# **libsndfile and GNU Octave**

[GNU Octave](http://www.octave.org/) is a high-level interactive language for numerical computations. There are currently two development streams, a stable 2.0.X series and a development 2.1.X series. Octave reads and writes data in binary formats that were originally developed for [MATLAB](http://www.mathworks.com/). Version 2.0.X of Octave uses binary data files compatible with MATLAB version 4.2 while Octave 2.1.X uses binary data files compatible with MATLAB version 5.0 as well as being able to read the older MATLAB 4.2 format.

From version 1.0.1 of libsndfile onwards, libsndfile has the ability of reading and writing a small subset of the binary data files used by both versions of GNU Octave. This gives people using GNU Octave for audio based work an easy method of moving audio data between GNU Octave and other programs which use libsndfile.

For instance it is now possible to do the following:

* Load a WAV file into a sound file editor such as [Sweep](http://www.metadecks.org/software/sweep/).
* Save it as a MAT4 file.
* Load the data into Octave for manipulation.
* Save the modified data.
* Reload it in Sweep.

Another example would be using the MAT4 or MAT5 file formats as a format which can be easily loaded into Octave for viewing/analyzing as well as a format which can be played with command line players such as the one included with libsndfile.

## **Details**

Octave, like most programming languages, uses variables to store data, and Octave variables can contain both arrays and matrices. It is also able to store one or more of these variables in a file. When reading Octave files, libsndfile expects a file to contain two variables and their associated data. The first variable should contain a variable holding the file sample rate while the second variable contains the audio data.

For example, to generate a sine wave and store it as a binary file which is compatible with libsndfile, do the following:

octave:1 > samplerate = 44100 ;  
 octave:2 > wavedata = sin ((0:1023)\*2\*pi/1024) ;  
 octave:3 > save sine.mat samplerate wavedata

The process of reading and writing files compatible with libsndfile can be made easier by use of two Octave script files :

octave:4 > [data fs] = sndfile\_load ("sine.mat") ;  
 octave:5 > sndfile\_save ("sine2.mat", data, fs) ;

In addition, libsndfile contains a command line program which which is able to play the correct types of Octave files. Using this command line player **sndfile-play** and a third Octave script file allows Octave data to be played from within Octave on any of the platforms which **sndfile-play** supports (at the moment: Linux, MacOS X, Solaris and Win32).

octave:6 > sndfile\_play (data, fs) ;

These three Octave scripts are installed automatically in Octave's site script directory when libsndfile is installed (except on Win32) ie when libsndfile is being installed into /usr/local, the Octave scripts will be installed in /usr/local/share/octave/site/m/.

There are some other Octave scripts for audio to be found [here](http://octave.sourceforge.net/index/audio.html).

The libsndfile home page is here : <http://www.mega-nerd.com/libsndfile/>.