Thinklabs One - USB Computer Connection & Setup

This guide helps you connect the Thinklabs One digital stethoscope to PC and Mac computers via USB ports. We recommend following this guide for best results.

Connecting the Thinklabs One is simple and provides excellent and consistent sound quality. While there seem to be many steps involved in the setup, most of the steps are just Windows or Mac settings that you do once.

Follow these steps carefully and in sequence, and you will obtain excellent results.

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USB Connection Option 1 - Recommended

Monitor stethoscope sound directly via audio splitter

When to use

If you're using headphones only for listening to stethoscope, can use loudspeakers to hear provider in a remote telemedicine encounter, and don't need to listen to stethoscope recordings from the PC.

Pros

> Simple. Always works. Stethoscope volume is louder.

Cons

> Can only listen to stethoscope on the headphones. Cannot hear computer audio such as videoconference or audio playback of recordings.

USB Port

Audio Technica
ATR2USB
USB audio device

Thinklabs
3.5mm 4- Conductor
male-male plugs

OR

3.5mm extension cables
(straight or spiral cable)

3.5mm stereo
audio splitter

Earbuds -
Optional for listening to stethoscope.
(Recommended to ensure that stethoscope is held correctly with no movement.)

USB Connection Option 2 -

Monitor stethoscope sound via USB headphone jack

When to use

If you need to hear *both* stethoscope sound and a remote provider *via headphones* during a telemedicine videoconference i.e. you do not have loudspeakers to hear provider, or you need to listen to PC via headphones.

Pros

> Can use headphones to listen to PC audio such as videoconference or audio playback of recordings.

Cons

> Audio depends on computer setup to route desired audio signals to USB (needs setting up).
> Stethoscope volume not as loud and depends on PC volume.

USB Port

Earbuds -
Optional for listening to stethoscope.
(Recommended to ensure that stethoscope is held correctly with no movement.)

Audio Technica
ATR2USB
USB audio device

Thinklabs
3.5mm 4- Conductor
male-male plugs

OR

3.5mm extension cables
(straight or spiral cable)

Setting Audio Levels - PC Windows

First, make sure your hardware is connected as shown on the Computer Connection instructions for Windows.

1. Open the Windows control panel.
(Can be found via Windows search function.)

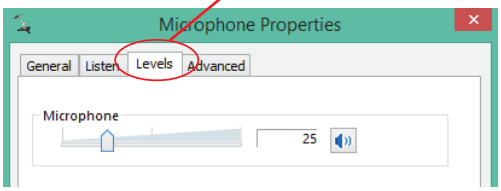
2. In the Control Panel window, Select Hardware and Sound.

3. In the Hardware and Sound window, select Sound.

4. In the Sound window, select the Recording tab.

5. In the **Recording** tab window, select the ATR2USB Microphone. (This is the input connected to the Thinklabs One stethoscope.) Then click the **Properties** button.

6. In the Microphone Properties window, select Levels.

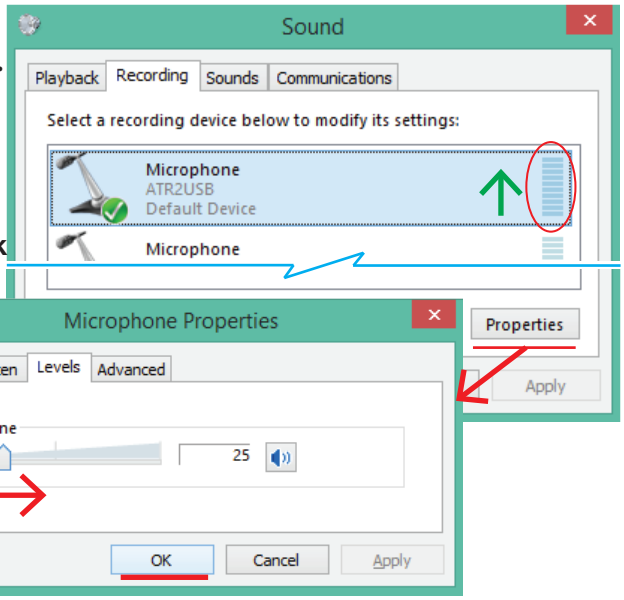


7. Push any key to turn on your Thinklabs One stethoscope. Then adjust volume to 3 or 4 out of 10 on the Volume scale.
(This is merely a starting volume level.)

8. Place the Thinklabs One over the heart on a patient (or yourself) to listen to heart sounds. (If you have headphones connected, listen to the sounds while adjusting):

9. Adjust sound levels for optimal result - not too low, not too high. Total volume = Stethoscope volume + Microphone volume. You can adjust both stethoscope and Mic settings. To adjust Mic, make sure you're in the Levels tab (step 6). Adjust slider to 10~25 to start, and click OK. The Sound window will show vertical volume bars peak during heart-beats. Now alternately adjust stethoscope volume and click Properties to adjust Mic slider until volume bars reach about 75% of maximum during a peak beat.

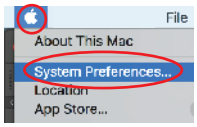
If listening to headphones at the same time, try to adjust the One so that headphone volume is at a comfortable level, and then change Mic volume to achieve the ~75% peak level. This balances listening volume and computer setting.



Setting Audio Levels - Mac OSX

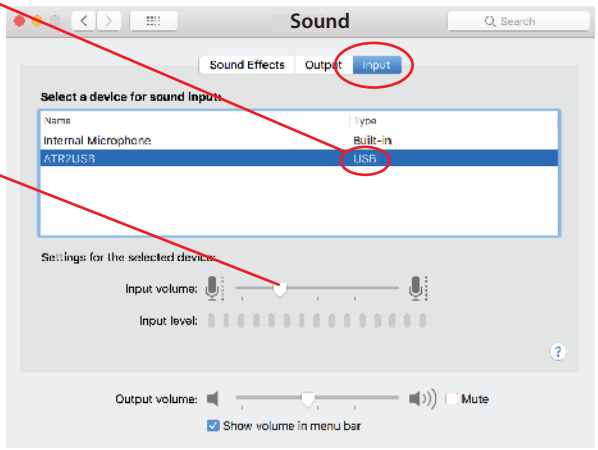
Before commencing this procedure, make sure your hardware is connected as shown on the Computer Connection instructions for Mac. Then follow these instructions:

1. Click the icon in the top left corner of your display and select **System Preferences:**



2. Click in the top menu bar: . When the window below opens, select **Sound:**

3. Select **Input** from the top menu tabs, to show the input devices on your computer. One of the hardware devices should be the USB audio device. *(The exact Name will depend on the specific USB device brand and model.)*:



4. Adjust the Input Volume slider to the midpoint position as a starting point.

5. Push any key to turn on your Thinklabs One stethoscope. Adjust the volume to 3 or 4 out of 10 on the Volume scale. (This is merely a starting point.)

6. Place the Thinklabs One over the heart on a patient (or yourself) to listen to heart sounds. If you have headphones connected, listen to the sounds while adjusting as follows):

7. Adjust sound levels to get the best result - not too low, not too high.

The Total volume = Stethoscope volume + Input volume. So you can adjust both stethoscope volume and Input volume slider and many combinations of the two levels can provide good results. If you're listening on headphones, you may want to first adjust stethoscope volume to a desired level and then adjust Input level.

The Input level scale 

will help you set the optimal level. During the peak of a heartbeat, the ideal level is about three quarters of maximum on the scale. Avoid allowing the levels to reach the maximum since this will cause distortion and "static" sound. However, avoid setting signal levels too low during peaks. See the FAQ (page 6) for recommendations.

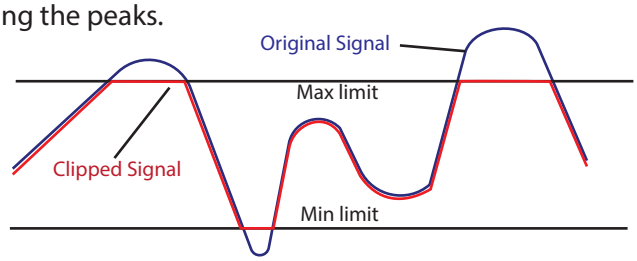
Sound Levels and Connections - FAQ

Q: What is the "optimal" level for balancing stethoscope volume and the Input Volume setting on the computer? It seems that I can increase one and decrease the other and still get about the right level, so what's best?

A: If you're listening to headphones while placing the stethoscope on the body to monitor the stethoscope sounds, especially when using an audio splitter, the volume to your headphones is determined by the stethoscope volume only. You will therefore want to first set the stethoscope volume so you can hear the stethoscope well on the headphones. Then, adjust the Input volume setting on the computer so the sound level is just right - not too high to cause clipping and not too low such that you cannot see the volume bars jump over halfway on the scale.

Q: What do you mean by "clipping"?

A: An audio signal is a waveform with peaks and troughs. There are signal amplitude limits in any electronic system, and if the maximum or minimum peaks in a waveform hit those limits, the signal peaks are "clipped", as shown here. Clipped signals tend to sound "scratchy" or sound like "static" during the peaks.



Q: You show headphones plugged into a USB device or into a splitter, so there are two ways to connect. Which do you recommend?

A: We recommend using the splitter so the headphones are connected to the stethoscope as directly as possible. This is best for basic recording. For videoconferencing (such as live telemedicine), you will want to hear the stethoscope AND the remote provider (doctor, nurse etc). We recommend routing the videoconference speaker sound to your computer speakers, while you listen to the stethoscope on headphones connected via a splitter. So the remote provider will be heard via speakers, and the headphones will *only* be used to monitor the stethoscope sound while auscultating.

Q: So why do you also show the USB audio device connection as an option?

A: If you connect the headphones to the headphone jack on the USB device, you can route BOTH stethoscope sound AND videoconference speaker sound to the USB headphone jack. So you can listen to both stethoscope and th remote provider via the same headphones. However, the stethoscope sound is somewhat quieter than it would be via a splitter connected directly to the stethoscope.

Q: I've connected everything correctly, but I cannot record; or the remote provider cannot hear the stethoscope. What might be the problem?

A1: Is the stethoscope powered on? Push any key on the stethoscope.

A2: Once everything is connected, you have to make sure that the app you're using, such as a recording app, or a videoconference app, has the correct audio settings. Specifically, has the audio input or mic input on your actual app been set to the USB audio device when you want to listen to the stethoscope? You have to make that selection within your app.

FAQ - continues on next page...

FAQ - ... continued from previous page.

Q: Can I use any USB audio device or only what you recommend?

A: The USB audio devices we recommend have been tested and do not distort or add noise to heart and lung sounds. Most USB audio devices do not handle body sounds well and add artifact. You may find others that we have not yet tested that perform well, however we caution against making judgments without a highly qualified clinician's opinion.

Q: When doing a videoconference, I want to speak to the remote provider, then switch to the stethoscope so the provider can listen, and then switch back to the voice mic so I can talk to the remote provider. How do I do that, and how do I get good stethoscope sound?

A: WITHIN your videoconferencing app, find the Audio Input, or Mic settings. Set that to internal mic when you want to speak, and switch to the USB device when you want to send stethoscope audio.

Note that most videoconferencing apps provide good voice audio, but may not transmit stethoscope sounds as well. You must use an app designed to transmit clean stethoscope audio, such as Zoom, Vsee, or WebRTC with "clean" audio channel. These channels or mode settings are named differently by various videoconferencing vendors, so contact them for more details or contact Thinklabs for assistance. If you're setting your videoconference app correctly AND using the clean audio setting for stethoscopes, check the audio level settings as recommended in these instructions.

Q: What happens if the level is too low?

A: The provider at the other side of your patient exam will not be able to hear the stethoscope as loud as desired by the clinician.

Q: What if the level is too high?

A: The sound will be distorted and "scratchy" or have "static" specially during the peaks of the hearbeat sound. (See previous answer and diagram regarding clipped signals.)

Q: When I launch my videoconference or audio recording application, the sound level is too loud or too quiet, even though I've already adjusted it. What now?

A: Some applications take over the settings and change them. Once you launch the application, you may need to either adjust the input again using the above process, or use a slider on the app screen, or buried inside an audio settings menu in the app. Usually the system settings above are tied directly to the settings within the app itself, so adjusting in either place is fine.

Q: The setting is fine for heart sounds but not lung sounds, or it's good on some patients and not others.

A: Sound varies across the human body and from patient to patient. Simply adjust the stethoscope volume to accommodate the specific situation. That's why we provide volume adjustment on the Thinklabs One.

Q: What about the filter adjustment? Will this affect sound level?

A: Most definitely. For heart sounds, use a low filter setting (LEDs light on the left side of the red scale). For lung sounds, use a middle setting. See the Filters section of Thinklabs One User's Manual or search "filters" at support.thinklabs.com