

Making Music with Audacity

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Audacity is a free piece of computer software that allows one to record, modify and play music. Square dance callers can use this tool to record vinyl records, to “clean up” the hiss, clicks and pops that come from the vinyl, to adjust the volume of the sound and to make that music available to other computer programs, CD or MP3 players.

Audacity will also allow you to trim out parts of music, to splice pieces of music together, and to “tweak” that music: change its pitch, tempo and apply many other “special effects” if you wish.

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Questions, Comments and Corrections are appreciated!
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Downloading and Installing Audacity

Audacity is distributed free of charge through the Audacity web site at <http://audacity.sourceforge.net>, and is available for computers using the Windows, Mac or Linux operating systems. There are two versions described on the opening page: the “stable” release and the “beta test” release. The stable release will be fully documented (in several languages) and has been “market-tested”: there are no known problems of significance. The “beta test” version will contain new features, but will be somewhat of a “work in progress” as pieces of the program are being polished, completed and documented.

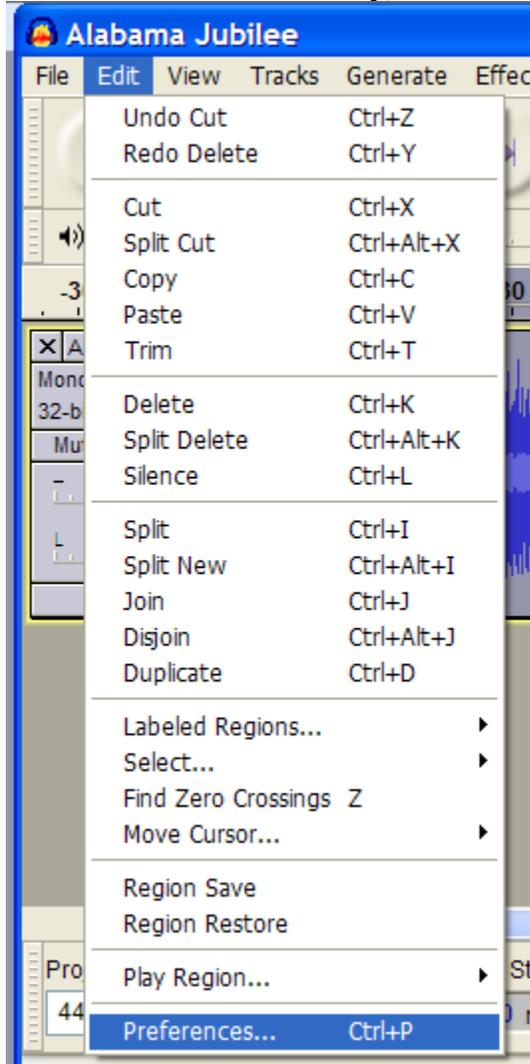
The beta test version is a better fit for most callers and cuers than the stable release – it adds certain effects and features that are quite useful. As of this writing, that beta test version is 1.3.5, and this is the version described in this paper.

To get the software, visit the Audacity web site and download a version intended for use on your computer (Windows, Mac or Linux), and install it by following the directions on the web page.

There is one additional piece of software you will want to install: the “LAME MP3 Encoder”. The Audacity web site will also include instructions on how to download and install this software – and you’ll need it if you want Audacity to be able to work with MP3 files (the most popular type of music file).

Setting Your Preferences

Immediately after installing Audacity, there are a couple of settings that you probably want to make. Start Audacity, and choose the Edit / Preferences menu:



Within the Preferences window (as shown below), you'll need to select the correct sound card for recording and playing music. Click on the "Audio I/O" selection on the left side, and check out the "Playback" and "Recording" Device settings. You may need to experiment with these devices to find the proper one – and if you're using an external USB sound card (like an iMic), you'll probably need to specifically select it.

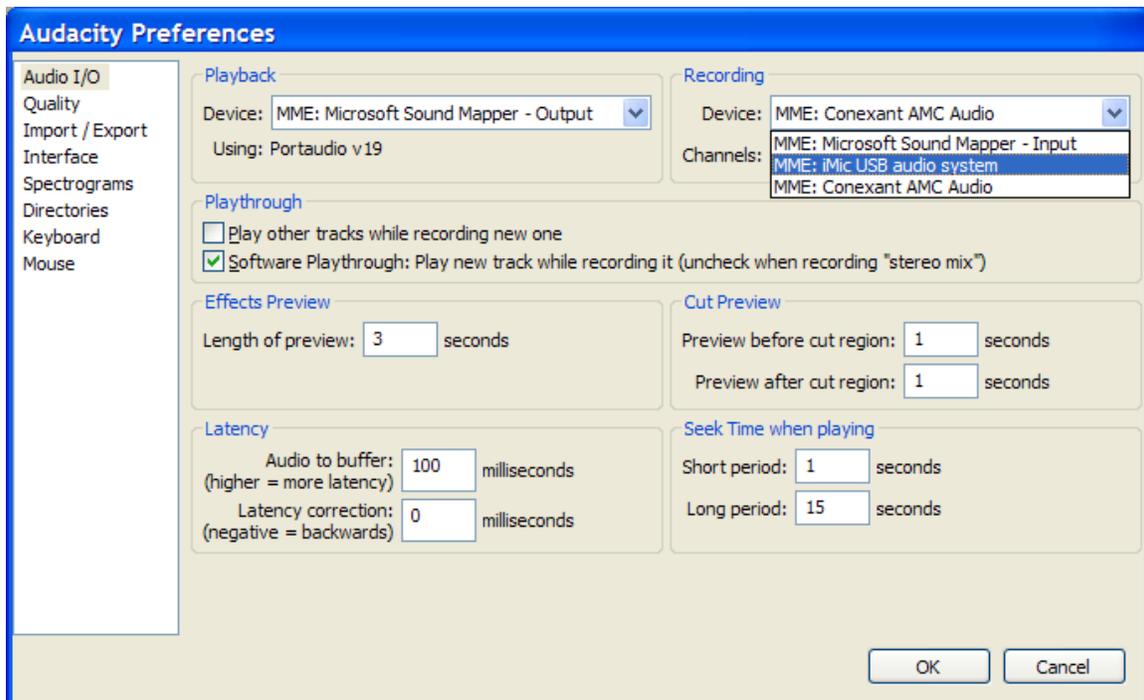
If you wish, you can have your computer play the music as it is recording by checking the "Software Playthrough" box in the "Playthrough" section.

Immediately below the device selection in the Recording section, you can control the number of channels Audacity will record. When you're recording typical square dance

music, you'll want to select 1 channel (Mono). If you're recording music off a stereo LP album or other source, you may wish to select 2 channels (Stereo).

If you did not install the LAME MP3 dll at the time you installed Audacity, you can click on the "Import / Export" page and follow the instructions available there to download and/or locate the library.

The rest of the preferences will have reasonable settings, although you can explore changing them as your Audacity skills increase.



When finished, press "OK".

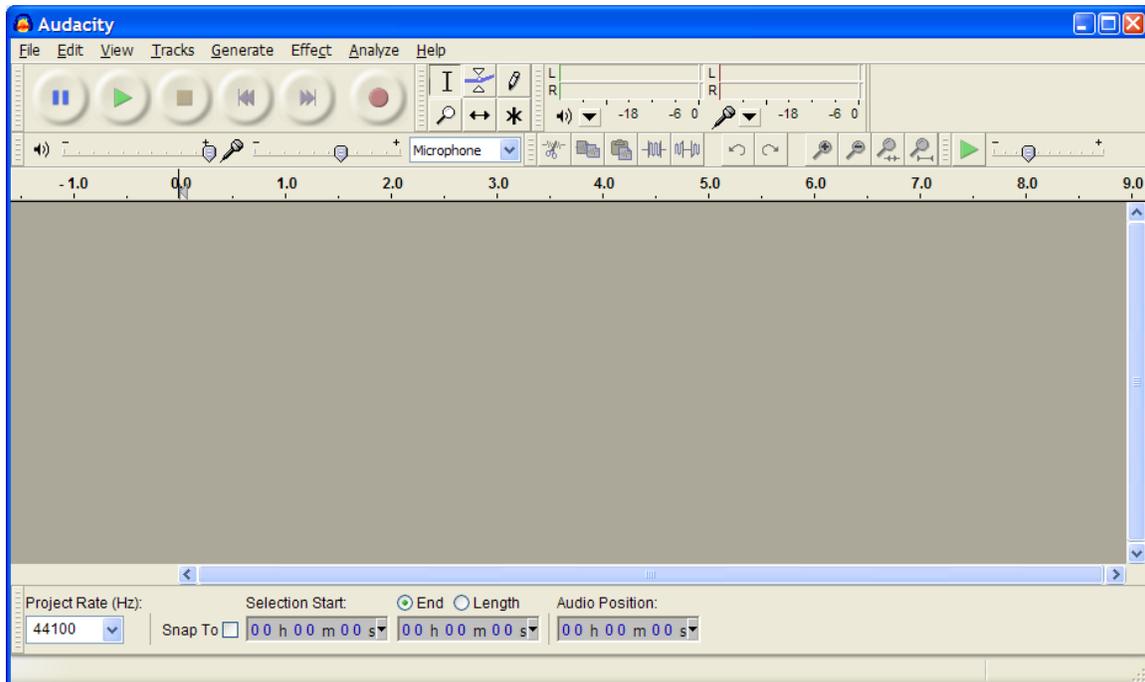
Show Clipping

When you digitize music, you convert the smooth sound pressure waves into a series of numbers representing the amount of pressure. These numbers have a maximum value – you can think of that maximum as the furthest distance your speaker cones can be pushed in or out. While recording music from older turntables or when amplifying the sound, you can cause your music to hit these limits. The sound card will chop off the sound at this maximum level (this is called "clipping"), but if your music has significant amounts of clipping it will often sound "fuzzy". You may hear a "buzz" similar to the sounds you hear when a speaker has a torn cone.

Audacity can help you see when you've reached this level of distortion. Click on the View menu then click "Show Clipping" (so that there's a checkmark beside the selection). Audacity will show clipped sections of music in red. I highly recommend using this option.

Getting Started: A Quick Tour of Audacity

When you start Audacity, it should look something like this:



It looks overwhelming at first – there are buttons and knobs all over the place, and most don't have any explanation. But they're really fairly simple once you've had a tour.

Control Panel



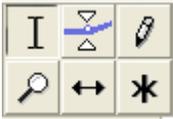
The big buttons towards the upper left of the toolbar control playing and recording of music. From left to right, these buttons are Pause, Play, Stop, Rewind to Beginning, Skip to End and Record.

Play, Pause and Stop are fairly self explanatory – they follow the model you use on nearly every audio and video device manufactured: Click Play to start playing, click Stop to stop it, and click Pause to halt the playback right where you are. Clicking Pause a second time resumes the playback.

Rewind to Beginning and Skip to End move all the way to the beginning or end of the current “project” – more on projects later.

If you click the Record button (the red dot), Audacity will immediately begin sampling its audio input and squirreling that data away in a temporary spot on your disk drive. The Pause button works during recording, too.

Tool Panel



We'll explore these tools a little later, but these buttons control just what will happen as you click and drag things around your music. From left to right, the tools in the top row are the Selection Tool, Envelope Tool and the Draw Tool. In the bottom row, the tools are the Zoom Tool, the Time Shift Tool and the "Multi-Mode" Tool.

VU (Volume) Meters



These meters will become important while recording – they'll show you the how loud your music is during recording and playback, with a special indicator that shows the maximum peak. The left-hand meter (with a diagram of a loudspeaker) shows the volume of the left and right channels during playback, and the right-hand meter (with a diagram of a microphone) shows the volume during recording.

For each meter, the small "down-arrow" will open a menu that lets you control aspects of the meter. For example, you may set the meters to display vertically instead of the horizontal display shown here.

Normally, the recording VU meter only "runs" while you're actually recording. If you wish, clicking on the recording meter's down-arrow allows you to start and stop "monitoring" of the input: showing the incoming volume even if you're not recording.

Volume Controls and Input Selection



In addition to showing the recording and playback volume with the VU meters, Audacity allows you some simple control over those volumes with these sliders. Using your mouse, you can slide the indicators to the left or right to decrease or increase the volume. As with the VU meters, the diagrams of a loudspeaker and microphone represent the controls for playback and recording respectively.

The sound card on your computer may be able to record from several different types of input – Microphone and Line In are the most common, although not all computers have a separate Line In jack. The selection box on this toolbar allows you to choose which input signal you'd like to record.

A brief digression: The difference between Line In and Microphone has to do with the “level” of voltage expected for that input. Line In and Line Out connectors use a larger signal and provide the best quality of sound (since the range of the signal is larger, we can be more accurate as we convert it from analog to digital). Microphones produce very little energy – in fact, the electricity produced by a microphone is *created* out of the energy of the sound waves themselves. Those waves of compressed air don’t have very much energy, so they can’t produce very much electricity.

The best analogy might be to think of a firehose (line in and line out) and a soda straw (microphone). If you hook a firehose (line out) up to a connector that expects water from a straw (microphone) and turn on the hose, bad things are going to happen: you’ll “overdrive” the microphone input, needing to turn the volume on your turntable *way* down in order to keep it in range.

On the other hand, hooking a microphone up to a line in connector is just about as bad: that soda straw’s output is barely measurable through the line-in connector. One must turn the volume on the turntable way up, and that distorts the sound significantly.

To save space, most laptop manufacturers have combined the Line In and the Microphone jacks into a single connection, usually called Microphone. The circuitry in the computer recognizes the signal level and switches itself automatically. So if your laptop has just a single jack, you can probably use it for either purpose without much concern.

Edit Toolbar



From left to right, these toolbar buttons are: Cut, Copy, Paste, Trim, Silence, Undo, Redo, Zoom In, Zoom Out, Fit Selection and Fit Project.

We’ll talk more about these functions later, but (just like in a word processor), the Cut, Copy and Paste buttons allow you to cut and paste selected sections of music. Trim silences all sound outside of the selected area. Silence does just the opposite – it quiets all sound in the selected section, turning it to dead silence.

As you make changes in the music, the Undo button allows you to reverse a change, and the Redo button allows you to “undo the undo”.

Zoom In allows you to take a closer look at the sound waveforms, and Zoom Out gives you a wider view of the music. Fit Selection will zoom in until your selected section of music fills the screen left to right, and Fit Project zooms out until you can see everything in one screen.

Play At Speed Toolbar



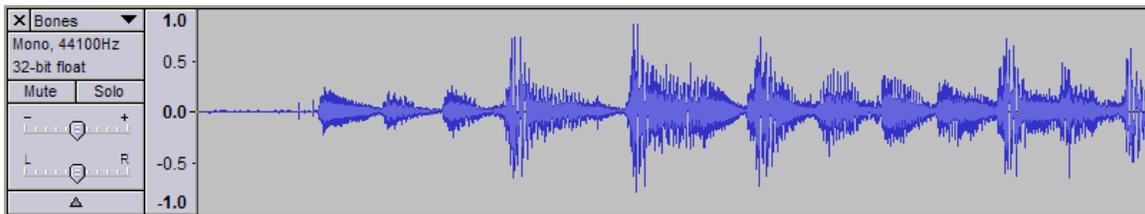
The final toolbar allows you to play selections of music at slower or faster tempos. These particular buttons affect only the speed at which Audacity plays the music, and don't affect the actual speed at which other programs will play it. Using the slider beside the green arrow, you can slow the music down to as little as just 1% of normal speed, or speed it up to 3 times normal speed.

Once you've set the slider, press the green triangle on this toolbar (instead of the big green Play button at the top) in order to play at the selected speed.

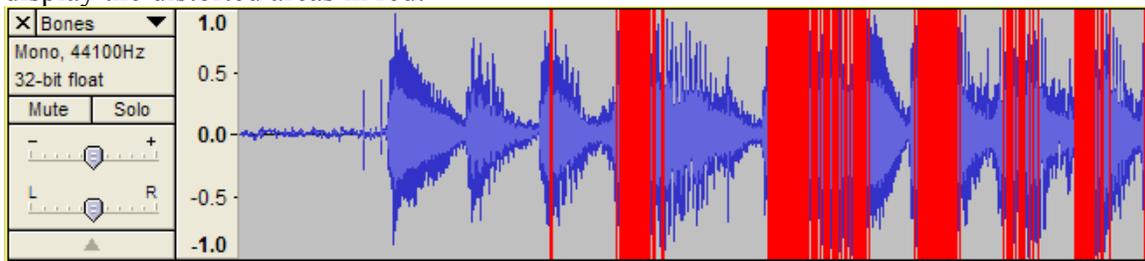
The only real purpose of this button is to allow you to quickly (or slowly) listen through areas you've edited. Again, these buttons don't affect the speed at which the music will play when you're calling.

Recording Music

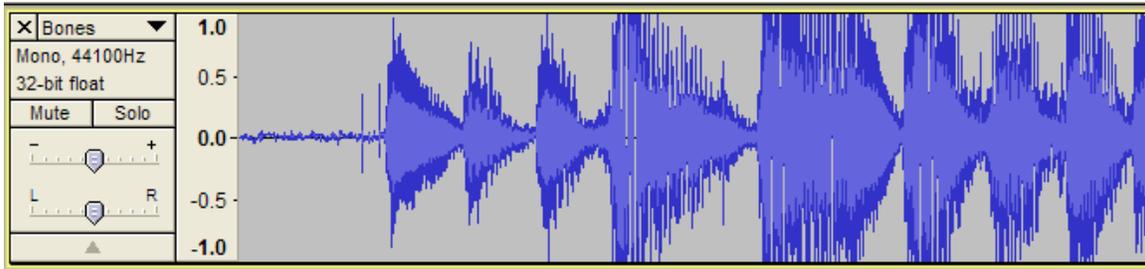
Well, we're ready to start. With your equipment all connected, drop the needle on a *clean* record and press the big red "Record" button. Ideally, you should see a set of waveforms looking something like this:



If your incoming volume is too high, you will see "clipping" as the peak levels reach the maximum allowed values. With the "Show Clipping" option turned on, Audacity will display the distorted areas in red:



If you don't have the "Show Clipping" option turned on (it's under the View menu), clipped music will look like this:



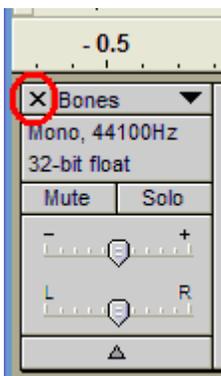
Whenever you see those “flattops” in the recorded music, you need to reduce the volume being produced by your turntable, or adjust the microphone volume control on the toolbar.

The volume coming out of the turntable can also be too low, like this:



You’ll want to increase the input volume to nearly the maximum you can without clipping any of the waves.

If you’d like to start over, you can press the Stop button (big round button with a yellow square in the center), then deleting your previous recording by pressing the small X in the upper left corner of the track (just above the word “Mono” in this picture):



Once you’ve removed the old track, start recording again at any time.

That’s all there is to recording!

As we’ll see in the next section, Audacity does indeed allow you to “edit” your music, changing it in many possible ways. But one guiding principle still holds: If you can, you’re better off making the original recording as good as it can be, rather than relying on the software to clean up a poorly recorded track. So as you’re recording, you’ll generally

want to:

- Clean your records before recording – get rid of that dust, so you don't have to clean the clicks out later.
- Increase the volume to nearly the loudest you can *without* clipping the peaks.
- For the best on-pitch tonal quality, record at 45 RPM and use the software to adjust tempo or pitch when you're playing, rather than when you're recording. Slowing the music down to 43 RPM for recording will cause the music to sound "flat" by about ½ tone.

Don't worry about recording extra time at the beginning or end of the record – there's no need to try to press "Record" just before the music starts. It will be easy to trim the extra time off the beginning and end, so comfortably press Record then drop the needle.

Minor Editing and Cleanup

There are a few steps you'll always want to do to "clean up" your recorded music:

- Remove record hiss and noise
- Silence beginning of track
- Trim off extra silence from beginning and end
- Adjust volume to a "normal" level

Each one of these steps is fairly quick and easy – an experienced Audacity user can do them all in less than a minute.

Selecting Music and Moving the Cursor

Much like a word processor or email editor, Audacity has a "cursor" that indicates a specific position somewhere inside the sound file. The cursor will appear as a thin vertical line (as seen in the picture below).



Zooming in and out will be centered on the cursor, and the cursor will automatically be moved along as music plays. You set the location of the cursor simply by clicking on a spot within the music.

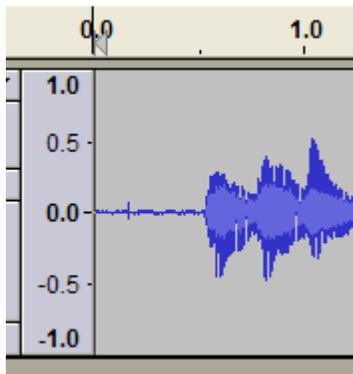
In general, Audacity will apply an effect to just a part of the recording that you select, or (if nothing is selected) will apply the effect to the entire track. Selecting a portion of the music works much like selecting text in a word processor: Move the mouse to one end of the area you wish to select, then move the mouse to the other end while holding down the left mouse button.

You may also use the keyboard to select parts of the music: use the mouse to set the cursor at one end of the range, then hold the Shift key while pressing either Home or End. Shift-Home will select from the cursor to the beginning of the music, and Shift-End will select from the cursor to the end.

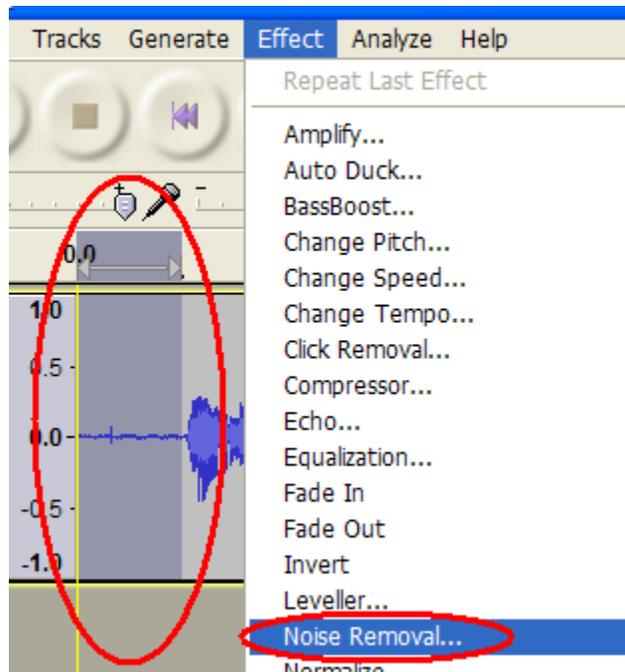
1. Removing Record Noise

Most records will have some amount of background and repetitive noise – much more so with older records than brand new ones. Audacity has a “Noise Removal” effect that can reduce the amount of noise, and there are other techniques you can do to eliminate the remainder in important places.

Look at this image showing the beginning of reasonably good quality recording. The beginning shows some “fuzz” from the record, and this is the noise we’d like to remove throughout all of the music.



Removing noise is a two-step process. First, using your mouse select a section of the recording that contains only “typical” noise, then click the Effects / Noise Removal menu selection:



In the Noise Removal window that opens, press the “Get Noise Profile” button. The Noise Removal window will close.

For the second step, select the entire range of music that you’d like cleaned up. There are several ways to do this, so you can pick your favorite:

- You can click on the Edit / Select... / All menu item
- You can click on the beginning of the section, then move the mouse to the far right (or left) side while holding the left button down and the entire song will scroll past until you release the mouse button.
- You can use the mouse to click on one spot, then scroll to the other end, hold the Shift key down and click at the distant end.
- You can simply hold down the Control key and press A to select all music
- You can press the Home Key (to move the cursor home), then hold down Shift and press End (to select from the cursor to the end).

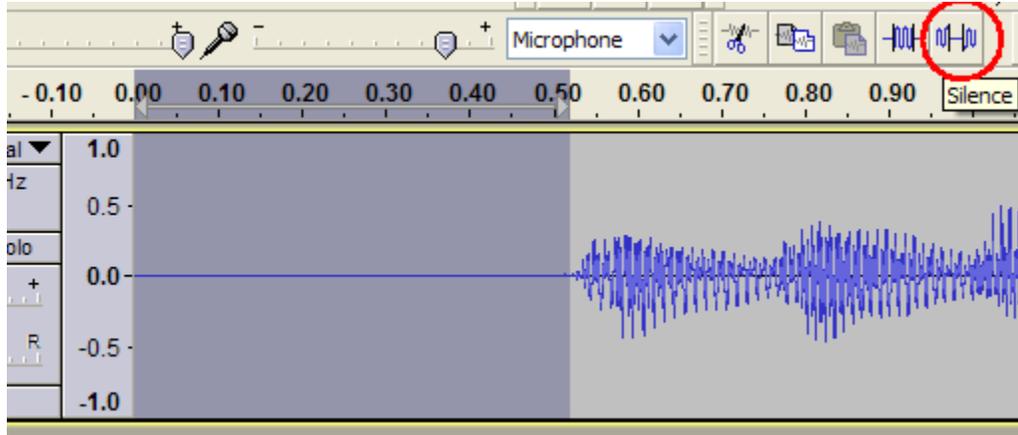
Once you have all the music selected, click the Effects / Noise Removal menu item once again and press the OK button in the lower right corner of the window.

2. Silence the Beginning

The noise removal tool generally does a good job of cleaning up the “dead air” before the start of the music, particularly if you selected that small section for determining the noise

profile. But even so, it's very easy to completely eliminate any noise at the beginning: no more pops or scratches while you're waiting for the music to start!

To silence a portion of a recording, select the section you'd like, then press the Silence toolbar button:



The selected area will be completely silenced! No more rumble, hiss or clicks while you're waiting for the music to start!

Some pieces of music have intentional silent spots within the music. You may wish to use the Silence button to quiet those pauses as well, if any.

3. Trimming the Beginning and End

You have probably become accustomed to a few-second pause after dropping the needle until the music actually starts. With digital music, the sound begins immediately when you press play. You have complete control over the amount of silence at the beginning.

Some callers prefer to keep a two- or three-second delay at the beginning. Others prefer to have the first beat occur immediately after they press Play. This author prefers about ½ second of silence. You'll need to make your own choice on the matter.

If there is too much silence at the beginning, you can trim it by simply selecting the unwanted portion and pressing the Delete key on the keyboard. Use this same technique at the end of the music: select everything after the moment when last chords fade out, and press Delete.

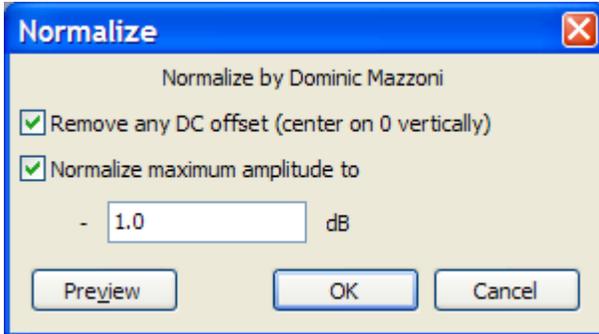
If you'd like to add silence to the beginning, press Home (to move the cursor to the very beginning), then click the Generate / Silence menu item. Enter the number of seconds of silence you'd like to insert and press OK.

4. Adjust Volume

It's helpful to have all of your music play at a consistent volume level, unlike the various levels at which different records are recorded. Audacity can help you adjust the volume such that the peak notes (the loudest) are all at a consistent volume. While this isn't quite

the same as setting the “average loudness” of each song to the same level, it’ll get you fairly close.

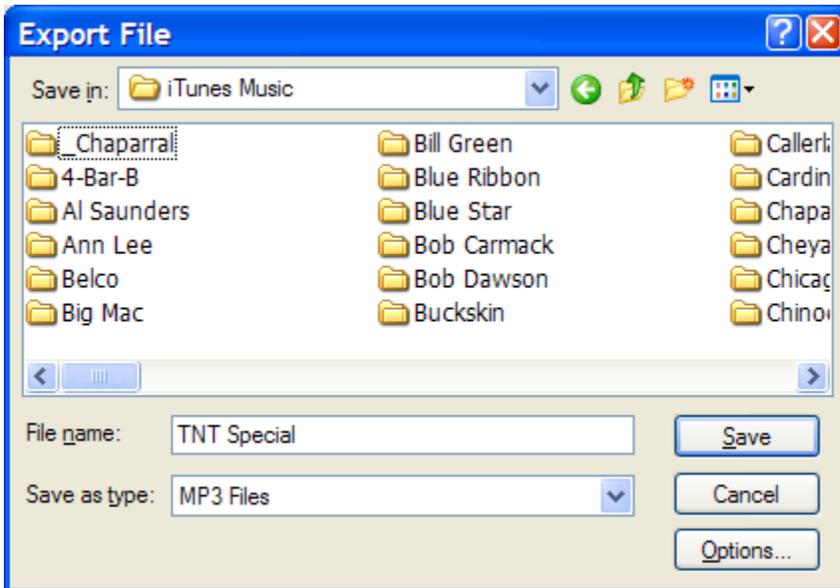
Click the Effects / Normalize menu item, set the values to look like this, then press OK:



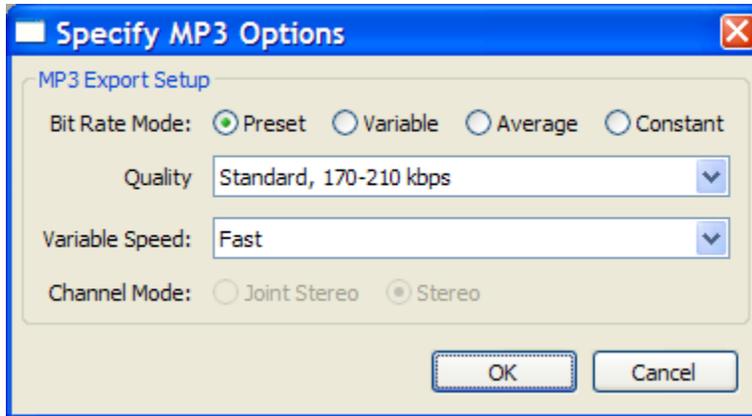
Setting the maximum amplitude to -1.0 decibels (as shown) will adjust the peak volume of the entire track to be *almost* at the maximum level. Some sound cards will distort sound if you allow the peaks to hit the actual maximum, so we’ll stay just a little away from the edges.

Saving the Result

After you’ve cleaned up the edges of the track, click on the File / Export... menu selection, and choose select the file name and directory in which you’d like the track stored:

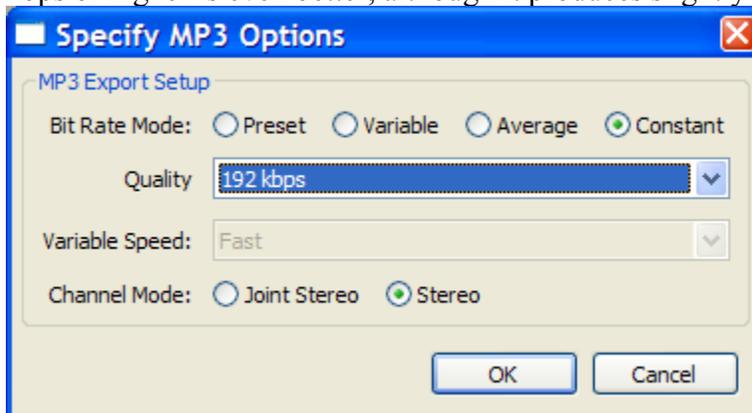


Choose the compression format (MP3 is recommended), and press the Options button:



Your choices here affect the quality of the MP3 compression. For the smallest files (while retaining high-quality sound), choose the Preset option at the Standard quality level as shown here. However, there are some older MP3 players that do not support this “variable bit rate” format.

If this concerns you, the “safest” selection is a Constant bit rate of at least 128 kbps (192 kbps or higher is even better, although it produces slightly larger files):



Press OK for this Options window, then press Save on the Export File window.

Fancier Editing

There are many, many other manipulations you can do with your digitized music. Let’s look at a few of them:

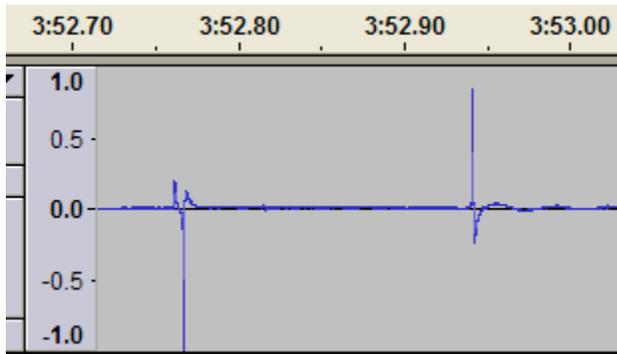
Removing Clicks and Pops

Vinyl recordings are notorious for producing “clicks” and “pops” if the record gets slightly damaged. But once you’ve recorded your music, there is a lot you can do to eliminate these artifacts.

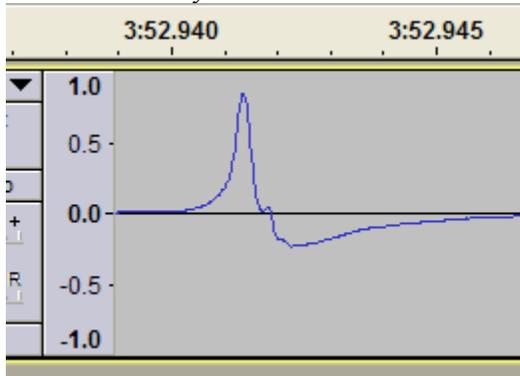
Before going further, though, it’s important to note that there is no “magic bullet” to clean up the sound from a badly damaged record. Even with the Audacity tools, a bad

record will still sound bad after done your best to clean it up. But if your record has just a few clicks or pops, you can remove as if by magic!

Let's look at a typical click in a recording. To make it easier to see, here's a click that happened right at the beginning of a recording:



Let's zoom *way* in on the second one to see just how short these clicks can be:



At this level of magnification, each of the small tick marks on the scale at the top is 1/1000th of a second – so our spike is just one millisecond long.

There are three ways you can clean up these types of noise:

- Use Audacity's Click Removal effect
- Use the Silence toolbar button
- Manually reshape the spike until it looks like other nearby waves

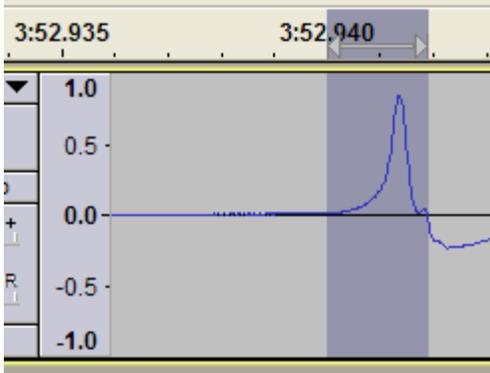
Click Removal Effect

The easiest way is Audacity's Effect / Click Removal... menu selection. When you run this effect, Audacity will search the entire track looking for sharp spikes and will trim them down. Unfortunately, some music sounds (like a strike on a cymbal or a tap on a drum) might *look* like clicks, and Audacity will remove them as well (boo, hiss!).

Silence Toolbar Button

If you've only got a couple of clicks to clean up, another approach is surprisingly simple: zoom in until you can see the single unwanted wave, select the wave itself and press the Silence button on the toolbar.

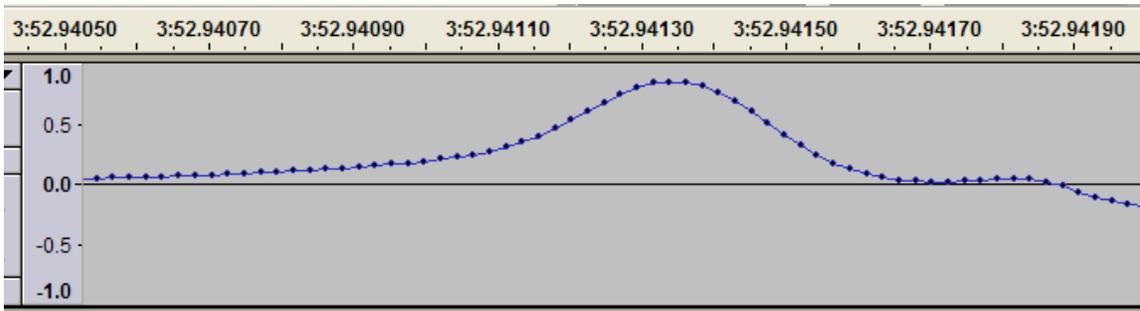
Now, you really want to avoid any sharp straight-up-or-down lines in the wave form, so each end of your selection ought to be very close to the zero line across the middle – like this:



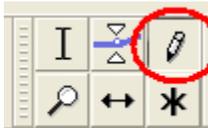
Press the Silence button, and your spike is gone! Dancers will never hear 1/1000th of a second of silence, even in the middle of loud music. (I've tried, and I can't hear it.)

Redrawing the Wave

The most perfect fix for a click is to restore the shape of the wave to something like its original value. You can usually tell the expected shape by looking at the waves just before and afterwards – or at least you'll be fairly close. If we zoom in on this wave a little more, we can see the individual sound samples that make up the digitized music:



This is our same spike, but the little dots are just 1/44,100th of a second apart. By switching from the "Selection Tool" to the "Draw Tool" (by pressing the Draw Tool toolbar button:



With this button pressed, you can drag the individual sound samples up and down and redraw the wave to its original form. While it might take a little bit longer to do, for some people there is an element of personal satisfaction in making a “perfect” repair.

Changing Tempo or Pitch

When you speed up a record on a turntable, the pitch of the music also increases. Playing a record at 43 RPM instead of 45 RPM drops the pitch by about ½ tone: people with a “good ear” say that the music sounds flat.

With Audacity (as well as with most programs for playback), you can alter the tempo and the pitch independently of each other: change pitch without changing tempo, or change tempo without changing pitch.

Use the Effects / Change Pitch or Effects / Change Tempo menu items.

Trimming Introductions

When using music that wasn’t originally arranged for square dancing, you’ll occasionally find good pieces that have a longer introduction than you may wish. Don’t be afraid to experiment with the music a bit: sometimes you can trim off the beginning sections and just start with the phrasing you like. The Fade-In and Fade-Out selections from the Effects menu can be useful here.

Bass Boost

The amplifiers used by most callers boost the bass of the music, so normally one would not want to use Audacity’s Bass Boost effect. However, if you need to burn music to an audio CD to play through “house sound” at some venue, you may wish to make a copy of your music with the bass frequencies strengthened.

Compression

The Compression effect makes just the loud portions of your music softer, then amplifies *all* of the music back to its original peak volume. This has the effect of making the soft and middle-volume portions of the music louder to the listener’s ear.

Vocal Removal

Vocal removal tools, in general, don’t work all that well. It’s very difficult for a program to separate the portions of waves that represent human voices from the portions of the waves produced by instruments. Remember, we don’t have a separate “track” for each voice and instrument: all of those tracks are merged together and a single (complicated) wave is produced on the record.

Like most other vocal removal tools, Audacity’s tool works by comparing the two tracks of a stereo recording, finding those wave frequencies that are in common to both tracks. Those frequencies are assumed to be the voices (further assuming that each instrument will appear louder on one track than the other), and those “center-panned” sounds are removed. One can only hope that only the voices are removed.

The vocal removal tool will not work on any monaural recording, which means it won't work on typical square dance records.

“Jedi Tricks”

Loop Points for SqView

The SqView application for playing square dance music has a “looping” feature intended for hoedowns. When the music reaches a certain point (presumably near the end of the piece), SqView will skip back to a designated point (presumably near the beginning).

The looping feature works well, but the default loop points pay no attention whatsoever to the music itself, so the dancers usually hear an abrupt change in the middle of a phrase as the music restarts. But with some care, you can establish loop points to a precision of 1/100th of a second, making a much smoother jump.

The tools within SqView for establishing loop points are somewhat crude. But you can use Audacity to zoom in, identify the exact time for the beginning and ending loop points, then type those times into SqView.

Automating Multiple Effects

At the beginning of this document, we identified several edits will usually be required for each recorded song. With some work, some of those edits can be combined into a “Chain” and executed as a single step (like Noise Removal, Normalization, and Export as MP3).

Use the File / Edit Chains menu item to build your chains, and File / Apply Chains to apply them to a recorded track.

Building Longer Hoedowns

There is a fairly simple alternative to SqView's looping action for hoedowns: use Audacity to create longer hoedowns by repeating certain sections of the music. It's fairly easy to do this, but does require a little bit of painstaking care to identify the seams.

Open your original hoedown music, and carefully locate the beginning and ending sections of the portions you'd like repeated. The best seams will start and end on the zero axis and will be exactly at the beginning (and end) of 64-beat sections.

Select the exact segment you'd like to repeat, click the Edit / Copy menu item, then click the File / New menu item to open a new blank track. In this new track, click Edit / Paste. Press the End key (to position the cursor to the end of the section you just pasted, then click Edit / Paste again. This second piece will become the first repetition of your section. Repeatedly press End and Paste as many additional times as desired.

Still looking at the new track, press Edit / Select All (or hold Control and press A on the keyboard) to select *all* of the repetitions, then click Edit / Copy. At this point, you've got

several copies of the repeated section copied to the clipboard. You can close the new track now, and there's no need to save it.

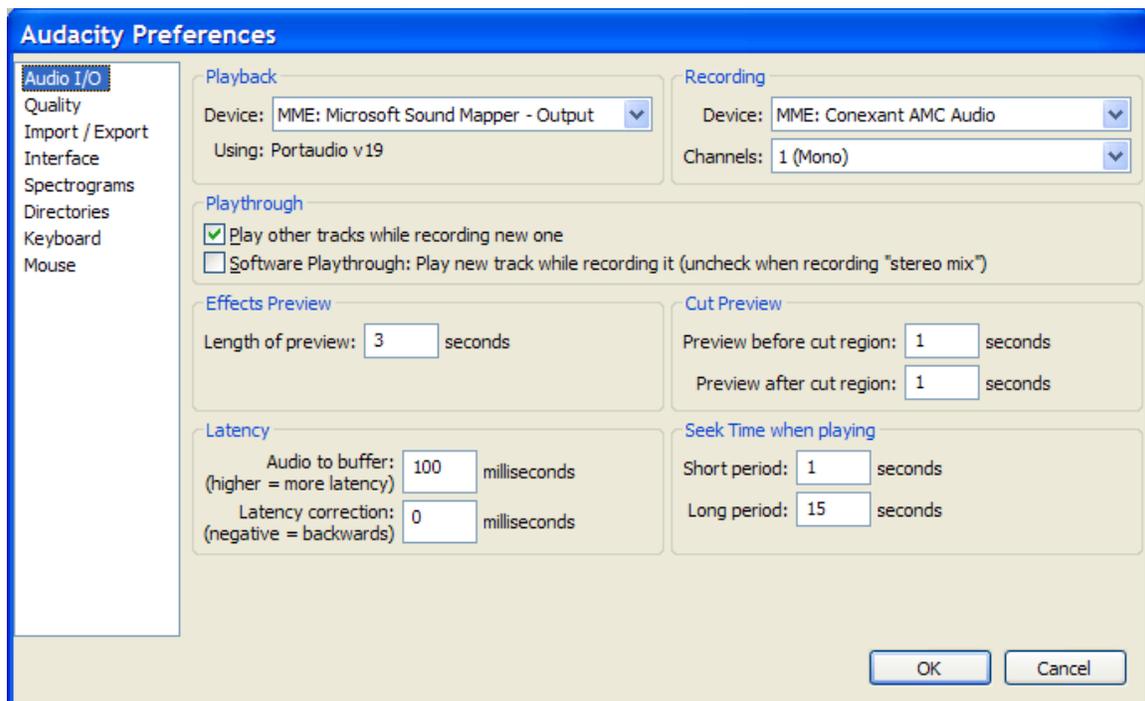
Looking back at the original track, you should still have the original section highlighted. In this original track, press Edit / Paste, and your original section will be replaced with the string of repetitions. Your hoedown has been extended.

When you export this extended track, you'll probably want to save it under a different name (you don't want to overwrite the original!). Listen carefully to your seams (especially between the end of the copied section and the beginning of the first extension), and use slightly different beginning and end points if necessary.

Dubbing In Your Own Voice

There are times you may wish to record your voice and “dub” it into a music track. Perhaps you're auditioning for a record producer? Perhaps you're doing a demo where people need to dance to your calling without having you on a microphone? Perhaps you're a round-dance cuer that uses stereo tracks – one for the music, and one with your pre-recorded cues? Audacity allows you to record one track while playing another.

To do this, you want to make a slight change in your preferences (click the Edit / Preferences menu item):



In the Playthrough section, select the option to “Play other tracks while recording new one”, and turn off “Software Playthrough”. Hook your microphone up to the computer (use of a microphone pre-amplifier is *strongly* recommended, since the microphone

amplification on most laptop sound cards is atrocious), and hook the output of your laptop up to you're amplifier and speakers.

Press the Record button on the toolbar, and you're off!

Adjust the volume of your pre-amplifier and use the microphone gain slider on the toolbar to get a good volume level. You may have to try several times until you're happy with the result.

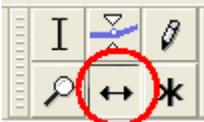


Correcting for Latency

The first time you play back your voice recorded over music, you'll probably be disappointed with your timing: you won't be on the beat at all. Since general-purpose computer systems periodically need to do something other than music (reading the disk drive, for example), sound card engineers build "buffers" into their cards. By default, Audacity will push 1/10th of a second of music into the sound card – in other words, the given note will come of the speakers about 1/10th of a second *after* Audacity thinks it has played the note. This delay is called "latency".

There is also additional latency added while the sound card processes the microphone input before it passes the data on to Audacity. When you add these delays together, your voice may be nearly a quarter-second late on playback – that's half a beat, and it's noticeable.

It's easy to fix, though. When you recorded, Audacity put your voice on a separate track from the music. To fix the timing, select the "Time Shift Tool" on the toolbar:



You can then drag your vocal track forward or backwards to line it up with the instruments. In fact, if you wish, you can select just small pieces of your voice track and move them forward or back within the voice track itself (Copy/Paste and Silence are perhaps the easiest way to do this).

Other Vocal Effects

You can change the tonal quality of your vocal track by using items from the Effects menu (being careful to select just the vocal track, not the instrumental, when applying these effects). Perhaps the most interesting is the Equalization effect. Perhaps you've seen the large equalizers with many sliding knobs that let you "turn up" certain frequencies while "turning down" others – this effect allows you to do just that¹. You can

¹ In fact, you can even have Audacity look like those sliding knobs by selecting the "Graphic EQ" option on the equalization window.

customize the curve, perhaps adding more bass to your voice to make it a little richer sounding.

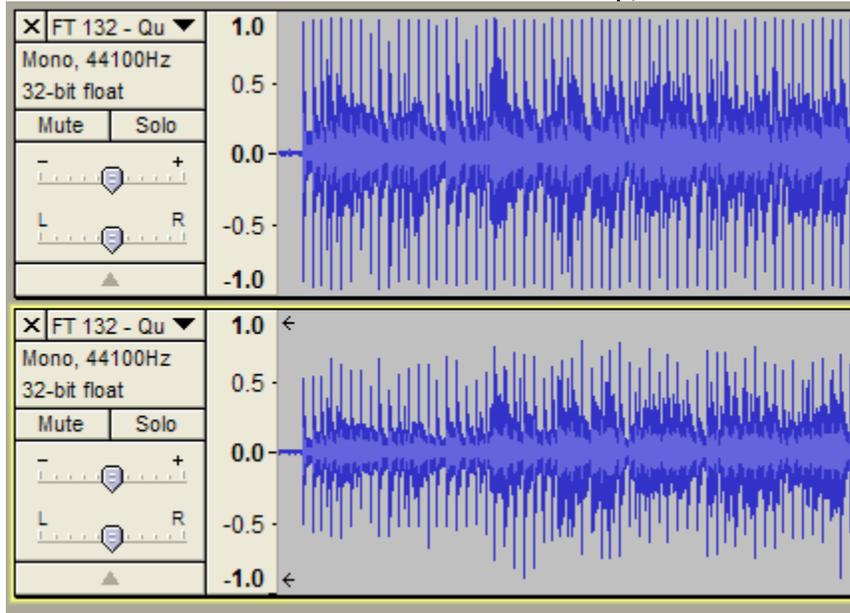
This is a great place to use Audacity's "Undo" feature (the Edit / Undo menu selection, or holding down Control while pressing Z on the keyboard). You can try one equalization curve, undo that then try another until you're satisfied. With a bit of practice, you may find an equalization curve that you think suits your voice well. You can save that curve and use it again in other places.

Engineers in sound studios are experts at knowing what types of effects to apply (and just how hard to apply them). But with Audacity, you'll have basically the same tools as those professional engineers, so don't be afraid to learn how to use them well!

Adding Background Vocals²

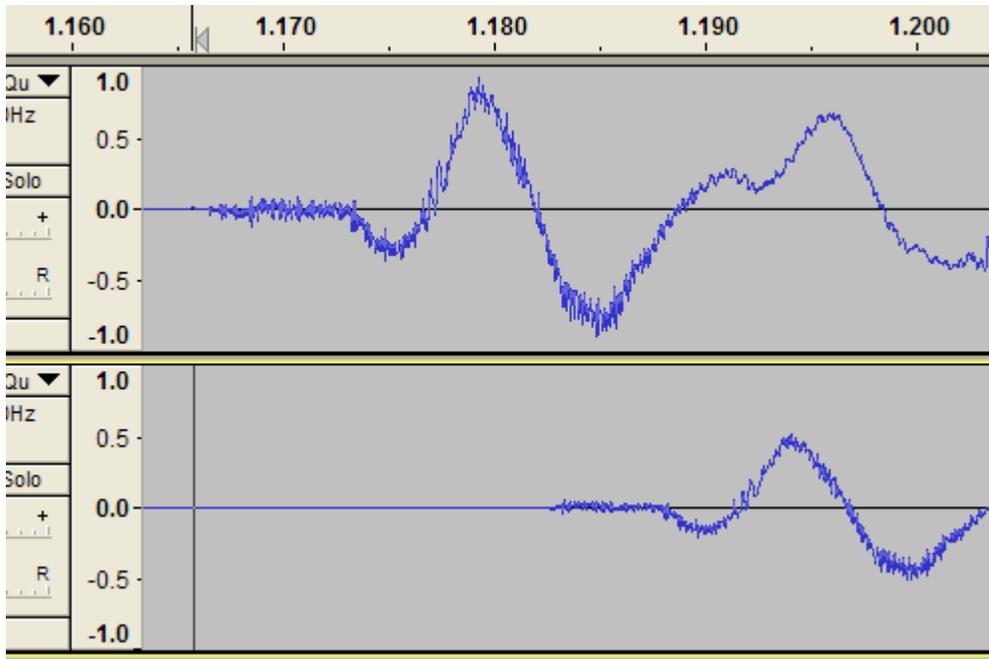
Ever wish you could add background vocals to one of your singing calls? You can do it with Audacity with just a little bit of fiddling. Most record producers use a trick while producing music: they'll record one good instrumental track then add the vocals to that track for the "called" side of the record. Because of this, we can believe that the instrumental portion is exactly the same on both sides of a record. We can then take advantage of this to splice a section of the called side of a record (with the original artist's voice) into your instrumental version.

To do this, start off by recording both sides of a record (the instrumental and the "called" side) and perform the same "cleaning" steps on each. Open the instrumental side, then "Import" the audio from the called side of the record into the same project. You should see two tracks of music – the instrumental on top, the called side on the bottom, like this:

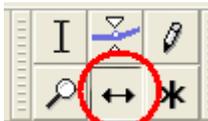


² Thanks to Scott Bennett for this idea!

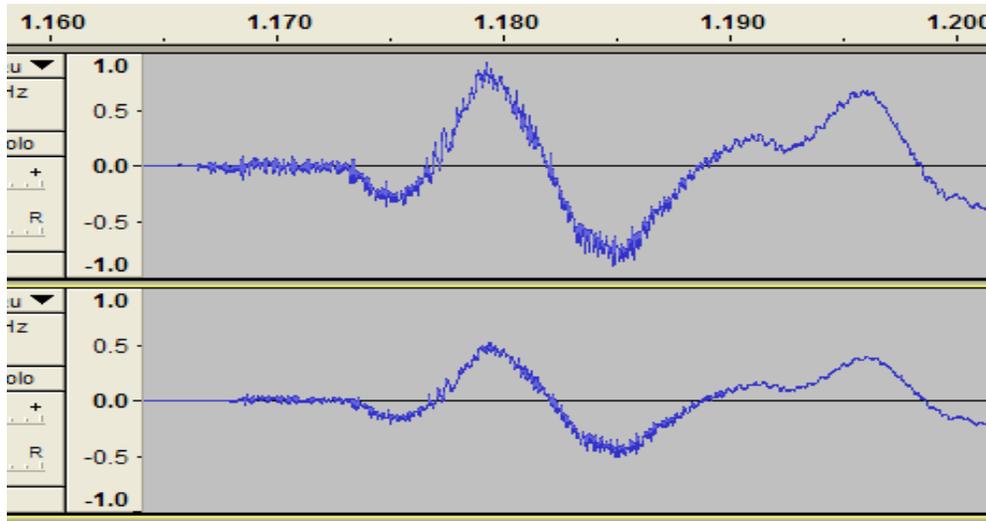
You almost certainly didn't record them with the exact same amount of silence at the beginning – one track will be starting slightly later than the other. Let's zoom way in and take a look at the first beat of music:



Nope – the first beat of the song isn't lined up between the two tracks. So let's select the "Time Shift Tool" from the toolbar:

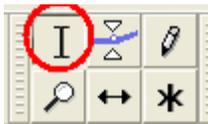


We can then drag the vocal track left or right until it's lined up exactly with the instrumental track like this:

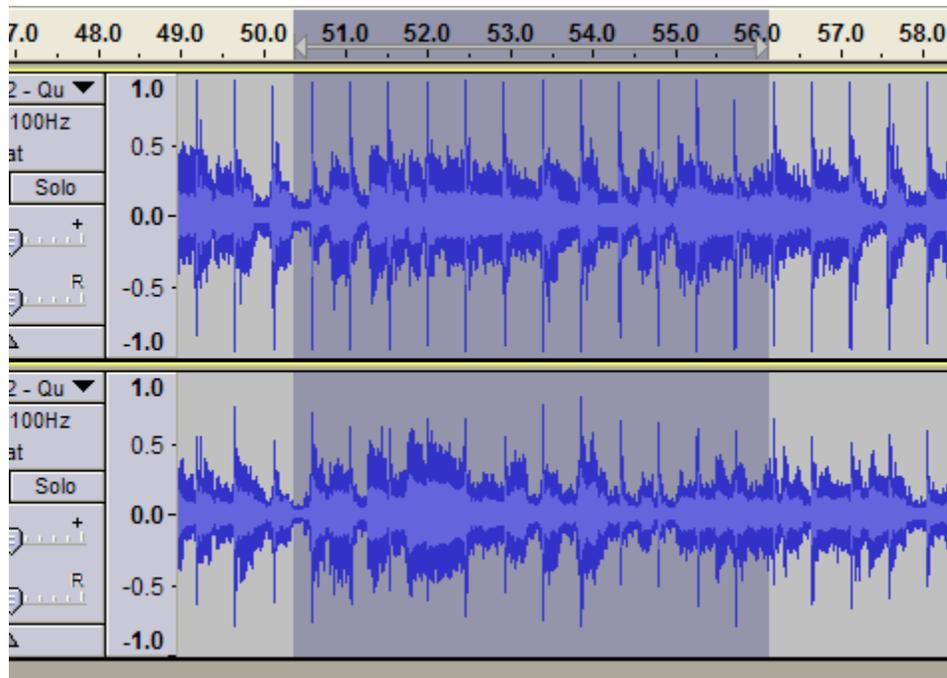


How close does it need to be? Probably within a hundredth of a second or so. I'm a perfectionist, so I like to zoom *way* in. In this screenshot, they're probably aligned within 1/10,000 of a second. Why not? It's easy – just press the “zoom in” button a few more times. As long as you can recognize the same beat on both tracks, you're fine!

OK, we've got the vocal and instrumental tracks lined up. Zoom back out and switch back to the “Selection Tool” on the toolbar:



Working on the called track, select the section of music with the vocals you'd like to duplicate. *While continuing to hold down the mouse button*, you can move the mouse up to the upper track, and that same section will be selected on *both* tracks of music, like this:



You can use the “Playback” toolbar button on the right side (It’s the green triangle that *isn’t* inside a circular button) to play just this section and make sure you’ve got exactly the vocals you want.

Now, here’s where the trick comes in: we want to replace the selected section in the top track (our instrumental track) with the selected section in the bottom (instruments plus vocals), and we want to do it seamlessly. So let’s try this:

Click the Edit / Copy menu item, then File / New (to open a new project while leaving the original still open), and in this new project press Edit / Paste. This copies our selected section of both tracks to a new file. Next, working in this new file with our snippet, we *delete* the top track (the original instrumental) by pressing the little X in the upper left corner of the track. Now click the Edit / Select / All and Edit / Copy menu items, and we’ll have nothing but the desired section of the vocal track copied to our clipboard.

Close this project and go back to the original project. We should still have our section of selected music highlighted, so we can press Edit / Paste to paste our vocal track exactly in place into the instrumental track. We’re done with the vocal track now – get rid of the lower vocal track (press that X in its upper left corner).

If we’ve done this all correctly, we’ve spliced a segment of the called side of the record into the exact same section on the instrumental side. It should be a perfect match. Play it through, and you’ll have vocalists on your instrumental piece!

For More Information

To learn more about Audacity, check out the Audacity on-line documentation at <http://audacity.sourceforge.net/help/documentation>.

There is also a “Wiki” about Audacity at <http://audacityteam.org/wiki> containing numerous tips on everything from avoiding noise during recording to applying various effects. This is a web site that anyone can edit: you’re welcome to add your own favorite tips or tricks if you wish.

Finally, if you need assistance with Audacity, there is an on-line forum at <http://audacityteam.org/forum>. The developers of Audacity, as well as many other knowledgeable users, will respond to requests for assistance and help trouble-shoot any problems you may have.