# Lux Spectralis **2**

Assembly Instructions

STEP 1 - IDENTIFY ALL THE PARTS

Please verify that the Lux Spectralis 2 kit contains the following components:

ITEM	QTY	DESCRIPTION
1	1	Lux Spectralis PCB (printed circuit board) with pre-inserted controller chip
2	1	150 ohm resistor (brown green brown gold)
3	2	220 ohm resistors (red red brown gold)
4	1	Push button
5	3	5mm clear LEDs (red, green, blue)
6	1	3xAAA battery holder
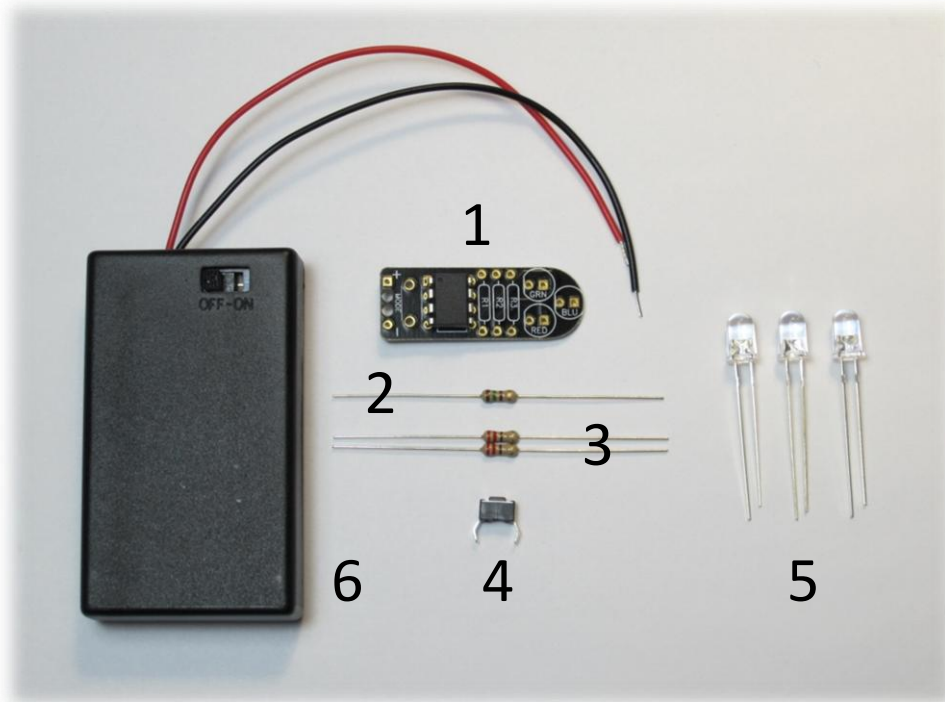
NOTE: The LEDs look virtually identical. This is OK. You will identify the colors in the last assembly step.

STEP 2 - COLLECT THE NECESSARY TOOLS

You will need the following tools and materials, as well as the skill to use them, to assemble the Lux Spectralis 2 kit:

- Soldering iron and some solder - 15W to 50W pencil-style is best, with a pointy tip and small-gauge solder
- Wire cutters
- 3 AAA batteries

STEP 3 - SOLDER THE CHIP TO THE PCB

The chip should come pre-inserted into the PCB in the proper orientation. Please verify that it is, indeed, correctly aligned before soldering it to the board. Pin 1 of the chip is indicated with both an etched triangle on the top of the chip and a round dot molded into the package. This pin should line up with the square pad on the PCB, and all of the other chip lead pads are round.

Flip the PCB over and solder from the bottom of the PCB. Solder all eight of the chip's pins to the PCB. Use as little solder as possible, to minimize the chance of solder bridges between the pins of the chip. Heat both the pin and the metal pad on the PCB before adding solder. The solder should melt and run down into the hole, forming a solid connection between the pin and the PCB. Trim the excess leads using wire cutters. Do not cut into the solder joints to do so.
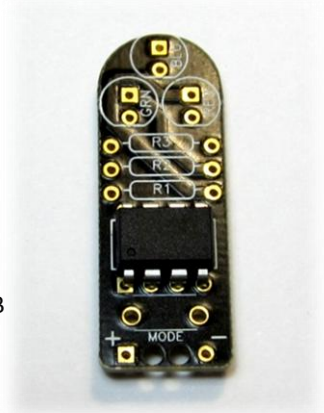
STEP 4 - INSTALL AND SOLDER THE RESISTORS

R1 is the resistor for the red LED. It is a 1/4W 150 ohm resistor, with brown, green, brown and gold stripes. Hold the body of the resistor between two fingers of one hand, and use your other hand to bend the leads down so that they now point in the same direction. The resistor has no polarity and can be installed in any direction on the PCB.

Now find the location for R1 on the PCB. There is a small part outline for R1 printed on the PCB, immediately next to the controller chip. Thread the leads of the resistor through the holes in the PCB that are at either end of the part outline. Push the resistor all the way down until it is flush with the PCB. Bend out the leads protruding from the other side of the PCB so that the resistor does not accidentally fall out before you can solder it in place.

Turn the PCB over. Solder the two leads of R1 to the PCB. Heat the lead and the metal pad at the same time before adding the solder. Trim the excess leads using a wire cutter. Do not cut into the solder joint itself.

Repeat for R2 (green LED resistor) and R3 (blue LED resistor). These are 1/4W 220 ohm resistors, marked with red, red, brown and gold stripes.

## STEP 5 - INSTALL AND SOLDER THE PUSH BUTTON

Find the location of the mode select push button on the PCB. It is labeled "MODE" and is on the other side of the chip from the resistors previously installed. The button is not polarized and can be installed in either direction. It can even be installed on the other side of the PCB if you like.

Flip the PCB over and solder the push button's two leads to the board. Trim the excess leads with wire cutters.
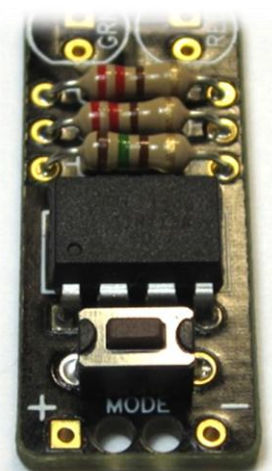
STEP 6 - LACE THE BATTERY HOLDER WIRES THROUGH THE PCB, THEN SOLDER

Thread the red and black wires of the battery holder up through the two center holes on the edge of the PCB. Then loop the red wire back down to the square metal pad marked with a plus sign [+]. Loop the black wire down to the round pad marked with a minus sign [-]. With about a one inch tall loop of wire sticking out from the PCB, turn the board over and solder the two wires to the pads. Double-check that the red wire goes to the square pad marked with a [+]. Trim the excess wire with wire cutters. After the wires cool, pull the excess slack of the loop back through the PCB. This forms an important strain relief for the battery wires.
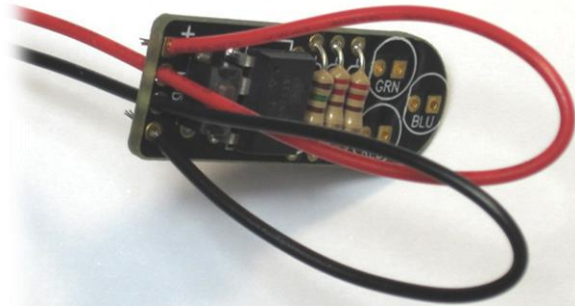
STEP 7 - INSTALL THE LEDS

It's hard to tell the different colored LEDs apart when they are off. We'll check each of the LEDs before permanently installing them into the PCB.

Remove the cover of the battery holder and install three fresh AAA batteries. Replace the cover. Turn the switch to the "ON" position. Nothing happens that you can see. We'll test each of the LEDs in the spot for the blue LED, labeled "BLU" on the PCB.

IMPORTANT: LEDs are polarized and will only work when installed in the correct way. Here's how to tell:

Each LED has two leads. One lead is slightly longer than the other. Insert the longer lead into the hole with the square pad of the LED part outline marked "BLU". Insert the shorter lead into the hole with the round pad. The long lead always goes in the "square" hole. OK, the hole is still round, but the pad is square. "Long lead, square hole!" Say it ten times.
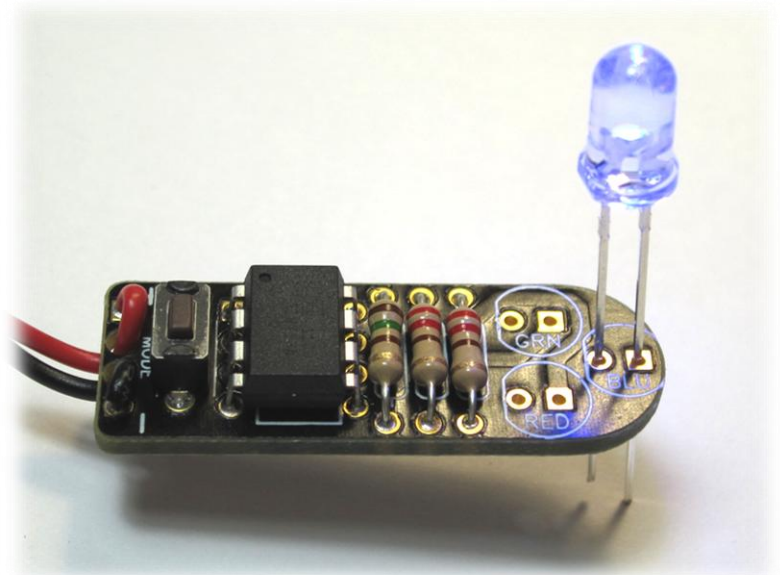
Test each LED and identify its color. The LED should light up. If not, try one of the other LED locations. Once all the LEDs are identified, turn the power off using the power switch or remove the batteries from the battery holder.

If none of the LEDs seem to work, try turning the battery holder switch off and on again. The first active mode of the Lux Spectralis is a "night light" mode that turns on all the LEDs but eventually turns them all off again.

The three LED locations are labeled "RED" for red, "GRN" for green and "BLU" for blue. Once properly identified, insert each LED into its appropriate location and solder the leads to the pads. Long lead, square hole! Trim the excess leads using wire cutters. Repeat for all three LEDs.

It's easier to solder one LED at a time than to try to solder them all at once.

Solder one lead of the LED to the PCB, then check that the LED is mounted straight. Then solder the other lead.
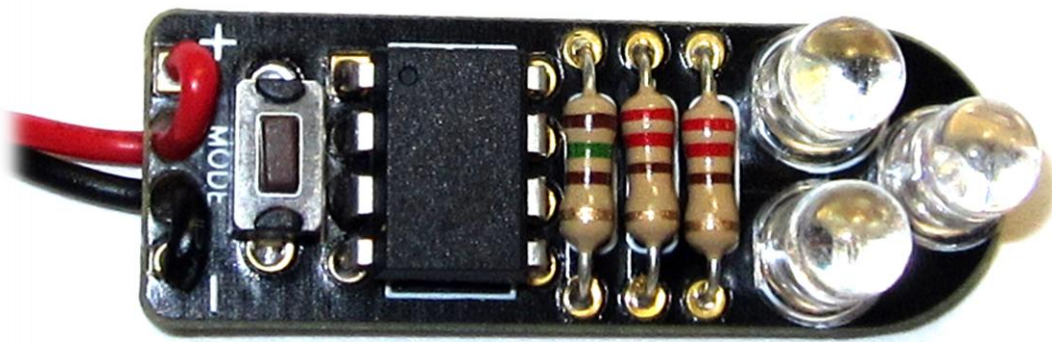
Your Lux Spectralis 2 kit is now complete! Replace the batteries and turn on the power switch. Use the "MODE" button to advance through the pre-programmed color patterns. Enjoy!

TROUBLESHOOTING

Here are some things to check if your Lux Spectralis 2 kit is not performing correctly:

- You're using fresh batteries.
- The batteries are installed in the correct position within the battery holder.
- The power switch is turned to "ON".
- The red wire goes to the square hole marked with a plus sign [+].
- The chip is oriented correctly, with pin 1 in the hole with the square pad.
- All the pins of the chip are soldered to the PCB.
- There is no excess solder forming a "solder bridge" between any two or more pins.
- The LEDs are installed in the correct orientation.