

Assess the Environment

The very first thing on your list when you decide to build a studio, mix or recording room is to evaluate the environment where the studio will be. What we need is the noise spectrum and the SPL (sound pressure level), unweighted or C-Weighted. We must use a standard measuring technique to be confident that the existing environmental noise levels will not interfere with the studio operation. Your studio sound-proofing will need to be adjusted according to what is found during the measuring process.

Failure to do this part first will often result in the failure of the studio as a business or a hobby.

An SPL meter or phone app is not good enough and will only allow you to get a rough idea of the existing environmental noise levels.

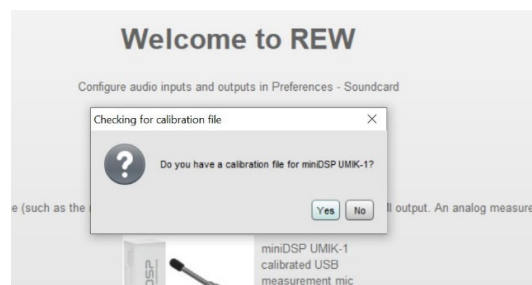
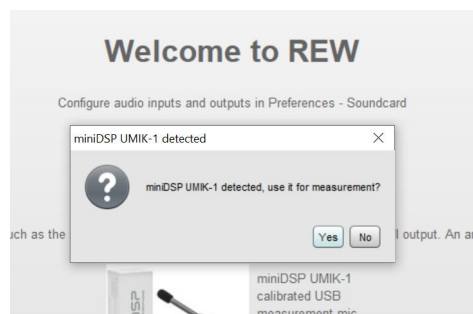
Prepare the equipment needed

You will need a calibrated testing mic and your computer or laptop for these tests.

- a. Purchase the miniDSP UMIK-1 calibrated USB measurement microphone (Google it. You can find it on Amazon)
- b. Download the free software Room EQ Wizard - <https://www.roomeqwizard.com/>

Setup

1. Install the REW software on your computer. Follow the directions written in the help files.
2. Plug in the USB cable for the UMIK-1 and turn the computer back on.
3. Open REW (it doesn't matter what OS you are running. This works the same for Mac or PC). You will see the following:



Go to the website <https://www.minidsp.com/products/acoustic-measurement/umik-1> and scroll down until you see this:

Unique Calibration File Download

All UMIK-1's are calibrated with a unique calibration file. In addition, an unique autogenerated 90-degree calibration file for use with surround system applications. To download the calibration files, look for the 7 digit Serial Number (shown on the body of the microphone).

1. Enter the serial number in the form below (minus digits three & four e.g. 7000000).
2. Your calibration files will automatically download in most browsers. If not, click on the links provided to manually download.

Calibration file download

Serial number: 701 6613

Which calibration file should I use and where to point the UMIK-1?

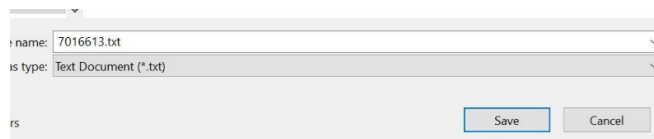
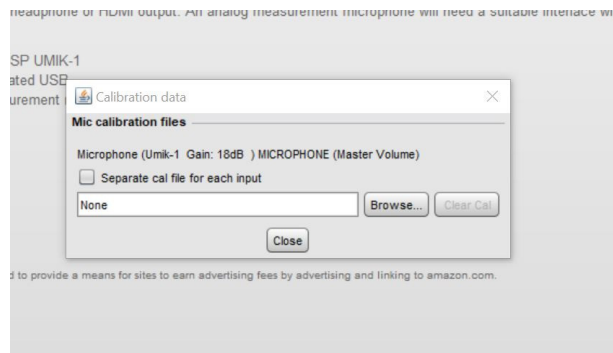
We provide two calibration files to be used depending on your application.

For stereo system (e.g. 3d) direct free single speaker measurement, use the 0deg file and point the UMIK-1 at the speaker.

For multichannel system (E.g. 5.1/7.1) or a surround application where multiple speakers are spread out around the room, use the 90deg file and point the UMIK-1 at the ceiling.

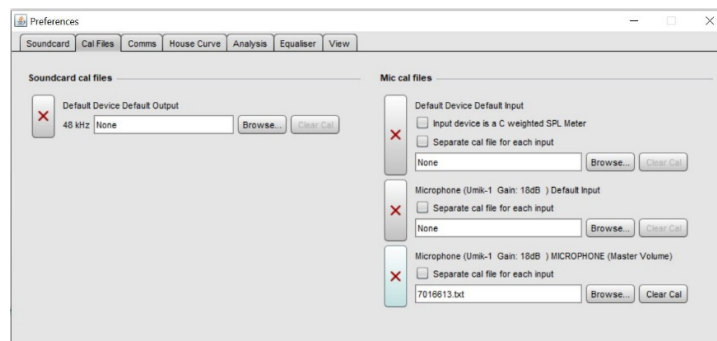
Enter the serial number that is on the bar-code label ON the microphone. (please don't enter the number that is shown in the screen-shot. That's MY microphone's serial number.

SAVE the text file in a place where you can access it later.



In REW, when asked for the Mic calibration files, click Browse. Navigate to the folder where you saved your cal file (text) and select it

as show in the next screen-shot.



Preferences

Soundcard Cal Files Comms House Curve Analysis Equaliser View

Drivers: Java Output Device: Default Device Buffer: 32k Input Device: Microphone (Umlk-1 Gal... Buffer: 32k

Sample Rate: 48 kHz Output: Default Output R Input: MICROPHONE (Master V... R

Timing Reference Output: L Loopback Input: L

Input Options: ☐ Invert ☐ High Pass ☐ Control output mixer/volume Output Volume: 0.500 Mute ☒ Control input mixer/volume Input Volume: 0.530

Sweep Level: -12.0 dBFS

Soundcard calibration

Default Device Default Output at 48 kHz: None Calibrate soundcard... Browse... Clear Cal Make cal file...

Levels

Use main speaker test signal to check/set levels Check Levels... Generate Debug File... Use pink periodic noise for level checks throughout REW

Help

Choose the **Output Device** and **Input Device** you wish to use for measurements. After the devices have been selected the particular **Output** and **Input** can be chosen. The channels used for output and input are selected from the drop downs to the right of the output and input selections, most outputs and inputs are stereo so you have the choice of using the left or right channel, or (for output only) both channels. Some interfaces only provide mono inputs or outputs, if that is the case the channel selectors will be disabled.

Make sure that the input channel is the one connected to your SPL meter (or mic preamp output). If **Use loopback as timing reference** has been selected in the **Analysis Preferences** the other channel will be used as a reference to remove time delays within the computer and interface, this requires a loopback connection on the reference channel.

Next > Cancel

Set up your sound card as shown above. Click the tab, Cal Files, to check if the cal file is in the correct slot – as shown. Close Preferences.

Make a measurement

Type: **SPL** Impedance

Name: Add number Add date/time Use as entered

Will appear as: Sep 4

Notes:

Keep for next measurement

Start Freq: 0 End Freq: 20,000 Hz

Range: 0 Level: -12.00 dBFS RMS dBu dBV Volts dBFS

Ready to measure... 0%

Input:

Method: **Sweep** Noise

Settings: Length: 2M Repetitions: 1 43.7 s

Timing: No timing reference Set t=0 at IR peak

Protection: ☒ Abort if heavy input clipping occurs ☐ Abort above SPL limit 100 dB

Playback: **From REW** From file

Sample rate: 48 kHz Delay: 0 seconds

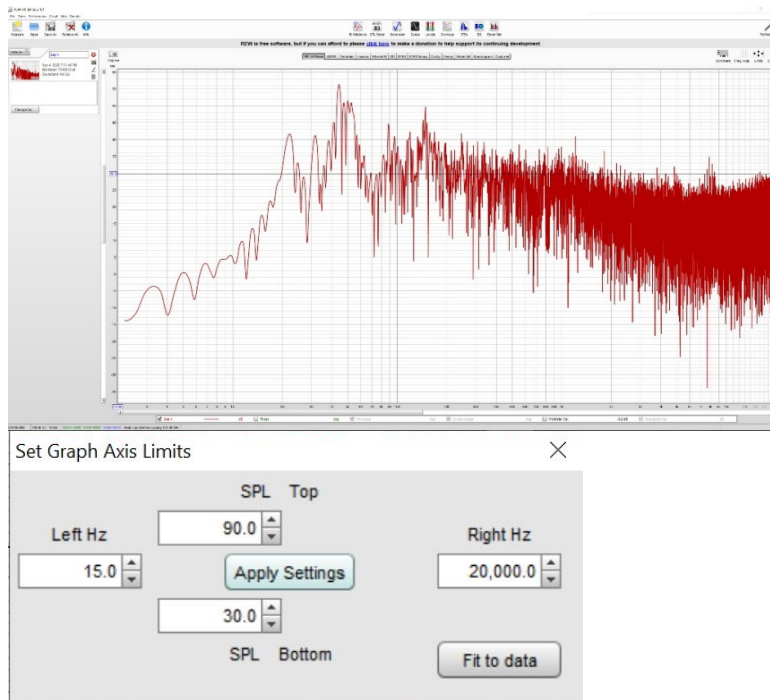
Output: Default Output R

Cal files...

Input: MICROPHONE (Master Volume) R

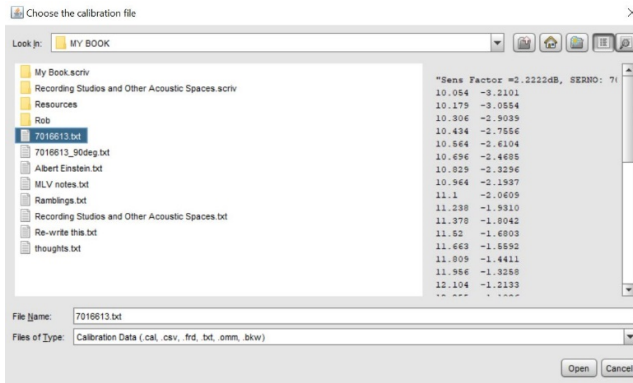
Check levels Start Cancel

Next, click Make a measurement. Adjust your settings so that they are as shown here. **Wait for the noisiest moment to test.** Click Start and be very quiet. – We want the ‘worst-case’ noise when testing.

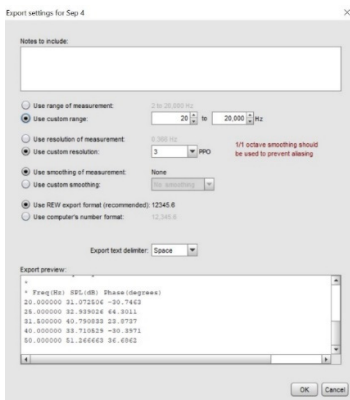


Once the measure appear in the display, you can fit the data to the screen by going to the upper RH corner and clicking Limits. You will see 'Set Graph Axis Limits'. Click 'Fit to data'. Save measurement(s).

You can skip the next steps if you plan to send the data to me. You can use wetransfer.com to send me the REW *.mdat file.

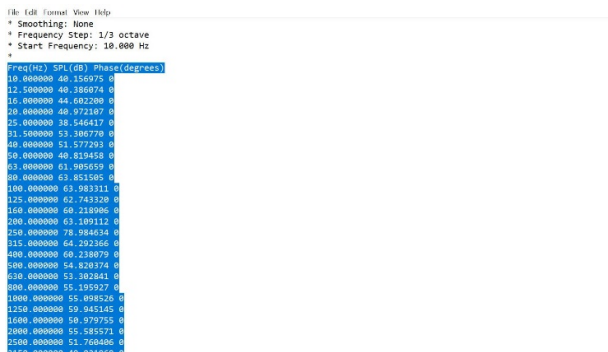


Next we're going to export the data so that we can pull it into a spreadsheet and 'work on it'.



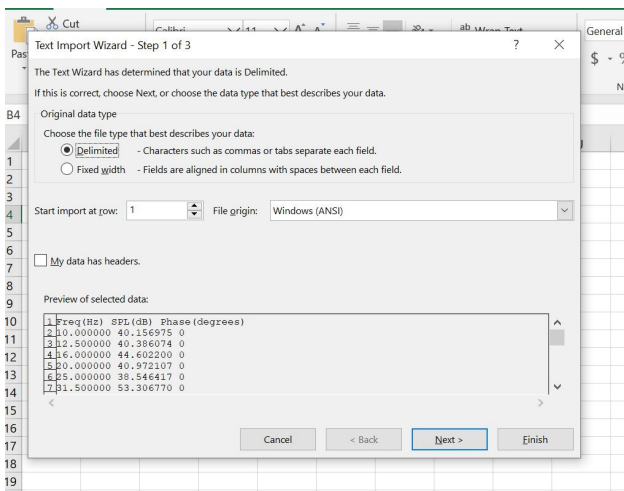
We don't need the high-resolution data that REW is capable of because it would be pages long and we would need to average it anyway. It's best to get no more than 1/3rd octave information.

So make your Export settings as shown above. Save them where you can access them.



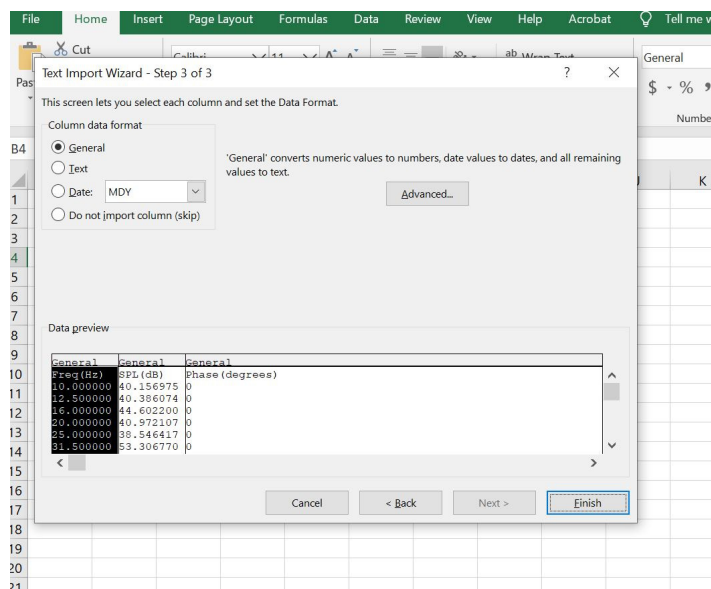
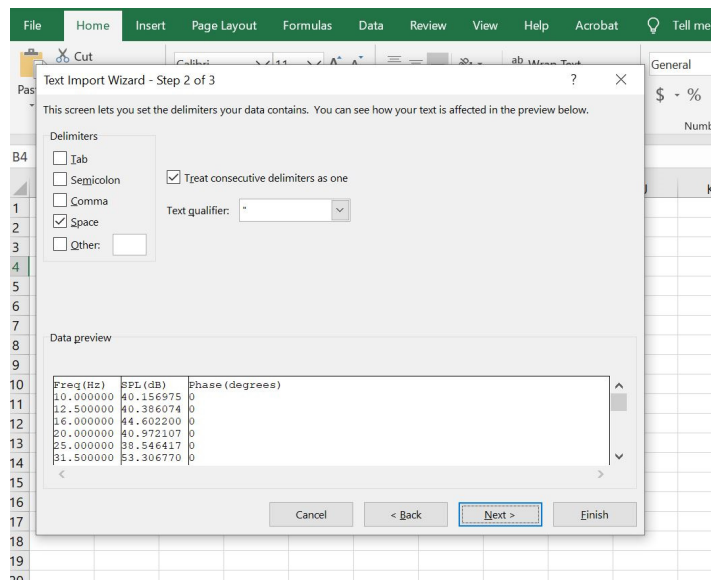
The next step is to import them into an Excel spreadsheet.

Select the text as shown. You don't need the top part of the text file, only the data.



Open Excel. Select cell B2 and then click the arrow under the Paste icon. Select "Use Text Import Wizard" as shown here.

Check the fields as shown... continue.



Press Finish and you have your data displayed.