

# VANCOUVER HACK SPACE

## BLINKY LED BADGE KIT INSTRUCTIONS

Vancouver Mini Maker Faire 2015



### PREPARATION:

1. Read the "Soldering is Easy" comic book (this book can be downloaded for free from <http://mightyohm.com/soldercomic>).





2. Check that you have all of the parts listed in the parts list on the next page. Once you have everything, you are ready to start!

**PLEASE LEAVE THESE INSTRUCTIONS AT THE WORKSTATION.**

## PARTS LIST

| Quantity | Description                         | What it looks like  |
|----------|-------------------------------------|---|
| 1        | Printed Circuit Board               |   |
| 2        | 100 ohm resistors                   | <br>(Colour bands: Brown Black Brown Gold)    |
| 2        | 47K ohm resistors                   | <br>(Colour Bands: Yellow Violet Orange Gold) |
| 2        | 10µF capacitors                     |   |
| 2        | 2N3904 NPN Transistors              |    |
| 2        | 5mm LEDs<br>(Light Emitting Diodes) |   |
| 1        | Battery Holder                      |    |
| 1        | CR2032 Lithium Battery              |    |

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|   |                    |   |
|---|--------------------|---|
| 1 | Switch<br>(on/off) |  |
| 1 | Pin Back           |  |

## RESISTORS

1. Bend the leads (wires) of the resistors at right angles so they look like the picture below.



*How to bend the leads of the resistor.*

2. Identify your resistors by their colour bands and insert them in the correct locations on the board; their leads should be sticking out of the back side of the board.

| Resistance (ohms) | Colour Code               |
|-------------------|---------------------------|
| 100               | Brown Black Brown Gold    |
| 47k               | Yellow Violet Orange Gold |

3. Hold the resistor flat against the board and bend the leads outwards at 45 degree angles. This will prevent the resistors from falling out before they are soldered into place.
4. Solder the resistor into place. Follow the soldering instructions in the "Soldering is Easy" comic book.
5. Trim the leads using the cutters. Keep your other hand over the board so that the lead doesn't fly off and hurt someone.

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## CAPACITORS



Capacitor

1. Insert the capacitors into the board so that the leads stick out the back.
2. Bend the leads out 45 degrees to keep the capacitors in place.
3. Solder the capacitor.
4. Trim the leads while covering the board with your other hand.

## TRANSISTORS

**Transistors can be damaged by too much heat. Do not heat the solder joint for more than 10 or 15 seconds. If you need to re-do your solder joint, wait for it to cool down a bit first.**

1. Insert a transistor so the flat spot is facing the same way as shown on the board.
2. Solder the transistor. Remember: transistors can be damaged by too much heat!
3. Trim the leads while covering the board with your other hand.

## SWITCH

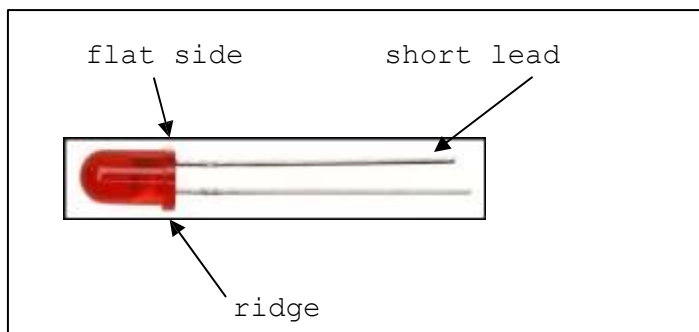
1. Insert the switch so the leads stick out the back of the board as far as possible.
2. Solder the leads.
3. Trim the leads if necessary.

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## LEDs

LEDs are polarized, which means that they will only work in one direction. If you install an LED backwards it won't light up, so double check before you solder it in!

1. There is a ridge around the base of the LED that has a flat side. Match up that flat side with the flat side of the LED symbol on the board and insert the LED into the board. If there is no flat side, match the side with the short lead.



2. Bend the leads outward to keep everything in place.
3. Solder the LED. Just like the transistors, LEDs can also be damaged by heat, so let the solder joint cool down if you need to fix it.
4. Trim the leads while covering the board with your other hand.

## BATTERY HOLDER

The battery holder goes on the back side of the board. The direction of the battery holder must match the symbol on the board.

1. Solder the leads of the battery holder on the front side of the board. You do not need to trim the leads.
2. Pop a battery into the holder (+ side faces out). Flip the on/off switch. If your kit blinks, congratulations! If it doesn't, ask an instructor for help. The battery will last for about 24 hours when running continuously.

## PIN BACK

1. Using either hot glue or solder attach the pin back on the back of the board. Fill up the holes with glue/solder to make a strong joint.

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## You're Done!



Your completed kit should look like this.

We hope you had fun making your kit and learning a useful new skill!

If you'd like to do more soldering, come visit the Vancouver Hack Space at #104-1715 Cook St, Vancouver. We're open every Tuesday from 7:30 - 10:30 pm.

The Vancouver Hack Space is a member-run non-profit organization that provides a place where people can meet and work on their projects. You can support us by becoming a member.

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