

OpenTheremin Version 4 - Instructions

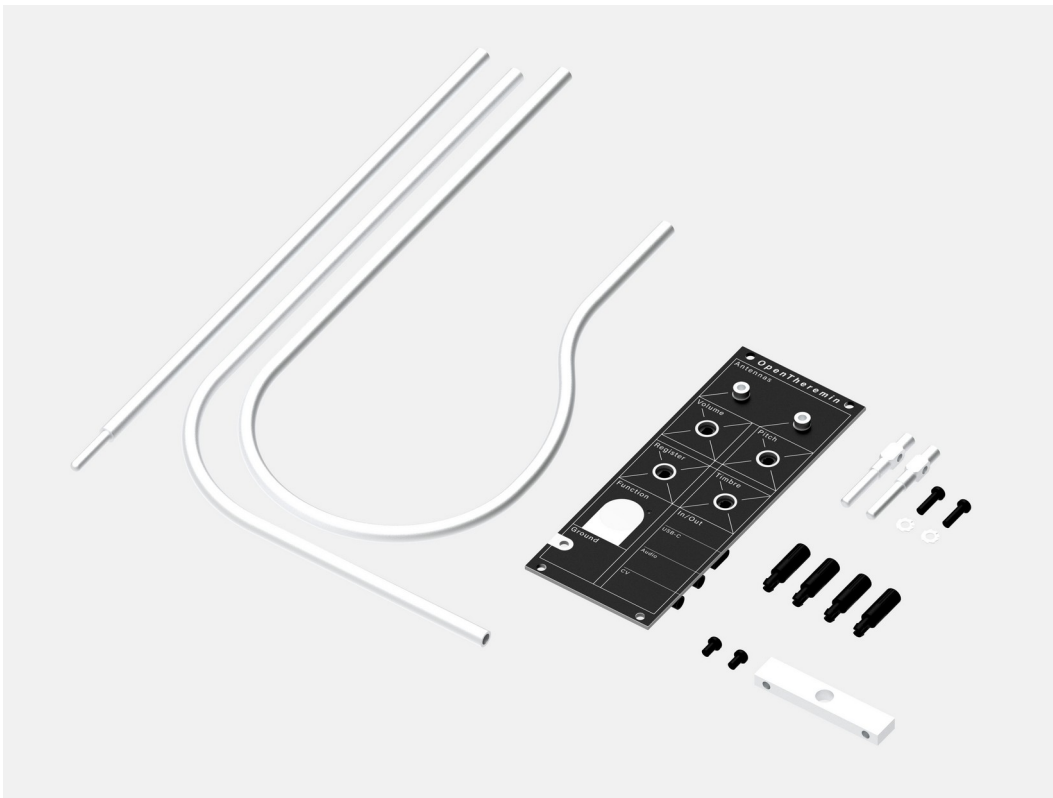
Congratulations, this is your OpenTheremin V4, the newest version of the DIY Theremin used by more than 1000 people around the world today. Happy to have you in the community of people exploring the amazing instrument initially conceived by Leon Theremin. This is a modern theremin using the original principle of heterodyne oscillators.

Contents of your Kit:

Antennas

Theremin Circuit Board

Mechanical Parts



The circuit board is fully soldered, programmed and tested.

Now follow these instructions carefully to set up your theremin.



The only tools you need to assemble your theremin is a cross-head screw driver.

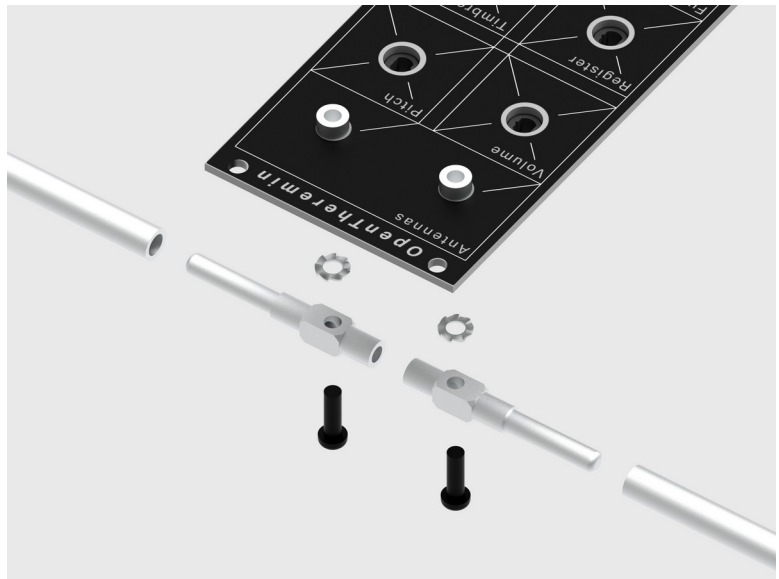
1. Screw on the tripod mount

First start with attaching the tripod mount to the back of the circuit board. Use the two smaller screws and attach the aluminum part as shown on the picture.



2. Mount the antenna connectors

Next mount the antenna connectors using the two longer screws and the two washers. Be sure to place the washers between the antenna connectors and the electronic board as shown on the picture. Attache the connectors from the bottom of the board and tighten the screws well.



3. Install the knobs

Now install the four turning knobs. Align the shaft of the knob with the shape of the potentiometer on the board and press in until it snaps in.

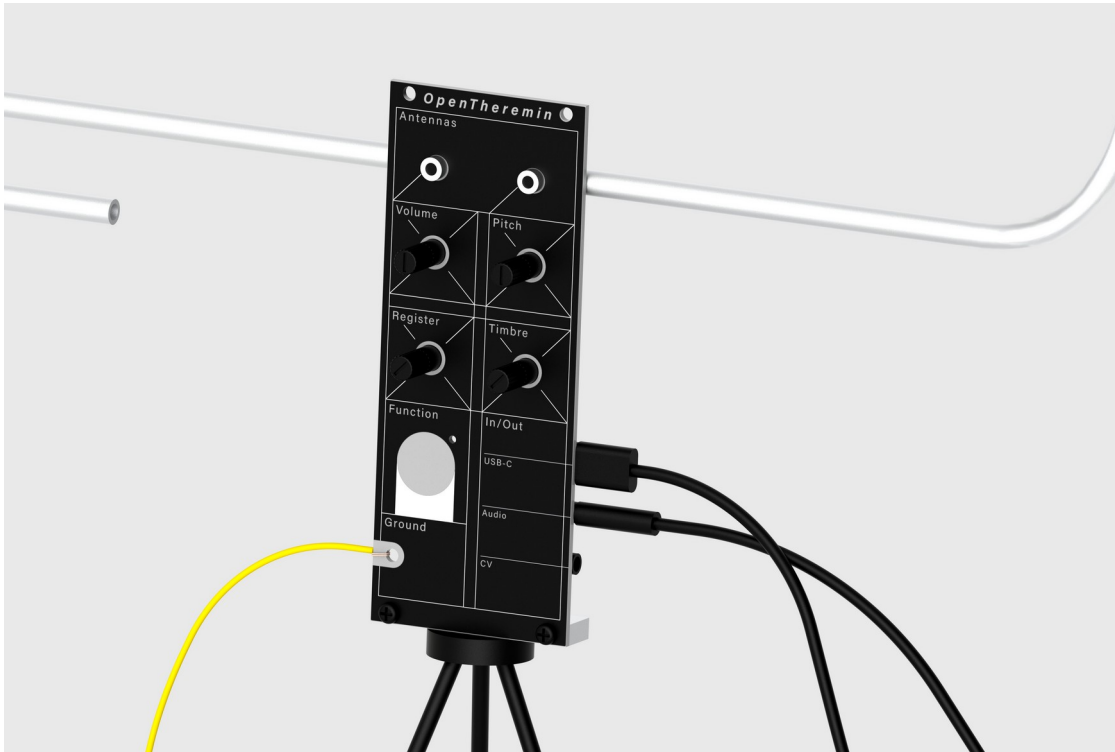


4. Setting up the theremin

The magic of the theremin is that it is played in the air, without touching. The circuit is very sensitive to capture the motion of your hands. For this the instrument must be set up on a stable stand with the antennas in the air. Any object close to the antennas can influence the sound, just as your hands.

Best set up the theremin on a tripod using the tripod mount. The tripod mount fits to most commercial camera or smartphone stands (1/4" UNC thread).

Connect the antennas to the antenna connectors. The round antenna is the "Volume Antenna" and goes to the left, the straight antenna is the "Pitch Antenna" on the right.



5. Grounding the Theremin

The theremin measures smallest variations between the antennas and your hand and translates this into sound. The electric loop with the instrument is closed from your hand, through the floor into the ground and from ground back into the instrument. This is why proper grounding of the instrument is important.

Use any of the following methods to ground your theremin.

- a. If the power supply is grounded the theremin is grounded as well. Notice that many USB power adapter and power supplies are not grounded.
- b. Use a grounded audio cable. If you connect your theremin to a mixer or amplifier that is grounded, the theremin is grounded through the audio cable.
- c. Use a wire to ground the theremin. There is a ground pad on the OpenTheremin board where you can attach one end of the grounding wire. Attach the other end of the wire to a grounded metallic object in your room, like a metallic lamp or a water tube.

6. Connect the Audio Out and USB Power

Use the mini jack connector on the side of the OpenTheremin to connect an amplifier or an active speaker. The output is mono.

Next to the Audio connector the OpenTheremin V4 also features a 'Control Voltage' (CV) output that allows to send the volume and the pitch signal to devices such as synthesizer.

Power your theremin through a USB-C cable. Plug the USB cable to a USB port on a power adapter a power strip with USB outlet or a computer. (USB-C cable and power plugs are not included, any mobile phone adapter and USB-C cable should work).

7. Auto-calibration of the theremin

For the theremin to adapt to it's environment it needs calibration before playing. The new OpenTheremin V4 has an electronic auto calibration built in, it makes calibration very easy. To do so follow these steps:

- a. Power the theremin. Let it warm up for a few minutes.
- b. Now turn the two knobs VOLUME and PITCH to the middle position and the knobs REGISTER and TIMBRE all to the left.
- c. Touch the FUNCTION button on the theremin for about 3 second. The LED-light will turn pink and the theremin will start the automatic calibration of the antennas. To not disturb the calibration step away form the theremin and wait until the blue LED-light goes back on. The calibration should take about 60 seconds.

Now your theremin is ready to play.

The calibration values are stored in the theremin. So you only have to do this procedure once. If however you move your theremin or feel that it is not playing well, you can always repeat the procedure to re-calibrate.

Functionality of the knobs:

The PITCH knob allows you to fine adjust the playing range of the pitch antenna (zero beat).

The VOLUME changes the sensitivity of the volume antenna.

For a good introduction on how to tune the theremin see this introduction by Carolina Eyck: <https://youtu.be/blOmm6e-Qu4>

With the REGISTER knob you can vary the sensitivity of the theremin. Turn it to the right to increase sensitivity. Note that higher sensitivity may come with more noise picked up by the antenna.

The TIMBRE knob allows you to choose from one out of 8 different sound settings.

You can mute your theremin by pressing the FUNCTION button.

I want to address a big thank you to all the contributors to the project. For more information, documentation and source code of the open design go to: www.gaudi.ch/OpenTheremin

