

## SOME NOTES IN ADDITION TO THE HELP FILE (USER MANUAL) OF THE ROOM EQ WIZARD (“REW”) SOFTWARE

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<https://audioreviews.org>



**Purpose:** this cookbook aims to clarify and streamline the information in REW’s original help file in order to save time and frustration with the setup.

**The original REW help index** (*read as often as possible*):

[https://www.roomeqwizard.com/help/help\\_en-GB/html/](https://www.roomeqwizard.com/help/help_en-GB/html/)

### What you need:

1. A computer with external speakers
2. The REW software (free download: <https://www.roomeqwizard.com>)
3. A USB microphone OR a calibrated measurement microphone ([like this Dayton imm-6](#))
4. If you don’t have a USB microphone but the second kind (“Dayton”), you need an USB audio adapter such [as this one](#) between the mic and the computer’s usb port
5. A [TRS to TRRS adapter](#) for connecting Dayton with usb audio adapter
6. An external dac/amp with volume control connected to another one of your computer’s usb ports (I use the Schiit Fulla but could also use the Shanling M0, for example)
7. A sound meter like [this one](#)...there may be phone apps, too.



## Setup workflow:

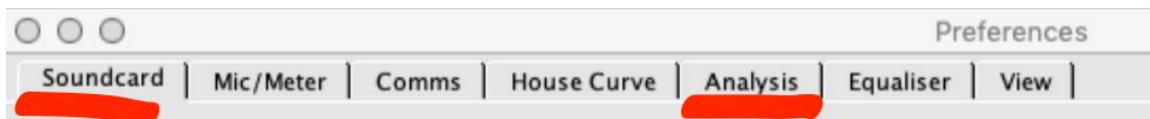
1. Setting up preferences
2. Soundcard calibration, step I: calibrating REW's internal SPL (**Sound Pressure Level**)
3. Soundcard calibration, step II: calibrating dac/amp and usb audio adapter

*If you purchase a USB microphone, you can skip steps 2 and 3. And that's all, folks...always good to get the big picture right away. So let's start with the preferences...*

## Setting Up Preferences

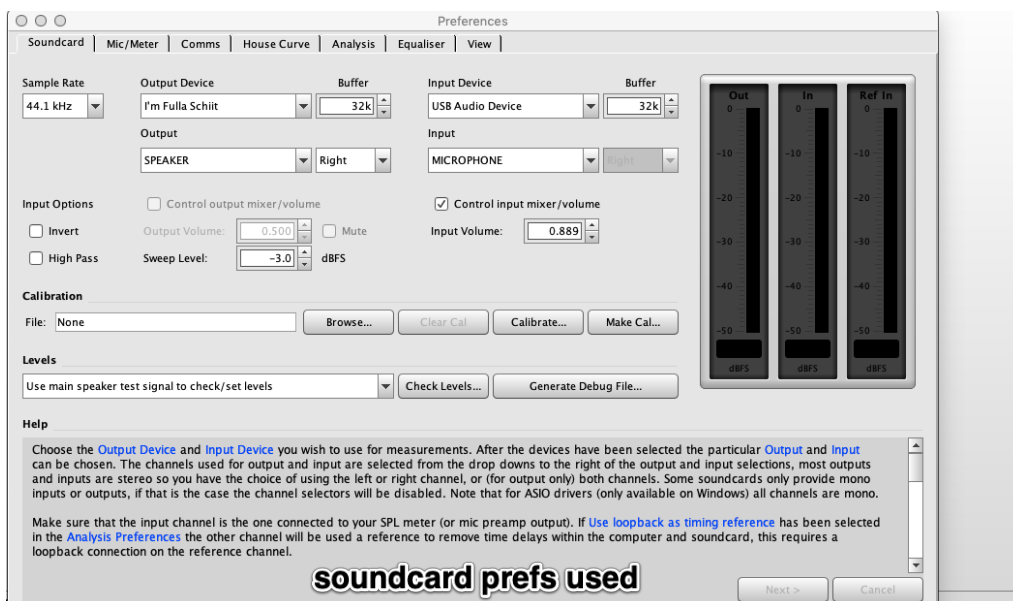
*This is easy. You just copy the settings provided. Biodegraded has extracted them from discussion forums. And they work...*

When you open the "Preference" panel you see the following tabs.



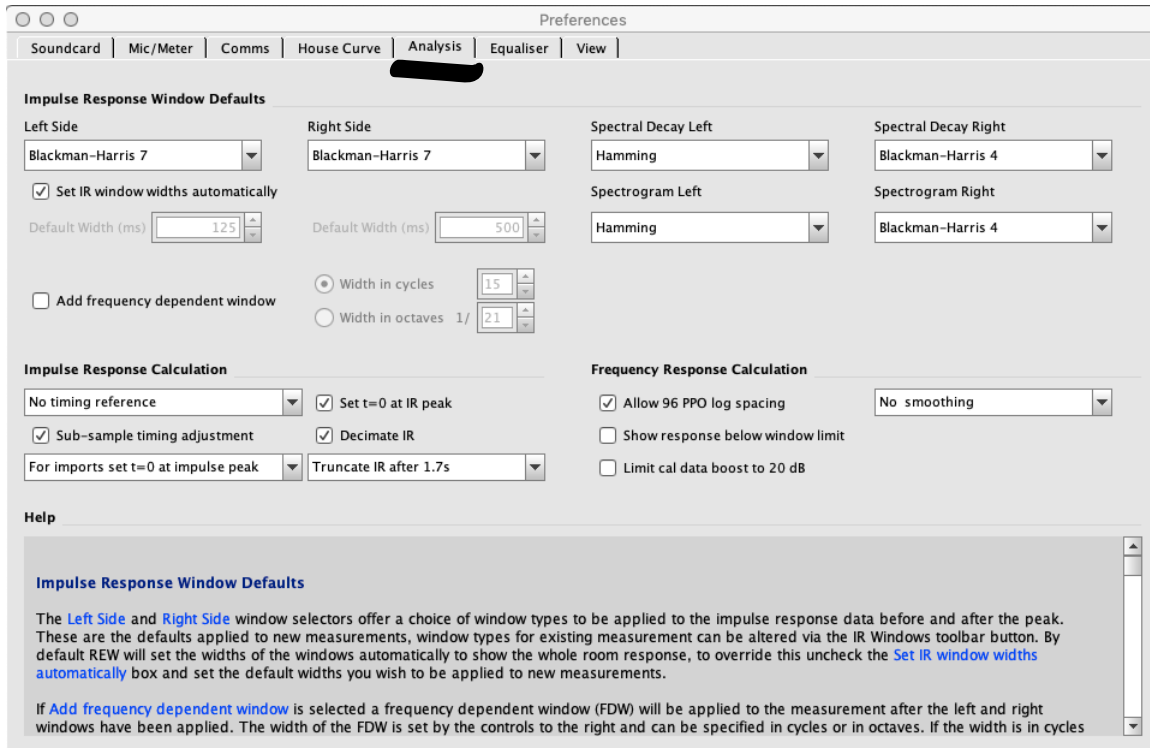
Only the two underlined tabs "Soundcard" and "Analysis" need to be modified by you – the other five tabs remain untouched.

This is the **Soundcard preference panel**. All you have to do is inputting the numbers and input/output devices seen in this screenshot. The input volume should be 0.9. "Output device" is whatever dac/amp you have plugged in, and "input device" is whatever your computer calls the USB audio adapter.



This is the **Analysis preference panel**. Just fill in these settings into your own window.

*Note: the greyed-out Control output mixer/volume should be set at 0.500. We had some initial problems doing that.*



*And we are done with the Preference setup – close the pane. Wasn't all that bad, was it? But hey, why did we ignore the mic/meter tab? After all, our Dayton mic comes with a calibration file...shouldn't we input it there? Well, no, apparently the measurement results are better without the calibration file.*

## Soundcard calibration, step I: calibrating REW's internal SPL

[https://www.roomeqwizard.com/help/help\\_en-GB/html/inputcal.html](https://www.roomeqwizard.com/help/help_en-GB/html/inputcal.html) - top

Hardware setup:

**Input:** microphone → TRS to TRRS adapter → USB audio adapter → computer's usb port

**Output:** computer's headphone jack → external speaker

*The idea of this step is to tell the internal SPL what 85 dBs in real life is. For this, we need an external sound source. An 85 dB sound from the computer's loudspeakers is recorded by the (in our case) Dayton imm-6 microphone. 85 dB is an arbitrary number that has proven to work well for measurements. The sound is generated with the REW software and output to an external speaker via the headphone jack and recorded by the*

*microphone. When you hold your hand held sound meter side-by-side with the microphone, you can adjust the volume of the sound so that both sound meter and microphone record the desired 85 dB.*

1. After having connected all devices, open the SPL in REW. Select “Calibrate” and choose Signal Source “Use an external signal”.
2. Next, select “Generator” to produce the sound. Make sure, you got the right settings:  
RMS level: -3.0  
1000 Hz sine wave  
Speaker: can be left or right, doesn't matter

3. Now run the sine wave and adjust the volume on your amplifier (Fulla or whatever) until you measure 85 dB with the hand held sound meter. Place the microphone at the location where the sound meter reads 85 dB, adjust the internal SPL to 85 dB, and then push “Calibrate” à use external signal.

*Done! Now we have calibrated the internal SPL as part of the soundcard calibration. And you never will have to do this again for this hardware.*

### **Soundcard calibration, step II: calibrating dac/amp and usb audio adapter**

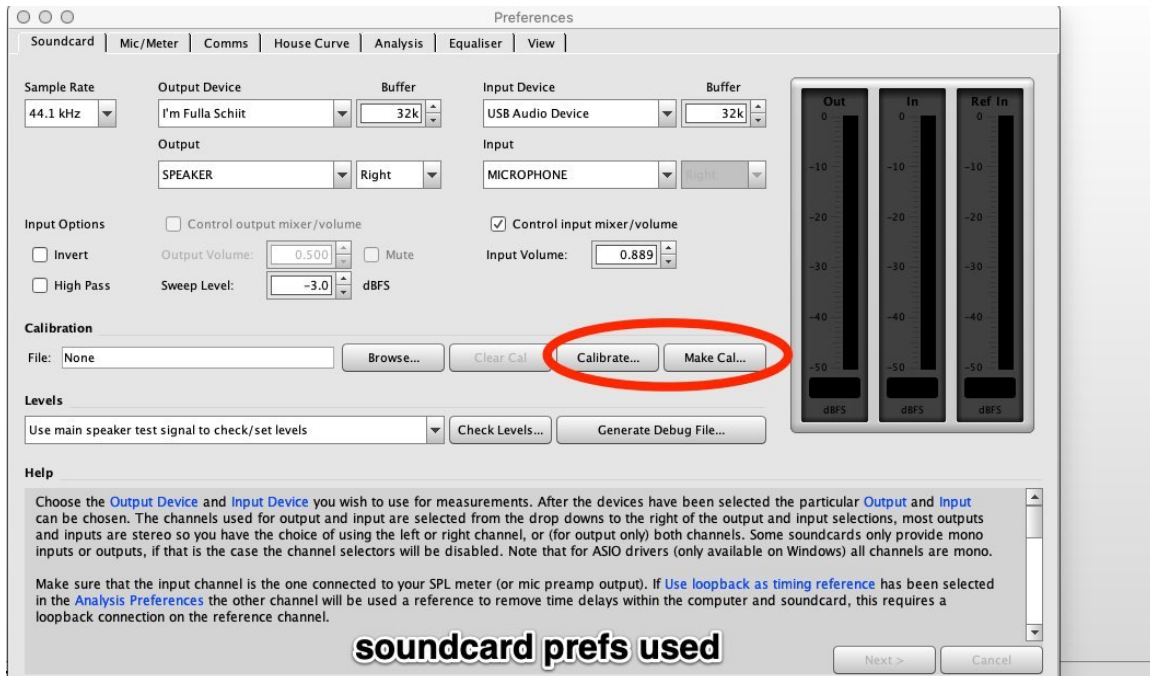
Hardware Loop:

First USB port (**output**) → dac/amp → 3.5 mm audio cable → TRRS to TRS adapter  
→ audio adapter → second computer USB port (**input**)

*This step produces a calibration file to be used in your soundcard preferences. For this we need an internal sound source. This calibration file is specific for this hardware arrangement and can be used each time you perform measurement. If you decide, for example, to use another amp/dac, you will have to create another calibration file.*

1. Carefully double-check your soundcard preferences.

This is the same screenshot as the first one above.



There is a “Calibrate” and a “Make Cal” button. What is the difference? “Make Cal” is the important one -- used to create our calibration file.

The “Calibration” is used to apply the calibration file to the soundcard.

Open Generator and SPL: produce a sine wave with the same settings as before:

RMS level: -3.0  
1000 Hz sine wave

Press the SPL’s record button. Adjust the volume of the dac/amp so that the SPL meter shows 85 dB (you remember that number from before). Let it run.

Next, push the “Calibrate” button to run the calibration process.

Now switch off the sound.

Push the “Make Cal” button to save your calibration in a file. At one point you will have to name this newly generated file.

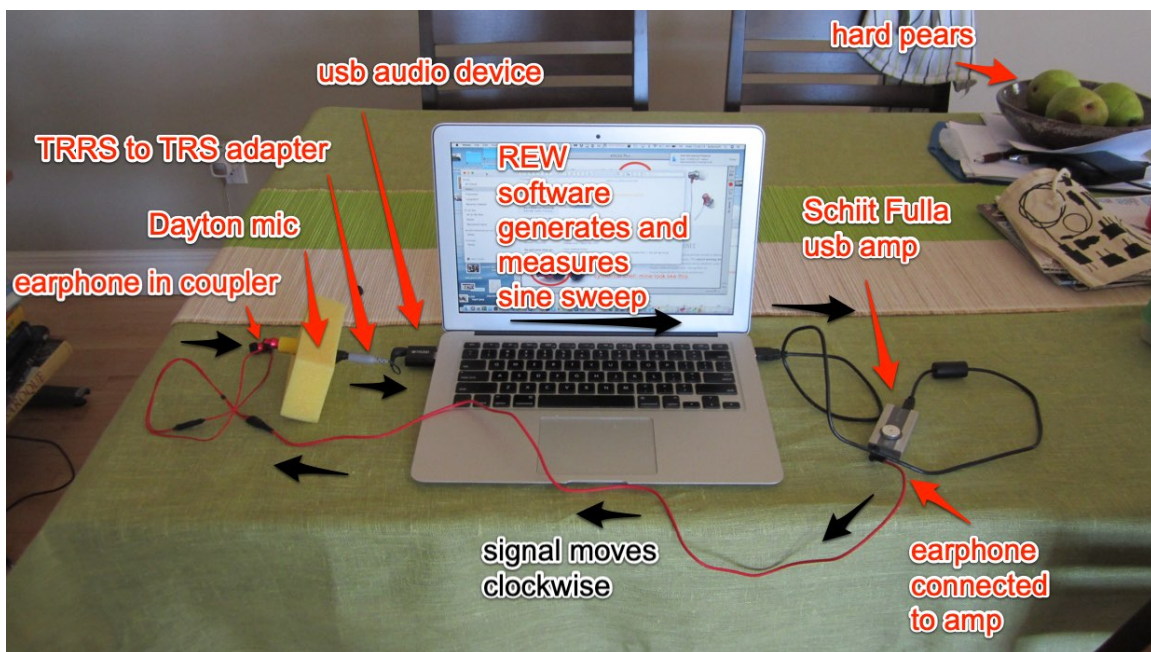
*Congratulations, your soundcard is now calibrated and will never have to be recalibrated again for this hardware setup...unless you accidentally push the “calibration button”.*

*And if you break your Dayton microphone for another one, you will also not have to recalibrate the SPL meter again – as the error of any specimen of this model has more variation than our calibration error.*

*And now some window dressing...fine-tune your display window that will host your frequency response curves.*

Set axis limits to 50 to 105 [dB] and 20 to 20000 [Hz]

*And done. Now we can focus on the measurements.*



### Measurement SPL by Biodegraded

After performing the SPL and 'soundcard' calibrations described above, you're ready to make some measurements. Because different headphones have different sensitivities, you'll need to play with the volume on your output device (amp) to get the same level (85 dB SPL at 1 kHz) for each headphone being investigated. To do this:

- 1) Put the headphone/earphone on/in your microphone measurement coupler (e.g., our highly sophisticated plastic double-tube) and connect it to your output device (amp).
- 2) Open the Generator and adjust it to RMS Level dBFS **-3**; choose Sine Wave & 1000 Hz for the inputs and Speaker, L or R (corresponding to whichever 'phone you're measuring); and hit the 'play' button.

- 3) Open the SPL Meter, hit the big red 'record' button, and adjust the volume on your amp until the dB screen reads 85.0.
- 4) DO NOT HIT THE 'CALIBRATE' BUTTON on the SPL Meter, or you'll ruin all the good work you did in calibration step 1 above and will have to repeat it. Exit the SPL Meter and Generator.

Note that a common standard for headphone measurements is 90 dB at 1 kHz rather than 85 dB. We use the latter because we find with our setup that peaks in the frequency response (commonly the ones around 3kHz) any higher can result in clipping (overloading of the input), leading to the FR curve at the offending frequency being blunted or flattened (and the sound being distorted). Occasionally (e.g. with 'Chifi chainsaws') this also happens at 85 db. REW will warn you if it does. If so, use a lower level (e.g. 80 dB) at step 3 and try again. If you still get clipping at 80 we suggest there's no need for any more measurements and recommend throwing the offending earphones away or using them to punish evil children rather than putting them in your own ears.