Setting UP the UMI-1 with REW

PC based test gear or single purpose device?

Is there an easier way? Sure. There are lots of options for a single purpose device that will allow you to make frequency response measurements of audio systems. The benefit of a closed system (a hand-held) is that it's already calibrated. You turn it on and you're ready to go. That's an attractive option, but it often comes at a much higher cost.

The benefit of using a PC is that the software available is often much more powerful and can display the information in several formats. Once you have some experience, you'll find that being able to store and analyze measurements is a valuable feature, especially if tuning audio systems is part of your profession.

We've designed this kit to be a convenient way to get all the parts you need to make accurate frequency response measurements of car audio systems without the hassle of figuring out what to buy, how it works together and how to calibrate all of it for use with your favorite analysis program.

How this works.

Another benefit of PC test gear is that instead of the accuracy of measurements being dependent on the perfect accuracy of a microphone or a soundcard, we can use the processing power of the PC to remove the frequency response of our test rig and to compensate for the frequency response of the microphone, so long as we know what that frequency response is. That's what the microphone calibration file is for.

If you follow these instructions, you'll be able to make frequency response measurements that are just as accurate as the ones you might make with a lab-grade measurement tool costing much more.

The frequency response of the sound card that's included should be removed from the measurement. Room EQ Wizard makes this simple. Using a calibration routine, you'll make a measurement of the sound card with its input connected directly to its output. Then, the program will store that measurement as a "calibration" file and subtract that frequency response from every measurement you make. If you perform the calibration correctly, your measurements will be super accurate.

The frequency response of the microphone can also be removed from the measurement in the same way. Both Room EQ Wizard and True RTA provide a way to store the frequency response curve of the microphone (your calibration file) and also subtract it from each measurement you make.

So, if accuracy is important, then it's a good idea to follow these instructions to set up your kit. You'll only have to do this once.

NOTE: This process will not calibrate the ACTUAL SPL readings you'll make with your kit. The graph will show an accurate frequency response shape, but the actual SPL level won't be correct. For that, there is a second process that we will describe in a second document. Usually, when tuning cars, we are more interested in the frequency response shape and the relative levels between channels and speakers. Accuracy of those aspects is assured by this process, even if the absolute level is incorrect.

Step 1. Download version 5.20.13 at www.roomeqwizard.com and follow the instructions to install the program.

Step 2. Using the extension cable and the 3.5mm male to male adapter, plug the soundcard input into its output.
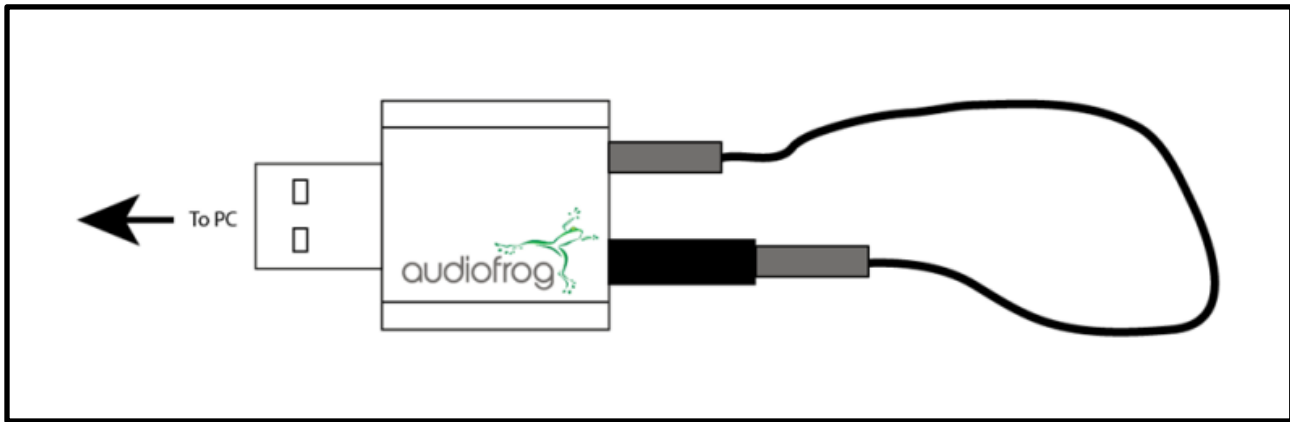

Plug the soundcard into an open USB port on your PC.

Step 3. Right click on the speaker icon at the bottom right of your computer screen and choose Playback Devices from the drop down menu. You'll see a list of all possible playback devices. The USB Audio Device should be highlighted. Double click on the USB Audio Device.(For windows 11: tap the windows key then type "control panel". The control panel will appear. Click on control panel. Once in the control panel at the top right corner type "sound". Click on menu item "Sound").
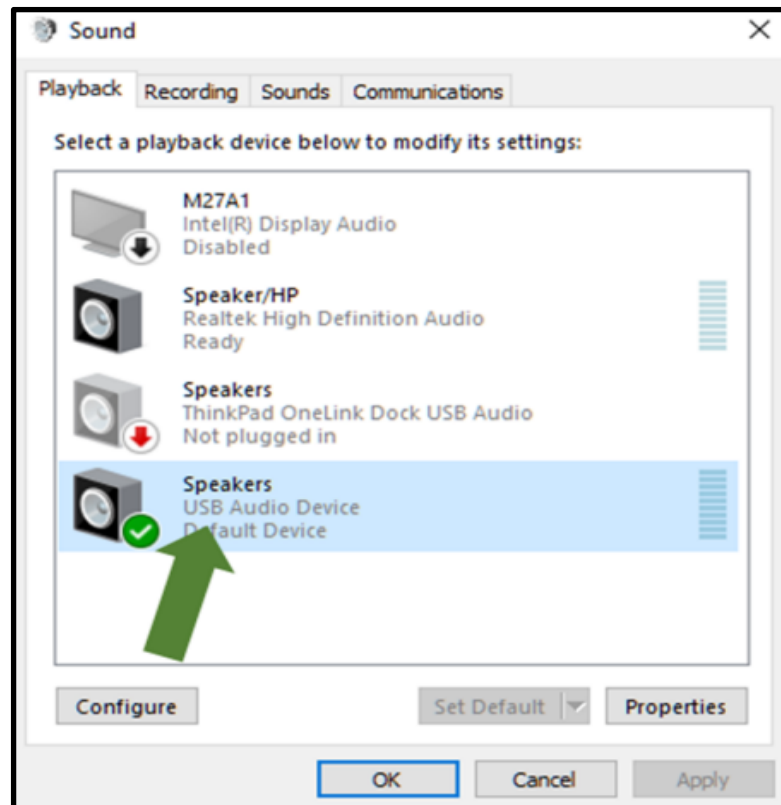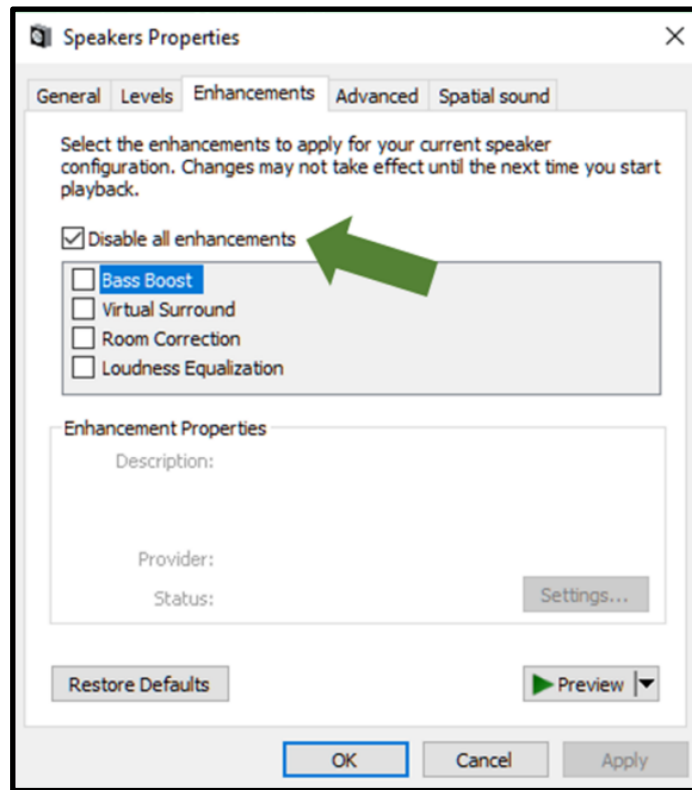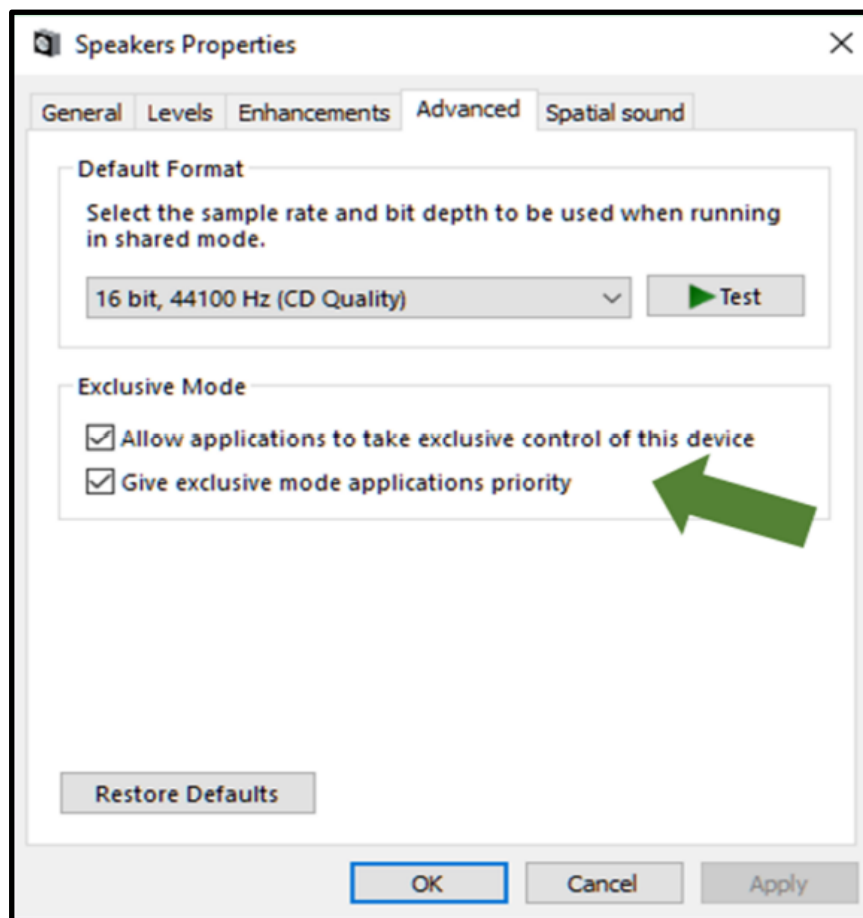
Windows 11:
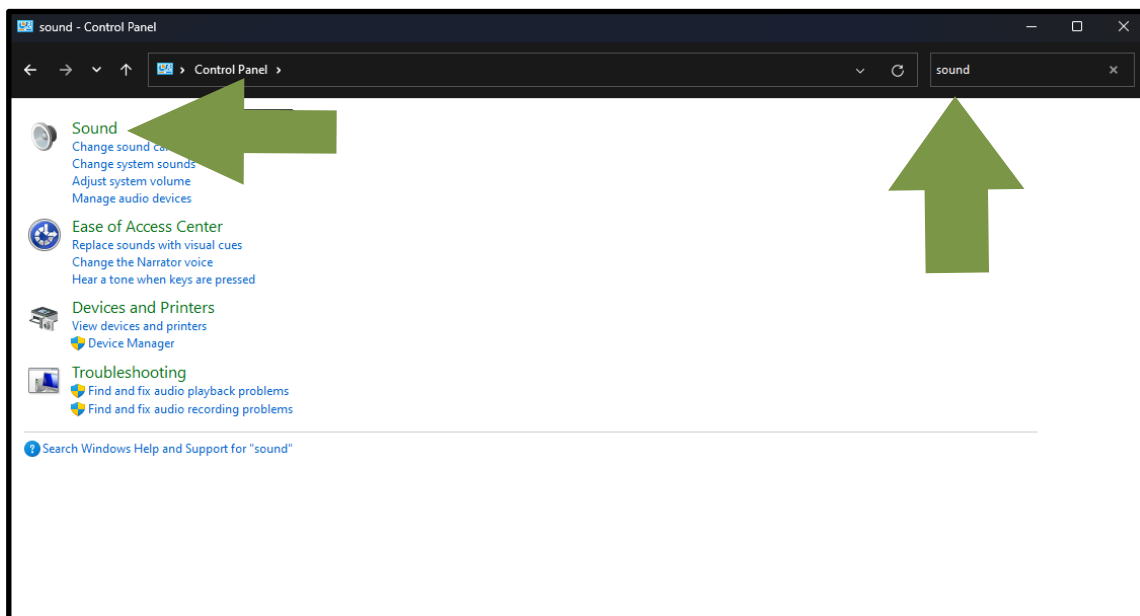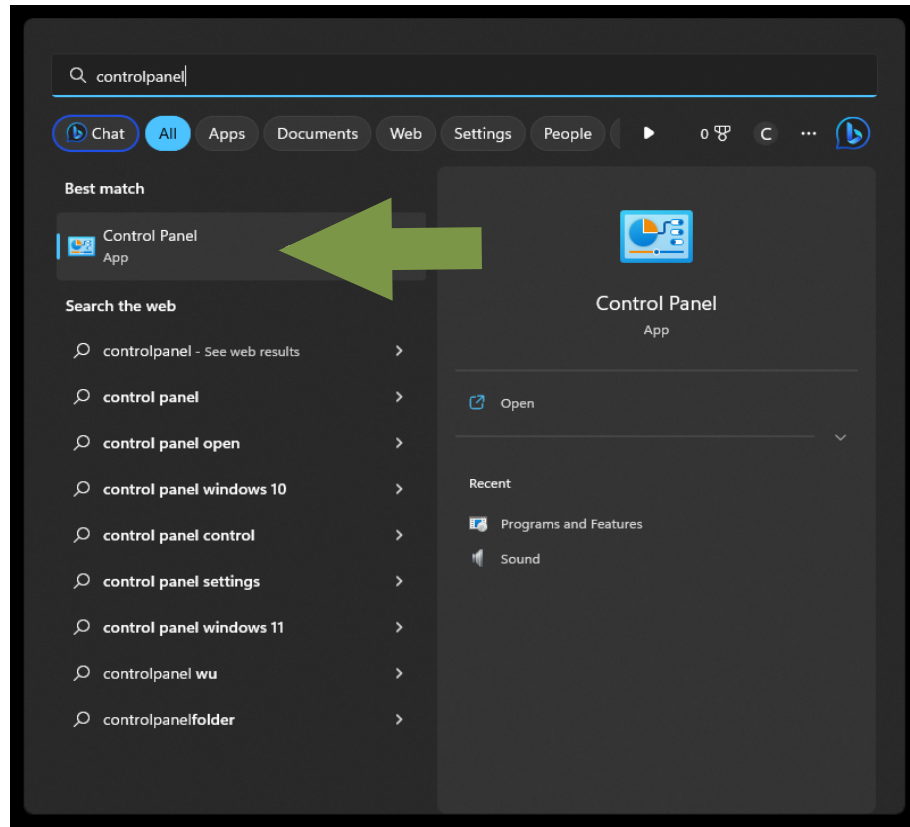
Step 4. In the box that's now open, choose the "Levels" tab and set the level to 80 using the slider control. The "Microphone" should be muted.
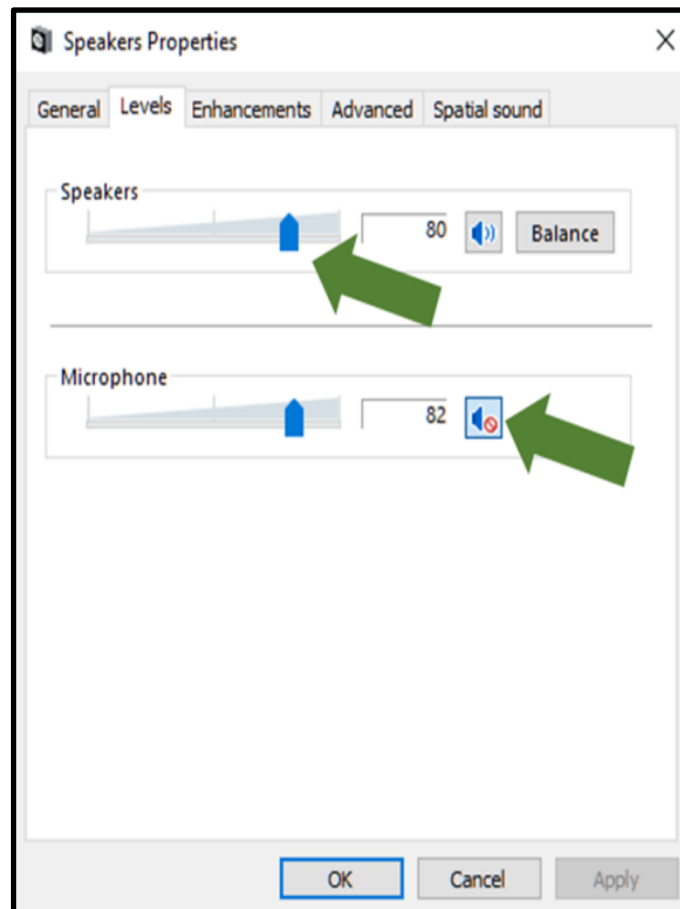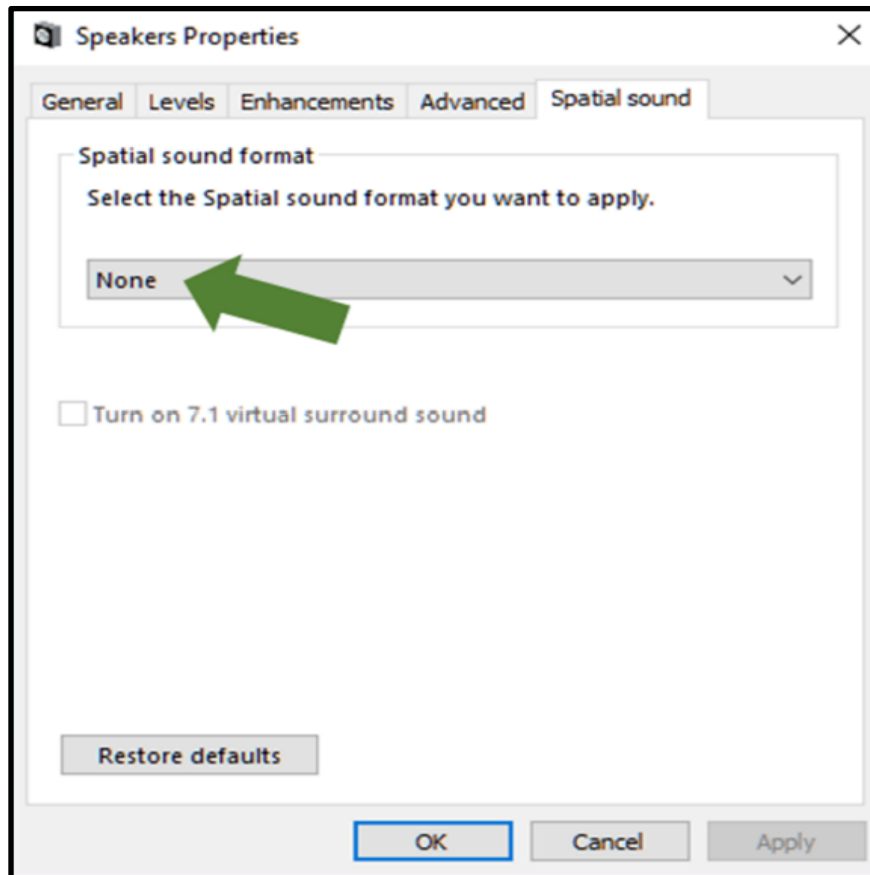
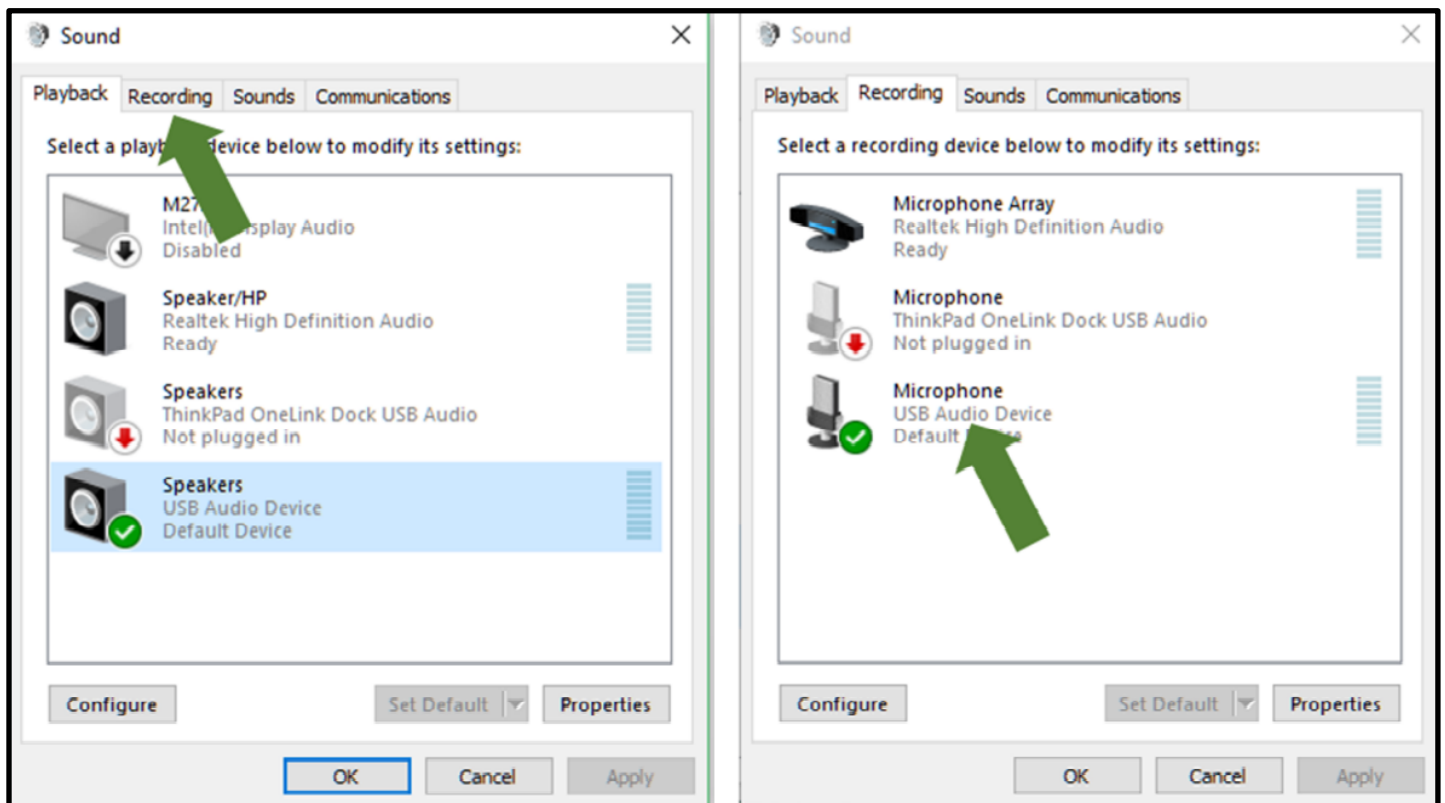**Step 5.** Click on the "Enhancements" tab and be sure that all enhancements are disabled.

Step 6. Click on the "Advanced" tab and be sure that the boxes under "Exclusive Mode" are checked.
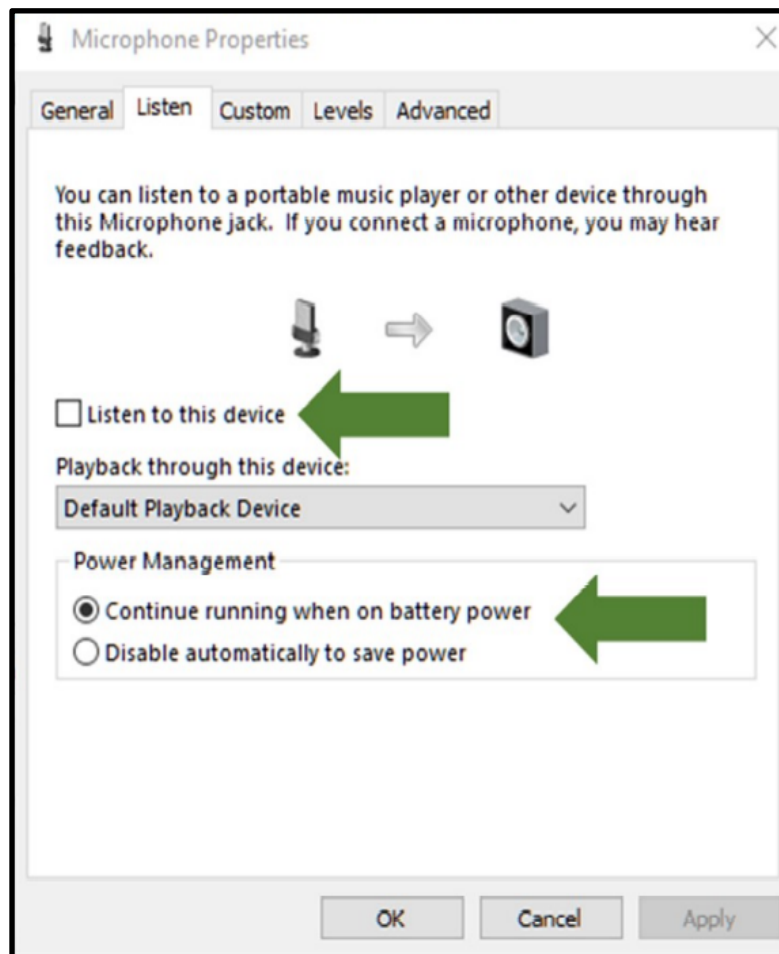
**Step 7**. In the "Spatial Sound" be sure that Spatial Sound is disabled. Click OK

**Step 8.** Now, click on the "Recording" tab and double click on the USB Audio Device.

Step 9. In the "Listen" tab, be sure that the "Listen to this device" box is unchecked and that the box next to "Continue running on battery power" is checked.
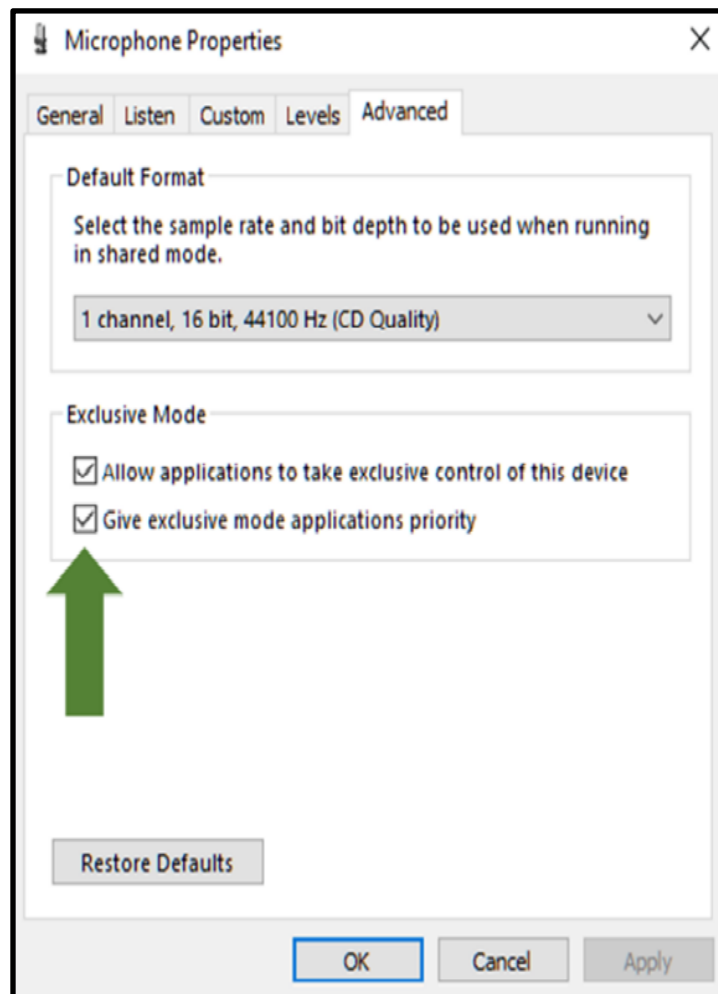
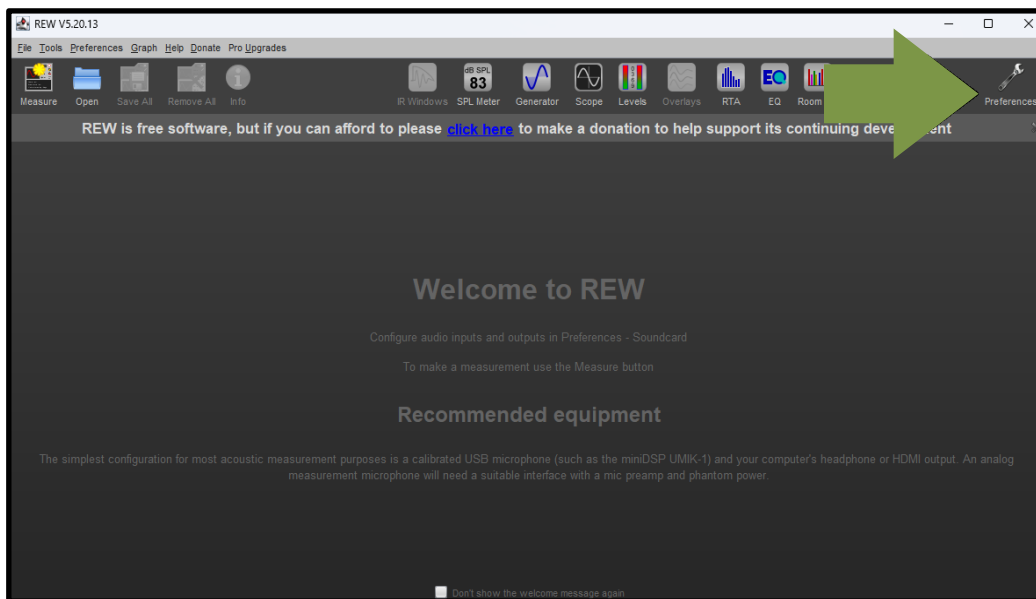**Step 10.** If you have a "Custom" tab, click on it and be sure that the AGC (Automatic Gain Control) box is unchecked.
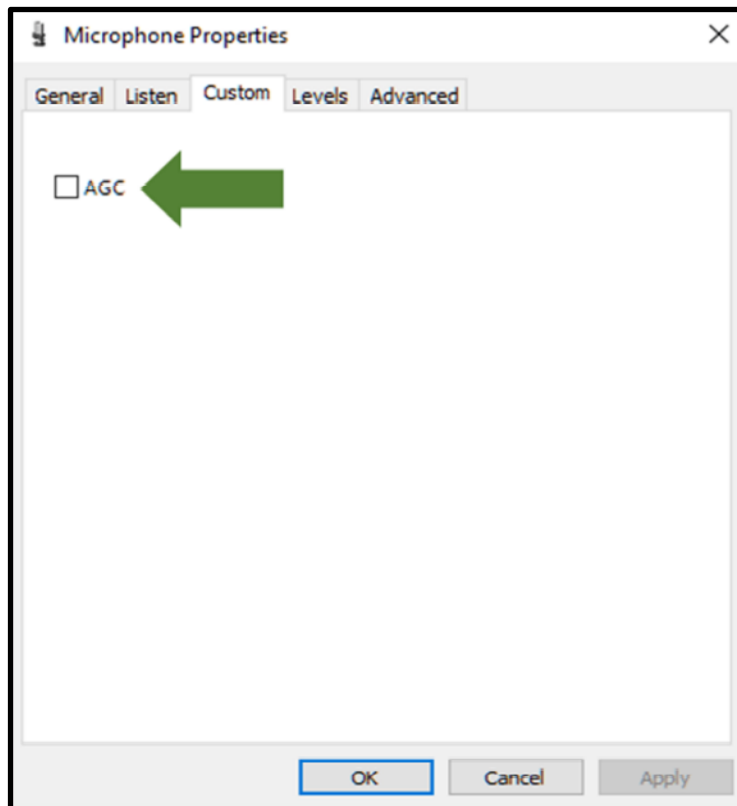
Step 11. Click on the "Levels" tab and set the level to 80.
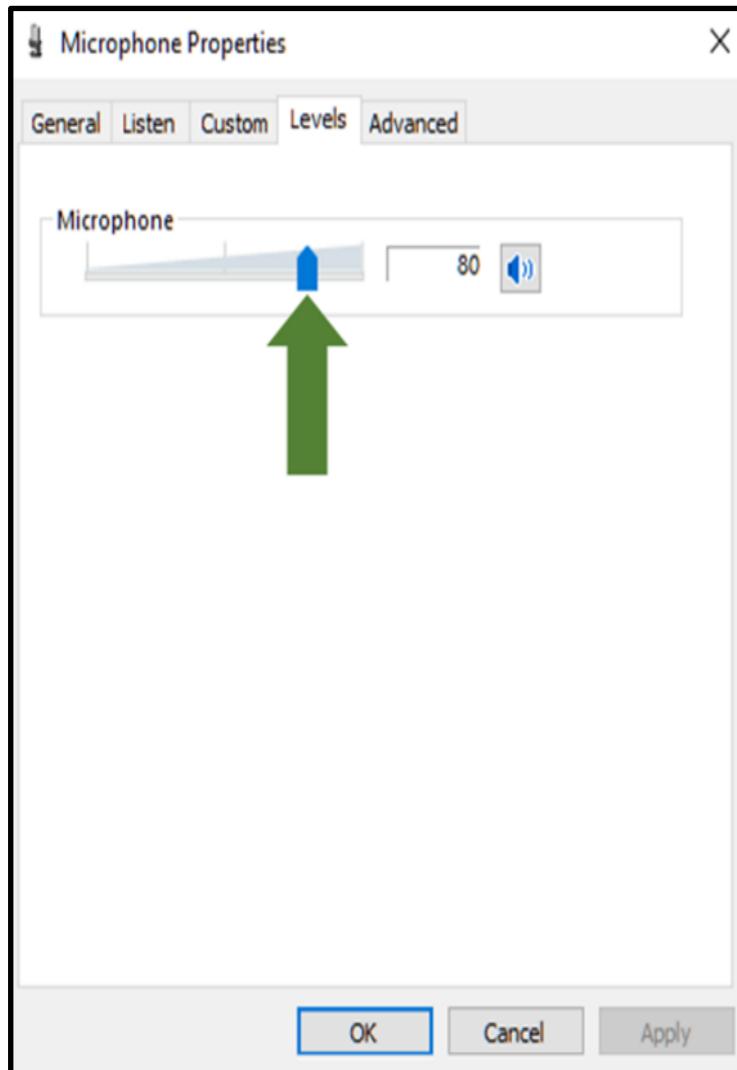
**Step 12.** Click on the "Advanced" tab and be sure that the boxes under "Exclusive Mode" are checked. Click OK. Then, click OK again.

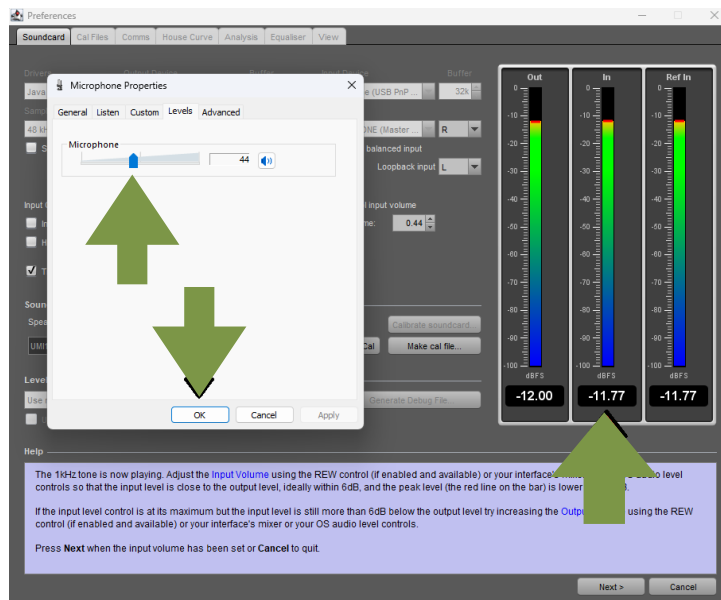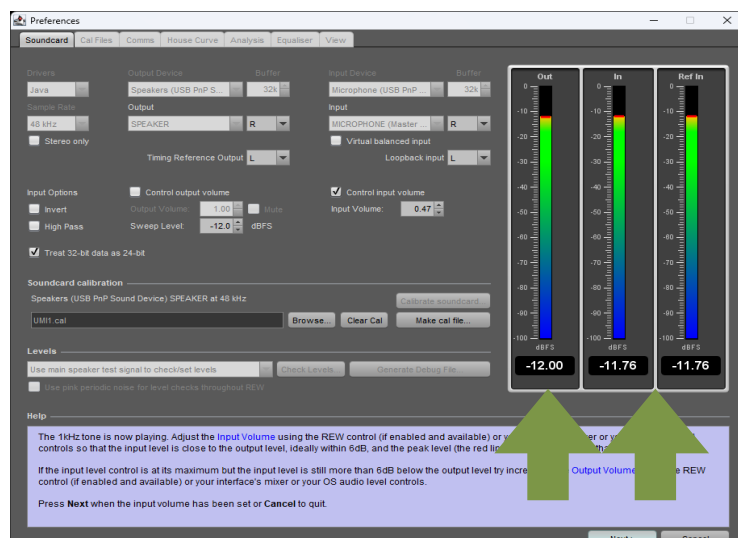**Step 13.** Run Room EQ Wizard and Click Preferences .

Step 14. Use the down arrows and the drop down menus to select the USB device in the "Input" and "Output" selection boxes. Also, choose "Use main speaker signal to check/set levels". Double check that all of the other boxes in the "Soundcard" panel match the settings shown below.

Step 15. Click "Calibrate". After you click "Calibrate", the information in the "Help" box will change to indicate the next steps. Read it if you want. If not, click "Next" and then click "Next" again.
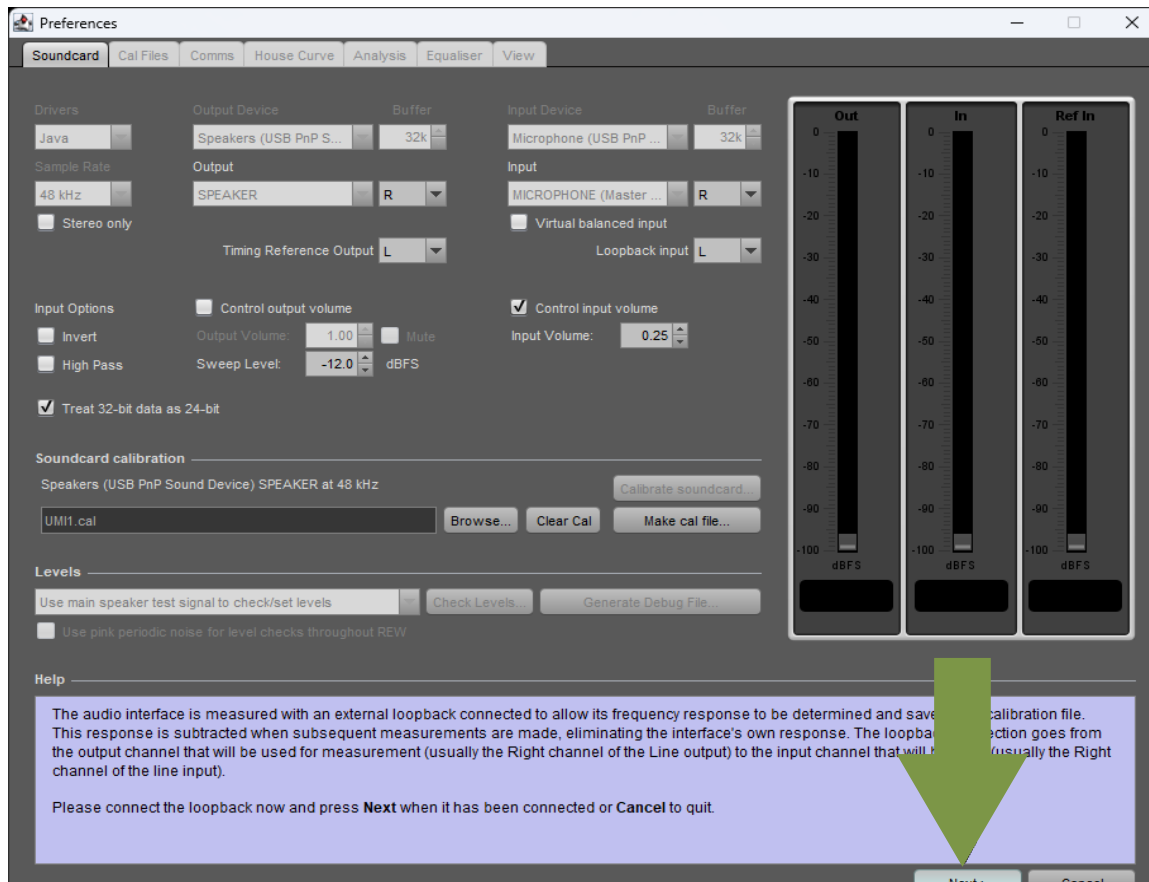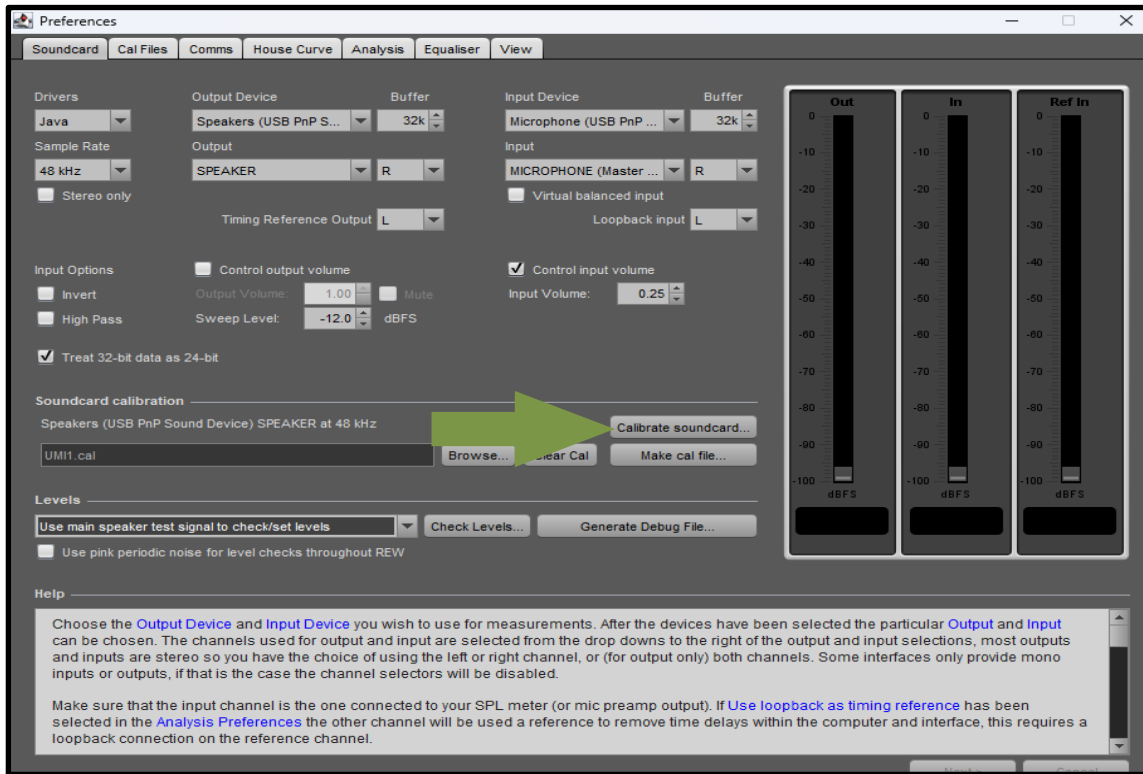
Step 16. After you've clicked "Next" twice, the analyzer will send a signal out through the soundcard and receive the signal through the sound card. The three level bars indicate the output level (left), the input level (center) and the reference input level (in this configuration,(the In and Ref In are the same). Check the level meters. The inputs should be within about one dB of the output level. If they aren't, right click on the speaker icon at the bottom of your screen, choose "Recording Devices" and then choose the "Levels" tab. Adjust the level of the microphone while watching the level bars. When they are within one dB of the output, click OK in the microphone panel.

Step 17. Click "Next" in REW's Soundcard panel. Then click "Next" again.

Step 18. REW will start a measurement, which will take a few seconds. Once the measurement is complete, it will be displayed in the measurement panel. Ignore that, for now.

Step 19. Click "Make Cal" to store the measurement.
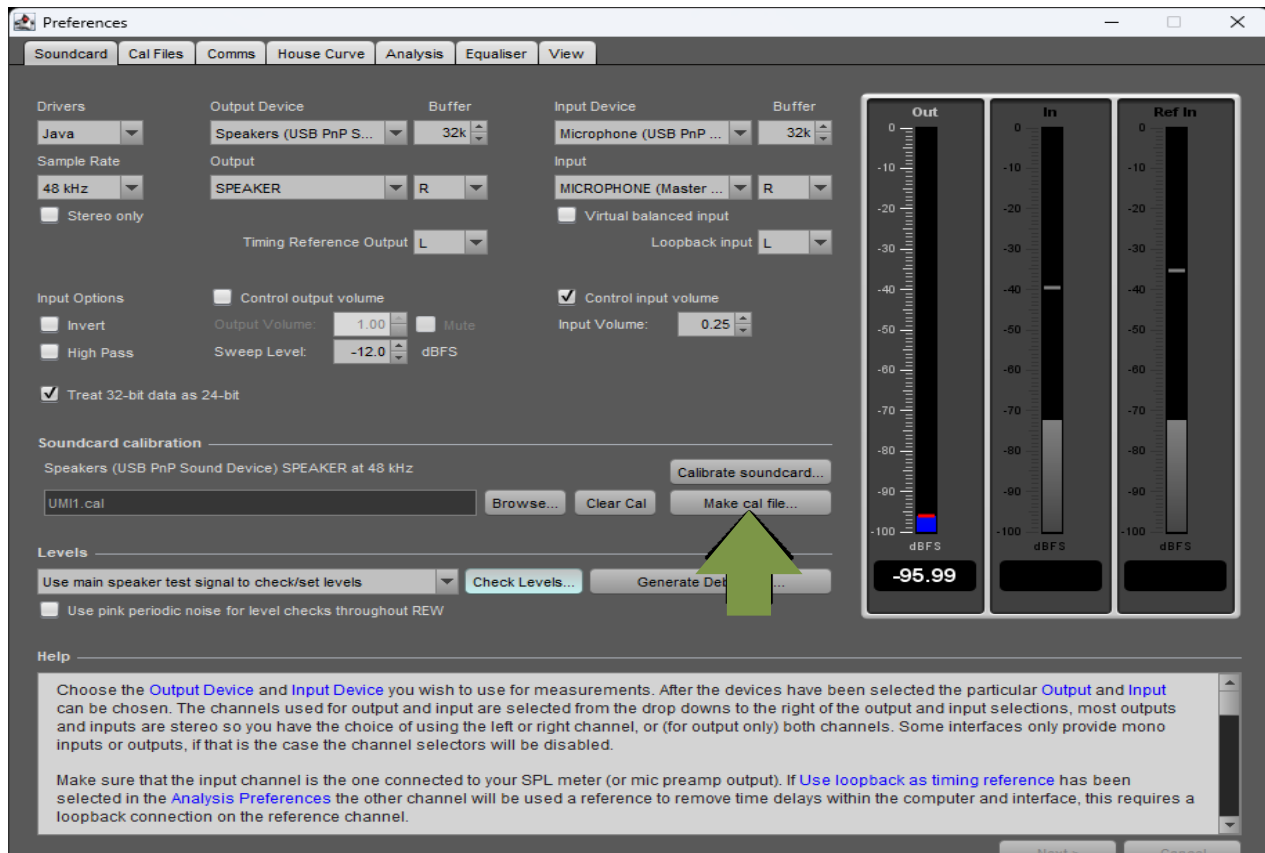
Step 20. In the "Notes" box, type "Audiofrog UMI-1 Soundcard". Click OK

Step 21. Then, choose a location to store the soundcard calibration file in your computer, name the file "UMI-1 Soundcard" and click "Save".
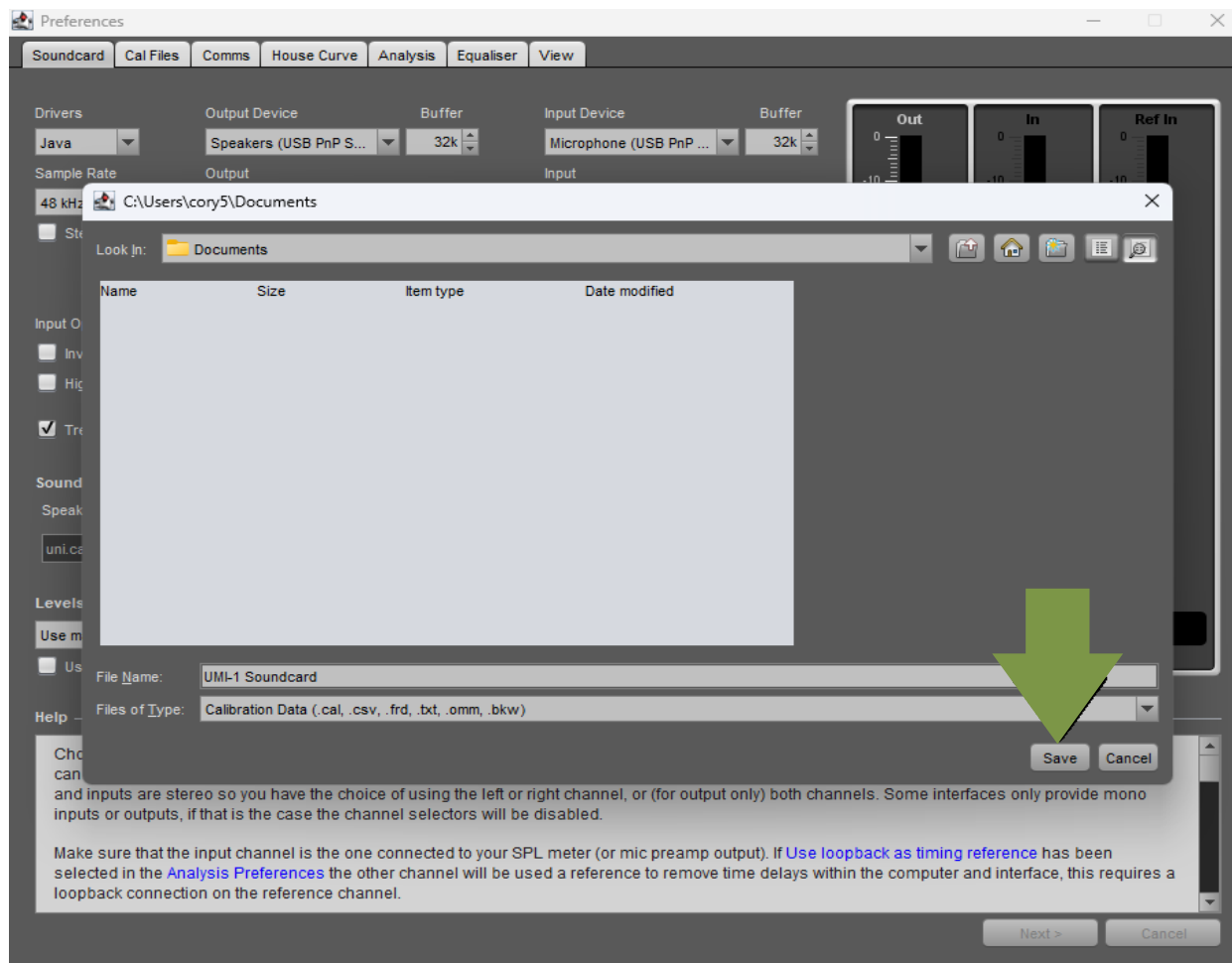
Step 22. Save the Mic Calibration file you received in an email from Audiofrog in the same place where you saved the soundcard calibration file. Right click on the .zip file and choose "Extract All" extract the text file to the same folder in which the zip file and the soundcard calibration file are stored.
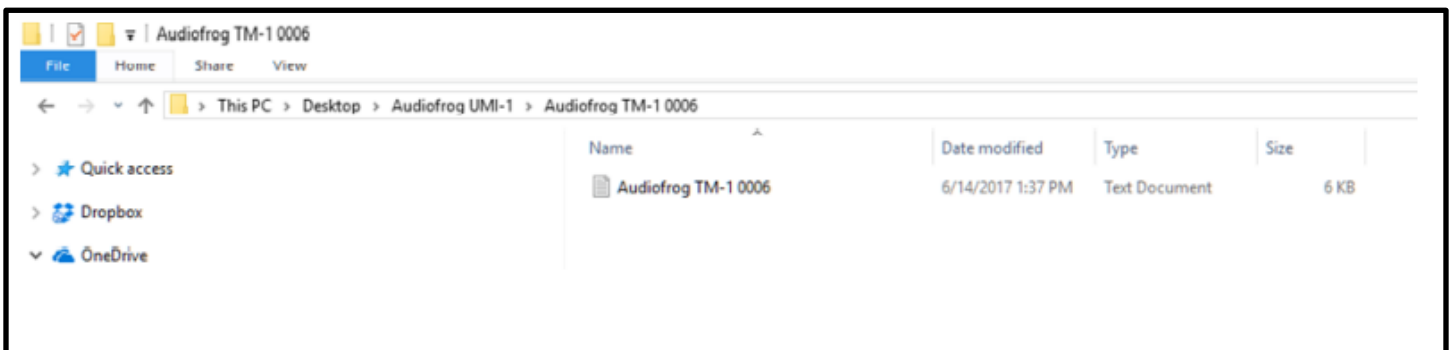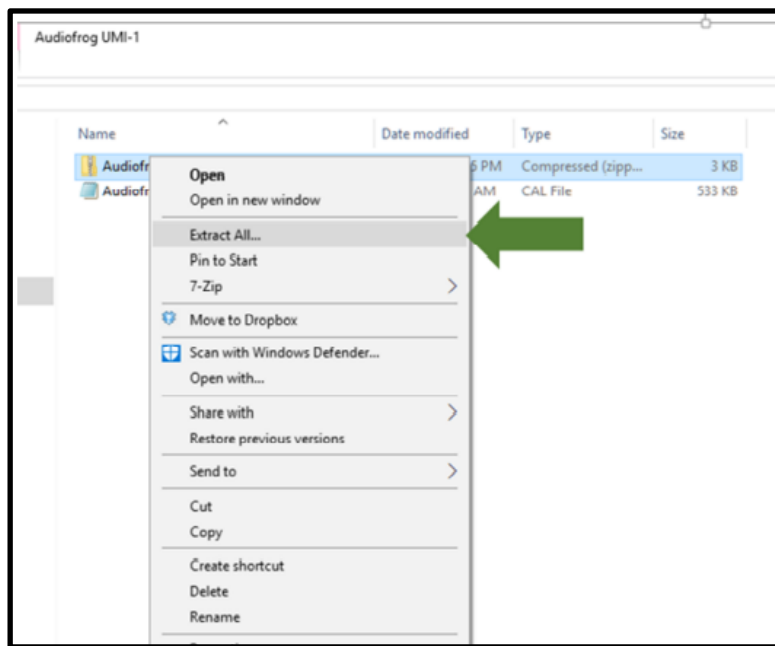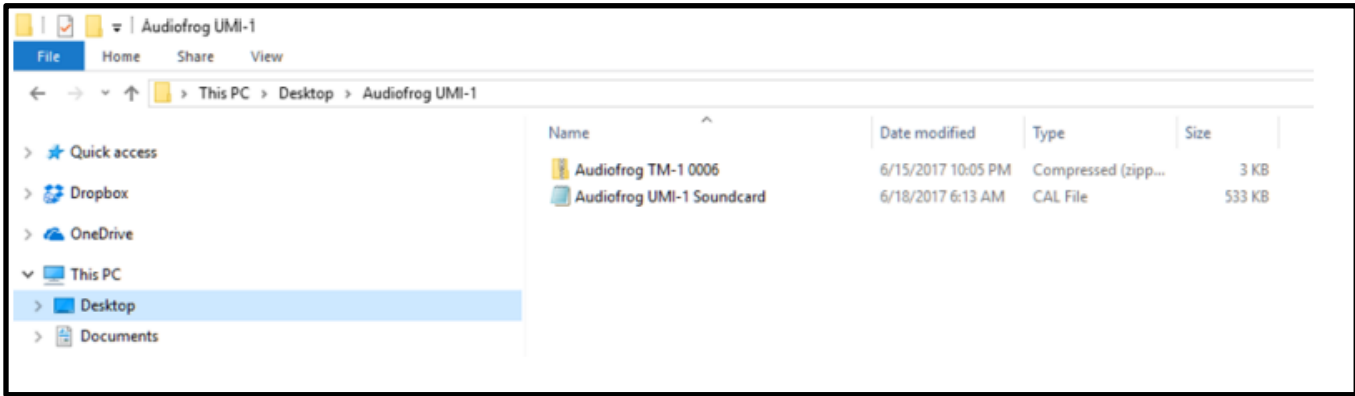
Step 23. In REW, Click on the "Cal Files " tab in the Preferences panel. Click "browse" next to the usb device under the "Mic cal files" column.
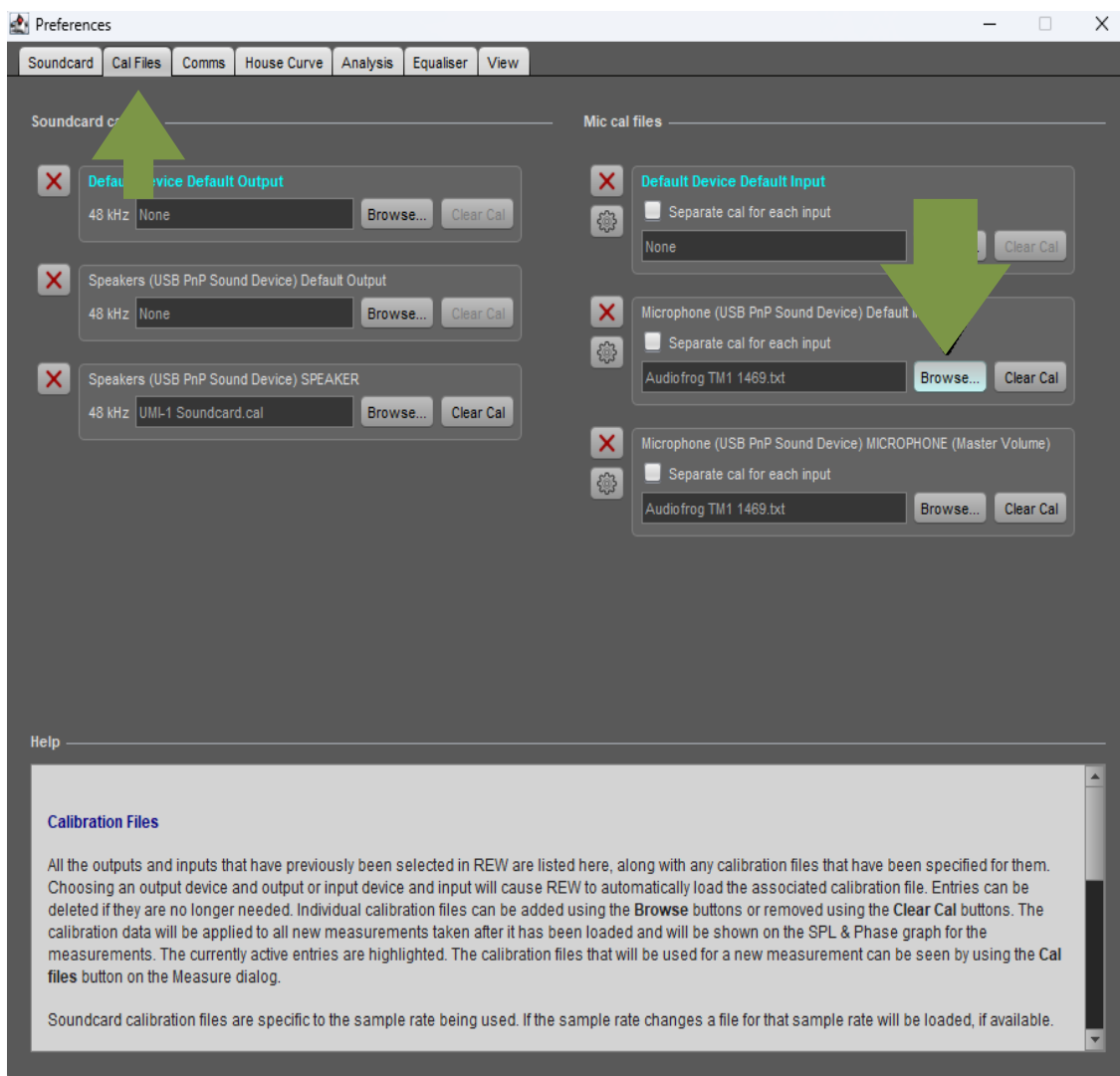
Step 24. Find the Audiofrog TM-1 calibration file. Double click on the file to choose it or click once to highlight it and click "Open"
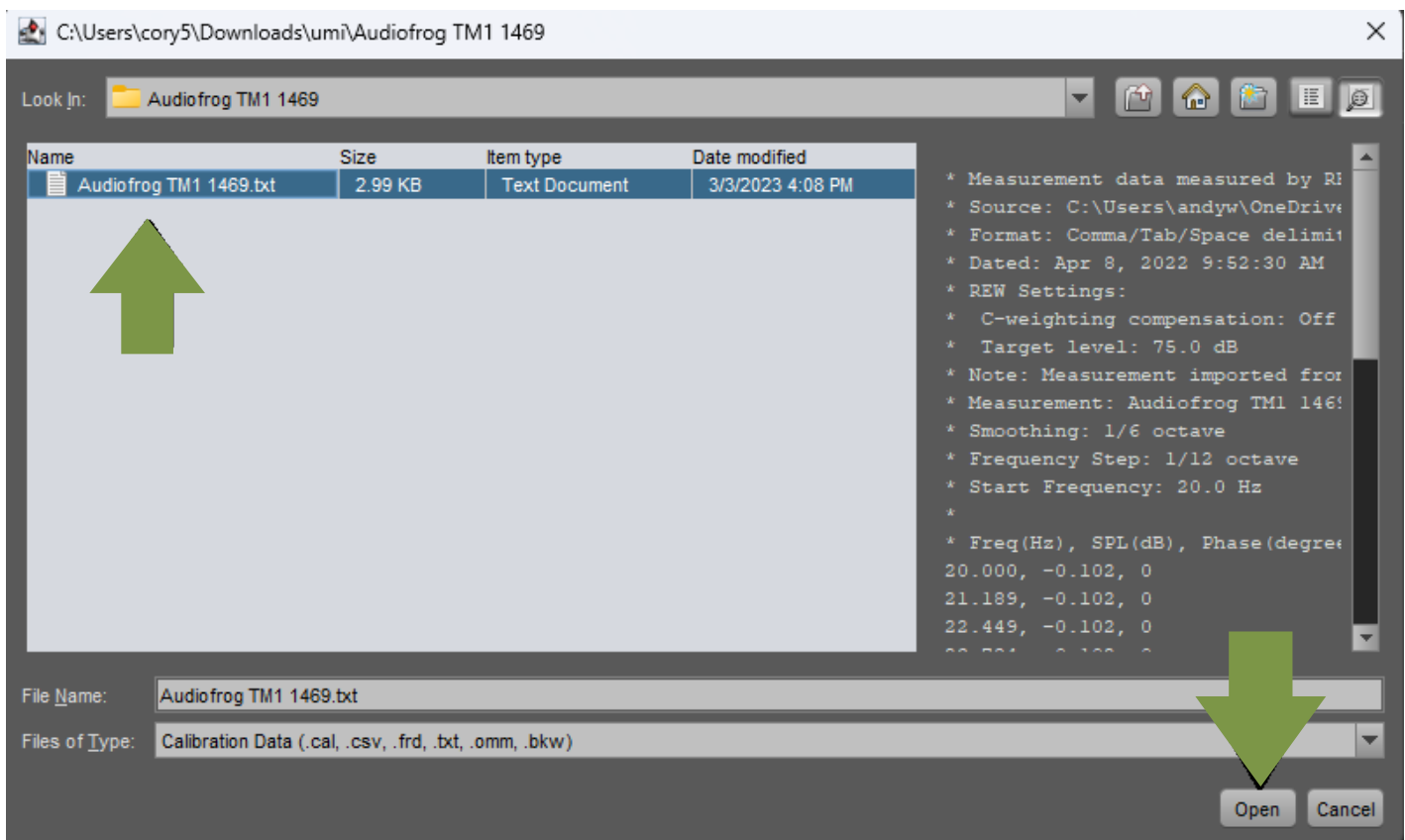
Step 25. Click the settings wheel next to the usb device under the "Mic cal files column". Make sure both boxes are unchecked.

That's it. You only have to do this once. So long as you plug the USB soundcard into your computer before starting REW, you'll won't have to do this again. **Be sure to remember or to write down the settings you chose in the Windows mixer if you'll use this computer for other stuff. If you adjust those, you'll need to set them back the values you chose during the setup process the next time you use your UMI-1.**
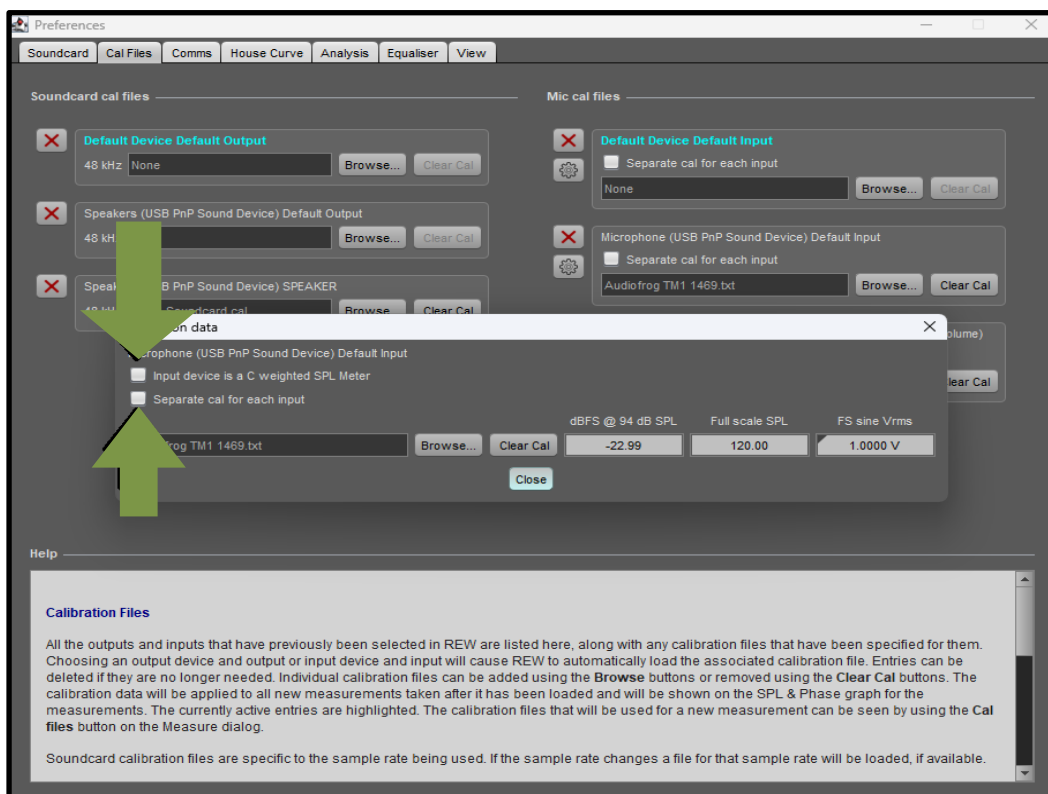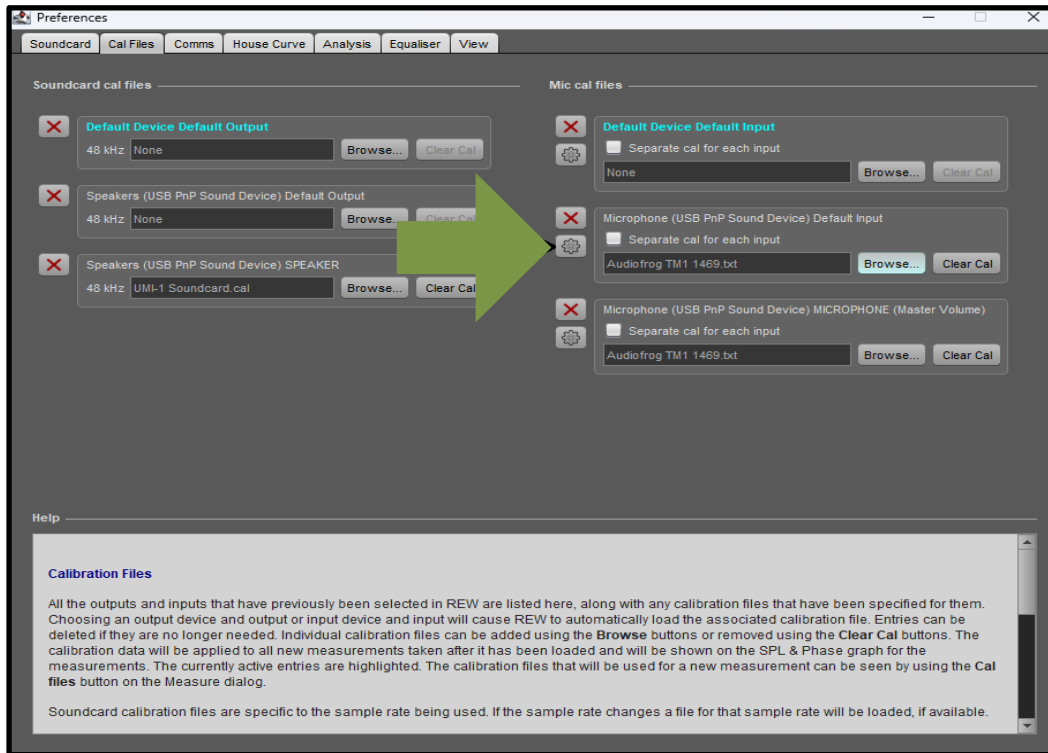
Using RTA in REW

Step 1. In REW's main panel, click here to close your soundcard measurement. There's no need to save it because it's already been saved and loaded as a calibration file.(Click close if java.lang error occurs)
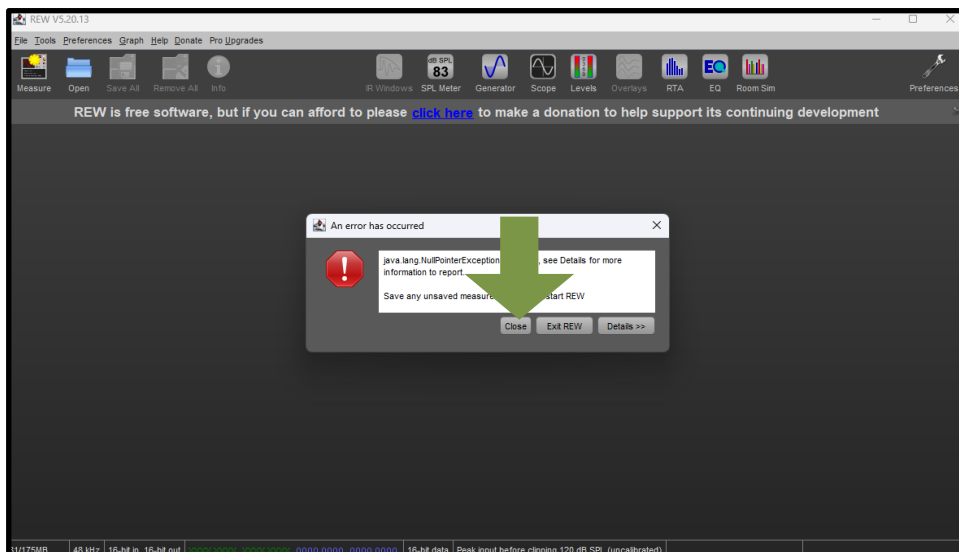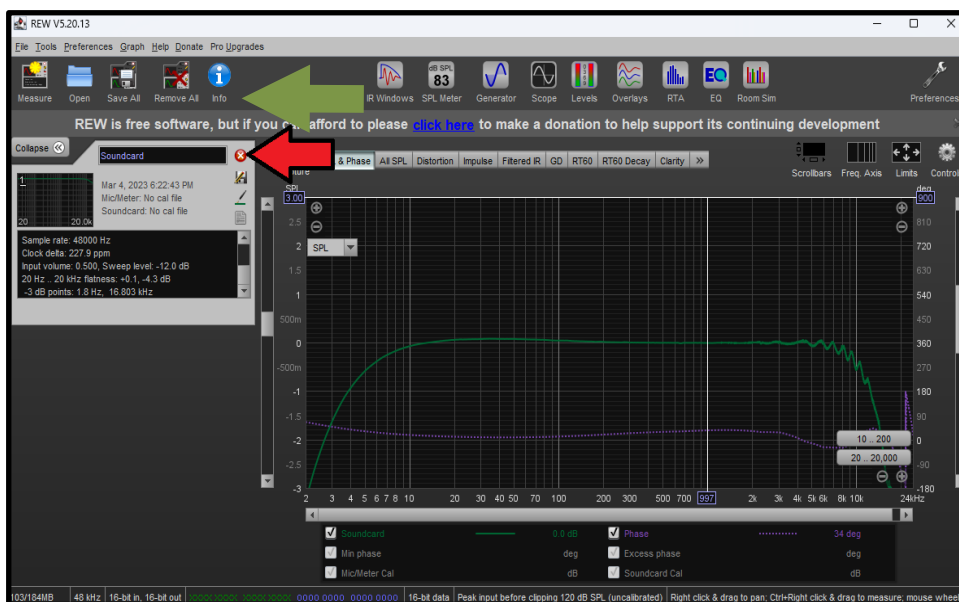
Step 2. Click on RTA at the top of the screen.
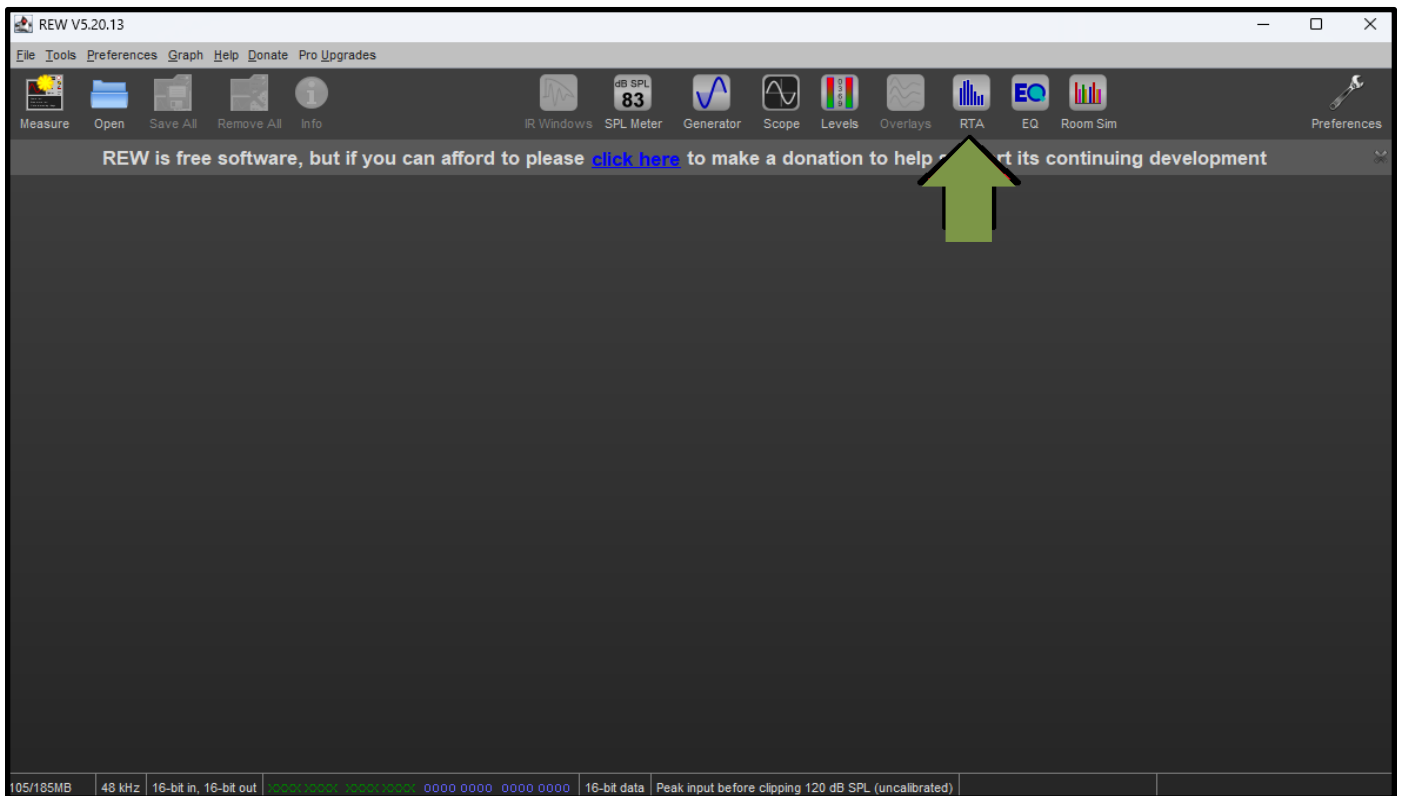
Step 3. In the small drop down menu on the left, choose "dBFS" instead of "dB".
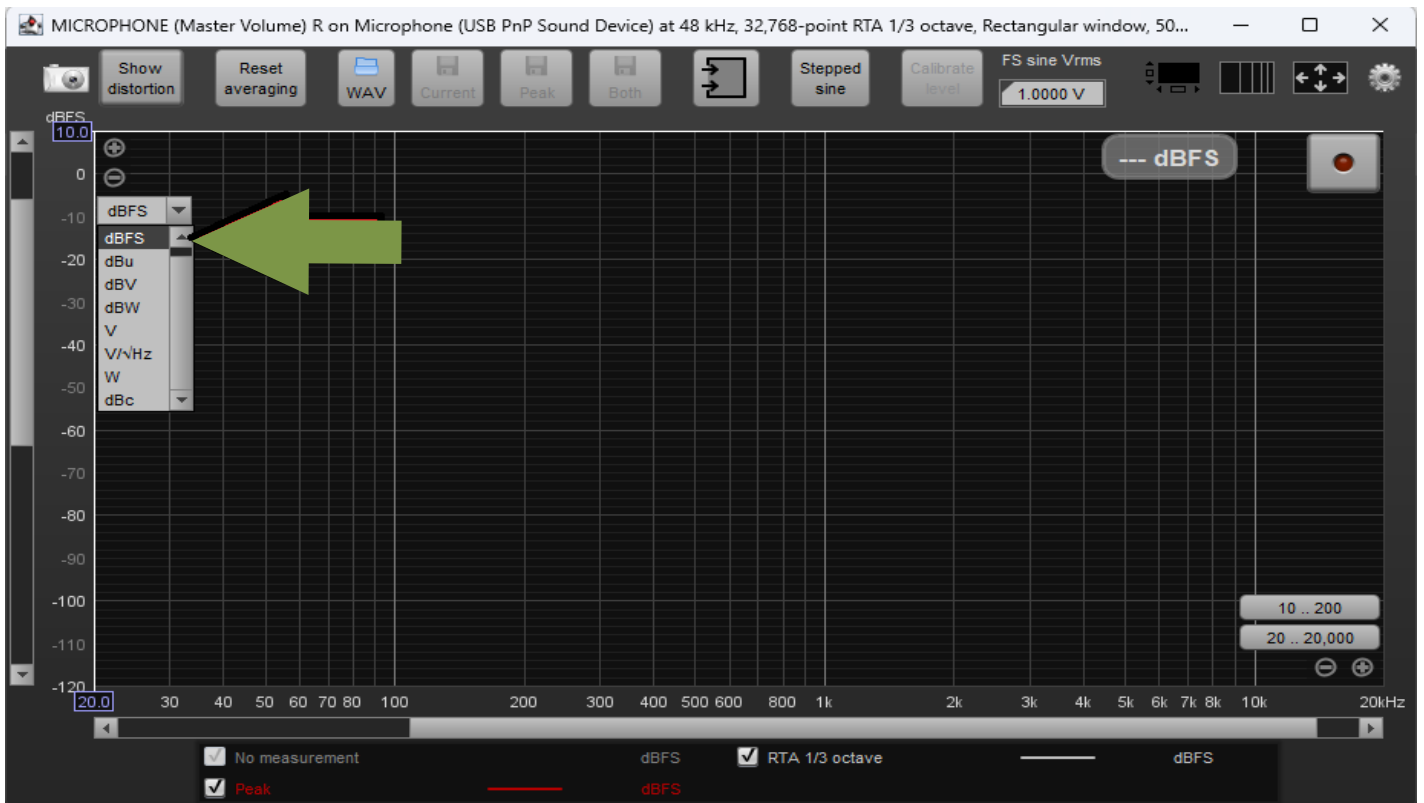
Step 4. Click on the "Limits" box at the top right of the display and enter "20" in the Left box and 20000 in the Right box. Leave the top at 10 and the bottom at -120. Click "Apply Settings".
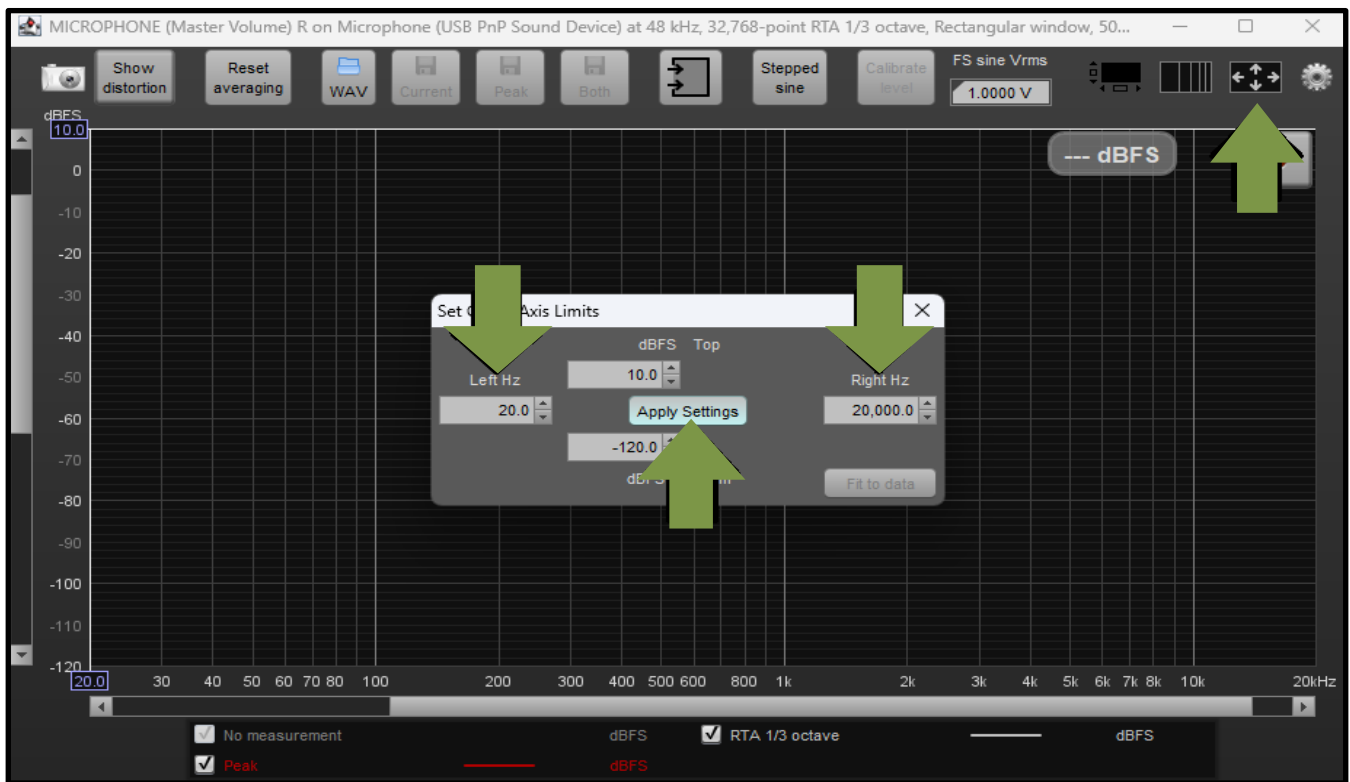
Step 5. Click on the "Settings" wheel and in the top drop down box, choose 1/3 Octave for the Mode. Choose 32768 for the FFT length. Choose None for Averages. Choose "Rectangular" for the Window. Choose 50% for Max Overlap. Select "Bars" for the RTA and for "Spectrum". Click the settings wheel to close the box.
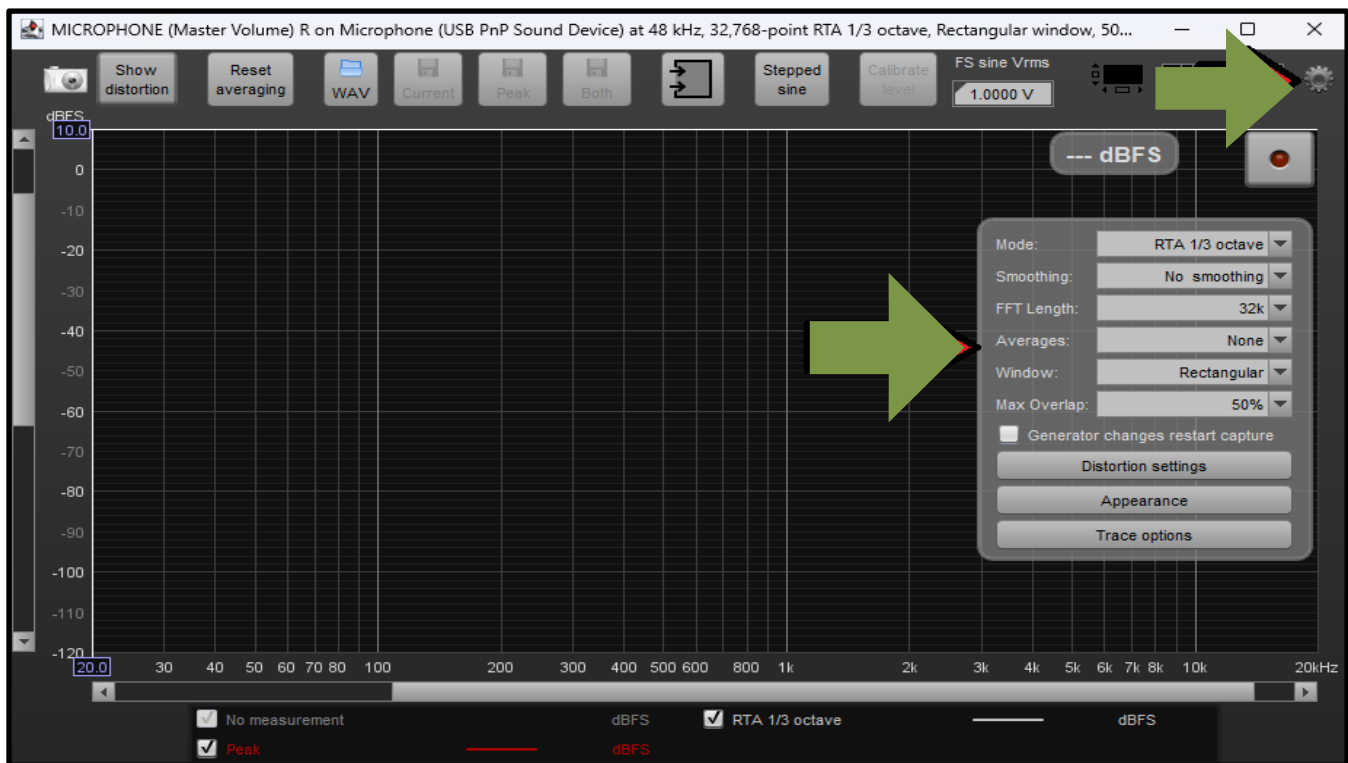
Step 6.To start the RTA, click on the red "record" button. Start Track 1 on the Tuning CD and measure the frequency response of the system.

That's it! When you close REW, it will remember all of these settings the next time you open it unless you choose "Delete Preferences and Shut Down". If you chose that, you'll have to repeat this process. One of the reasons we recommend REW, is that the help file is great and provides lots of easy to understand explanations of how this program works and how to use it. These instructions have been written to get you started using REW in a format that's similar to other Real Time Analyzers you may have used. There are many additional tools available in the program, too. We will provide some additional information, tips and tricks and tuning help in the Forum section of www.audiofrog.com.

Happy Tuning!