

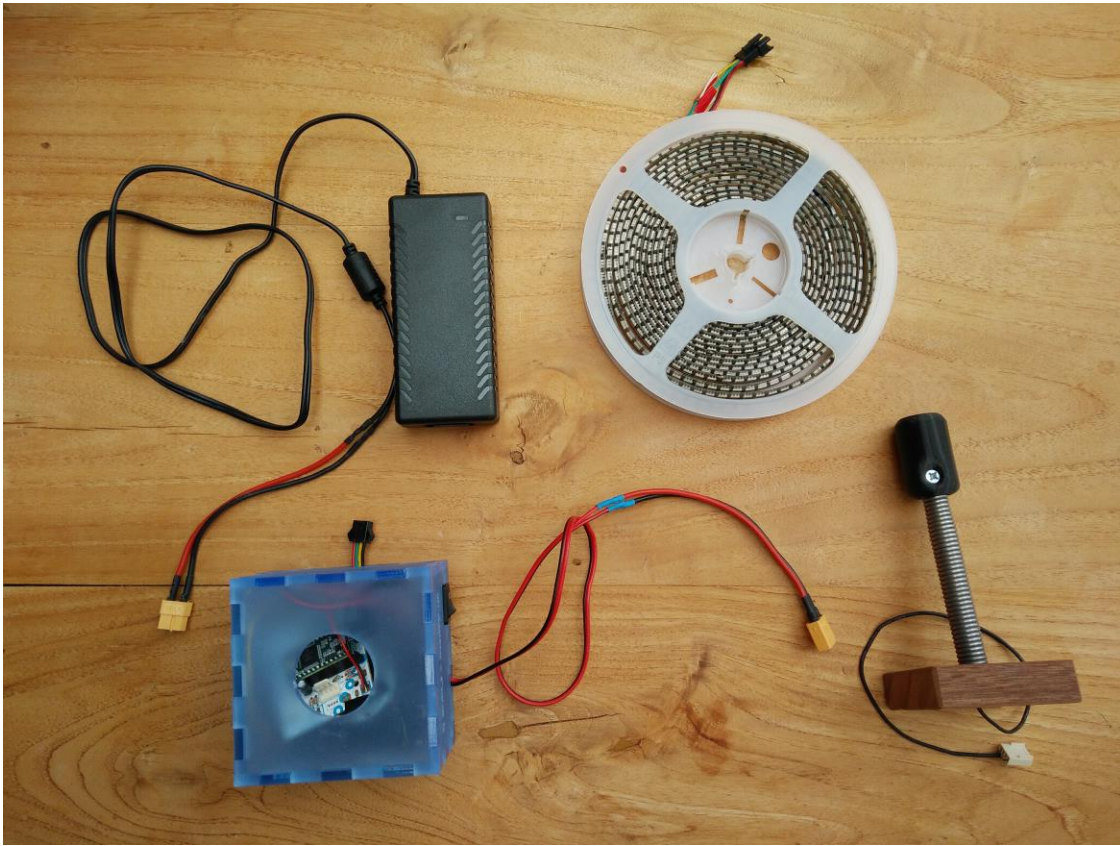
LINE WOBBLER MANUAL

Welcome to this brief guide on how to set up, maintain, and troubleshoot your Line Wobbler!
Should anything be unclear, feel free to email me at robin@wobblylabs.com.
In urgent situations (only), you can call me on +44 7891042810.

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PARTS

Each Line Wobbler consists of several separate parts:



LED STRIP

Most copies of Line Wobbler come with a 5 meter long flexible LED strip with 144 LEDs / meter, either with IP67 or IP65 insulation, both of which are splash-proof against water damage. These strips are specifically manufactured for Line Wobbler, so it might be a bit tricky to find replacements online. Until 2017, the LED type was APA102. From 2018 onwards, the SK9822 type is used. Note that most Line Wobbler boxes made for APA102 strips are not compatible with the newer SK9822 strips. All strips use 4-pin JST SM connectors.

Dimensions: The strips are 5 m x 10 mm x 2 mm, with a short (~10cm) connector wire.

Getting replacement strips: Please email robin@wobblylabs.com to request a replacement strip. Each strip costs 150 USD.

BOX

The main box for Line Wobbler contains the logic board for Line Wobbler, a speaker and connectors for all other components (the LED strip, power supply, and the spring joystick).

Dimensions: 10 cm x 10 cm, 5 – 6 cm height (depending on model)

Getting replacement boxes: Please email robin@wobblylabs.com to request a replacement box. Each box costs 450 USD, and needs to be individually built.

SPRING JOYSTICK

The custom built spring joystick uses a machined steel spring, a soft 3d-printed handle, an accelerometer sensor inside the handle, and a wooden base.

Dimensions: 15.5 cm tall, spring diameter 15 mm, base plate typically 7 cm x 7 cm x 2 cm

Getting complete replacement joysticks: Please email robin@wobblylabs.com to request a replacement joystick. Each joystick costs 250 USD, and needs to be individually built. It's often possible to fix problems yourself or replace only parts of it (also see the Maintenance chapter):

Replacement accelerometer: The cheapest, but perhaps least reliable accelerometer used in older Line Wobbler joysticks is called *GY-521 MPU-6050*, and is a readily available part online. All Line Wobbler boxes are compatible with this accelerometer.

Other used accelerometers are [Pololu miniu-9 v5](#) and [BMI160](#), which are more reliable and compatible with all Line Wobbler units with 2018 firmware.

Replacement handles: It is possible to 3d-print your own replacement handles using this file:

<https://www.thingiverse.com/thing:2967009>

I can also send replacement handles over at a cost of 10 USD each.

POWER SUPPLY

Line Wobbler uses a 5 volts, 8 ampere power supply. This makes its maximum power consumption 40 Watts. The connector facing the box is an XT60 connector, and the cord connecting to mains is a [standard C14 inlet](#).

Dimensions: 13 cm x 5.5 cm x 3.5 cm

Getting replacement power supplies: Please email robin@wobblylabs.com to request a replacement power supply. Each one costs 20 USD.

INSTALLATION

GENERAL SETUP REQUIREMENTS

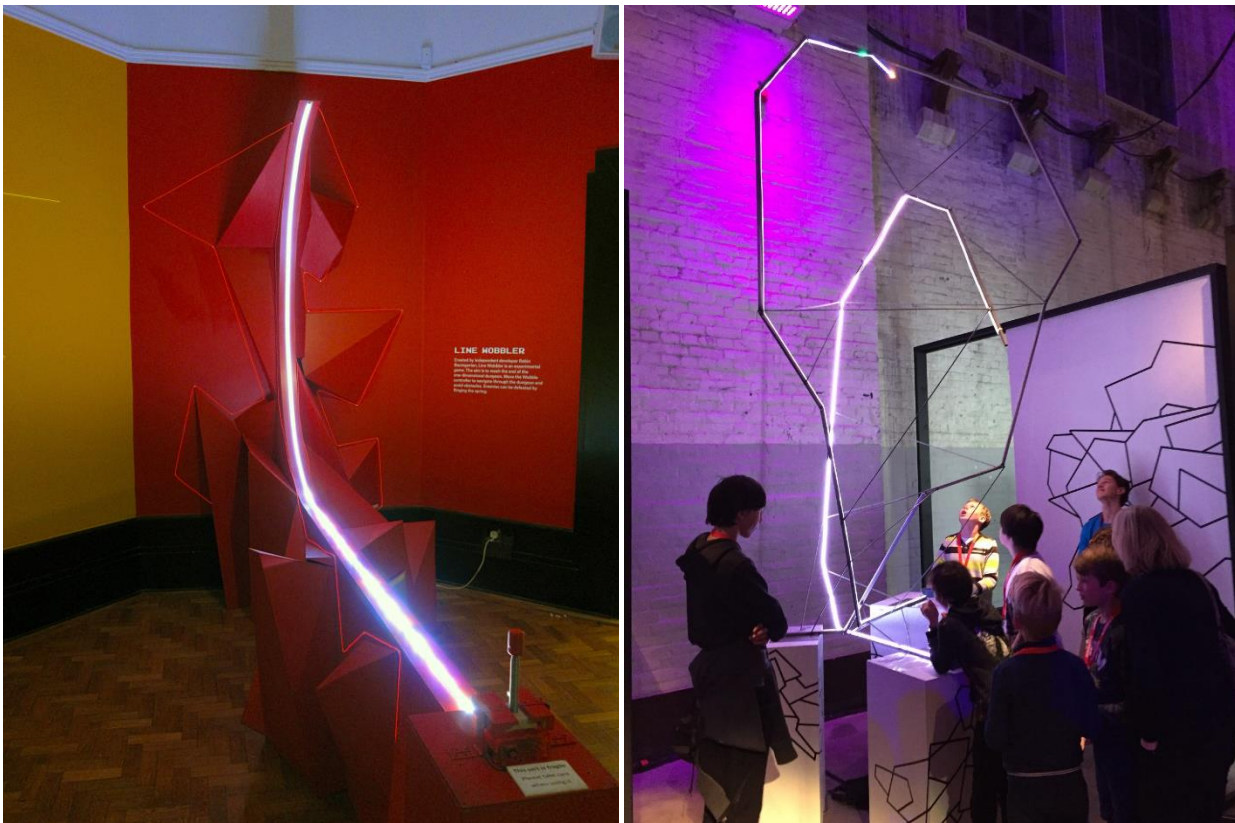
Line Wobbler has the following setup requirements:

- The game requires a single mains outlet. The maximum power consumption is 40W.
- A table or similar structure that the box can be fixed onto.
- A wall or surface where the 5m long LED strip can be mounted on.
- No external software/hardware is required
- The game runs well in lit rooms, but works best in darker environments
- The game isn't water-proof, but the LED strip itself is water resistant.

LED LAYOUT

The 5 meter long LED strip is flexible and can be laid out in a variety of ways. I encourage a creative layout involving the existing architecture of the space Line Wobbler is shown in. Regardless of the layout, the beginning of the strip needs to be close to the box, as the connector cable between strip and box needs to be relatively short. The most common (and easiest to play) layout is horizontally towards a wall and then straight up the wall. However, this is not necessary.

Below are some inspirations of how the game has been shown in the past:





BOX MOUNTING

Line Wobbler needs to be fixed to a sturdy surface so it doesn't move when players get rougher with the spring joystick. Depending on the model, the spring is either directly attached to the main box or equipped with a wider wooden board that will be mounted above the board.

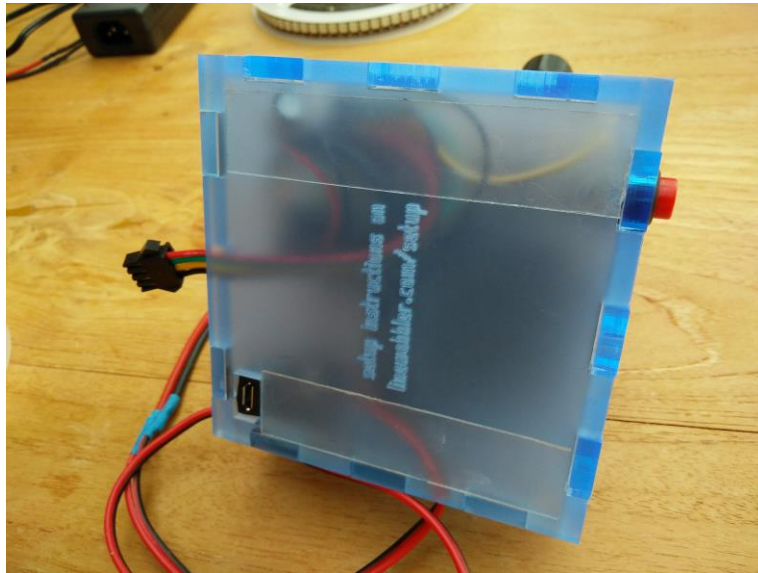
SPRING SEPARATE ABOVE THE BOX

This setup is well suited for long exhibitions that will see heavy use, the installation is more involved. The wooden board needs to be mounted above the acrylic box using 4 long metal screws, as shown in the photo below. The acrylic box should be kept in place using double-sided tape or Velcro tape.



SPRING ATTACHED TO BOX

This is the most common Line Wobbler configuration. The box needs to be attached to a smooth, clean, level and sturdy surface. For most short installations (a week or two) a strong double-sided mounting tape will be sufficient, such as 3M foam mount tape.



When mounting, orient the box so that the reset button and speaker are facing the player. Press down firmly after applying two strips of tape along the bottom of the box.

SIGNAGE AND PLAYER INSTRUCTIONS

I recommend displaying a sign with instructions for your audience. This reduces wear on the game and eases unexperienced or shy audience members into the game. Usually, I show at least these instructions:

You're the **green** dot. Get to the other end!

Red - enemies, kill them by wobbling the stick

Orange - lava, deadly when bright

I have used these PDFs before, feel free to use or modify them:

- Color: http://aipanic.com/_media/projects/wobbler/wobbler-sign-instructions-color.pdf
- Black/White: http://aipanic.com/_media/projects/wobbler/wobbler-sign-instructions.pdf

TAKE-DOWN AFTER EXHIBITION

When taking down a Line Wobbler that has been attached to a surface by double-sided tape, special care should be taken when removing the box from that surface.

REMOVING LINE WOBBLER BOX FROM SURFACE

Depending on the strength of the double-sided tape used, disassembly might be tricky. The easiest way to remove the box is by twisting it off the surface:

1. Unplug the LED strip and power cable, clear the surrounding space
2. Hold the box with two hands and slowly twist it clock- or anticlockwise
3. If necessary, push a flat metal object between box and surface, such as a screwdriver or knife, to weaken the adhesive. Be very careful when levering the box up straight, it might crack the acrylic.



SETUP MODE – CHANGE VOLUME AND FORWARD DIRECTION

It is possible to change the sound volume level and which direction the joystick should be pressed when you want to move forward. This is how:

1. Switch the game on, and within 2 or less seconds, press the reset button
2. The game should start beeping, it's now in setup mode! The first setting is volume. Bend the stick back or forward to de- or increase the volume.
3. Press the button again to go into the direction setting (you might have to press for a second or so, until it stops beeping). Bend the stick in the desired forward direction (a blue light will indicate the angle), hold it there while you switch the game off.

MAINTENANCE

Should a repair become necessary, you might need to take apart Line Wobbler. The spring handle might need regular maintenance as it is the part that players touch. Should the game stop working (see also Troubleshooting), many repairs involve replacing / removing the spring, as detailed below.

DAY-TO-DAY RUNNING LINE WOBBLER DURING EXHIBITION

Line Wobbler usually doesn't need much staff attention during an exhibition, especially when short instructions are posted for players.

POWERING LINE WOBBLER ON & OFF

When switched on, Line Wobbler will auto-calibrate the joystick, this takes about 5 seconds. Therefore it is important not to move / bend the spring joystick during power up.

The Line Wobbler hardware is very robust and can be switched on and off (and unplugged) at will without any bad side-effects. It can run indefinitely and has been running in several exhibitions for months on end.

CLEANING THE GAME

Most wear & tear appears on the joystick, specifically on the handle. The handle itself can and should be replaced regularly if it gets too worn or dirty (depending on use; for many exhibitions that would be every 2-8 weeks).

SPRING MAINTENANCE

REMOVING SPRING HANDLE

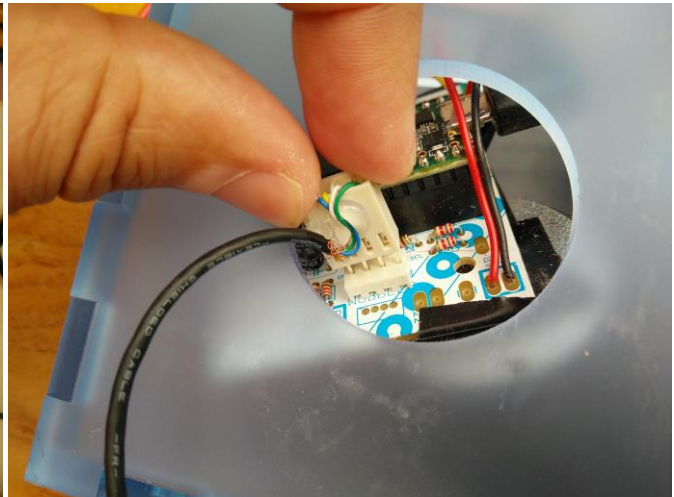
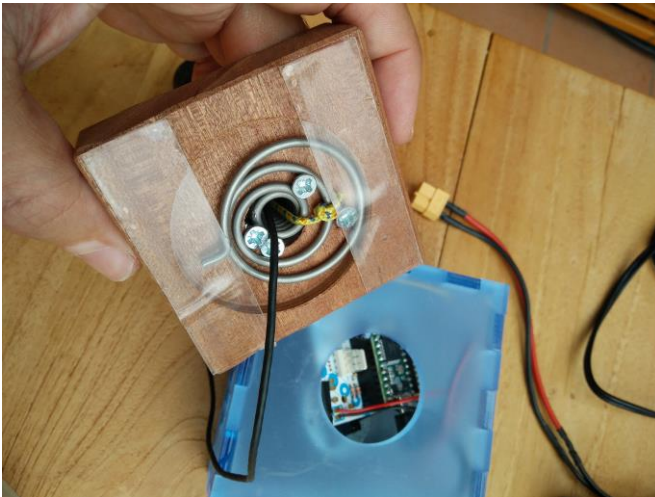
1. Unscrew screw holding the spring handle in place
2. Carefully and slowly lift handle upwards. The accelerometer sits in a small slot in the handle, and should come out after some coaxing.

DISCONNECTING THE JOYSTICK

1. Remove power and disconnect the LED strip
2. Remove the spring/wood assembly from the acrylic box. If the wooden part is attached to the acrylic box via double-sided tape, carefully slide a flat metal piece (flat screw driver or knife) between wood and acrylic and carefully pry / lever off. This might require some force. Try not to crack the acrylic. Careful: The joystick is connected with a fairly short wire to the main board.
3. Inspect the connector to the main board. If there is a broken wire, and you feel confident in re-soldering it, try that.
4. Carefully disconnect the white connector, ideally by pulling on the white plastic part instead of the cable itself.

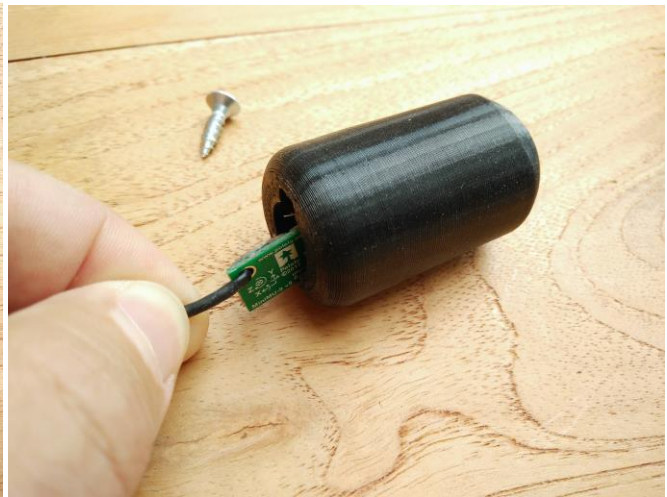
CONNECTING JOYSTICK

1. Make sure power is off
2. Connect the white joystick socket with the connector on the main board in the box. You might have to carefully move the main board inside the box to expose the connector properly. Push down gently on the connector until fully seated.
3. Test joystick: Connect box to power and switch on: The new joystick is working properly if you can hear sound (if volume > 0) and the LED strip reacts properly to joystick input (the green dot moves smoothly when joystick is tipped)
4. Fix spring/wood assembly in place. If using a Line Wobbler where the wood is attached to the acrylic box:
 - i. Remove all old double sided tape if necessary
 - ii. Apply new double sided tape as shown
 - iii. Center joystick over hole, making sure not to trap the cable going to the accelerometer
 - iv. Rotate joystick so the handle screw is facing away from the player (this is a purely cosmetic consideration, the game works either way)
 - v. Press down firmly.



ATTACHING SPRING HANDLE

1. Carefully push accelerometer into slot of handle. There is a hole in the accelerometer PCB where the cable is fed through, make sure that this hole is facing down towards the spring (i.e., closer to the entrance of the slot in the handle). You might need to use a tool such as a flat screwdriver to push it all the way in.
2. Push the handle onto the spring, aligning it so that the screw hole ends up over the gap in the spring. This gap will hold the screw in place. Ideally, the screw faces away from the player.
3. Screw in the screw so it sits flush (or slightly deeper) with the handle surface. A slight amount of force might be required to make the screw grip the gap in the spring. If the screw does not go in, readjust the position of the hole over the spring gap.



TROUBLESHOOTING

- ❖ After switching on, nothing happens
 - Check power supply LED: lit?
 - No: Check wiring to wall socket and if wall cable is sitting properly in power supply.
 - Power supply might need to be replaced.
 - Can you see lights through the acrylic box (orange blinking)?
 - No: Check connection from power supply to box (yellow connector)
 - Box needs to be replaced
- ❖ After switching on, there's activity in the box, but LEDs stay off
 - Check LED strip connector, check LED strip for damage (sharp bends)
 - No obvious damage: Box might need to be replaced
 - Otherwise: Box or LED strip might need to be replaced
 - If you are using a new LED strip (SK model) with an older hardware version of Line Wobbler (for APA102 model LEDs), the LED strip might be incompatible and box needs to be replaced (or old LED strip 'APA102' version needs to be found)
- ❖ After switching on, there's strange LED behaviour
 - LED shows game, but in 'slow motion', only updating a few times per second: Connection of Joystick sensor to main board lost.
 - This is a common problem after heavy use, likely indicating an issue with the wiring between the accelerometer and main board.
 - First, check top of spring for visible damage by removing the spring handle (see Removing Spring Handle)
 - Inspect solder joints and connections near top.
 - If there is a broken wire, and you feel confident in re-soldering it, try that.
 - If there's no visible damage, replace the entire joystick (see Spring Maintenance).
 - If this didn't solve the issue, the main board is likely faulty. The entire box needs to be replaced.
 - LED strip mostly black, first few LEDs are red and then some white or blue LEDs, possibly some beeping: setup mode was accidentally entered, switch game off and on again. If it keeps happening, the reset button might be stuck / broken.
 - LED strip works smoothly near the beginning of the strip, then glitchy / stuck from some LED onwards: LED strip is probably broken (most likely due to physical damage), and needs to be replaced. As a temporary fix, 'massaging' or slightly bending the LED strip at the failure point might work.
- ❖ There is no sound:
 - Check the volume of the game by following the steps in chapter Setup Mode – Change Volume and Forward Direction
 - The sound is also disabled if no joystick has been detected. Does the game run smoothly and react to joystick input? If not, follow instructions above to inspect joystick.
 - Still no sound? Entire box might need to be replaced.
- ❖ Player position (green dot) is moving when no input is given:
 - Game might need to be recalibrated. Switch it off and on again, not moving the joystick in the process
- ❖ Forward direction of player doesn't match with joystick movement:
 - You might need to adjust the forward direction as shown in Setup Mode: Forward Direction