

**Audio Toolbox** is an audio function generator for the Macintosh. Using no additional hardware, you can produce sine, square, triangle, and sawtooth waveforms of any frequency up to 22 kHz, as well as generate noise. There is also a sweep generator. In addition, oscilloscope, spectrum, and waterfall displays are available. The purchase price is only \$19.99.

You can generate up to 13 different waveforms. Each waveform can be routed to either the left or right channel, or to both. The amplitude of each waveform may be adjusted, as well as the volume on each channel, which is a mix of any waveforms routed to that channel.

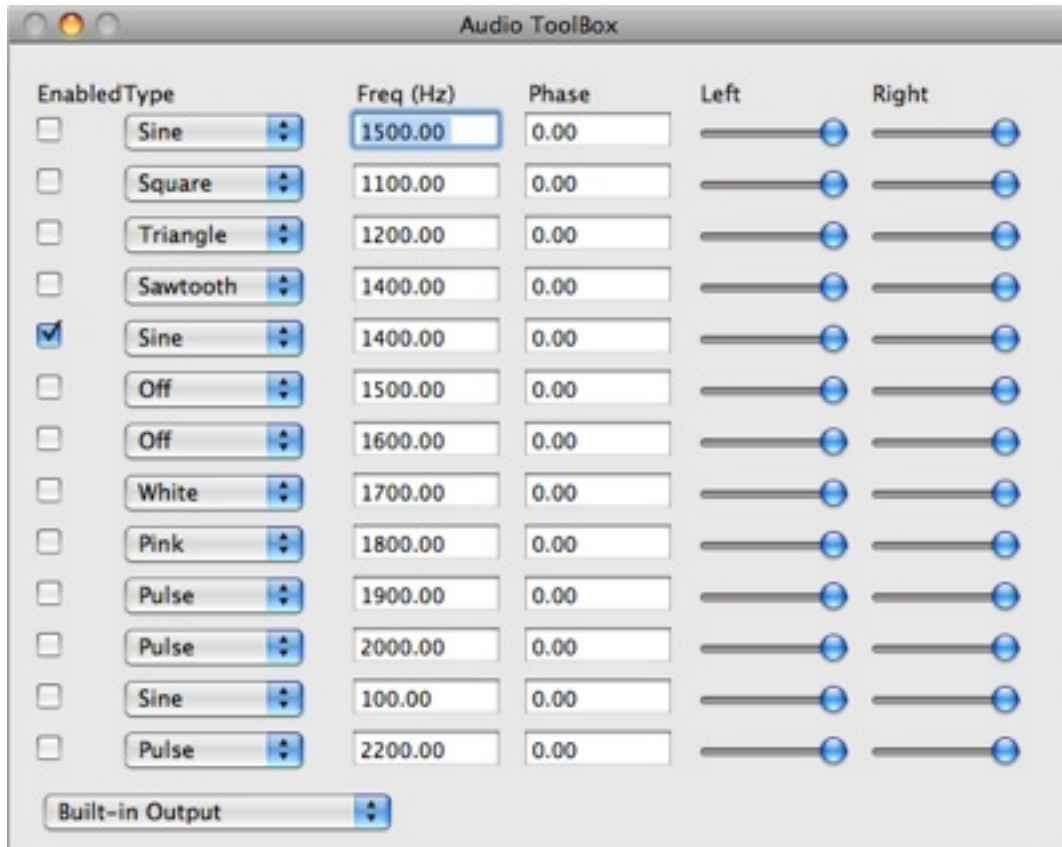
Please be sure to read this document before using the program, you will probably find the answers to any questions you may have. If you still have a question, feel free to contact us at [info@blackcatsystems.com](mailto:info@blackcatsystems.com)

### **Installation**

No special installation is required, just drag the app to your applications directory (or elsewhere, if you prefer).

## Function Generator

When the program starts up, you'll a windows, similar to the following, it's the function generator window:



Let's take a look at the various controls and features:

For each waveform, there are six controls:

**Enabled** If this is checked, the waveform is enabled for generation. Typing control-command-0 through 9, A, B, C will turn a generator on or off when this window is selected.

**Type** This popup menu selects the type of waveform to be generated

**Freq** This is a text box into which you type the desired waveform frequency, in hertz (Hz).

**Left** When checked, this waveform is routed to the left channel.

**Right** When checked, this waveform is routed to the right channel.

**Amplitude** This is a text box into which you type the desired amplitude of the waveform, ranging from 0 (off) to 100 (maximum).

As you add more waveform to a channel, the overall gain of that channel is automatically adjusted, to prevent clipping.

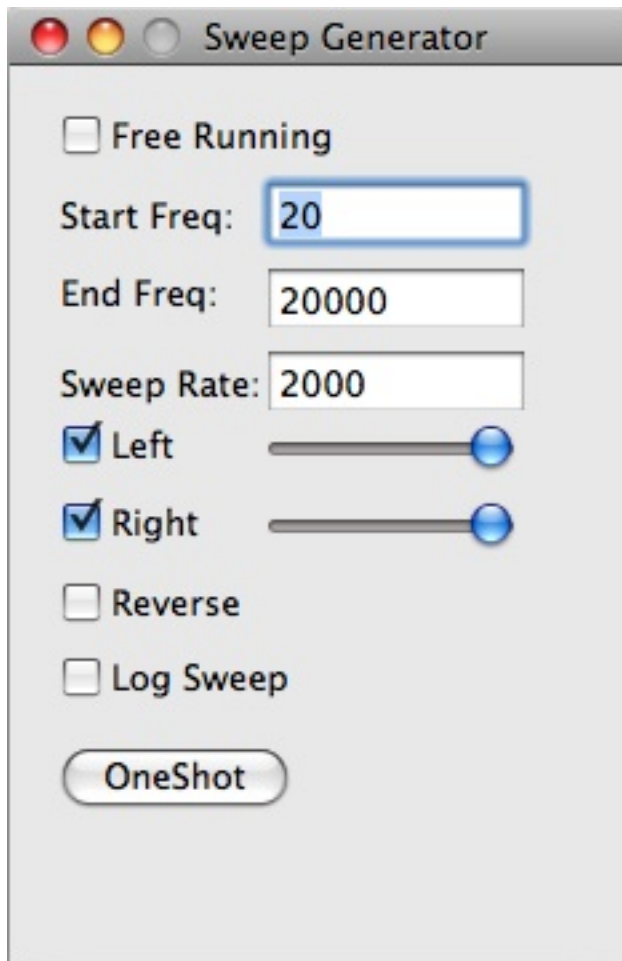
Please note that due to the limited bandwidth of the Mac's audio output, square and sawtooth waveforms will show significant overshoot. This is a function of the Mac's hardware, and cannot be overcome by software.

You can also select which sound output device to use, assuming your computer has more than one, using the popup menu at the bottom of the window.

You can Save your current settings, and restore them later, by using the Save and Open selections under the File menu.

## Sweep Generator

The second window available is the sweep generator:



The Enabled, Left, and Right controls and the Amplitude work just as with the function generator window.

The Start and End values are the two frequencies between which the generator will sweep. The Rate is the sweep rate, in Hz per second.

By selecting Reverse, the sweep generator will sweep the frequency back to the low frequency, rather than just jumping there, after it reaches the high frequency.

You can also click on the One Shot button, and you will get just one sweep, rather than continuous sweeping.

It's probably best to play around with the various settings, to get a feel for how they interact. It's possible to create some interesting sound effects using the sweep

generator. For example, going from 1000 Hz to 2000 Hz at 8000 Hz/sec produces a sound similar to a police siren.

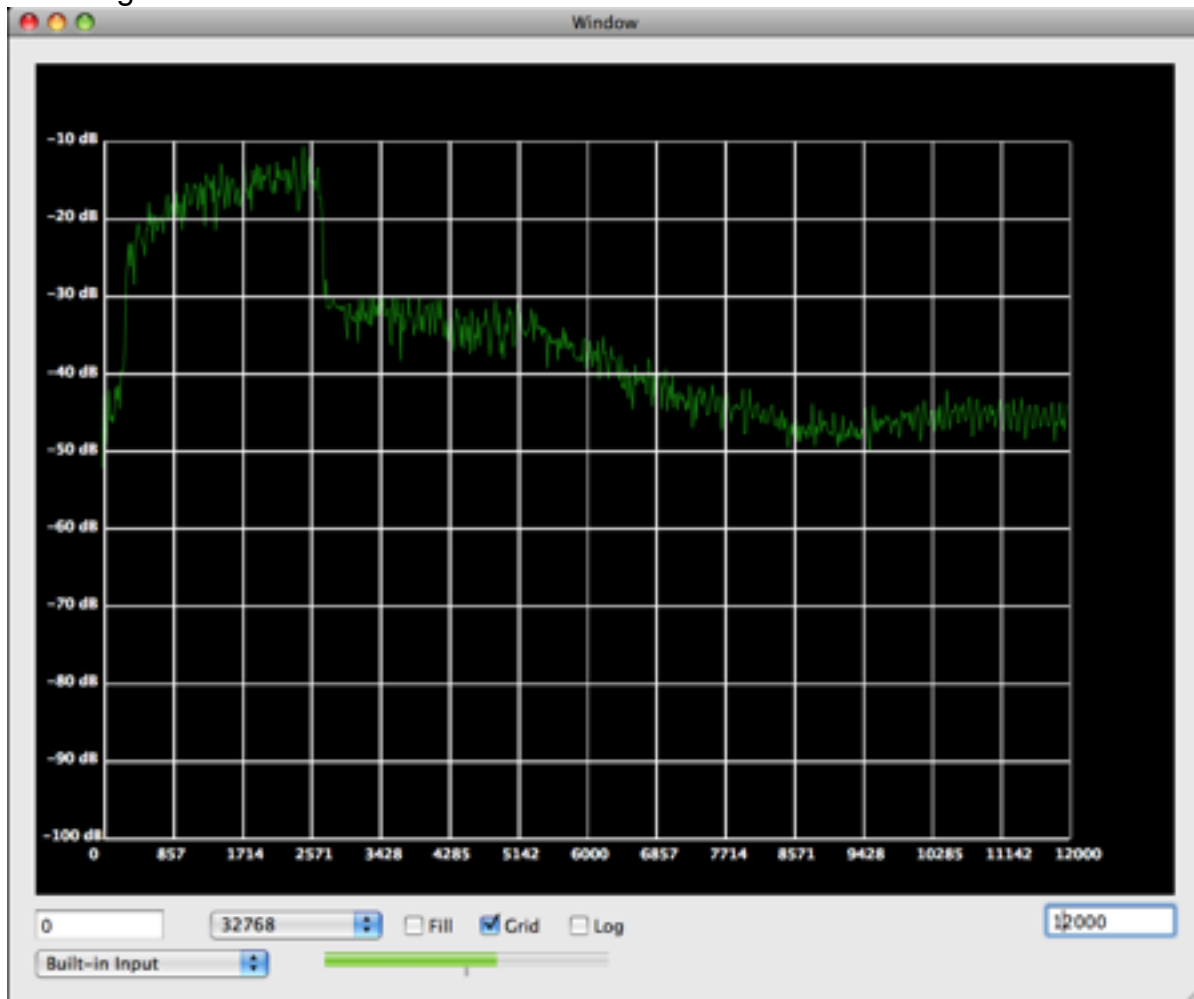
## **Recording sound to files**

You can save the audio generated to an AIFF recording file. To start recording, select Record to File from the File menu. To stop recording, select Stop Recording from the File menu.

From the time you start recording until you stop, a sound file will be generated containing all the sound produced, even dead air. The file is always 44.1 kHz, 16 bits, stereo, and has a name that is a timestamp of when the recording began. You can always change the name of the file in the Finder after you're done recording, if you'd like.

## Spectrum Window

The third window is the spectrum window. This window lets you see the spectrum of an audio signal.



The two text boxes allow you to specify the minimum and maximum frequencies to be displayed, between 0 and 22000 Hz.

A popup menu is available to select the input source. The number of FFT bins is selected by a popup menu as well.

The Fill checkbox causes the display to be a filled graph, rather than a simple line.

The Grid checkbox displays a vertical signal amplitude grid.

The Log checkbox scales the frequency in a logarithmic form. In this case, the two text boxes for the minimum and maximum frequency are not used, and the full 1 to 20000 Hz range is displayed.

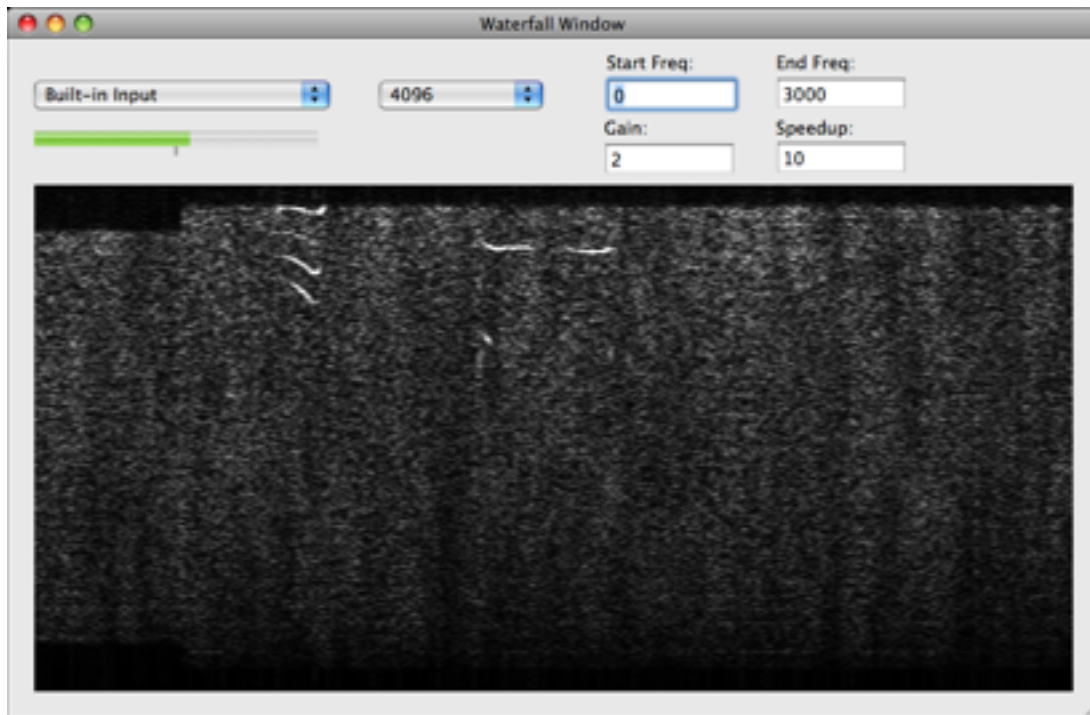
A slider is available to set the input gain, with a volume bar to the left.





## Waterfall Window

The fourth window is the waterfall window.



You can select the input source, as well as the FFT size, from popup windows.

The starting and ending frequencies for the waterfall are entered into two text boxes.

The gain value is used to make the waterfall brighter or darker, and can be used to compensate for the audio volume.

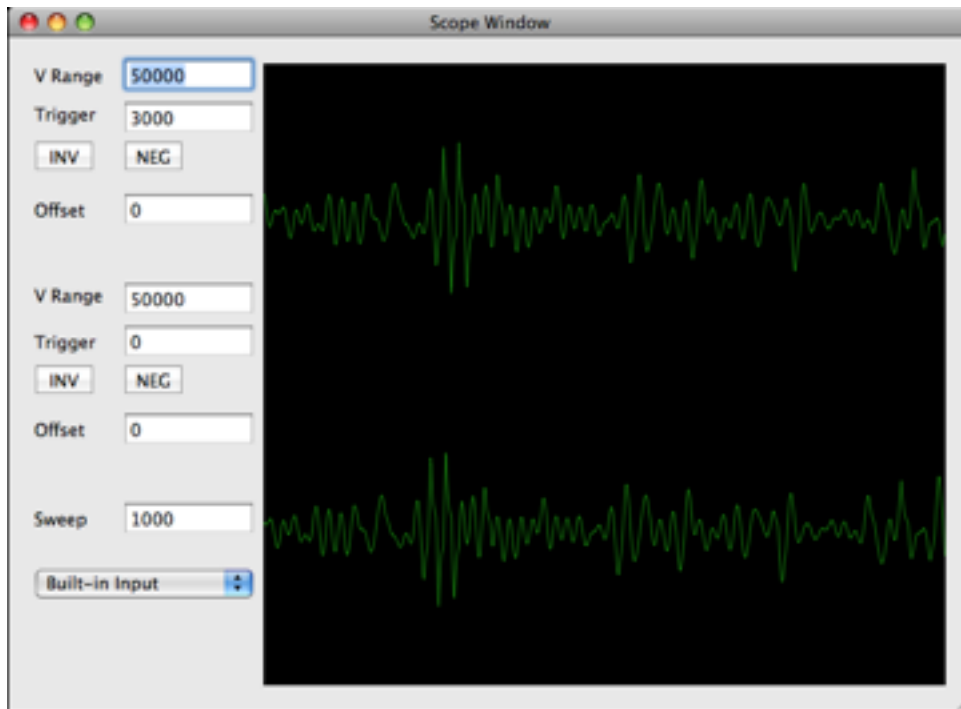
Finally, the speedup value can be used to increase the rate that the waterfall updates. For values larger than 1, additional spectrums are computed on “between” each group of new sound data. A speedup value of 10, for example, will make the waterfall run 10 times faster.

The color checkbox controls whether the waterfall is color or greyscale.



## Oscilloscope Window

The fifth window is the oscilloscope window.



For each input, the Range can be selected, as well as the Trigger point and Polarity. The Offset input allows the trace vertical position to be adjusted.

Finally, the sweep rate can also be set.

A popup menu is available to select the input source, as with the spectrum display window.

## **Buying Audio ToolBox**

The price of Audio ToolBox is only \$19.99, allowing the use on a single computer. If you wish to run Audio ToolBox on multiple computers, you should obtain a license for each system, or the appropriate site license.

Online purchase is the quickest and easiest way to register your copy. You'll typically get your registration code back from us within minutes of purchase. Visit <http://www.blackcatsystems.com/register/audiobox.html> to buy online.

Site licenses are also available, allowing copies to be run on multiple computers at a single location (for example, a school or university, or office). Please contact Black Cat Systems for pricing and details about site licensing.

By buying your copy of Audio ToolBox you'll help support our efforts to develop new versions with additional information. When you register, you'll be entitled to use all new releases and updates to Audio ToolBox released over the next year, free of charge.

When you buy and receive your registration code, select Enter Registration... from the File menu, and enter the code. If you buy and don't get your registration code within a day, please send us an email at [info@blackcatsystems.com](mailto:info@blackcatsystems.com). Please check your spam folder first!

Thanks again for giving Audio ToolBox a try.

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email: [info@blackcatsystems.com](mailto:info@blackcatsystems.com)

Web: <http://www.blackcatsystems.com/software/audiotoolbox.html>

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4708 Trail Court  
Westminster, MD 21158  
USA

## Revision History

May 16, 2020 - 3.1.0:

Fixed a memory leak, several other small improvements.

September 30, 2019 - 3.0.1:

Fixed a bug related to saving WAV recording files.

May 10, 2018 - 3.0.0:

Updated to 64 bit application.

June 30, 2014 - 2.2.0:

Fixed a bug that could cause a crash when the Spectrum or Waterfall window is opened.

June 16, 2011 - 2.0.3:

Fixed a bug that didn't allow multiple generator types to produce sound at the same time.

May 7, 2010 - 2.0.2:

Fixed a bug that caused distorted audio on PowerPC Macs.

November 14, 2009 - 2.0.1:

Fixed a bug that could cause a crash at launch.

November 9, 2009 - 2.0.0:

Cocoa port for Intel/PPC Universal Binaries.

Added waterfall window.

October 30, 2005 - 1.8.0:

Added logarithmic frequency scaling to the Spectrum Display.

Bugfix - Pink noise would sometimes have a popping sound if the amplitude was too high.

Bugfix - clearing the freq or phase fields would cause that channel to no longer produce sound.

March 9, 2005 - 1.7.0:

Added Applescript support.

Can now copy and paste between fields.

Fixed a bug with the pink noise generator.

August 4, 2004 - 1.6.0:

Can now type control-cmd-0 through 9,A,B,C to turn sound generators on and off.

February 1, 2004 - 1.5.0:

Improvements to Spectrum Display

Added White and Pink noise outputs.

Added frequency/amplitude display for current cursor location.

January 5, 2004 - 1.4.0:

Improvements to Spectrum Display

Added Oscilloscope Display. (Mac OS X only)

June 13, 2003 - 1.3.1:

Bug fixes for OSX.

October 11, 2002 - 1.2.0:

Spectrum display window added (Mac OS X only).

May 12, 2002 - 1.1.0:

Can now record produced audio to AIFF files.

April 26, 2002 - 1.0.1:

Now up to 13 tones can be played at a time

Fixed a bug that prevented decimal points from being entered

April 10, 2002 - 1.0.0:

Release for Mac OSX and MacOS 8/9

Added single shot feature to sweep generator

November 4, 2000 - 0.3.0:

Added sweep generator

Changed name to Audio Toolbox

October 14, 2000 - 0.2.0:

Added ability to save/restore settings

Tab now moves between the various fields, as well as the arrow keys.

Fixed a bug where the sound could start clicking when the volume was adjusted (maybe!)

October 9, 2000 - 0.1.0:  
Initial Release



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