

SpeakerSweep Version 2.0, November 2020. (Freeware)

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Short Description:

SpeakerSweep is an application for measuring the frequency response of a speaker in real time.

When the Capture starts, SpeakerSweep generates a sine frequency sweep, on a logarithmic scale.

This signal should be applied to the amplifier to which the speaker is connected.

At the same time, SpeakerSweep "listens" to the audio input the microphone is connected to and plots the frequency response on the screen (in dB).

The frequency sweep is preceded by a short audio burst to synchronize the audio input with the output.

What's new in version 2.0:

- You can select a calibration file for the microphone. This response curve will be applied in real-time to correct the measurement.
- You can "smooth" the measurement curve to erase the small (and irrelevant) irregularities.
- you can save the measurement curve in a raster-graphics file.

What is needed to use SpeakerSweep ?

Although SpeakerSweep can be used with standard PC peripherals (internal microphone and headphone output), the accuracy of the frequency response will be poor. It can only give an idea to compare different speakers.

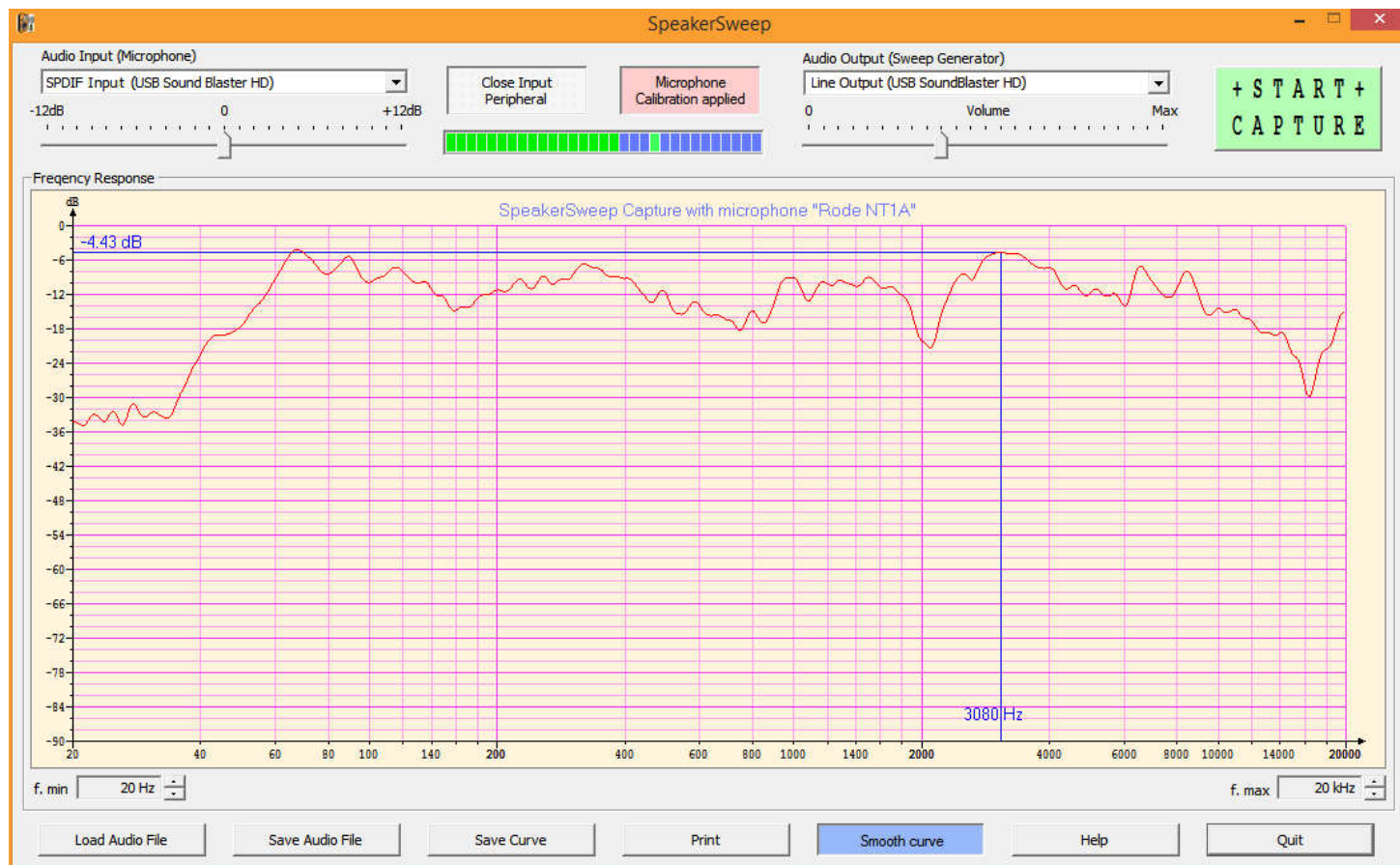
To make a good measurement, you need high quality audio peripherals (DAC and ADC).

E.g.: Sound Blaster X-Fi SBX or equivalent. You also need a good microphone, preferably sold with its calibration file. Remember that studio-grade microphones need a dedicated preamp that delivers "phantom" power. In addition, the room should not be too reverberant.



Photo: *Measuring the frequency response of an old Philips 9710M.*

The Application Dialog Box:



On top, you will find the drop-down lists for the source input and for the output. All the devices available on your PC are listed.

Input sensitivity and output volume can be adjusted. A bar graph is used to adjust the recording level, even when the input device is open but the capture has not yet started.

Before Starting the capture, you can select the "Microphone Calibration". A dialog box will appear, displaying a list of all microphones found in the "CalibFiles" directory (default), and it will display the response graph of the selected microphone. The use of "microphone calibration" is not mandatory.

The sweep generator is started by clicking on the "START CAPTURE" button, which starts the sweep generator.

A short audio burst initiates the synchronization between the audio input and output. Once this burst is detected by the microphone, SpeakerSweep begins to draw the frequency graph, stopping when the maximum frequency is reached.

You can easily modify the starting and the ending frequencies, with a minimal bandwidth of one decade.

By clicking on the graph you can displace a cursor (Blue lines) that shows the exact frequency and level in dB.

The "Smooth Curve" function is useful for smoothing out irregularities in the curve, which are anyway not significant.

The captured audio can be saved in a standard ".wav" file embedding the minimum and the maximum values of the audio frequency in the metadata of the file, eventually with the name of the microphone used.

This audio file can be played by any audio player, or it can be loaded (and played back) in SpeakerSweep itself.

The graph can be printed and it can also be exported to a raster-graphics file.

Some words about the Calibration Files

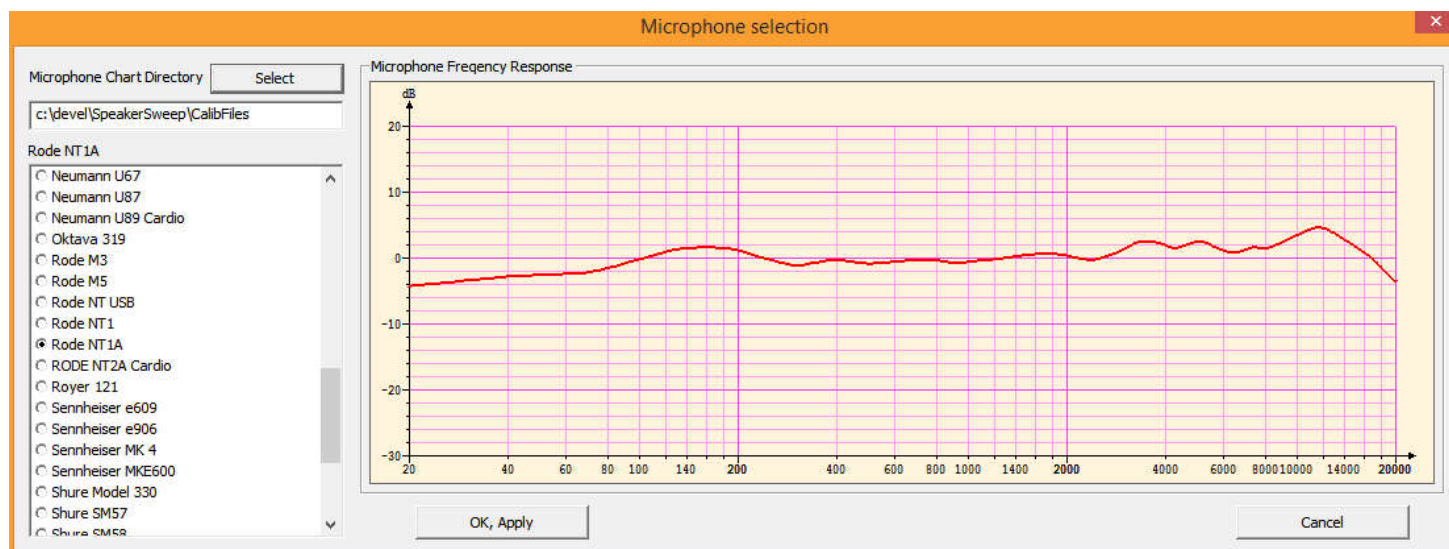
There is a pending AES standard for the microphone calibration files. This standard is used by certain manufacturers (Sonarworks, Behringer) and by the calibration services..

The file format is extremely simple, it is only a text file, with a ".txt" or a ".frd" extension (Frequency Response Data).

Each row has a frequency value followed by a level in dBs, separated by a tab, comma, or blanks.

Any number of data points may be present. No need to have a dB value for every frequency, the level will be interpolated.

A list of microphones found on the web is included in SpeakerSweep. By no way should this information be considered reliable! This list is more for showing examples than for effective use. You will need to provide your own microphone calibration file.



If you do not have access to a file provided by the manufacturer, you can create your own.

Inside the SpeakerSweep package, you will find a small tool called "MicroCalib" to create a calibration text file from a graphic. (See "MicroCalib" documentation).