

# Digital Audio Basics with Audacity

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### What is a Podcast?

A podcast combines the internet's file transfer ability with compression technology and subscription services to provide automatic access and downloads of new content.

### Podcasting isn't just for iPods or Macs!

While the "pod" in "podcast" refers to Apple's ipod music player, podcasts can be accessed on any device that can play digital audio or video files such as MP3 players, PDAs, laptops, or desktop computers.

## Get Started with Digital Audio

If you have previously recorded audio, you can get started with editing right away. If you need a sample file to work with, visit [www.librivox.com](http://www.librivox.com) and download a clip. If you wish to make your own recording, go to the *Record Your Audio* section of this document for some pointers on how to record quality audio using Audacity.

### What You Will Need

1. **Recording device:** a voice recorder, computer or camcorder. We recommend recording in digital format so there is no loss of quality during transfer. A digital voice recorders are good, especially if they have a digital cabled connection to your PC. You can also record directly to your computer.
2. **Microphone:** The built-in microphones of most digital devices are usually adequate if you are recording in a quiet, closed space but, for best results, you should use an external microphone or headset, preferably with a USB connection.
3. **Audio Editing Software:** in this document, we focus on *Audacity*, a cross-platform editing program available as a free download from: <http://audacity.sourceforge.net>. If you own a Macintosh computer, you can also use *GarageBand* which is part of iLife, a Macintosh creative software suite.

### Create Your Project

Audacity project files (.aup) save your work in progress. They keep all the channels in your recording separate and allow you to easily make changes to the original audio project. If you wish to create an audio file that others can listen to, you must export your project to a playable file. For information on how to export your project, see the *Export Your Audio Project* section of this document.

1. In your computer, open *Audacity* and go to File > Save Project As... to save a project file to your computer. The *Save Project As:* window will open.
2. In the *Save Project As:* window, enter a name for your file and click **Save**. You are now ready to record and edit your audio.

### Import Audio to Your Project

You can add audio clips to a project by importing files from your computer.

1. In Audacity, go to **Project > Import Audio...** or press Ctrl+I. The *Select one or more audio files...* window will open.
2. In the *Select one or more audio files...* window, locate and select the audio you wish to import from your computer and click **Open** (bottom right).
3. Your imported audio clip will appear in your project as a new track.

# The Audacity Interface

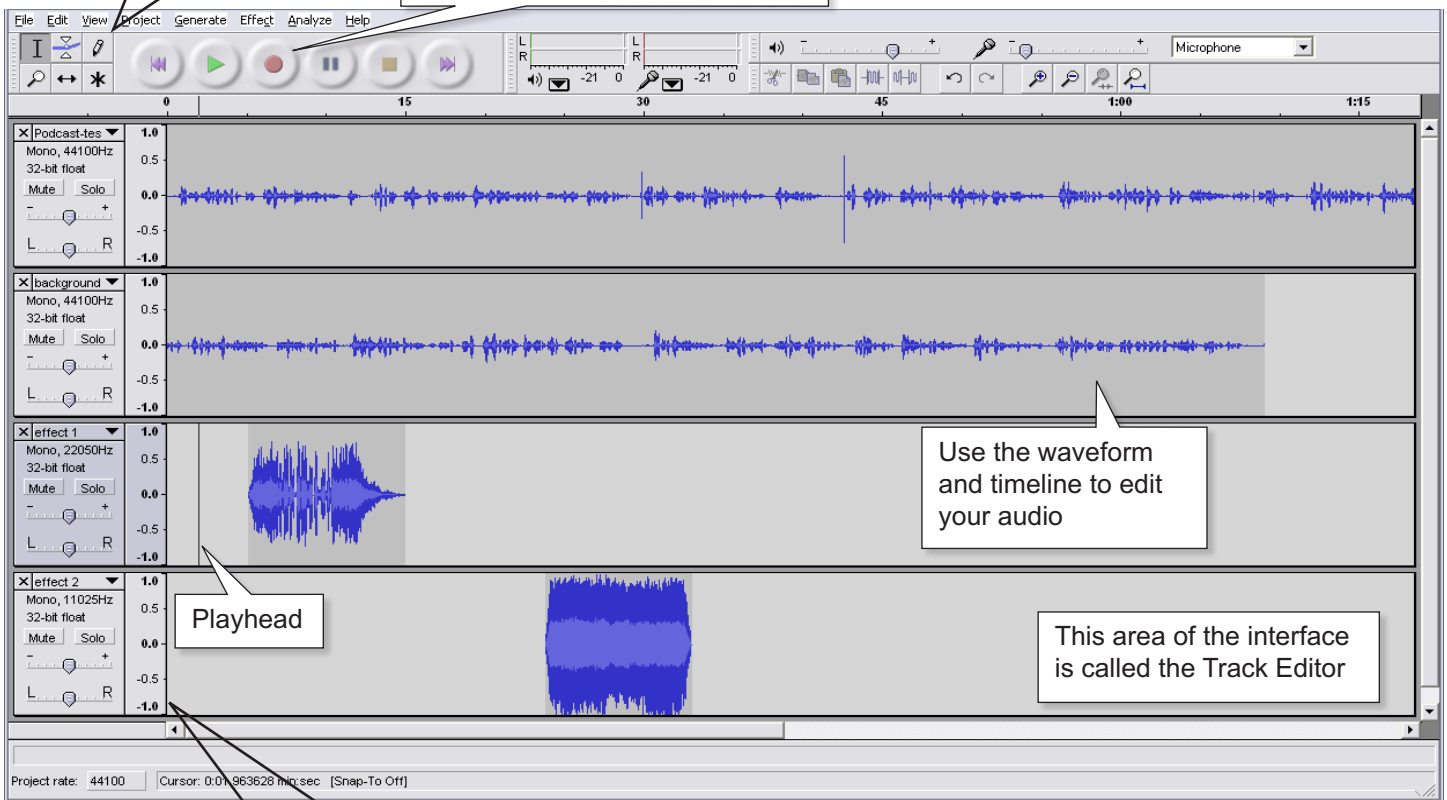
## Tracks in Audacity

Audacity relies almost exclusively on the track system to mix and edit audio. Since there can only be one segment of audio per track, it is possible that complex projects have a large number of them. This makes it easy to move clips around on the timeline so they play at exactly the right time.

The Selection tool lets you set the playhead anywhere on a track. It also lets you select a segment

The Timeshift tool lets you change a clip's location in the timeline.

Click here to record new content.



Use the waveform and timeline to edit your audio

Playhead

This area of the interface is called the Track Editor

Click this button to delete a track from your project.

The Solo button mutes all tracks except for the the ones selected.

The Mute button will silence a track, during playback in Audacity, but it will be audible when you export your project.

You can adjust the gain on a track to raise or lower its playback volume.

The balance slider lets you set whether a track plays louder on the Left or Right channel on multi-channel audio systems.

## Editing Audio

Learning how to select and manipulate segments of audio is key to editing in Audacity.

### Select and Modify a Segment of Audio

1. In the *Track Editor* area, place your cursor at the the starting point of the undesired segment then click and hold your left mouse button then drag the cursor along the audio wave to the ending of the segment to be selected.
2. The selected segment will be highlighted in a dark blue/gray color:
  - To Delete a segment from a track, go to **Edit > Delete** or press **Ctrl+K**.
  - To create a Duplicate segment, go to **Edit > Duplicate** or press **Ctrl+D**. Your duplicate segment will appear on a new audio track.
  - Audacity does not allow you to split a segment within a single track. To “split” a track into segments, you must first create a duplicate (see above), then select and delete the section of audio *before* the splitting point on the first track and *after* the splitting point on the second.

#### You Don't Have to Delete Your Audio

To be safe, instead of deleting a segment directly from your track, you can cut/paste the segment to a new track and mute it until you are absolutely sure you wish to delete it.

#### Create a Loops Folder

You should create a single folder on your computer where you save all of your loops to make it easier to retrieve them later. Also, try to use descriptive filenames such as “train-engine.wav or mooing\_long.wav to make your loops easier to identify.

#### Exporting and Audio Formats

You can also choose to export your loop clips as an MP3 file or an Ogg Vorbis file, WAV is recommended however, because it creates an uncompressed (lossless) file, which preserves audio quality.

### Change the Location of a Clip in Your Timeline

Moving the your clips from one place in the timeline to another will change the order of play.

1. Select the clip you wish to move (this clip should be on its own separate track, see the instructions for creating a loop below).
2. Click the *Timeshift* tool, your cursor will change.
3. Place your new cursor over the clip you selected, then **click and hold** your left mouse button and move the mouse left or right to reposition the clip. The clip will move along with your cursor.



### Create a Loop

If there is a segment in your recording which you would like to use as a loop (a reusable clip), you will have to export it as an individual file.

1. Select a segment of audio to be removed as per the instructions above.
2. With the desired segment selected, go to **File > Export Selection As WAV...** The *Save WAV (Microsoft) File As:* window will open.
3. In the *Save WAV (Microsoft) File As:* window, locate a folder on your computer where you wish to save your clip and click **Save** (bottom right).

## Recording Audio

Audacity allows you to record audio directly onto a new track using your computer and a microphone. However, your computer may require additional hardware (i.e. a better sound card or a USB microphone) to produce quality audio. You might also have to adjust settings in other programs outside Audacity, such as your computer's audio settings, before you achieve your desired results. We recommend that you test your equipment and settings before you rely on your computer to record anything of value.

### *Create a Track and Begin Recording*

In Audacity, whenever you click the **record button**, a new track is created, as recording begins. To create a new, empty track, go to **Project > New Audio Track**. You can also create new tracks by duplicating audio in an existing track or importing audio to your project.



If you pause your recording, you can continue recording in the same track by clicking the pause button again to unpause the recording.

To playback, click the **Play** button on the GarageBand screen. (or press Spacebar).

### *Recording Tips*

To maximize the quality of your recording:

- Find a secluded, quiet space (listen for traffic, fans or other noises). A space with soft materials on the walls will make for cleaner audio.
- Try to make sure that you will not be interrupted during your recording and remember to **turn off your cell phone!**
- Before you record your actual content, test your equipment by recording a brief piece of audio to ensure that everything is working properly.
- Type up some notes or use index cards to help you get through your recording with a good sense of timing and rhythm.
- Avoid unnecessary noises such as banging your hands on the table, shuffling papers, or touching the recording device. Also, remove any jewelry or accessories that add unwanted noise.
- If you flub a line, pause, keep talking, and edit it out later.

### *If You Are Recording for a Podcast*

- Make your podcast casual but structured. Don't lecture or read your content. But don't talk too fast or run words together either.
- Monitor the length of your podcast. The best length is between 30 and 60 minutes, neither too short nor too long. You can add or remove content later to reach the desired time.
- To get a better sense of the format and the style of the average podcast, surf the web or look in iTunes for podcasts you can use to become more familiar with the medium.

## Exporting Your Audio Project

There are many audio formats used on the Web, but MP3 is the most prolific. The MP3 format offers a balance of sound quality, file size and universal compatibility. In order to produce your podcast as an MP3 with Audacity, you need to download and install the LAME MP3 encoder add-on.

### Download and Install the LAME MP3 Encoder

The LAME MP3 encoder converts your Audacity project to MP3 format. You can find instructions on how to download and install the LAME MP3 encoder on the *Audacity Help* page:

<http://audacity.sourceforge.net/help/faq?s=install&item=lame-mp3>

### Convert Your File to MP3

The first time you export a project to MP3, Audacity will ask you to locate the LAME encoder on your computer. You must have downloaded and installed the encoder previously before you can proceed.

1. In Audacity, go to **File > Export as MP3**. The *Save MP3 File As:* window will open.
2. In the *Save MP3 File As:* window, locate a place on your computer where you would like to save your file and click **Save**. The *Edit the ID3 tags for the MP3 file* window will open. **Note:** If this is the first time you export a project to MP3, Audacity will ask you to locate the lame\_enc.dll file. Once you click Save, the Export MP3 dialogue box will open. Click Yes and locate the lame\_enc.dll file on your computer, then click **Open**.
3. The *Edit the ID3 tags for the MP3 file* window, lets you add supplementary information to describe your file and will likely be displayed by media players during playback. You can enter as much or as little information as you wish, but we recommend you enter information in the *Title:* and *Artist:* fields at the very least. Once you are finished entering the desired information, click **OK** to save your changes. The *Export* window will open and show you the file creation progress.
4. The *Export* window will close once the file creation process is complete and your file will be saved to the folder you indicated earlier. You can now upload this file a Web site or UDrive.

#### Quality and File Size

If you are creating a podcast that is just spoken word, you can use lower quality audio. For example, most NPR podcasts are 44.1kHz at 64 bit.

#### Technical Details:

##### *Samples per second & Quality*

44.1kHz	Standard audio CD sampling
22kHz	Half of the CD sampling rate. (good for a mix of voice & music)
11kHz	Passable voice
8kHz	Telephone quality

<i>Bit rate</i>	<i>Quality</i>	<i>MB/min</i>
1411	CD quality	10.584
192	Good CD quality	1.440
128	Near CD quality	0.960
112	Near CD quality	0.840
64	FM quality	0.480
32	AM quality	0.240
16	Short-wave quality	0.120

Source: <http://www.ukoln.ac.uk/qa-focus/documents/briefings/briefing-23/html/>

**Chipmunk Effect:** If you save your MP3 at a kHz rate that is not divisible by 11, some players will speed up the audio--creating a "chipmunk" version of your audio.

### Adjust the Bit Rate of Your MP3 Files

Audacity lets you control the quality of your exported MP3 files.

1. Go to Edit > Preferences. The Audacity Preferences window will open.
2. In the Audacity Preferences window, click the File Formats tab.
3. Under the File Formats tab, under the MP3 Export Setup heading, from the Bit Rate: drop-down menu, select the desired bit rate for your MP3 files and click **OK**.

## Appendix: Useful Links

### *Podcasting Overviews*

**Podcasting, Wikipedia**

<http://en.wikipedia.org/wiki/Podcasting>

**Make Your First Podcast, Podcasting News**

<http://www.podcastingnews.com/articles/How-to-Podcast.html>

**Ten Tips for Improving Your Podcasts, Jack Herrington**

<http://digitalmedia.oreilly.com/2005/08/10/improvingpodcasts.html>

**Creating a Podcast, Bart G. Farkas.**

<http://www.informit.com/articles/article.asp?p=605039&rl=1>

**Podcast Tools, S. Housley**

<http://www.rss-specifications.com/podcast-tools.htm>

**Video and Podcast Search Engines, SearchEngineWatch**

<http://searchenginewatch.com/showPage.html?page=3555196>

**General Recording Advice, Librivox**

<http://librivox.org/about-recording/>

<http://librivox.org/wiki/moin.cgi/NewbieGuideToRecording>

<http://librivox.org/wiki/moin.cgi/ImproveYourRecording>

### *Garageband Documentation*

**Garageband Manuals, Apple**

<http://www.apple.com/support/manuals/garageband/>

**Garageband Tutorial, Penn State Faculty Media Center**

<http://tlt.its.psu.edu/fmc/tutorials/garageband.pdf>

**Garageband Podcasting Tutorial, University of Toledo**

<http://eit.utoledo.edu/Documents/Podcasting.pdf>

### *Audacity Links*

**Download Audacity**

<http://audacity.sourceforge.net/>

**Audacity Tutorial, UPenn**

<http://www.sas.upenn.edu/computing/instructional/lrc/documentation/audacity/>

### *Educational Applications*

**Seven things you should know about Podcasting, ELI (PDF)**

<http://www.educause.edu/ir/library/pdf/ELI7003.pdf>

**The Educational Podcast Network**

<http://epnweb.org/>



## Appendix: Audacity Keyboard Controls

### *Playback Control*

Play   Stop	SpaceBar
Pause	P
Go to Beginning	Home
Go to End	End
Forward one measure	Right Arrow
Backward one measure	Left Arrow
Zoom In	Ctrl+1
Zoom Normal	Ctrl+2
Zoom Out	Ctrl+3

### *Recording and Editing Controls*

Record	R
Undo	Command-Z
Delete	Ctrl+K
Duplicate	Ctrl+D

For a complete list of Audacity Keyboard Shortcuts see:  
[http://audacity.sourceforge.net/manual-1.2/keyboard\\_shortcuts.html](http://audacity.sourceforge.net/manual-1.2/keyboard_shortcuts.html)