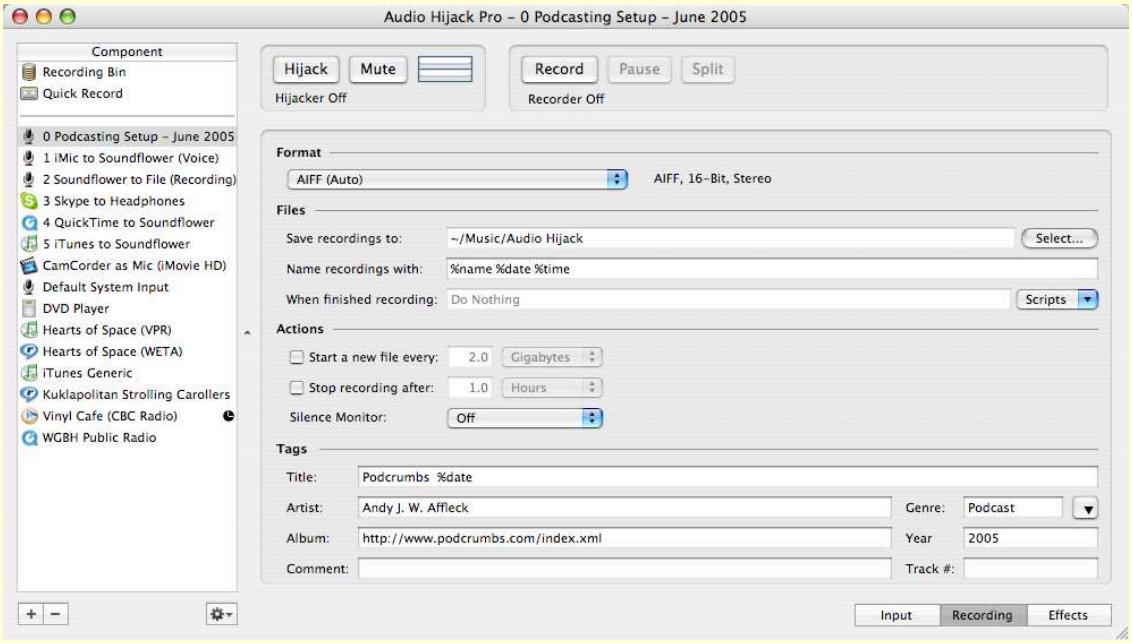


The input options for your podcast session in Audio Hijack Pro. Notice the buttons at the lower right, which you click to switch to panes where you set recording and effects preferences for the session selected at the left.

3. Set your audio output to your headphones by selecting an option from the Output Device pop-up menu. This lets you hear what you are recording. In the case of **Figure 2**, the headphones are connected to an iMic USB.

4. Click the Recording tab. Choose the audio format you wish to use. If you are in doubt, stick with AIFF (auto) (**Figure 3**). (See Encode Your Podcast for a discussion of encoding formats.)

FIGURE 3

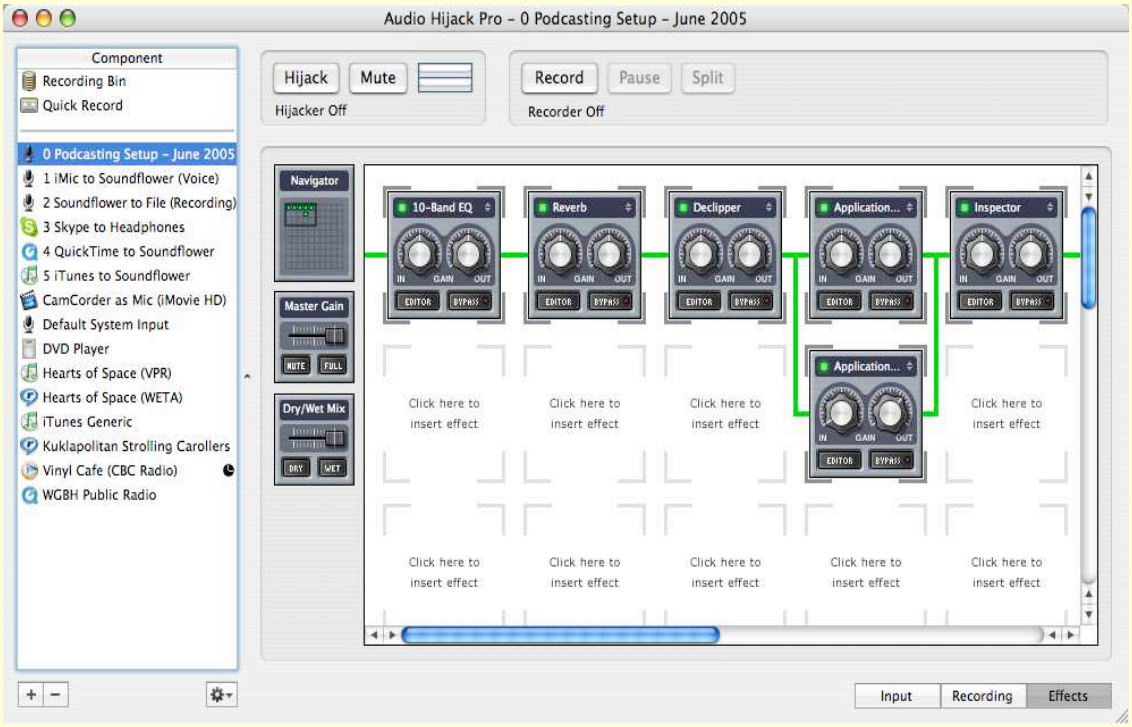


The Recording options for your podcast session in Audio Hijack Pro.

5. At the bottom of this pane, fill in values for your tags. (See Tag Your Podcast for a discussion on tagging your podcast.)

6. Click the Effects tab. This is the most complicated pane, but also the most fun. Here is where I have already added all the effects that I use to make myself sound better. I then mix in other audio sources and monitor the levels on my entire podcast. These audio effects are applied in real time rather than after recording is completed. **Figure 4** shows how I set these set up.

FIGURE 4



My effects are set up and ready to go with a full set of recommended effects for a podcast recording session.

You might wonder why I chose the particular set of effects shown in **Figure 4**. Let me walk through the reasoning behind each effect and the values assigned to them (not visible in the figure):

- **10-Band EQ:** I use this to tweak my voice and drop out some of the room noise (mainly the hiss from the central air system of my house). I also adjust the EQ settings so spoken "S" sounds are far less hissy; otherwise, it's annoying to listen to.
- **Reverb:** I add just a touch of reverb so my voice doesn't sound quite so flat. You need only a little unless you want to sound like you record your podcast in a cathedral.
- **Declipper:** This effect makes sure that no overly loud sounds make it through to your recording. It quiets the loudest sounds, which is a good idea as overly loud sounds badly distort your voice.
- **Application mixers:** I mix sounds in from QuickTime Player and Skype. You can also mix in iChat AV and any other application from which you need to record sounds.

- **Inspector:** This doesn't actually change your recorded sound but displays a window showing your current levels which helps you monitor output volume.

When all the input/output preferences are set, you are ready to record.

TIP Earlier, I mentioned that I once used my digital camcorder as a microphone to conduct an interview. Here's a quick look at how I did it:

1. Connect the camcorder to a PowerBook or iBook via a FireWire cable.
2. Remove the videotape from the camcorder. Most camcorders go to sleep after a few minutes of inactivity with a tape in. Without the tape, they stay on indefinitely.
3. Launch iMovie and put the program into capture mode. The iMovie window begins displaying live video and playing live audio.
4. Leave the lens cap on to avoid distraction.
5. Use Audio Hijack Pro to grab the audio from iMovie and save it to an audio file.

When an interview is over, I use SoundStudio to edit the audio to remove undesirable content and chop the audio into multiple shows, add my intro/outtro, and post it as a podcast.

Make a podcast

Here's a window into how I make a podcast using Audio Hijack Pro.

Prepare all audio

I open all audio clips I want to play in QuickTime Player (Pro or regular), even music files. I don't use iTunes because the window takes up much more room than a bunch of smaller QuickTime Player windows. I also don't have to worry about iTunes starting on the next song if I forget to stop it at the end of the one I was playing.

You can open iTunes music in QuickTime through these steps:

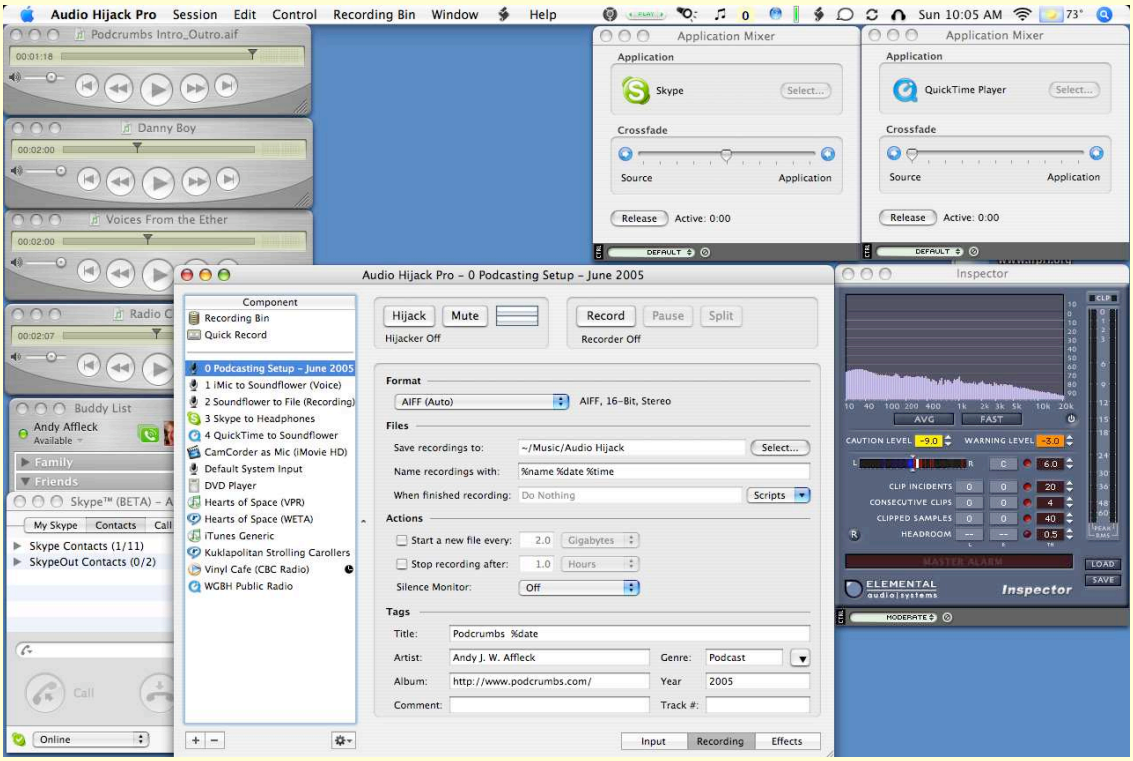
1. Find the song in iTunes.
2. Choose File > Show Sound File (or press Command-R, or Control-click the track and choose Show Sound File).

3. Drag the exposed file in the Finder onto the QuickTime Player's icon in the Dock.

Record the show

Once everything is on my screen (**Figure 5**) and ready to roll, I click Hijack at the top of the Audio Hijack Pro window, get my headphones on, and verify sound levels by performing a quick test: I click Record, talk for a few seconds, and click Record again to stop recording. I switch to the Recording Bin in the session list on the left side of the Audio Hijack Pro window, locate the most recent file, and click the Preview icon. If it all checks out, I throw that file away and return to my podcast session.

FIGURE 5



My complete screen for making a podcast. On the left are the QuickTime windows, one for each clip or song I plan to play. Below them at the bottom left are Skype and iChat windows in case I have any conversations with other people planned. In the middle is the main Audio Hijack Pro window. On the upper right are the Application Mixer windows for QuickTime and Skype. On the bottom-right is my Inspector window so I can monitor my audio levels.

Once you're ready to go, take a deep breath and begin. Here's a look at how I do my podcast recordings:

1. I click Record to start Audio Hijack Pro recording.
2. I say the podcast name and date.
3. I click Play on my intro music in its QuickTime Player window.
4. At a certain point in my intro music, I drop the volume using the slider on the Application Mixer window in Audio Hijack Pro for QuickTime and begin my standard intro.
5. I talk, and, when I need to play other audio files, I click play in the various QuickTime Player windows, adjusting volumes as needed.
6. I record my outtro, including the title of my show, my name and contact information, and the address of my website.
7. I stop the recording by clicking Record again.

From here, I move on to SoundStudio to trim. I usually need to clip just a touch off the front, because I tend to click record and then wait a second before I start talking. I save the final cut of my podcast and I'm ready to compress it and get it online!

TIP To make your podcast more useful, announce the podcast name and date at the very start of your show before any intro music is played. This helps people who are using MP3 players that do not have screens (such as the iPod shuffle), and people who are not in a position to see their screen. Once listeners know the show title and date, they can decide whether or not they want to listen to it or skip to the next track on their device.

Record with GarageBand

Podcasting with GarageBand has its pros and cons. On the pro side, you sequence all the different parts of your podcast into separate tracks, which gives you fine-grained control over audio transitions and timing.

For example, when recording using Audio Hijack Pro, I constantly goof up the reduction in volume of the intro music when I begin speaking. My hand slips and I fade it much too quickly, or I don't fade

it enough and it is too loud, drowning out my voice. I invariably have to either just let it go and leave it in, or go back and re-record it.

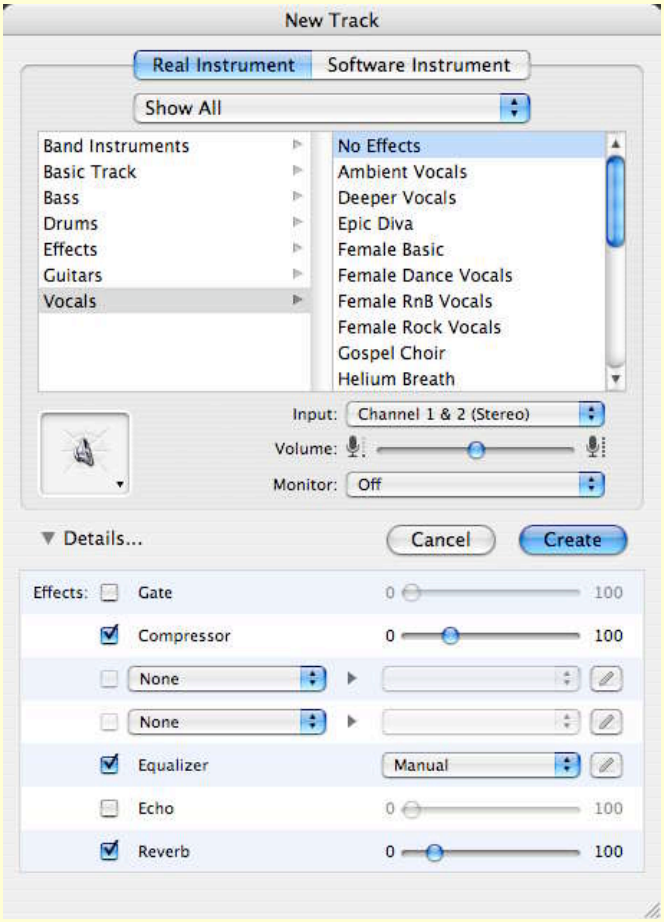
With GarageBand, I can adjust the volume of each track by hand and adjust the timing. Did I start speaking too late? I just move the track to the left to fix that. On the other hand, this is also a problem for podcasting with GarageBand as I lose most of the spontaneity of creating the podcast. I have to record each bit on its own and then manually sequence them together. I am far less likely to have that feeling of rawness that many value in podcasts.

Unlike Audio Hijack Pro, GarageBand can record only from a single sound input at a time. If you want to mix multiple sources of audio, you need to channel that audio into Soundflower and then have Audacity record the Soundflower space. (See Pull Audio from Multiple Sources with Soundflower for details.)

First, we set up a special instrument within GarageBand. Launch the program, create a new file, and follow these steps:

1. Choose Track > New Track. The dialog in **Figure 6** appears.
2. Click the Real Instrument tab at the top.
3. Select Vocals from the left-hand list.
4. Select No Effects from the right-hand list.
5. Choose Channel 1 & 2 (Stereo) from the Input pop-up menu. I have a single mono microphone, but find no difference between choosing Channel 1 (mono) or the default stereo setting.
6. Choose Off from the Monitor pop-up menu. If this setting is turned on, you hear yourself through your headphones, which I find to cause more trouble than it is worth. (Never turn this on if you are not using headphones as you create a nasty feedback loop and create some awful noises.)

FIGURE 6



This screenshot of the New Track dialog shows how I configured my "Podcasting Voice" custom instrument.

7. Open the Details expansion triangle to set additional options:

   - **Gate:** Leave unchecked. The Gate setting silences any noise below the value you set, which removes that constant hiss that appears on recordings outside of true sound-controlled recording booths. However, I find that it makes the hiss come when you talk and go when you are silent. It never sounds very good in practice.
   - **Compressor:** I set the Compressor slider about 1/3 from the left. This helps spread the sound coming in through the microphone across the entire range, giving your voice some dynamic lift and making it sound far less flat than it otherwise might. Play with this setting to see what works best for you.
   - **Filters:** I don't use either of these but I sure do like playing with them. They can be quite useful if you are going for special effects in your show.

- **Equalizer:** I created a custom setting because I had a lot of trouble with the letter S, which sounded like a nasty hiss. Play with this setting until you like how you sound.

> **NOTE** As soon you choose an Equalizer value other than Manual, you are prompted to create this instrument by providing a name under which it is listed. You can still make changes and save it again using the Save Instrument button that then appears.

- **Echo:** Leave off. Unless you are announcing a Monster Trucks commercial, there's no need for an echo.
- **Reverb:** A little reverb goes a long way. I set mine about 1/6 of the way from the left to give just a hint of depth to the space around me. Normal microphones in a normal room sound pretty flat. Adding a touch of reverb makes the voice seem more real and more like somebody is actually there speaking to you. Again, play with this setting to find a value that works for you.

8. To finish with Track Info, click Create.
9. A prompt appears, asking you to provide a name for this instrument. You can use any name that you like; I named mine "Podcasting Voice."

Now record your segments. With your voice instrument set up and metronome turned off (Command-U), click the Record button and start talking. If you don't like what you recorded, throw it away and start over.

Once you have all your vocal tracks completed, you are ready to edit your audio and mix in other tracks, as I describe in Edit Your Podcast with GarageBand.

Record with Audacity

Audacity is a well-respected audio recording and editing program that has a strong following. It packs a lot of power and a large feature set and is up to virtually any editing task you may want to throw its way. On the negative side, though I haven't seen much of this behavior, I have heard many stories about Audacity crashing before saving audio.

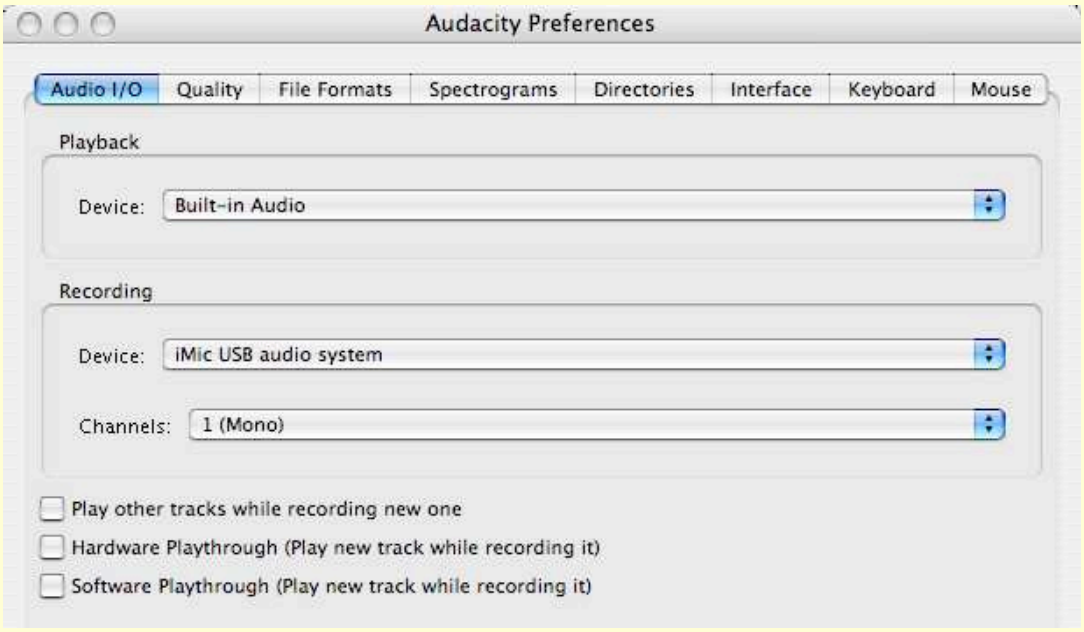
NOTE There has not been a new version of Audacity in nearly a year, which suggests that the project has stagnated. Most open-source projects with bugs or stability problems either improve through rapid releases or die. It is not clear which category Audacity fits into at this time. Given its popularity with podcasters, I would be surprised if it was a dead project; I think it's just resting.

Like GarageBand, Audacity uses a multi-track metaphor. Each track can contain different audio files that can be mixed together. You need to channel that audio into Soundflower and then have Audacity record the Soundflower space. See Pull Audio from Multiple Sources with Soundflower for details on doing this.

Follow these steps to configure and record audio with Audacity:

1. Choose Audacity > Preferences, and in the Audio I/O pane, set your input and output settings to match your configuration (**Figure 7**).

FIGURE 7



My Audacity settings for podcasting. I monitor through headphones (which I don't pass through the iMic to help reduce lag), I record through the iMic, and I only use a single (mono) channel, as I do not have a stereo microphone.

2. Start recording and speaking. The levels meter on the upper right let you know if you are talking too loudly or quietly. You may have to create several takes at first to get a feel for the right settings and volume in your own voice.

3. You can record additional spoken word tracks as needed and move all the different pieces around as suits your tastes.

Once you have all the pieces recorded, you can move on to editing your show See Edit Your Podcast.

Record with SoundStudio

SoundStudio enables you to work on a single audio track at a time, which makes it the most limited tool but also the simplest to use. This may cause you to choose SoundStudio to avoid complexity. The trick is mixing together the various parts of your show: your voice, music you play (including intro/outtro music), and so forth.

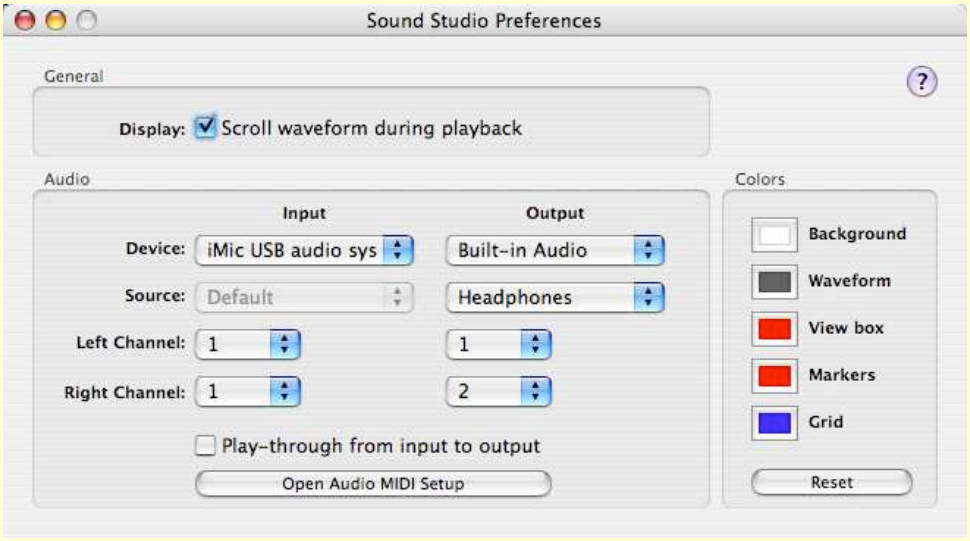
> **NOTE** SoundStudio released version 3.0 while this ebook was being finished. Click the Check for Updates button on the cover to learn about plans for a free update that covers SoundStudio 3.

Two methods let you get around this limitation. First, route audio from multiple sources into Soundflower, and then record the Soundflower channel within SoundStudio (see Pull Audio from Multiple Sources with Soundflower). Second, use SoundStudio to merge the different audio tracks after they are all recorded and otherwise ready to be mixed. I advise against this latter approach as it is takes the most time. You have far better ways to handle this, such as bringing all tracks into GarageBand or Audacity and using either of those programs to handle the mixing.

Here's how to set up SoundStudio and record:

1. Choose SoundStudio > Preferences and set your input and output settings to match your configuration (**Figure 8**).

FIGURE 8



Set the preferences to match your setup.

2. Start recording and speaking. The levels meter (found in a separate window that you can show or hide in the Windows menu) lets you know if you are speaking too loudly or quietly, and you may have to do several takes to find the right settings and volume for your voice.

I monitor through headphones (which I don't pass through the iMic to help reduce lag) and record through the iMic. The Left and Right channel controls determine where audio from the two channels winds up. Since I use a mono microphone, controls are set to Channel 1. If I were to set right to 2 for input, my voice would appear only on the left channel.

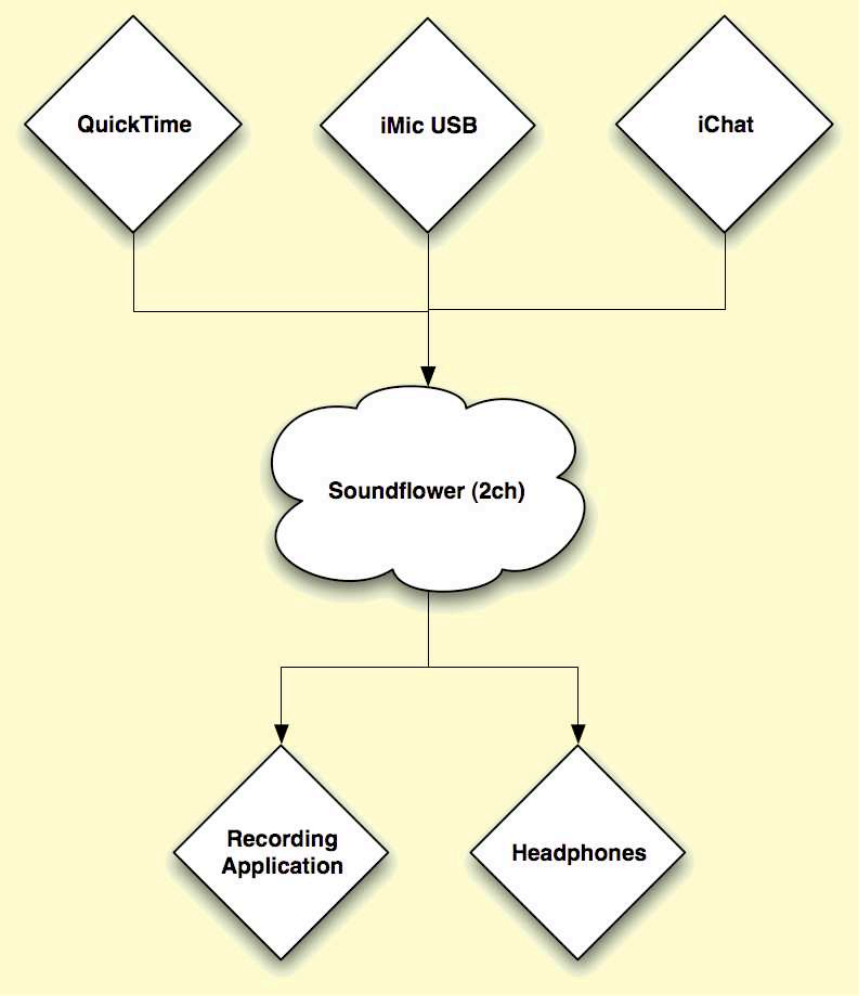
When you finish recording, you can then turn your attention to editing the file and, perhaps, mixing it with other audio files to build your show. I cover editing in Edit Your Podcast with Audacity later.

Pull Audio from Multiple Sources with Soundflower

If you choose not to use Audio Hijack Pro, you need to use Soundflower to pull together audio from multiple sources. Programs like Audacity and GarageBand specialize in audio mixing and editing, not incorporating sound from other programs like Skype, iChat, QuickTime, or iTunes. (You might use Soundflower with Audio Hijack Pro, too, to route application audio directly to other programs.)

Soundflower creates a single virtual audio source that can be used in any program, and that appears to all intents and purposes as if it's just a single source of audio. But you can route the sound from many different programs and sources into Soundflower, just like taking water from hoses connected to different faucets and having that water pool in a single bucket. You can then record directly from the shared sound space that is the Soundflower device (**Figure 9**).

FIGURE 9



Audio is routed from multiple applications directly into Soundflower where it is all mixed together. Your recording application records directly from this space and your headphones listen to it as well so you can hear what you are recording.

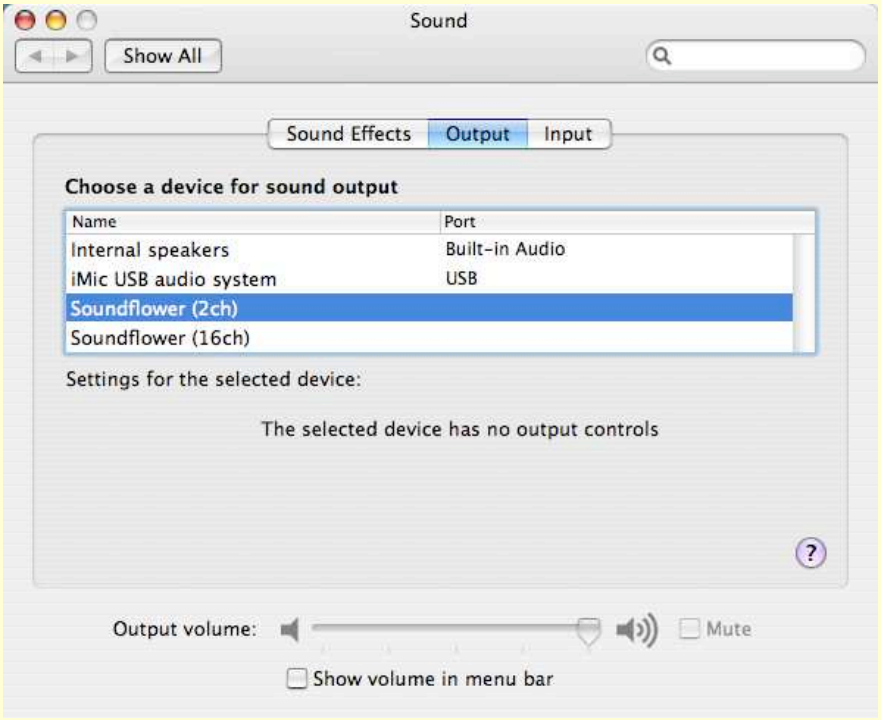
It can be a bit convoluted to set up, but once you have it all working, you have great flexibility in how you mix your podcasts.

Here's how this might work with GarageBand:

1. Download and install Soundflower (see Audio Software You Need).

2. Open System Preferences and click Sound (**Figure 10**).

FIGURE 10



Configure the Sound preference pane in System Preferences to prepare for running Soundflower.

2. Set each tab as follows:

   a. **Sound Effects:** Set Play Alerts and Sound Effects Through to your headphones. This keeps random alert sounds, new mail sounds, and other random noise from appearing in your podcast. If you actually want these sounds in your podcast, by all means set this to Soundflower (2ch) also.

   b. **Output:** Set to Soundflower (2ch) to direct all audio output generated by all applications on your computer to send their sound to Soundflower (2ch) rather than the speakers or your headphones. This covers all applications that do not let you set their output directly.

   c. **Input:** Choose your input device (Internal Microphone, Line In, iMic USB audio system, etc.).

3. Once you establish your default sound settings, you need to set up audio in programs that have their own sound controls, such as Skype and iChat AV—each of these programs has audio preferences that determine where the programs get their audio input and

where they send their audio output. In the case of these two programs, set their inputs to your microphone and their outputs to Soundflower (2ch) as in **Figure 11**.

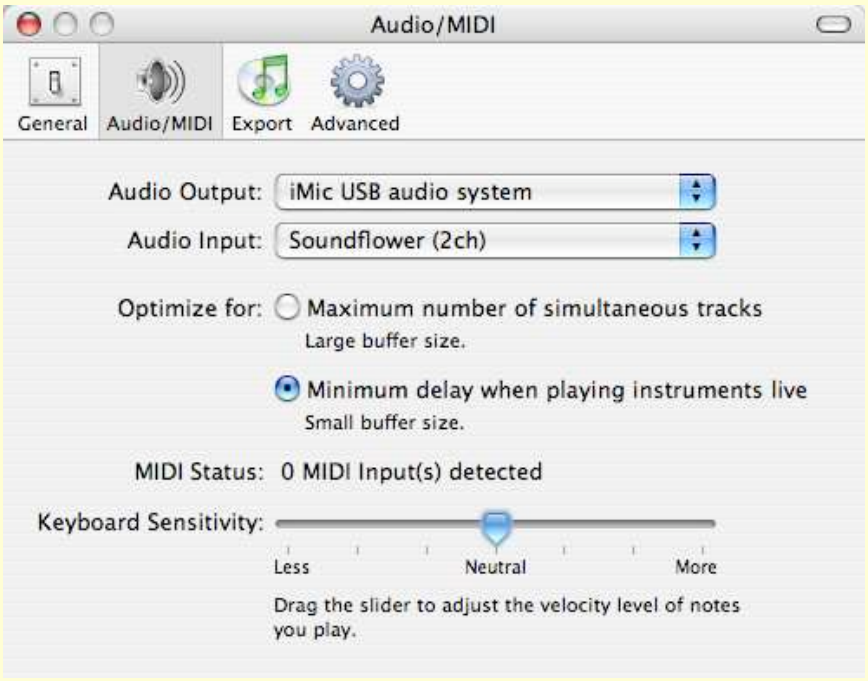
FIGURE 11

Skype's audio settings to direct all sound from Skype to Soundflower (2ch). Note that in iChat AV, the audio settings are on the Video tab.

4. Open GarageBand, Audacity, or SoundStudio and set up a new file as I describe earlier in this ebook.

5. In that program's preferences, look for the audio input/output settings (**Figure 12**). Set the input to Soundflower (2ch) and the output to whatever you are using to monitor your podcast (presumably, your headphones or an iMic or similar).

FIGURE 12



Audio preferences for GarageBand.

6. From this point onward, follow the instructions that I gave earlier for the program you are using. You can now record audio from multiple external sources including iChat and Skype conversations.

You can also play music directly from iTunes and QuickTime and record that music as these programs play, but I still think it is easier to work with these files as discrete tracks for the fine-grained control you have over the volumes and timing of the files.

Edit Your Podcast

Once you have recorded all the pieces of your podcast, you may want to edit them, either to sequence pieces together or to remove anything accidental you don't want in there such as excessive stumbling in your speech or other mistakes. (Whether you edit at all is a personal choice.)

Edit Your Podcast with GarageBand

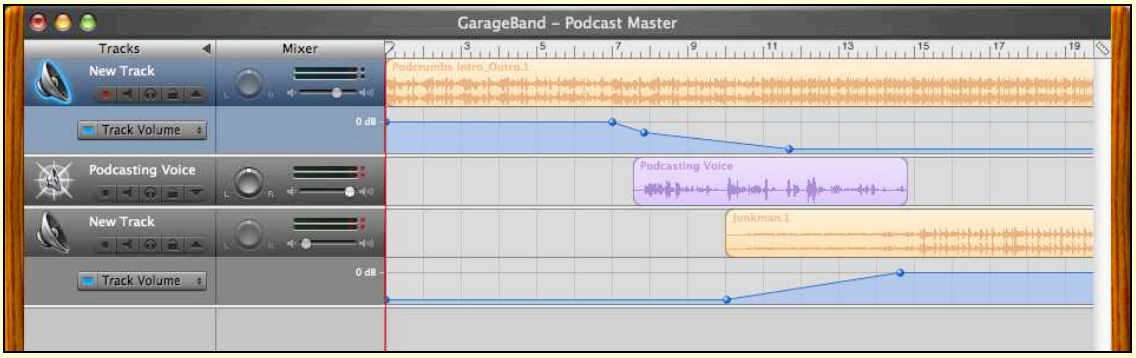
GarageBand provides the greatest flexibility in that it allows you to easily mix different tracks together and modify the properties of each track (including filters, equalizer settings, echo, reverb, and more) without changing the underlying recorded audio. It overlays filtering on top of the track and does not make destructive changes to the data.

You can also edit the tracks to remove gaps, speech stumbling, and other unwanted content as well as cut, copy, and paste audio bits into other locations. Those edits, however, do permanently change the data.

Add additional audio

Drag in any audio you plan to use. You can bring in any MP3, AIFF, or AAC format files (except iTunes Music Store purchases, which are protected and bookmarkable AAC files). Each time you drag in a new audio file, GarageBand puts it into a new, unique track (**Figure 13**).

Figure 13



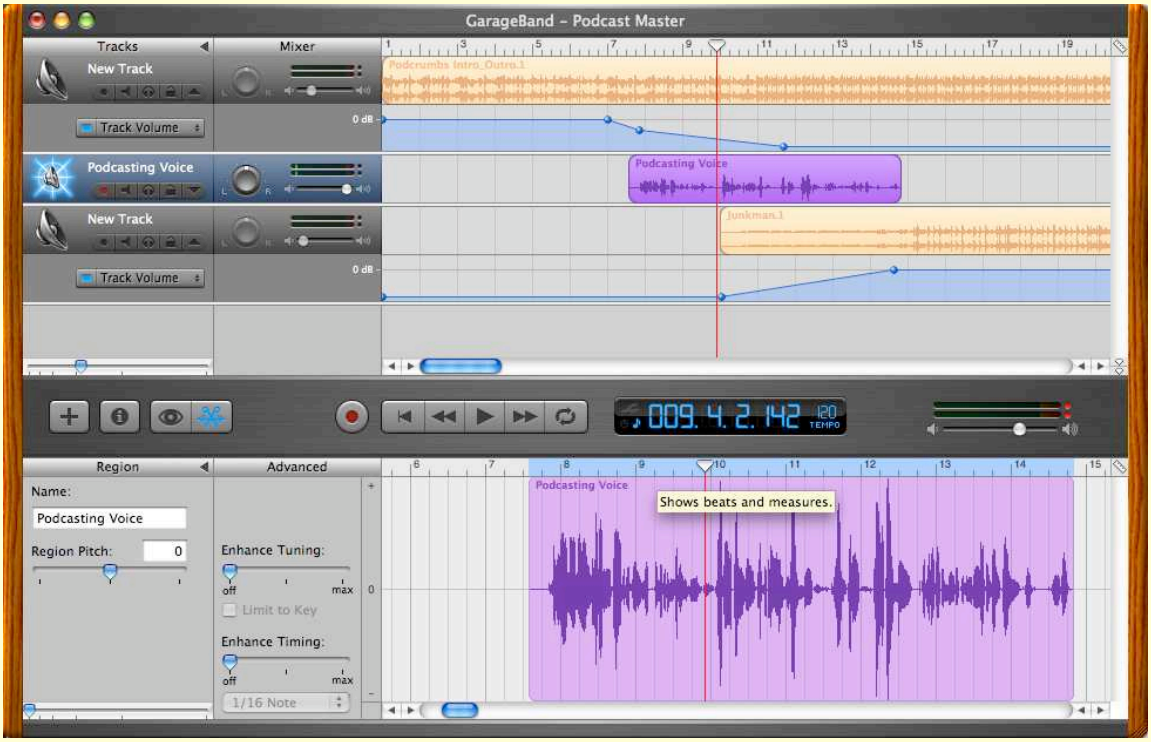
In this GarageBand example, the top track is the intro/outtro music. The second track is a recorded voice saying hello and welcome. The third track is a song. The intro/outtro plays alone for a few seconds, then the voice starts, and then the song starts and overlaps with the voice.

Edit your voice

You may want to remove any “ums” or other distracting noises from your vocal track. Or you may have gone off on a tangent, which, on listening to it again, you realize is boring and pointless, and want to remove it:

1. Select your vocal track and choose , the Track Editor button, which is next to the eyeball on the lower left. This brings up the track editor in the bottom half of the window as in **Figure 14**.

FIGURE 14



Edit mode lets you edit specific details of a given track. As this is recorded audio, you are presented with a sound wave.

2. Listen to your vocal track and identify any place where you have something to remove. When you do hear something, tap the space-bar to pause the playback and take note of where the red playhead is located. The playhead should be just after the undesired sound begins. To verify that you found the right bit, you may want to move the playhead back and tap the spacebar to start playback again.

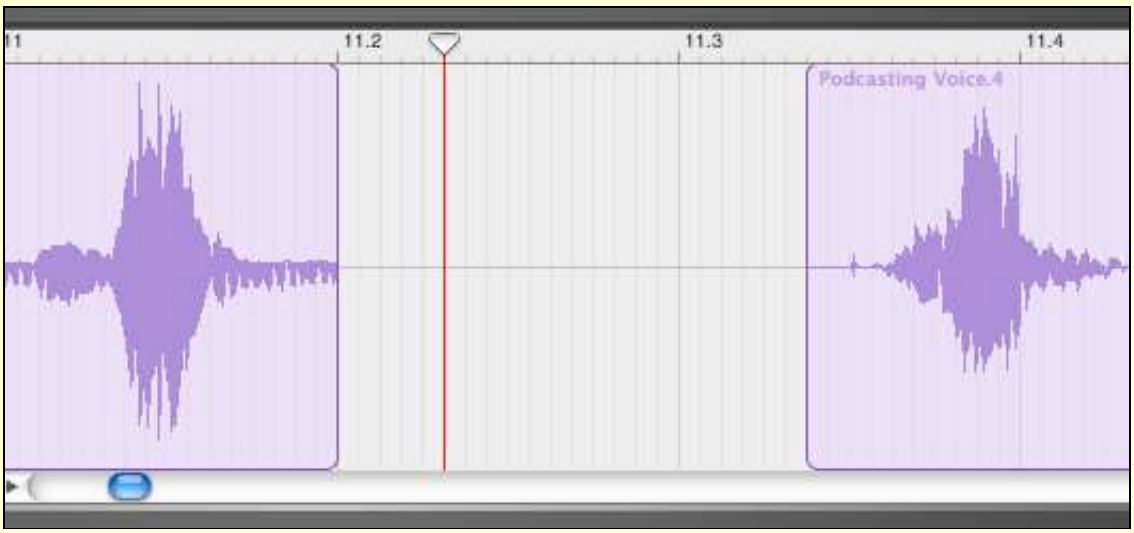
3. Once you are sure you've found the right end-spot, select the audio by dragging from the start of the sound to the end of the sound (**Figure 15**).

FIGURE 15

Here I have selected an "um" to delete.

4. With the undesired sound selected, choose Edit > Cut. Unlike other audio editors, GarageBand does not shift everything to the right of the cut towards the left but instead leaves a gap where you removed the sound (**Figure 16**).

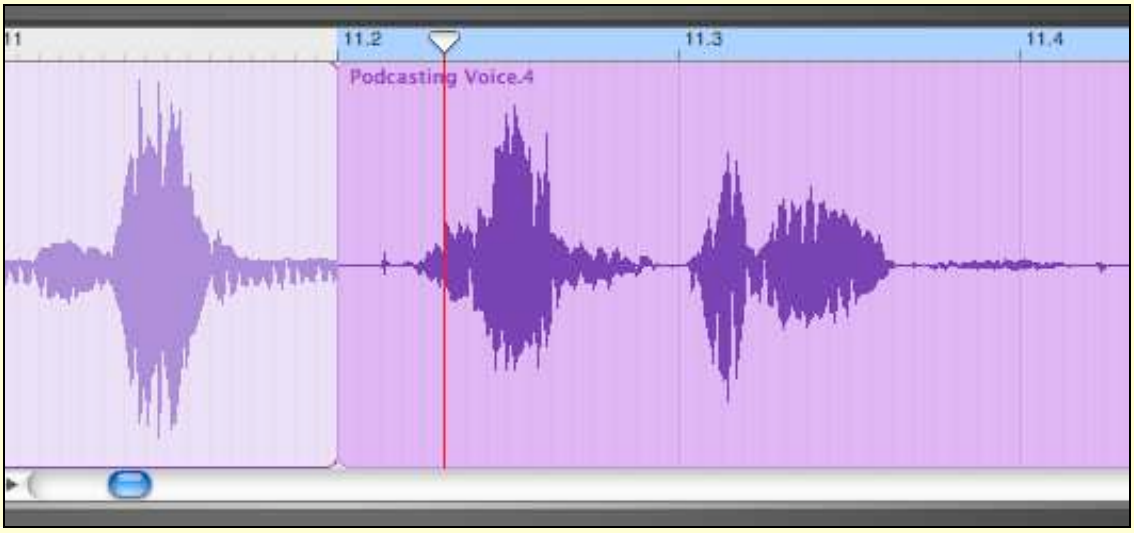
FIGURE 16



The gap left by removing the selection above.

5. Drag the sound block on the right over to the left to line up with the left sound block (**Figure 17**).

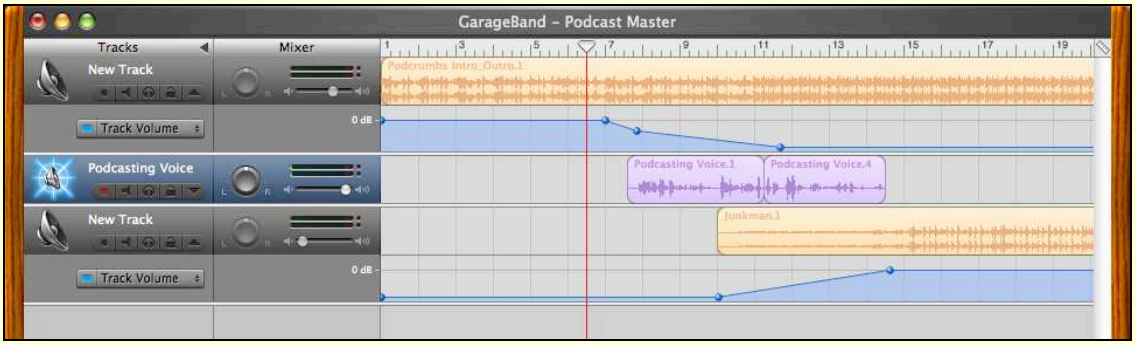
FIGURE 17



The sounds are together again with the offending "um" removed for good.

The offending sound is now gone and the only sign that something has changed is the fact that your track shows more than one sound block where it used to have only one (**Figure 18**). This is just a visual indicator of edits, and it doesn't affect your audio.

FIGURE 18



GarageBand now shows that the "Podcasting Voice" track holds two objects instead of one.

Mix tracks

After you record or import all your audio into GarageBand, you can move chunks of audio around to start and end when you want them to, and you can adjust their individual volumes to have them fade in and out as needed.

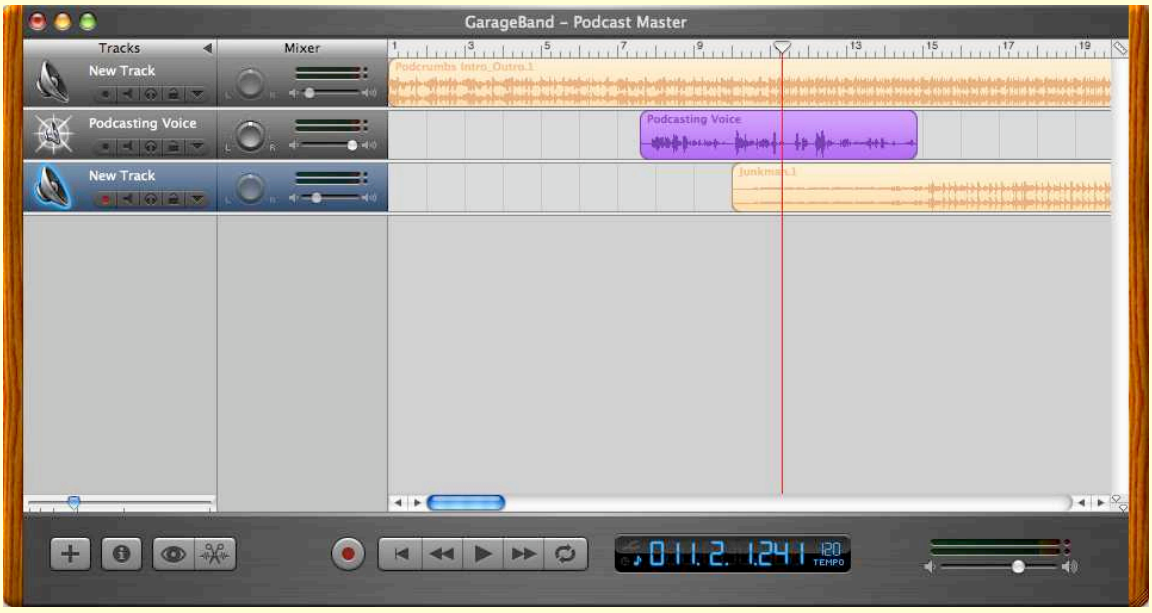
GarageBand indicates volume with blue lines and light blue shaded areas under the actual track data, which are orange, green, or purple depending on whether they are, respectively, software instruments, imported audio, or real instruments. The higher the blue line, the louder the sound is at that point.

Notice in my example in the step-by-step instructions just previously that the intro starts at full volume and then fades out right when the voice track starts. The voice track has no volume control displayed, and is played at full volume from start to finish. Meanwhile, a song slowly fades in under the voice and reaches full volume right as the voice finishes up introducing the song.

In order to achieve this professional mixing effect, try the following:

1. Drag each audio file from the Finder to the GarageBand window. GarageBand puts each dragged-in sound into a separate track and starts it at the point in the timeline where you dropped it. As you drag an audio file in, the playhead appears, showing the audio's start time. Move the dragged-in audio left or right until you get it close to where you want it (**Figure 19**).

FIGURE 19



Space the three tracks so the audio for each begins when needed.

2. To manage the transitions between the tracks, click the volume button (circled in red in **Figure 20**) in each track, which gives you individual volume control for each track (the blue area under the orange track in **Figure 21**). Then you can fade out one thing while fading in another.

FIGURE 20

Click the volume button (circled in red) to reveal an individual track's volume controls.

FIGURE 21

Close-up of the voice track (purple), song track (orange), and song volume (blue).

3. Decide when you want the fade-in of the song to begin, and click the blue volume line to create a control point (**Figure 22**).

   GarageBand inserts a control point at the spot where you clicked.

FIGURE 22

Create the first control point in the song's blue volume control.

4. Drag the leftmost control point at the start of the track to the bottom (**Figure 23**).

FIGURE 23

Drag the left edge of the line to the bottom.

5. Create another control point where you want the song to reach full volume. In **Figure 24**, this is when the voice track ends.

FIGURE 24

Create the second control point where the voice track ends.

6. Drag the first control point you made to the bottom to set the point where the fade in begins. In our example, the song gently fades in under the speaking voice and reaches full volume when the voice is finished (**Figure 25**). You may need to adjust the fade-in by adding additional control points to ensure the volume of the song doesn't drown out the final words in the voice track.

FIGURE 25

Drag the first control point you made to the bottom to create the desired transition.

Edit Your Podcast with Audacity

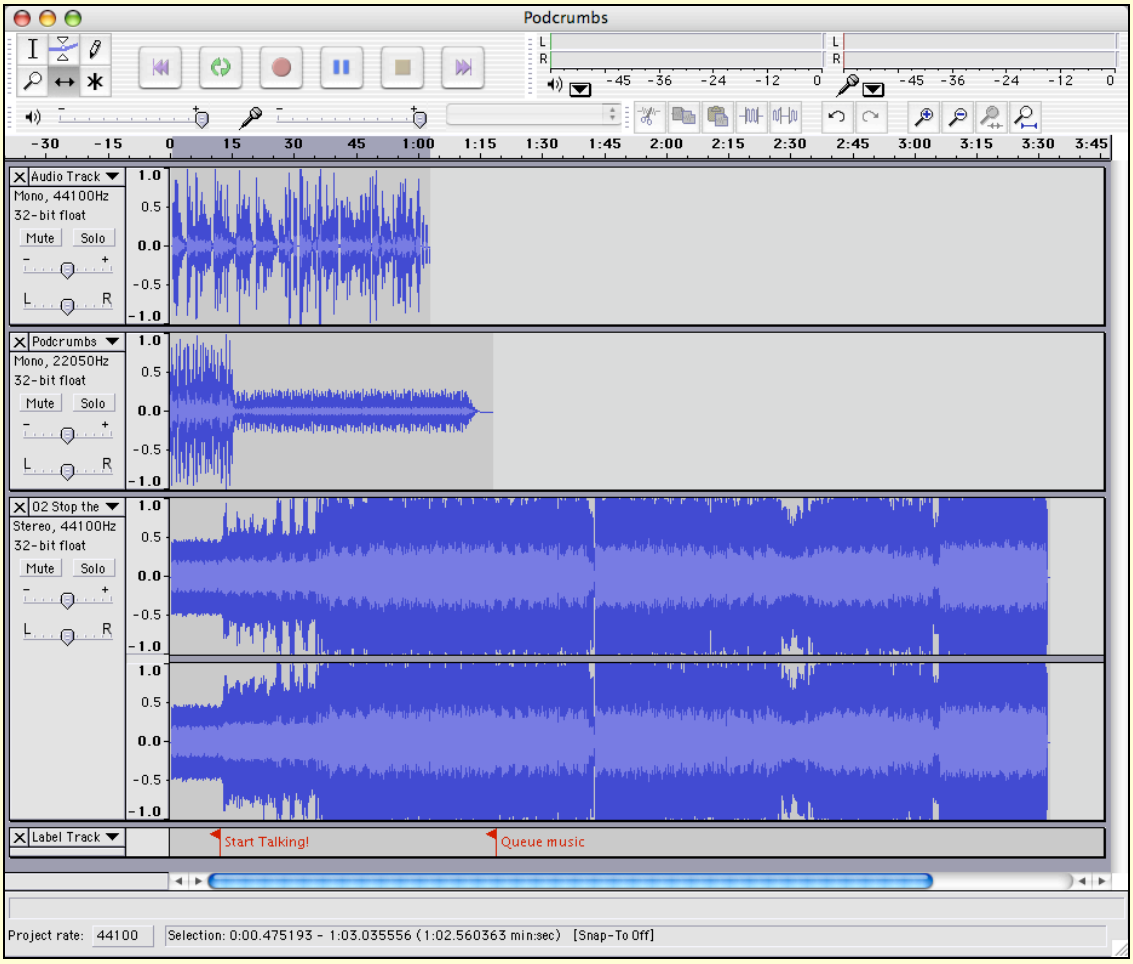
Audacity is popular among podcasters because it offers powerful editing and mixing features in a free software package. Its interface is certainly rough around the edges, but once you get familiar with how Audacity works, its power overcomes any limitations in its interface.

Add additional audio

You can import other sounds into your Audacity project. For example, you can import your intro and outtro music, any MP3s (but not AAC format files) you may want to play, and so forth. To add audio to your podcast, follow these steps:

1. Choose Project > Import Audio and locate any files you want to include in your project. After adding the files, your window will look something like **Figure 26**.

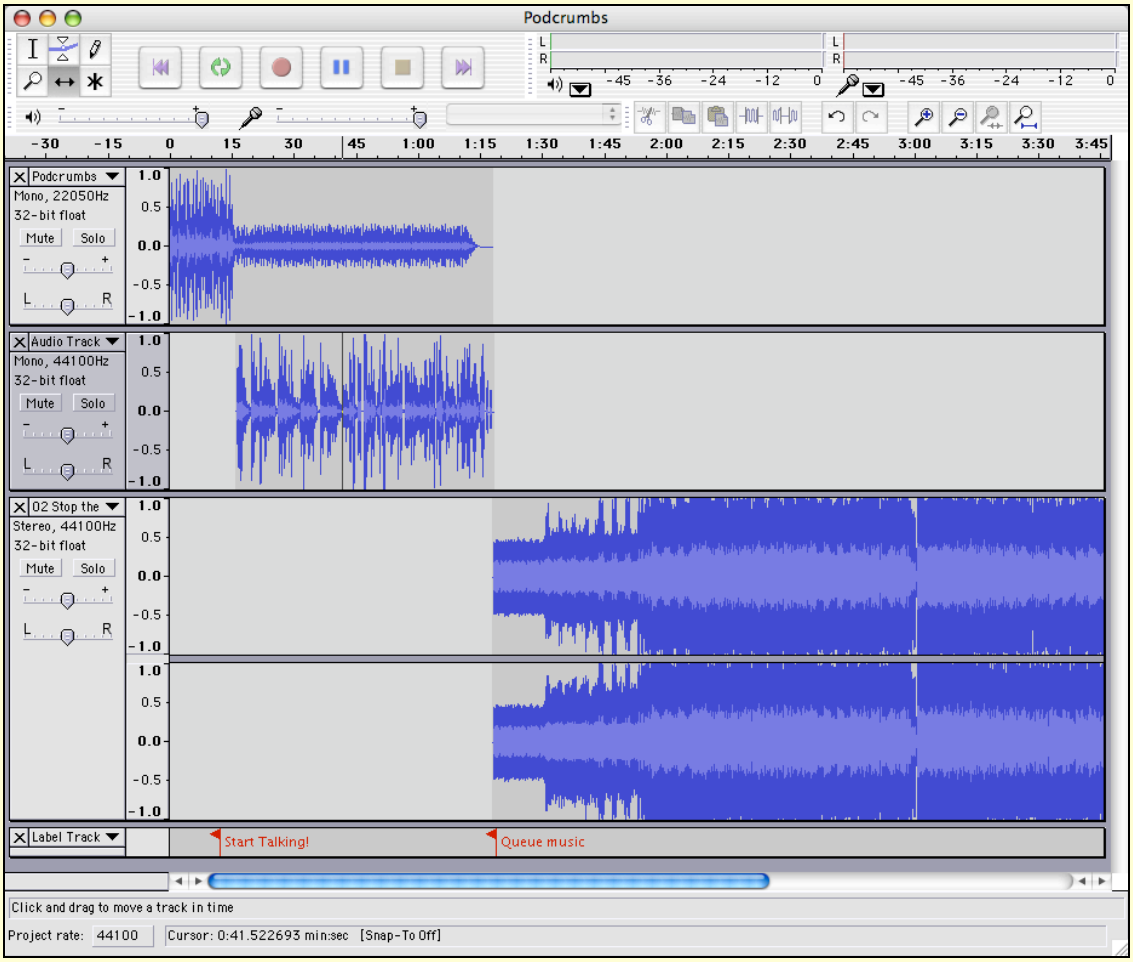
FIGURE 26



This Audacity window showing three newly added audio tracks.

2. From the selection of tools at the upper left of the window, pick the double-arrow tool (lower row, middle icon). Now, drag the tracks to set their start times, as in **Figure 27**.

FIGURE 27



I moved my voice (middle track) to start part way into my intro music (about where the volume drops), and I moved the song (bottom track) to start as my voice track finishes.

TIP Audacity can add labels (the bottom track with red type in **Figure 27**) to help you keep track of parts of the recording or when different transitions should happen.

Edit your voice

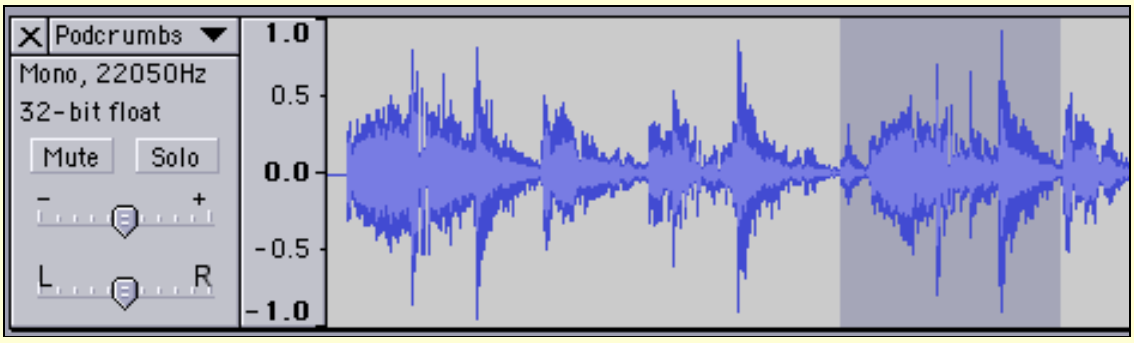
Editing your voice track is simple. Here are the steps:

1. Select your vocal track and choose the edit tool (the I-beam icon at the upper left).

2. Listen to your vocal track and identify any place where you have something to remove. When you hear an extraneous sound, tap the spacebar to pause the playback and take note of where the black cursor is located. It should be just after the undesired sound. You may want to move the cursor back and tap the spacebar to start playback again just to verify that you found the right bit.

3. Select the offending audio by dragging from the start of the sound to the end of the sound (**Figure 28**).

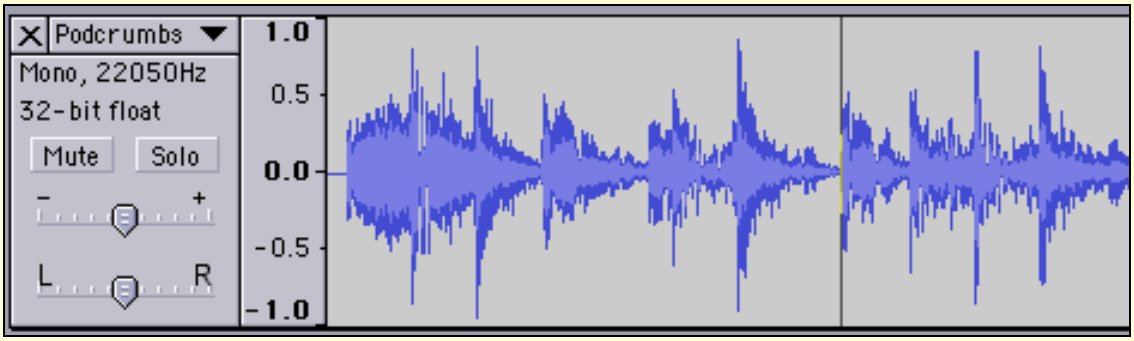
FIGURE 28



Select the offending sound.

4. Press the Delete key to delete the selected sound (**Figure 29**).

FIGURE 29



Audacity has removed the sound and snapped the audio to the right of the gap to the start of the deletion.

Mix tracks

Audacity has a weak spot for podcasting: the program only edits destructively. Change the volume of a track, and you've irrevocably changed the original recorded sound. It can't fade, either, but only change the overall volume of a selection. You can, however, fade a sound in or out completely, but there's no loud to soft or soft to loud settings.

Audacity provides some complicated features in place of simple transitions to handle cross fades between tracks but their complexity places them beyond the scope of this ebook.

Edit Your Podcast with SoundStudio

SoundStudio provides the same type of editing features as Audacity but operates on only one sound file at a time. SoundStudio provides no separate tracks and any mixing between separate audio sources almost certainly requires the use of a different program. However, as a sound editor, it is one of the most powerful and easiest to use, and it is excellent for preparing individual files for inclusion in a podcast or for doing final processing on a newly completed podcast.

> **NOTE** This ebook covers SoundStudio 2. Version 3 has recently been released and will be covered in a free update to this ebook. Click the Check for Updates button on the cover of this ebook to learn more.

Add additional audio

Aside from using Soundflower to live-mix multiple sources, you cannot add additional audio to a single project beyond SoundStudio's complicated mixing system (described ahead).

Edit your voice

SoundStudio's audio editing interface is quite similar to Audacity's and GarageBand's in that you can remove unwanted sound as needed through a simple select and delete/cut. Like Audacity everything to the right of a removed section snaps left to fill in the gap.

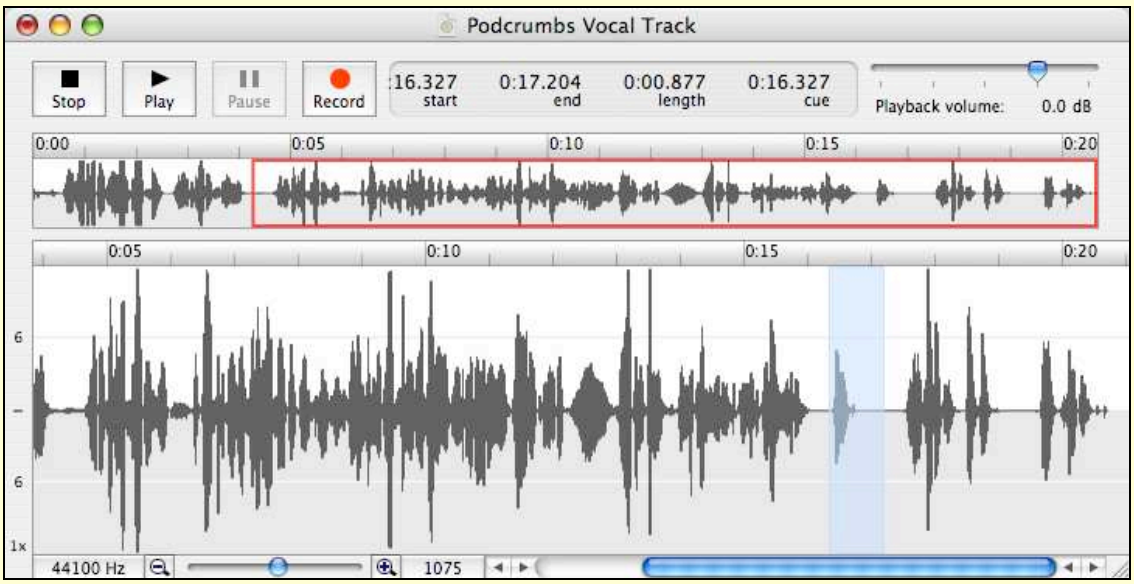
To edit your audio, follow these steps:

1. Listen to your vocal track and identify the starting point of audio you want to remove. Use the Cue timer at the top of the audio window to pinpoint the precise start time.
2. Press the spacebar when you reach the right starting point. Unfortunately, SoundStudio doesn't display a cursor showing the point you're paused at. Click as close to that point as you can, and then use the Start timer to see if you're on top of the precise moment.

3. Start playing the audio again. When you reach the end of the piece you want to remove, press the spacebar. Watch the Cue timer again to know where you want to stop.

4. Holding down the Shift key, click at the point where the unwanted sound ends. Use the End timer to click closer to the precise moment you wanted while holding down the Shift key to change the selection distance (**Figure 30**).

FIGURE 30



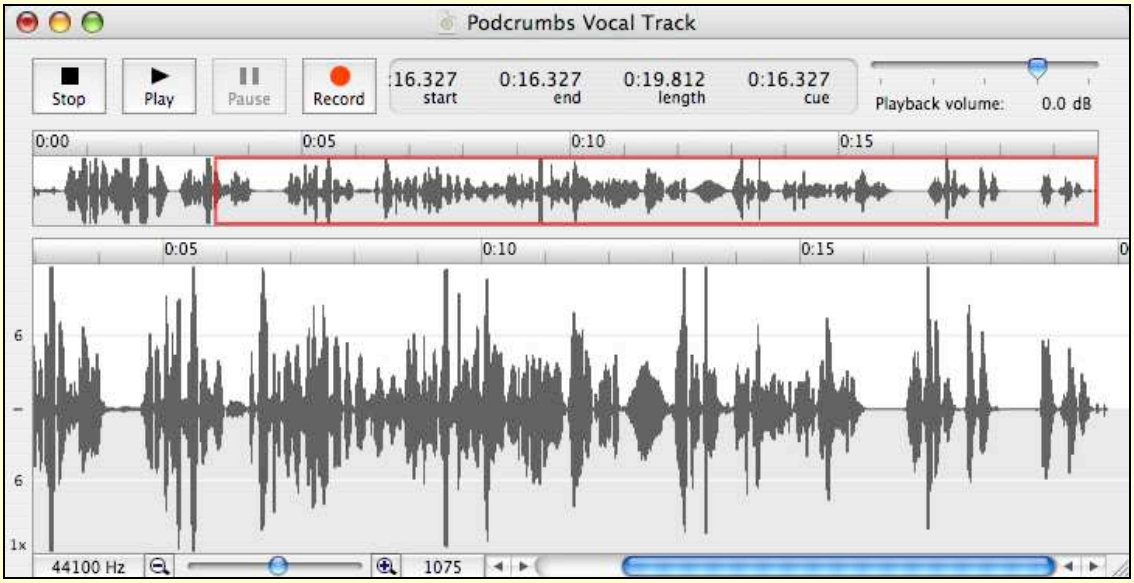
I have selected the offending sound.

5. With an area selected, click the Play button. SoundStudio plays the selected segment. You can now fine-tune the selection. Use the zoom slider at the bottom left of the audio window to see a finer or coarser view, in order to make a better selection.

6. Choose Edit > Cut (Command-X) if you intend to paste the audio somewhere else. Press Delete if you want to discard it.

SoundStudio removes the extra audio and automatically fills the gap with the sound that was to the right of it (**Figure 31**).

FIGURE 31



The sound has been removed and the gap automatically filled in by what was to the right of it.

Mix tracks

You can mix two audio files together using a cross-fade paste feature but this fade permanently alters the sound files. As such, I do not recommend using SoundStudio 2 to mix audio; GarageBand is the better option.

Edit Your Podcast with Audion

Audion has the unique capability to edit MP3 files directly, with as much ease as other programs handle AIFFs. Even though I think it's a bad idea to record directly into MP3 format—see Choose a File Type for why—Audion is the only tool to work with if you must use MP3s. You can also use Audion to tweak a file you've encoded into MP3 from a master file, but I would argue you are much better off re-encoding, unless you are in a time crunch.

Audion's editor is based upon SoundStudio and looks quite similar. Unlike SoundStudio, Audion provides only the capability to cut, copy, and paste selections and nothing else. Please refer to Edit Your Podcast with SoundStudio, earlier, for directions.

Encode Your Podcast

Your final, spiffed-up product is likely a large file in a raw audio format, such as AIFF, that needs to be encoded into MP3 or AAC format. These formats compress the audio down to a reasonable size so that you can share the file on the Internet.

Choose a File Type

Always record directly to AIFF, edit, and then encode to either MP3 or AAC (see **Table 1**, next page, for format details). Here's why:

- Encoding to a compressed format requires a lot of processing power. Making your computer encode on the fly while you try to sequence audio from multiple sources can overpower most computers, and you risk having some of your audio drop out as the computer fails to keep up with all its tasks.
- I prefer to have a full-dynamic-range master of my shows and then experiment with encoding options. If I have a show that is mostly talk, I encode it one way; if it has a lot of music in it, I encode it using another method. Because it can be hard to know what will work best before you record the show, I suggest that you leave encoding until the end, so that you can perfect your settings.

In general, I recommend you stick to MP3 unless your audience all uses iTunes (along with an iPod), in which case AAC is the superior option. (AAC is a subset of the MPEG4 standard, which is why we'll see more devices handling it over time.) For example, Doug Adams uses AAC rather than MP3 for a podcast about his AppleScripts for iTunes. He can be 100 percent certain that his audience uses iTunes—why would anyone not using iTunes care about his podcast? (http://www.dougscripts.com/itunes/itinfo/podcast_info.php).

iTunes is your best and nearly only choice for encoding: Among Audacity, Audio Hijack Pro, GarageBand, and SoundStudio, only Audio Hijack Pro can encode as MP3 while recording and none can encode as AAC. (Audacity can encode MP3 files with additional software libraries installed, see http://audacity.sourceforge.net/help/faq?s=install&item=lame-MP3.)

Table 1: Audio Format Comparison		
Audio Format	**Advantages**	**Disadvantages**
AIFF	• Best possible audio quality (the underlying format used for audio CDs) • Unencoded, thus better for production work without loss; avoids computational load	• Too large for Internet audio • Files are not bookmarkable
MP3	• Most widely supported audio format around, supported by all players on the market (except a few Sonys) • Files are small without a huge sacrifice in audio quality • Bookmarkable	• Older iPods can't read bookmarks: podcasts start from the beginning rather than the stopping place from the last listen*
AAC	• Same encoding settings produce smaller files and better quality than MP3 • Bookmarkable	• Many devices cannot play back AAC files
WAV	• Nearly as widely supported as MP3 and supported by the majority of current players, including iPods • Audio quality ranges from awful (smallest files) to AIFF-level quality (huge files)	• Files not as small as MP3 • Files are not bookmarkable
* Fourth-generation and later iPods, iPod minis, and iPod nanos support bookmarks in MP3 files if the podcast is downloaded by iTunes 4.9 or later.		

Encode Your Podcast Using iTunes

iTunes encodes audio files in MP3 and AAC formats quickly and painlessly. To begin, import your master file into iTunes.

TIP If you have iTunes set to copy imported audio into its own library, the next steps apply to the iTunes copy. But I recommend that you back up your original just in case. (You can control iTunes copying behavior in the iTunes Advanced preference pane, on the General tab.)

Once in iTunes, follow these steps to configure settings:

1. Choose iTunes > Preferences.
2. Click the Advanced icon and select the Importing tab.

3. Choose MP3 Encoder from the Import Using pop-up menu.
4. Choose Custom from the Setting menu.

> **TIP** iTunes lacks separate settings for encoding as MP3 and AAC and general audio CD ripping. If you use iTunes to rip music, take note of any settings in this area before changing them. You will want to change back to your original configuration after encoding. If you normally rip to MP3, changing AAC settings won't a cause problem; the reverse is true, too. You just change the encoder type back to your preference in the Import Using pop-up menu.

5. Set options as described in **Table 2** for MP3 or **Table 3** for AAC.

Table 2: Recommended MP3 Encoding Settings

Item	Setting	Comments
Stereo Bit Rate	96 Kbps	Results in a 48 Kbps rate for a mono file, which we are creating; see Channels, below
Use Variable Bit Rate Encoding	Checked	Encoding rate changes based on audio complexity; produces bigger files with the right tradeoff of quality and size
Quality	Medium High	A good tradeoff between quality and file size
Sample Rate	22.050 kHz	The lowest rate before the sound begins to degrade
Channels	Mono	Fine for podcasts without much music; otherwise select Stereo
Stereo Mode	Normal	The only option available for mono files and the proper setting for stereo files as well
Smart Encoding Adjustments	Checked	Allows iTunes to adjust settings based on the contents of your file
Filter Frequencies below 10 Hz	Checked	Removes sounds that cannot be heard by the human ear and reduces file size

Table 3: Recommended AAC Encoding Settings		
Item	**Setting**	**Comments**
Stereo Bit Rate	96 kbps	As with MP3, results in a 48 kbps mono file
Sample Rate	44.100 kHz	The highest quality needed for a podcast; higher rates don't improve audio noticeably
Channels	Mono	Fine for podcasts without much music; otherwise select Stereo
Use Variable Bit Rate Encoding (VBR)	Checked	Encoding rate changes based on audio complexity; produces bigger files with the right tradeoff of quality and size
Optimize for Voice	Checked	Useful for a podcast heavy on voice versus music

Now that you have made your settings, it's time to encode and check the file:

1. Select your newly imported master file and choose Advanced > Convert to MP3 (the menu item will read Convert to AAC if you've chosen AAC Encoder in the preferences).

   iTunes creates a new copy of the audio file in the format you picked and places that new file in the iTunes Music Library.

2. Listen to the new file in iTunes and verify that the audio meets your goal.

3. With the file in iTunes, choose File > Show Sound File to locate the actual file in the Finder.

4. Select the file in the Finder and choose File > Get Info to verify that you have made it as small as you want it to be. (You can also show the file's size within iTunes. Choose Edit > View Options, check Size, click OK, and scroll to the right to see the Size column.)

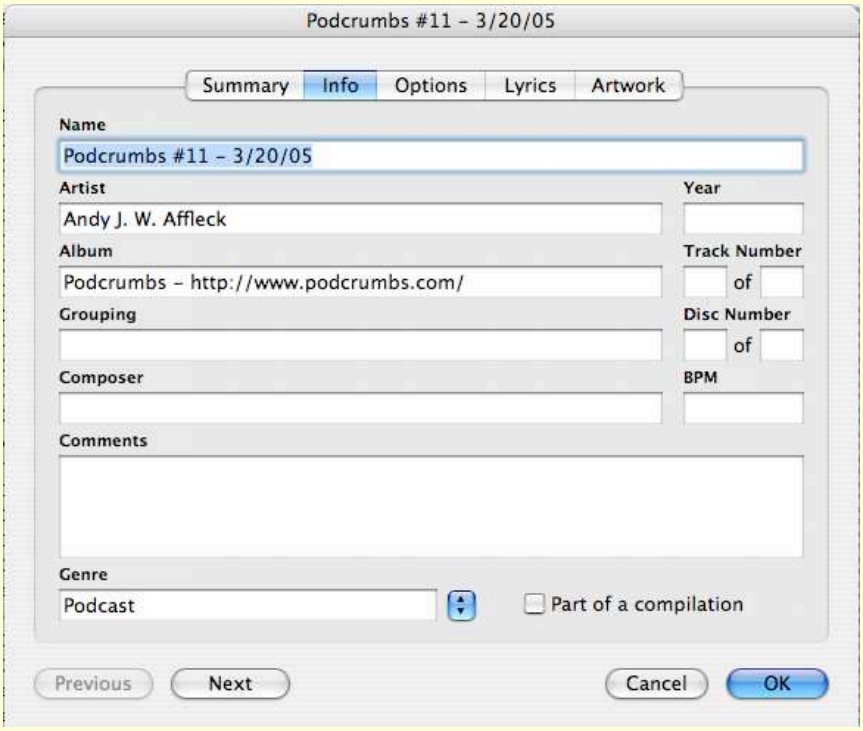
Your podcast file should now be properly encoded. Before you publish it, though, you need to tag it, as I explain next.

Tag Your Podcast

Add *tags* (bits of descriptive information, also known as *metadata*) to your podcast file to help listeners know what your show is about and where to file it in their libraries. Follow these steps to tag your file:

1. Select the track in iTunes and choose File > Get Info to bring up the track info window.
2. In the Info pane, set up your tags (**Figure 32**). **Table 4**, next page, has tagging suggestions for the most important tags, and the rest are up to you. The more information you can provide, the better.

FIGURE 32



Set up track tags in the Info pane.

Now that you have set the tags the way you want them, you are ready to upload your podcast.

Table 4: Suggested Tag Settings		
Tag	**Recommended Content**	**Example**
Name	The title of your podcast's episode. Generally this should include a show number and/or date and a brief overview of the content or guest.	Podcrumbs #4: Interview with Robert Burke Warren Part 1
Artist	Your name.	Andy J. Williams Affleck
Album	The title of your podcast. This groups your podcasts in iTunes or other organizers. Include the URL to your feed so appears in the listing.	Podcrumbs – http://www.podcrumbs.com/index.xml
Genre	Podcast.	Podcast
Comments	Use the same show notes that appear on the Web site for your podcast.	Episode the Fourth in which I interview singer/songwriter Robert Burke Warren (www.robertbwarren.com) (Part 1 of 3 or 4) about singing children's music and analog vs. digital recording, and he sings a cover of Ghost Riders in the Sky with backing vocals provided by the under-10 set. Details: MP3, 18:49, 6.5MB
Album Art	A picture. While this is optional, it helps to brand your show.	Logo from the Podcrumbs Web site. 

Publish and Promote Your Podcast

Now that your show is ready for the public, the next steps are to make it available and let people know about it. You need to put the MP3 or AAC file on a server, list the podcast on a Web site, reference the podcast in the RSS feed for your Web site, and advertise the show. But before I cover all that, you need to understand the potential pitfalls of success.

Understand Bandwidth Costs

Moving bits costs money. The site or service that hosts your podcasts pays money per megabyte, gigabyte, or terabyte per month, or by their peak bits per second, for pushing data out from their network. Most hosting companies pass that cost along to you in some way. Before you upload your show and get it out there, you should be aware of your hosting company's policies toward bandwidth.

If your show were to become popular with lots of listeners wanting to download episodes, you could find yourself on the losing end of the great contradiction of the Internet: the more popular you are, the more money it costs *you*.

As an example, when I wrote the article for *TidBITS* about podcasting in February 2005 (http://db.tidbits.com/getbits.acgi?tbart=07986), I created a companion episode of my podcast to go along with it featuring an interview with Dave Winer (http://www.podcrumbs.com/archives/2005/02/podcrumbs_8_int.html). Before this point, each episode of my podcast was garnering only a modest 300 downloads per episode. At about 10 megabytes (MB) per episode, that was only around 3 gigabytes (GB) of traffic moved from my Web site. My provider includes 30 GB per month of bandwidth allowance as part of my recurring service fee. After that, I pay $5 per gigabyte.

When the article was published, I moved over 25 GB in just a few days. If the article had been any more popular, it would have cost me a great deal of money. Instead of my usual $30 per month, I could have been paying double, triple, or even more for that one month.

As another example, my editor, Glenn Fleishman, nearly ended up paying $15,000 when tens of thousands of people downloaded a free

PDF version of a book he co-wrote. He was just shy of a monthly threshold, however, and owed nothing extra.

Many services simply cut you off when your bandwidth usage is exceeded. Apple's .Mac service used to offer a mixed message on download limits, stating no clear policy. Recently, they established a new set of rules that are quite clear: 10 GB per month with a regular subscription (about $100 per year) and 25 GB per month with the $50 per year extra storage upgrade that includes 2 GB of storage.

Some providers have much higher allowances than the typical hosting company. One popular service is Libsyn (http://www.libsyn.com/), which charges only by how much data you host with them—the rates are modest. If your provider's policies are restrictive, you should shop around. There's no reason you can't host your site with your current provider, but put the podcasts somewhere else.

Understand Syndication Formats

Syndication is used primarily by Web logs and news sites to allow visitors to subscribe to changes or follow updates without revisiting the site. *Really Simple Syndication* (RSS) and *Atom* are XML-based (Extensible Markup Language) standards for syndicating Web site content. The XML part defines a set of standard terms, and the various versions of the RSS standard and the single, coalescing Atom standard define how those terms are used.

RSS/Atom files typically list the most recent items posted to a Web log and include the following information:

- The title of the entry (if available).
- The body of the entry or a short excerpt or abstract.
- The permanent URL of the entry, which is the URL to the specific entry in the archives of the blog or on the site.
- The date and time it was posted.
- The URL of any enclosures attached to the entry. This entry points to your podcast file.
- The name of the blog entry's author.

- The category of the entry (if any).
- More arcane information of interest mostly to automated software.

iTunes supports additional tags in syndication feeds, which cover categorization in the iTunes Podcast directory, album art, whether the content contains explicit language, and more.

Tools to Publish Podcasts

Use a Web log to make your shows available. Web logs lend themselves nicely to podcasting by virtue of the fact that:

- Web logs are chronologically ordered sites in which the most recent posting is at the top;
- Web logs tend to have RSS/Atom files associated with them; and
- Many Web log management systems can already handle podcasting's special needs.

You can use any of a number of Web log management tools:

- Radio Userland has podcast support fully integrated (and has had it for years).
  http://radio.userland.com/ ($39.94 annual subscription)
- Movable Type can be given this capability via the MT-Enclosures extension by Brandon Fuller.
  http://www.movabletype.org/ (free for non-commercial use)
  http://brandon.fuller.name/archives/hacks/mtenclosures/ (free).
- WordPress provides built-in support for enclosures.
  http://wordpress.org/ (free)
- Blogger and LiveJournal do not, as of yet, support Enclosures.
  http://www.blogger.com/ (free)
  http://www.livejournal.com/(free)

  But, a workaround exists for these and other non-podcast-enabled sites: Use Feedburner, which takes an existing RSS feed and modifies in a number of interesting ways, including converting it to RSS 2.0 format and adding Enclosure links for any podcasts found in an entry. Subscribers to your feed use a Feedburner URL you provide rather than your host's feed URL.
  http://www.feedburner.com/ (free)

You can post podcasts to your Web log through a Web interface, but you might prefer to use a program that simplifies posting entries and uploading files. The two I like are:

- **MarsEdit:** From Ranchero Software, MarsEdit has an HTML view only for editing entries. The recent sale of Ranchero's NetNewsWire product has left MarsEdit's future a little unclear. http://ranchero.com/marsedit/ ($24.95)
- **Ecto** From Kung Foo TV, Ecto supports HTML and WYSYWIG editing of blog posts. http://ecto.kung-foo.tv/ ($17.95)

If you choose not to use a Web log to manage your podcast files, you can use one of these programs to generate the necessary RSS/Atom feeds and upload the individual episodes:

- **Feeder:** From Reinvented Software. http://www.reinventedsoftware.com/feeder/index.html ($29.95)
- **Podcast Maker:** This package from Potion Factory also supports the creation of chapters in podcasts, a feature supported by iTunes to allow access to specific sections of a specific episode. http://www.potionfactory.com/ ($30)

Upload and Publish an Episode

The procedure for uploading and posting an episode of your show is:

1. Upload the file to your site using either the Web interface to your Web log or one of the Web log management tools described just previously.
2. Create a new Web log entry that includes the same show notes you put in the Comments field in iTunes. Make sure to link to the podcast file in the entry (in the tip just ahead "Episode the Fourth" links to the MP3 file).

TIP Show notes provide an episode synopsis, and they include the size of the file and the duration of the podcast. For example:

Episode the Fourth, in which I interview singer/songwriter Robert Burke Warren (http://www.robertbwarren.com/) (Part 1 of 4) about singing children's music and analog vs. digital recording. He sings a cover of Ghost Riders in the Sky with backing vocals provided by the under-10 set. Details: mp3, 18:49, 6.5 MB.

3. Most Web log packages handle the generation of the RSS entry and, upon seeing the link to the MP3 file, add the required enclosure tag to your feed. If not, you may have to create these entries manually, a task that is beyond the scope of this ebook.

After this, it's up to you to tell the world about your episode.

Promote Your Podcast

When you first establish your podcast, you should get it listed in the major podcast directories. These are:

- **Apple iTunes Music Store:** The iTunes Music Store has an excellent podcast directory, which you access through iTunes. In the Podcasting section of the store (accessed via the Podcasts link on the left side of the store home page), is a link (again, on the left) labeled "Submit a Podcast," which provides a form for you to fill out. When you add your podcast to its directory, it automatically checks your RSS/Atom feed regularly and adds new episodes to its listings as they become available. In this way, you need tell iTunes about your podcasts only once. The listings stay current as long as your RSS/Atom feed is updated whenever you post new podcasts.
- **IPodder.organization:** This is the original podcast directory, and it is still actively maintained (http://www.ipodder.org/). Submitting your podcast to it is a bit cumbersome: you must navigate through the directory to each category page where your show should be listed, scroll to the bottom, and select "Submit a Link."
- **Yahoo:** Yahoo's Podcasting directory is a new kid on the block, but it is probably the easiest to add your show to. Just navigate to http://podcasts.yahoo.com/publish and add your feed to the form on the right labeled "Already have a Podcast?"

- **Podcast Alley:** Podcast Alley is another well-respected directory that's been around for a long time. Add your show by navigating to http://www.podcastalley.com/add_a_podcast.php and filling out the form.

There are many other directories out there; if any aim at an audience similar to yours, make sure you submit your listing.

After publishing each episode and ensuring that your RSS feed has been updated, you should also promote your podcast in other ways:

- **Update audio.weblogs.com:** audio.weblogs.com is a free service that you can use to alert the world to new podcast postings. Your blogging system may ping (or alert) this service when you post your podcast to your Web log; check your Web log settings to see if you can add a new site to ping if it's not already there. Otherwise, you can manually ping this site using the Web form at http://audio.weblogs.com/pingSiteForm.
- **Post a promo clip to OpenPodcast.org:** OpenPodcast.org (http://openpodcast.org) is a free service that lets you submit full podcasts or short promo clips via email. (I tend to favor small promo clips rather than sending full podcasts due to my service provider's maximum email message restriction.) You can also call a phone number to record a short clip. These clips are then listed in the OpenPodcast.org RSS 2.0 feed and audio.weblogs.com is pinged as well. Many people monitor this feed to look for interesting promos and find new podcasts.
- **Provide a promo clip to other podcasters:** Many podcasters are happy to play promo clips from other podcasters looking to advertise their shows. The etiquette for doing this varies by podcaster. Your best bet is to simply listen to other podcasts to learn what they will and will not play and how you may submit your clip to them.

RESOURCES

In the year since podcasting exploded onto the scene, I have found these resources invaluable:

- Phillip Torrone at Engadget wrote one of the first comprehensive articles on how to podcast, which has been invaluable (as have the comments following the article).
  http://www.engadget.com/entry/5843952395227141/

- Hugo Schotman provided a four-part, must-read, detailed description of his podcasting techniques and he even diagrams his setup (he uses GarageBand).
  http://log.hugoschotman.com/hugo/2004/09/audio_blog_soft_1.html

- My editor, Glenn Fleishman, wrote a fantastic article on using Audio Hijack Pro to record multiple sound sources without lag issues.
  http://www.macdevcenter.com/pub/a/mac/2005/01/25/podcast.html

  I later modified some of his article to handle adding other audio sources for a post in my Web log.
  http://www.podcrumbs.com/archives/2005/01/macdevcentercom.html

  In October 2005, Glenn updated the article to include details for updated versions of Audio Hijack Pro and Skype.
  http://www.macdevcenter.com/pub/a/mac/2005/10/10/how-to-podcast.html

- Teach for Two has a nice description of the basic process.
  http://www.teach42.com/2005/01/06/podcasting-its-easier-than-you-think/

- Currently, Wikipedia has a good entry about podcasting.
  http://en.wikipedia.org/wiki/Podcast

- Michael Geoghegan has an article on his Web site that describes how he uses Audacity as well as a nice external microphone.
  http://mwgblog.com/archives/2004/12/27/podcast-about-the-podcast/

- Garth Kidd wrote the Busy Podcaster's Guide, which explains some advanced topics such as using BitTorrent and feed tweaking. http://ipodder.sourceforge.net/docs/bpg.html
- The Podcasters group at Yahoo Groups is a great community of podcast enthusiasts. A lot of very friendly and helpful people hang out on the mailing list. Search the archives before posting your questions to make sure you aren't re-treading old ground. http://groups.yahoo.com/group/podcasters/

About This Ebook

In contrast to traditional print books, Take Control ebooks offer clickable links, full-text searching, and free minor updates. We hope you find them both useful and enjoyable to read. Keep reading in this section to learn more about the author, the Take Control series, and the publisher.

About the Author

Andy J. Williams Affleck (the Affleck part was stolen from his wife) has been using Macs since 1984 and has always been obsessed with any new medium that improves communication. At first it was mainframe based chat systems (Dartmouth College's XYZ for anyone who would remember that), and then email, instant messaging, newsletters, and finally the Web. He built Dartmouth College's first Web site in 1993, put together the original Web site for the sitcom *Friends,* and started a virtual community that's still around and kicking a decade later.

He has a master's degree from the Harvard Graduate School of Education in Technology in Education, specifically online networks for teaching and learning. When he's not figuring out new ways for people to communicate online, he's a senior project manager and accessible Web design expert (Section 508) for a federal contractor in Arlington, Virginia. He lives in Rhode Island with his wife and son.

Author's Acknowledgements

A job search and a relocation are not the best times to write an ebook so I owe all my thanks to my wife for her patience in giving me the space and time to work on this in the midst of a lot of insanity. This ebook is dedicated to my son without whom my podcasts would be infinitely more boring.

Shameless Plug

Ironically, my own podcast has been somewhat mothballed as I've worked on this ebook and relocated my family from Virginia to Rhode Island. But it will rise again and I welcome all listeners. You can find it at http://www.podcrumbs.com/. In addition, my Web log, which I've worked on more or less consistently since 1994, can be found at http://www.raggedcastle.com/webcrumbs.

Take Control: The Series

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Adam and Tonya are well-known in the Macintosh world as writers, editors, and speakers, and they have written innumerable online and print publications. They are also parents to Tristan, who thinks ebooks about trains, clipper ships, and dinosaurs would be cool.

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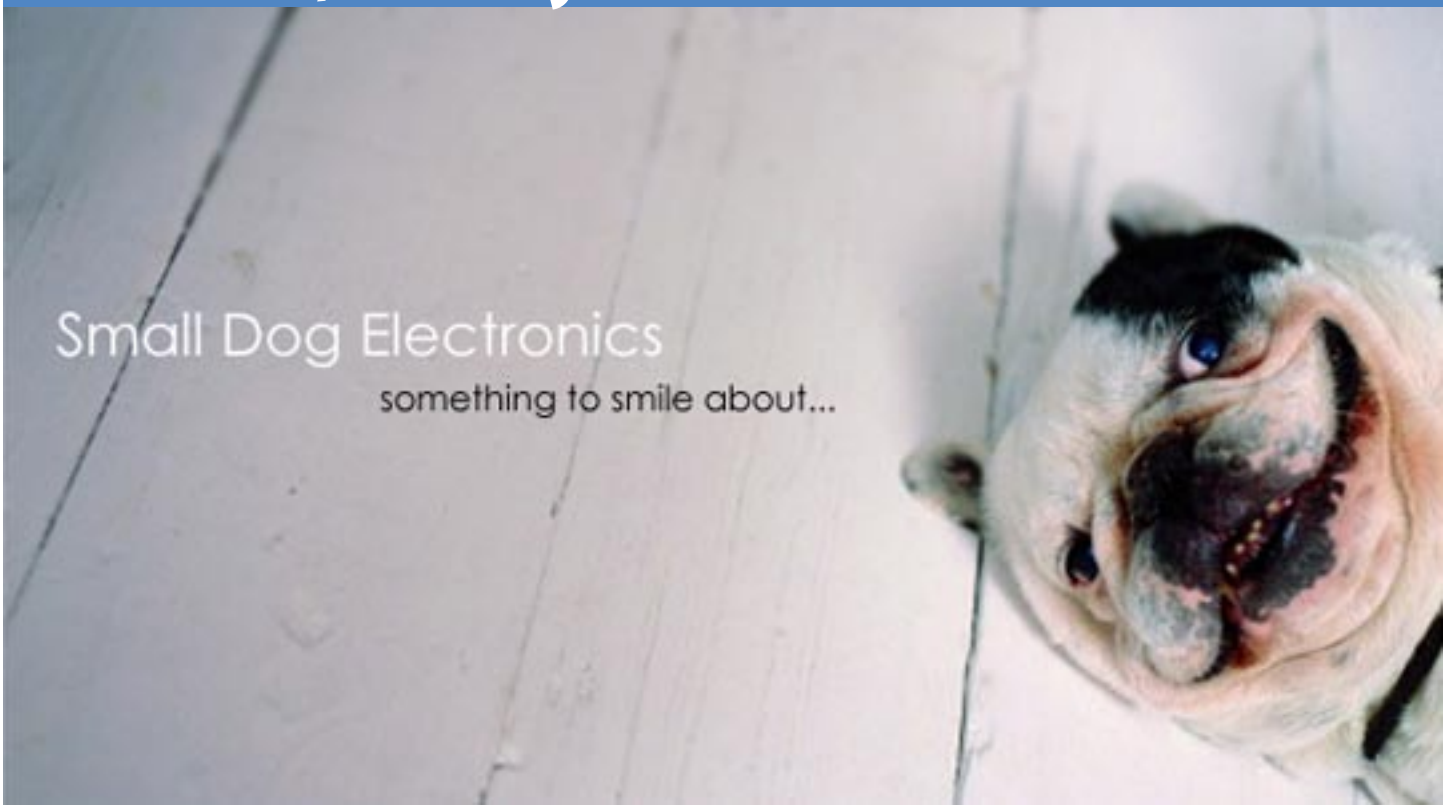

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