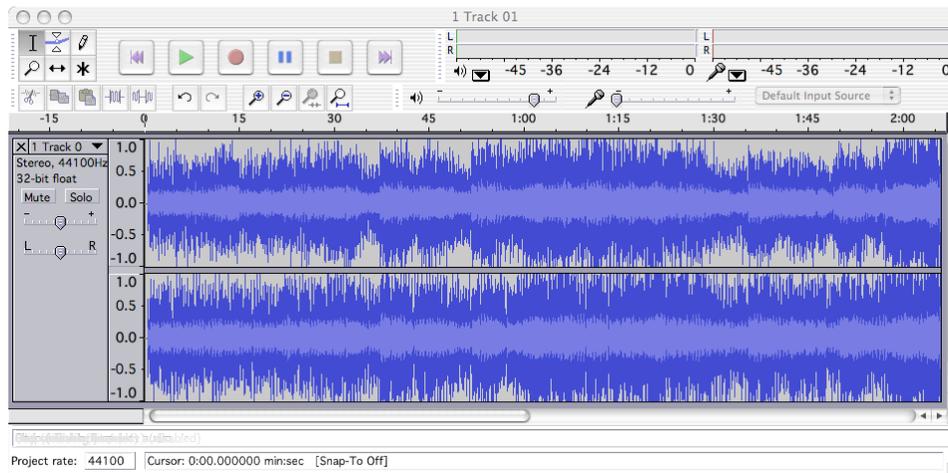


Working With Audio: Introduction to Audacity

Audacity is a free, cross platform application for working with digital audio. You can digitize your tape collection, do live multi-track recording, edit new and pre-existing digital audio, and save your audio file to be used in other audio applications.

Opening a CD Audio Track

1. Choose **File > Open**. Navigate to your audio CD.
2. Select the audio track you wish to open and click on **Open**. The file will be converted into an Audacity project that you can edit and save. All CD audio tracks will open up as 44.1 kHz, 32-bit float, stereo files.



Making a File Fit Within a Specific Time

1. Choose **Edit > Select... > All**. The entire audio file is highlighted.
2. Choose **Effect > Change Tempo....** Unlike some audio editors, Audacity contains the option to change the tempo of an audio file without changing the pitch.
3. In the Change Tempo dialogue box, you can use the slider to change the tempo to a slower or faster speed. If you'd rather type in a specific number of seconds you'd like the audio to last you can type that in the "to" field underneath the slider. If your audio file has a specific number of beats per minute or BPM defined, you can change the BPM by entering numbers into the designated BPM area.

4. If you'd like to change the speed of the song, which will also change the pitch automatically, choose **Effect > Change Speed...** Here you can also use the slider or enter a Standard Vinyl RPM amount from the dropdown menu.
5. You may also change the pitch of the audio without changing the tempo. Choose **Effect > Change Pitch....**
6. Again, there is a slider you can use to change the pitch in percentages. If you know the pitch your audio is in by note, you can also define a note in the **from** and **to** fields.

Saving your File

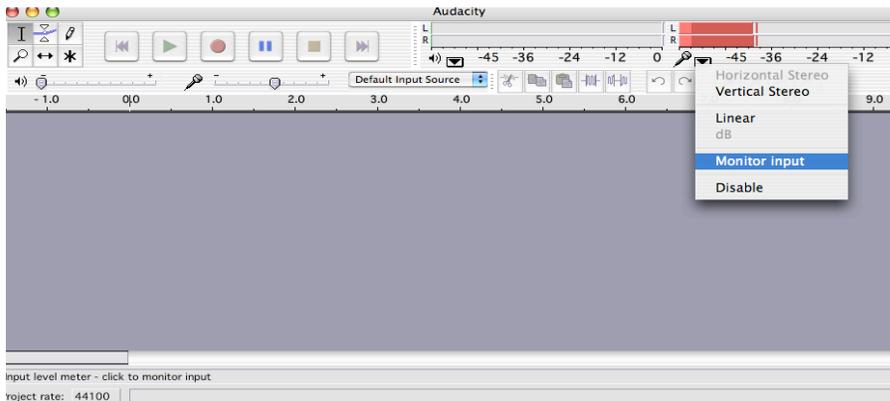
1. There are different options for saving your file in Audacity. Choose **File > Save Project As....** A small window appears, describing the .aup format that Audacity uses. Click **OK**. You can use the .aup format if you plan to open the file up in Audacity again in order to edit it some more. This format cannot be opened in other audio editing programs. If you wish to use this format, choose a location on your computer to save your file to and click **Save**.
2. Choose **File > Export as WAV....** This format can be used in a large number of audio editing programs and is the recommended choice on most occasions. If you wish to use this format, choose a location on your computer to save your file to and click **Save**.
3. Choose **File > Export as MP3.....** Audacity uses an external application called the Lame MP3 Encoder to export MP3 files. This application must be installed before this option will work in Audacity. If the Lame MP3 Encoder has been installed, you will be presented with an ID3 tag window where you can define information concerning the MP3 file before saving it. If you wish to, fill in this information and click **OK** before choosing a location on your computer and saving your file.

Creating or Adding New Tracks

1. Choose **Project > New Stereo Track**. A new blank stereo track is added to your Audacity project. You can then import a digital audio file to this track by choosing **Project > Import Audio** and locating your audio file on the computer. If you would rather add a mono track, simply choose **Project > New Audio Track** instead.
2. If you'd like to record a new track from your microphone or from an input instrument, choose **Audacity > Preferences** and select a device to record with under the **Recording** section drop-down menu for **Device**. Click **OK**. Click the record button and you will begin recording in a new track that Audacity automatically provides.
[note: if you'd like to hear previously recorded or imported tracks while you are recording, choose **Audacity > Preferences** and place a checkmark beside **Play other tracks while recording a new one**].

Input Levels

The Input Levels are located in the top right of Audacity and show the current levels of the sound input. They allow you control the input gain [amplification]. You can show and hide the Input Levels by clicking on the small triangle and choosing **Monitor input** from the drop-down menu located underneath the Input Levels.



Aligning Tracks

1. If you would like one of your tracks to begin at a different position in your project, click in the track at the spot you would like it to start at. The cursor blinks in the track. Choose **Project > Align Tracks... > Align with Cursor**. You'll notice other options for aligning tracks in this menu. Choose the one that you find to be the easiest or most useful with your project.

Computing How Many Bytes a Recording Will Take Up

To calculate the number of bytes that a recording will take up, given the duration of the recording, you can use a simple equation. First, you need to convert the time to seconds. To convert minutes to seconds, multiply by 60. To convert hours to seconds, multiply by 3600.

- 30 minutes = $30 * 60 = 1,800$ seconds
- 2 hours = $2 * 3600 = 7,200$ seconds

Once you have the number of seconds, you also need to know the sound quality settings of the file. This is the sample rate, sample size, and number of channels. The formula for computing the number of bytes given the time in seconds is:

- Bytes = Time * Sample Rate * Sample Size * Number of Channels

Where sample rate is in Hertz and sample size is in bytes instead of bits. This means that 8-bits equals 1 byte and 16-bits is 2 bytes. For 1 hour at 44.1 kHz, 16-bit, stereo sound, this is:

- Bytes = Time * Sample Rate * Sample Size * Number of Channels
- Bytes = $3,600 * 44,100 * 2 * 2$
- Bytes = 637,040,000

Since the number of bytes is often such a large number, it is easier to express it in terms of kilobytes, megabytes or gigabytes. In the computer world, a kilobyte is 1024 bytes, instead of 1000 bytes. Also, a megabyte is 1024 kilobytes, and a gigabyte is 1024 megabytes. So to convert the number of bytes, divide by the appropriate factor:

- Kilobytes = Bytes / 1024
- Megabytes = Bytes / (1024 * 1024)
- Gigabytes = Bytes / (1024 * 1024 * 1024)

For the above example, the conversions are:

- Kilobytes = $637,040,000 / 1024 = 620,156.2$ KB
- Megabytes = $637,040,000 / (1024 * 1024) = 605.62$ MB
- Gigabytes = $637,040,000 / (1024 * 1024 * 1024) = 0.59$ GB