

# **uTestMic User Guide**



**STUDIO SIX DIGITAL LLC**

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# Quick Start

uTestMic is a professional-grade test & measurement microphone for use with computers, smart phones, and other devices that are compatible with USB Audio devices. uTestMic also includes an audio output connector and status LED.

## ***Hardware Requirements***

uTestMic is designed to work with hardware devices that support USB audio through the use of standard USB audio class device drivers.

uTestMic has a 2m cable with attached USB A connector. It ships with adapters for USB micro and USB C. To use uTestMic with an iOS device that has a Lightning or 30-pin connector, an adapter such as the Apple Camera Connection kit is required.

It is possible to extend the USB Cable length using a standard USB A extension cable. Lengths up to 5m have been tested successfully, although it may depend on the quality of the extender.

## ***App Compatibility***

uTestMic is compatible with AudioTools and many other iOS Apps which record or process audio. It is also compatible with audio apps running on any hardware platform that support audio input from a USB audio device, such as Smart or Spectrafoo on Windows, and any of a number of apps that run on Android that can accept input from a USB audio source. Check with your app developer if you are unsure as to whether their app will work with a USB audio input device.

## ***Installation***

To install uTestMic, plug it into a USB connector of any compatible device. Once uTestMic is plugged in, it will be active and available as a USB audio source. On mobile platforms, uTestMic will automatically become the default audio input and output source. On a computer, you must select uTestMic as the audio source using the Mac System Preferences pane, or in Windows using Device Manager

Note that it takes approximately 3 seconds for uTestMic to be recognized by your hardware device. So, if you plug uTestMic in while AudioTools is running, there will be a slight delay until it can be used.

## ***App Installation***

If you do not have the AudioTools App installed, you can go to the App Store and download it. If you already have it installed, make sure you are updated to version 10.22 or later.

## ***Power***

If you wish to power your mobile device while using uTestMic, you can use any standard USB powered hub. Just plug uTestMic into the hub, and plug the another cable into the hub and into your mobile device.

## ***Audio Output***

uTestMic includes an 1/8" (3.5mm) stereo output jack. This will be used as the audio output for all mobile devices, and can be used on computers by selecting it as the audio output source.

Note that this is a line-output signal, and is not designed to drive headphones.

# AudioTools App

uTestMic is designed to work with the Studio Six Digital App “AudioTools”, which is available for download on the App Store. When used with AudioTools, all of the features of uTestMic, such as multiple gain ranges and audio output configuration, are available. When used with any other App, uTestMic operates in the configuration specified on the Settings->Configuration Settings screen of AudioTools.

This manual will not cover the AudioTools App in detail, but it will discuss some of the ways in which AudioTools interacts with uTestMic.

## ***Acoustic Analysis and SPL Functions***

These functions use the input source selected and gain range settings on the Settings menu, Microphone Setup module. The currently active input source is always shown on the screen. You may see labels like **uTestMic Mic Low Range**.

### ***SPL Meter***



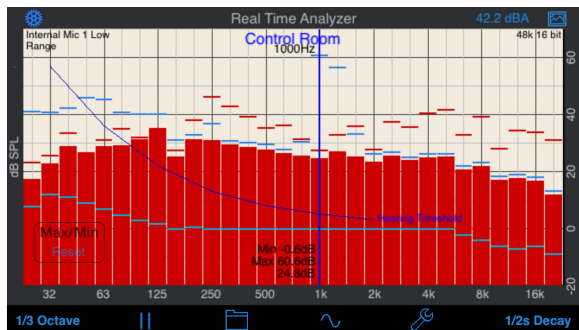
SPL Meter gives you a way to accurately measure Sound Pressure Levels with uTestMic.

SPL Meter uses ANSI / ISO Type 1 filters for A and C weighting, as well Type 1 exponential decay characteristics. Needle dynamics are carefully matched to real analog meter ballistics.

The Range may be set from 40 dB to 140 dB to measure sound levels over the full range available from uTestMic.

Note the there are several other SPL monitoring modules available for purchase, including SPL Pro, SPL Graph, and SPL Traffic Light.

## RTA



Use the Real Time Analyzer to display SPL levels for each frequency band.

You can view the display in octave or 1/3 octave mode, display a cursor to display actual levels, and see max and min values. Graphs may be saved and recalled, or exported for reports or further analysis.

## FFT

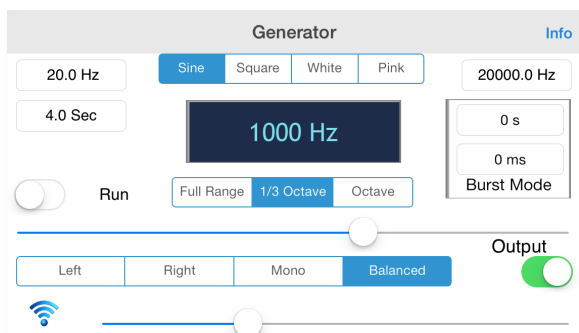


Use the FFT Analyzer for fine frequency analysis, and to find feedback frequencies.

Store and recall multiple traces, to compare system responses before and after tuning.

Use the cursor to read out exact frequency and dB levels on the plot.

## Signal Generator



Use the built-in signal generator to create test signals such as pink noise, white noise, or sine sweeps.

A pop-up signal generator is available in all of the acoustic analysis modules.

## Other Modules

AudioTools has many more modules for audio analysis, sound system tuning and system setup, and for SPL monitoring and graphing.

Check out LARSA, our premier loudspeaker test and measurement app. uTestMic is designed to work with LARSA, since it includes a high-quality DAC and analog output.

# Calibration

Every uTestMic is hand-calibrated at the factory, and an individual frequency compensation curve is created for it using an iPrecisionMic as the reference microphone. These curves are uploaded to our server, and may be downloaded to use with your hardware. See the instructions below for downloading the file.

The format of the file name will be “cal\_SD2073\_XXXXXXX.txt”, where XXXXXXXX is the serial number of the microphone.

## Calibration Data

The calibration file contains both frequency correction data, and overall SPL correction data. The format is that of an FRD file, which has the frequency first, then the dB value. The value at frequency 0 is a special set of trim values for AudioTools, first low and then high. The other numbers are dB values relative to 0, so you would subtract those from your analysis results.

## AudioTools

If you are running AudioTools 10.22 or later, simply plug in uTestMic and navigate to the **Microphone Calibration** page. From here, tap the **Get File** button, and enter the serial number that is printed on the microphone. It will be in the format “LN12345”. The app will connect to our server and download and install the file. You only need to do this once per iOS device.

The file will also be available in the public/calibration folder, if you would like to use it on other platforms. If you are using iCloud, this will be the in iCloud, under studiosixdigital/public/calibration.

## Windows, Mac and Android

Go to the uTestMic page on our website, and click on the **Download Calibration File** link. This will open a dialog box where you will enter the serial number of your uTestMic, and the file will be downloaded to your device.

## Re-calibration

uTestMic works with standard 1/2” calibrators. If you wish to re-calibrate in AudioTools and change the trim factors, you will need to edit the calibration file and store the new values in the file.

uTestMic will typically hold its calibration well, but if it is exposed to extremes of heat, cold, or humidity, the microphone calibration may change. At any time, you can check the calibration using an SPL calibrator, and if necessary adjust the trim values and save them in the calibration file. These instructions are below.

We also provide re-calibration services at the factory, which includes updating the frequency compensation file.



## ***Microphone Calibration with a Calibrator***

Before beginning calibration, connect uTestMic to your iOS device and obtain a 94 dB calibrator.

### **Get the Trim Factors**

- In AudioTools navigate to **Settings->Microphone Setup**. The **Input Sources** screen appears.
- Tap the **i** in the circle for the first entry on the top of the screen.
- Attach and turn on a 94dB calibrator.
- Select **Low Range**.
- Tap the **dBA Slow** field and wait while the value settles.
- Tap **Done**, the trim value will be set.
- Write down the Low Range **Trim** value.
- Select **High Range**, tap **dBA Slow**, allow the SPL to settle.
- Tap **Done**, the trim value will be set.
- Write down the High Range **Trim** value.

### **Update the calibration file**

Locate the calibration file, for example on iCloud look for the **cal\_SD2073\_LNxxxxx.txt** file in [studiosixdigital/public/calibration](https://studiosixdigital.com/public/calibration)

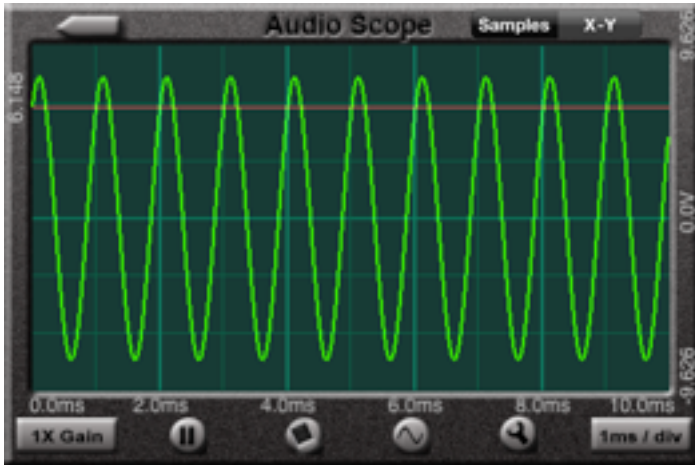
- Open the file, and find the 0 frequency line, with 2 values after the zero.
- Edit the first dB number to the Low Trim value
- Edit the second dB to the High Trim value.
- Save the file and overwrite the original file with your edited copy.

Now the new calibration values will be used with uTestMic.

Note: AudioTools uses the AES standard for dBFS, which is that for a sine wave just reaching clipping, the reading will be 0.00. A square would by this formula show +3.00 dBFS.

## Checking Headroom

After setting the ranges, it's a good idea to double check your headroom using Audio Scope. To do this, navigate to the **Line Input->Audio Scope** screen. Go to settings (tap the wrench icon), and select **Line Source Left**. Now go back to the scope screen and check that the sine wave is not clipped. It should look something like this picture, or smaller:



## Microphone Calibration by Matching

If you do not have access to a microphone calibrator, but you do have access to a calibrated SPL meter, you can do basic calibration by matching uTestMic to the SPL meter. Since uTestMic comes calibrated from the factory, we do not normally recommend doing this procedure.

To do this, follow the instructions above, with these changes:

- Use an acoustic noise source such as pink noise, or white noise. White noise will have less low frequency, and may be a better choice, since it is best to calibrate with mid-band energy. Do not use a sine wave signal, because you may get cancellation or reinforcement effects that can throw off the readings.
- Use C Weighting, if possible, with the calibrated meter.
- Enter the value read from the calibrated SPL meter into the dB field in AudioTools.

# Specifications

All specifications are subject to change.

## ***Microphone***

28 dBA - 120 dBA

Frequency Response 20Hz - 20kHz, +/- 3.0 dB

1/2" Nominal diameter, fits standard calibrators

Consumes less than 50ma in use

Omnidirectional response

## ***Audio Output***

1/8" (3.5mm) audio output

20-20kHz response

Line output signal

# Support

See our website for the most up-to-date information about our products.

[www.studiosixdigital.com](http://www.studiosixdigital.com)

support@studiosixdigital.com

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