

Sound Files and Project Files

Introduction

Sound files are standard files that you can use with any audio software. Audacity can create sound files that you can play on any computer, send to friends, put on CDs, or import into other programs (as a soundtrack to a video or animation project, for example). Sound files may be saved in several different formats with filenames ending in `ogg`, `mp3`, `wav`, or other endings (depending on the format).

Project files are special files that can be used only with Audacity. A project file contains a saved snapshot of your Audacity workspace. When you open the project file later, you can start working again exactly where you left off when you saved the file. A project file has two parts: a file with a name ending in `.aup` (like `My Project.aup`) and a folder with a name ending in `_data` (like `My Project_data`).

How to Use Sound Files and Project Files

While you are working with Audacity, use the `Save Project` command to save your work periodically. This will save your current work as a project file, which you can open whenever you want to keep editing your work in Audacity. Saving the project is very fast (faster than exporting a sound file), and you should do it often so that you don't lose your work if your computer crashes or loses power.

When you finish your work and want to publish or keep the final results, use one of the `Export` commands in the `File` menu. This will export your work as a sound file.

Anatomy of a Project File

A saved Audacity project actually consists of more than one file. For example, if you save a project named "My Song", Audacity will create the following files:

`My Song.aup`

This is the Audacity project file. To open a saved project, double-click on this file, or select it using the `Open` command in the `File` menu. The `.aup` ("Audacity project") file contains information about all of the project's tracks and settings. It also tells Audacity where to find the other files that are used by this project.

`My Song_data`

This is a folder where Audacity stores audio data. You do not need to open this folder yourself. Audacity will load data from this folder automatically when you open the `.aup` file. If you move a project file, you **must** move both the `.aup` file and the data folder to the same location, so that Audacity can still find both parts of the project.

Audacity File Formats

Audacity can import and export many different types of sound files. This section lists the most common of these file formats. It also describes how each format is different, and when to choose particular formats.

Lossy and Lossless Compression

To a computer, a recording is just a list of numbers. Each number represents the strength of the sound at a single point in time. There are three ways this list can be stored in a sound file:

An **uncompressed** sound file just contains the original list of numbers from the recording.

Uncompressed sound files can be very large: about 5 MB to 20 MB for each minute of recording (depending on the quality). WAV and AIFF are popular formats for uncompressed audio.

Lossless compression is a way to reduce the size of a sound file without losing any information or quality. A file that is losslessly compressed takes up less disk space, but when decoded it is exactly the same as the original (uncompressed) file. A lossless encoder can compress a sound file to about one half its original size. FLAC and Shorten (SHN) are popular lossless compression formats.

Lossy compression is another way to reduce the size of a file. Lossy compression throws away some of the information in the sound file; that information is **lost** and cannot be restored. Lossy encoders try to throw out information that is not noticeable to the human ear, so that the compression does not affect the sound quality. A good lossy encoder can compress a sound file to about one tenth its original size with little or no loss in quality. (They can also produce even smaller but lower-quality files.) Because lossy compression reduces file size so dramatically, it is widely used for transferring music over the internet and for storing large collections of digital music. Ogg Vorbis, MP3, and AAC are popular lossy compression formats.

Important Warning About Lossy Compression

When a file is encoded using lossy compression, it loses a small amount of information. If you import an already-compressed file, edit it, and then export it in a lossy format again, it will be compressed a second time, and lose some additional information. Each time the file is re-encoded, its sound quality decreases slightly—like making a copy of a copy with a Xerox machine or VCR.

To avoid this loss of quality, use lossy formats like MP3 and Ogg Vorbis only for finished recordings, or for saving a copy of your work to send over the internet or store on a portable music player. Use lossless or uncompressed formats to save work that you plan on editing again later.

While you are editing a work in progress, it's best to save it as an Audacity project file. Audacity project files are uncompressed, so you can open and save them as many times as you like with no loss of quality.

Formats Supported by Audacity

These are the most common file formats that Audacity can import and export:

WAV

This is a format created by Microsoft. It usually contains uncompressed audio, but it can also store various types of compressed audio instead.

*Audacity can import and export WAV files containing PCM (uncompressed) data, and some types of ADPCM data (a simple compressed format). Audacity **cannot** import or export WAV files that use other encodings, such as WMA or MPEG.*

AIFF and AIFF-C

AIFF and AIFF-C are formats developed by Apple Computer, and are commonly used by Mac applications. AIFF files contain uncompressed audio. The newer AIFF-C format can store data either uncompressed, or compressed with several different simple encodings. Audacity can import and export all standard AIFF and AIFF-C files.

MP3

This is a lossy compression format developed by the Fraunhofer Institute, in Germany. MP3 files can be played by many software programs, and also many portable music players (like the Apple iPod). Audacity can import all MP3 files. Using the optional LAME encoder, Audacity can also export MP3 files. Fraunhofer and other companies hold patents on the MP3 encoding process, and charge royalties for MP3 software, hardware, and streaming. Because of this, Audacity cannot include a built-in MP3 encoder, and people who use MP3 encoding might need to pay licensing fees.

Ogg Vorbis

This is a lossy compression format. Unlike the MP3 format, it is completely free of patents and other restrictions. Ogg Vorbis files can be played by many software programs, and by some portable music players (like the iRiver H300).

Audacity can also import and export several other sound formats, including AU, IRCAM, SDII, and others.

Formats Not Supported by Audacity

These are some common file formats that Audacity cannot import or export.

Open Formats

The following formats are free from patents and other restrictions. We would like to include support for them in future versions of Audacity.

FLAC - lossless encoding

Speex - lossy encoding designed for compressing voice recordings very efficiently

Proprietary Formats

Patents or other restrictions make it impossible for Audacity to include built-in support for these formats. However, future versions of Audacity might be able to use your operating system's media libraries to import or export some of these formats.

Windows Media Audio (WMA) - format used by Microsoft Windows applications for lossy compression

AAC - lossy format used by Apple iTunes

MP3Pro - lossy format developed by the inventors of MP3