

Circuit Building

A journey to learn how to breadboard and how to solder

Opening

- What is wrong with this circuit? Why is this a problem?



Basic Parts to make your first circuit

- Battery



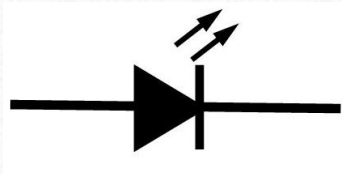
- Wire



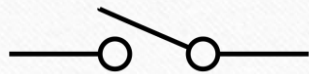
- Resistors



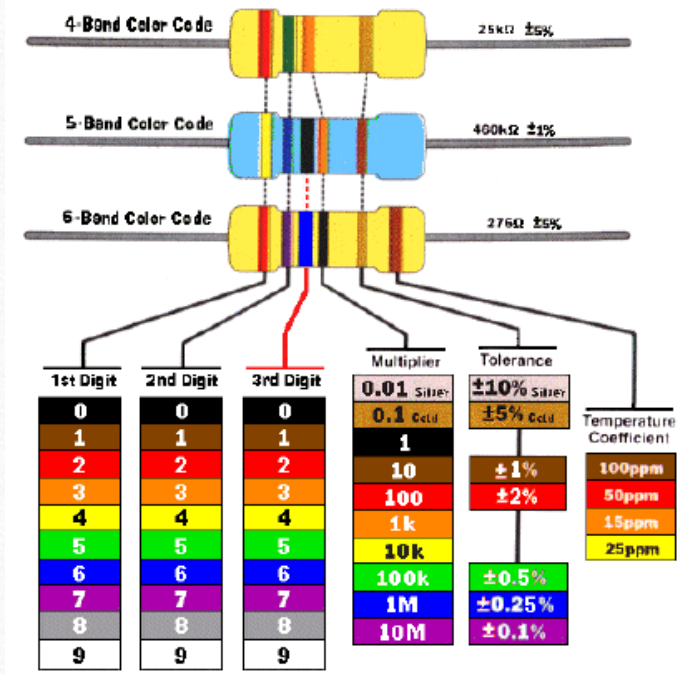
- LED



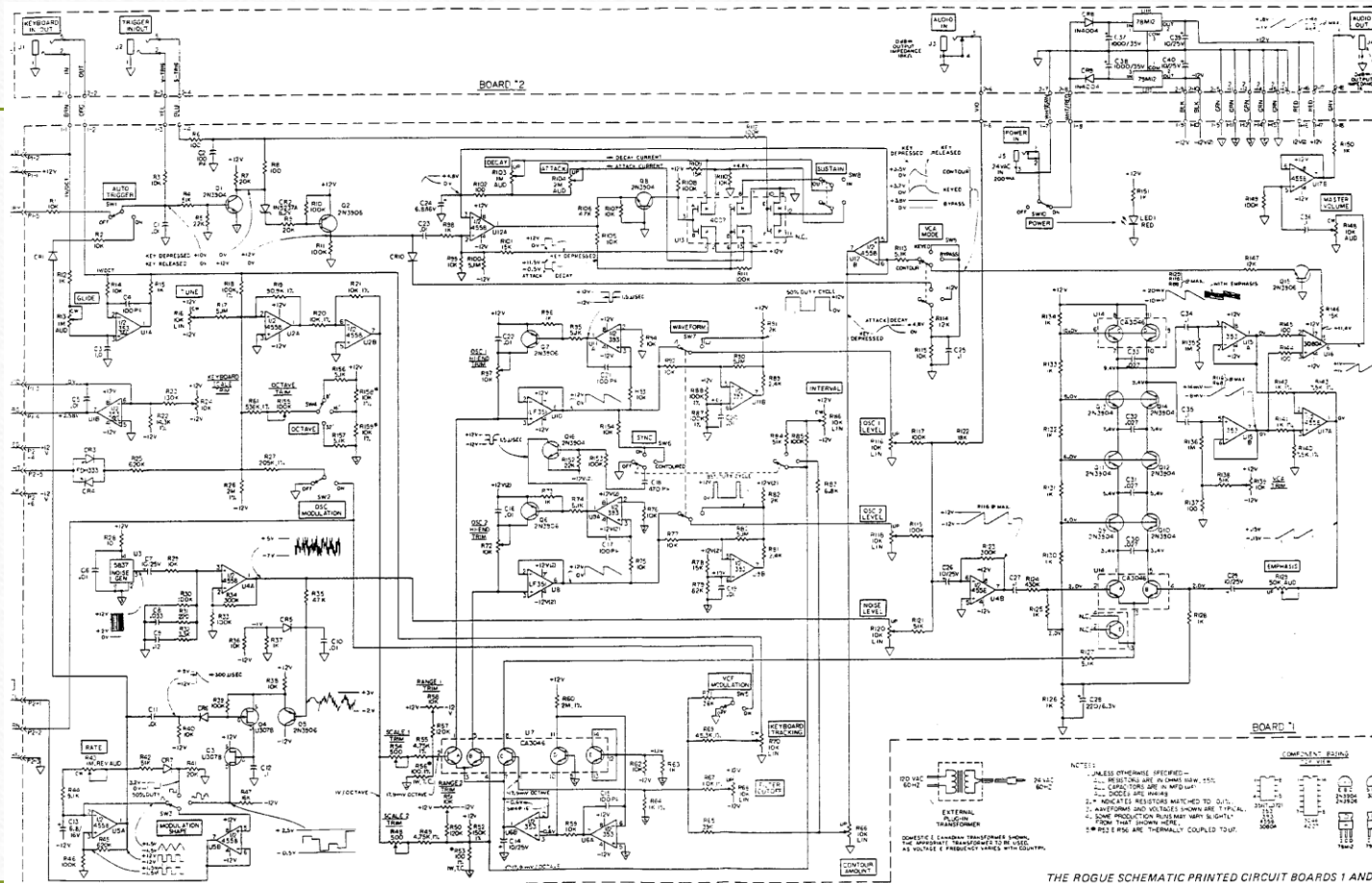
- Switch



Resistor Color Code

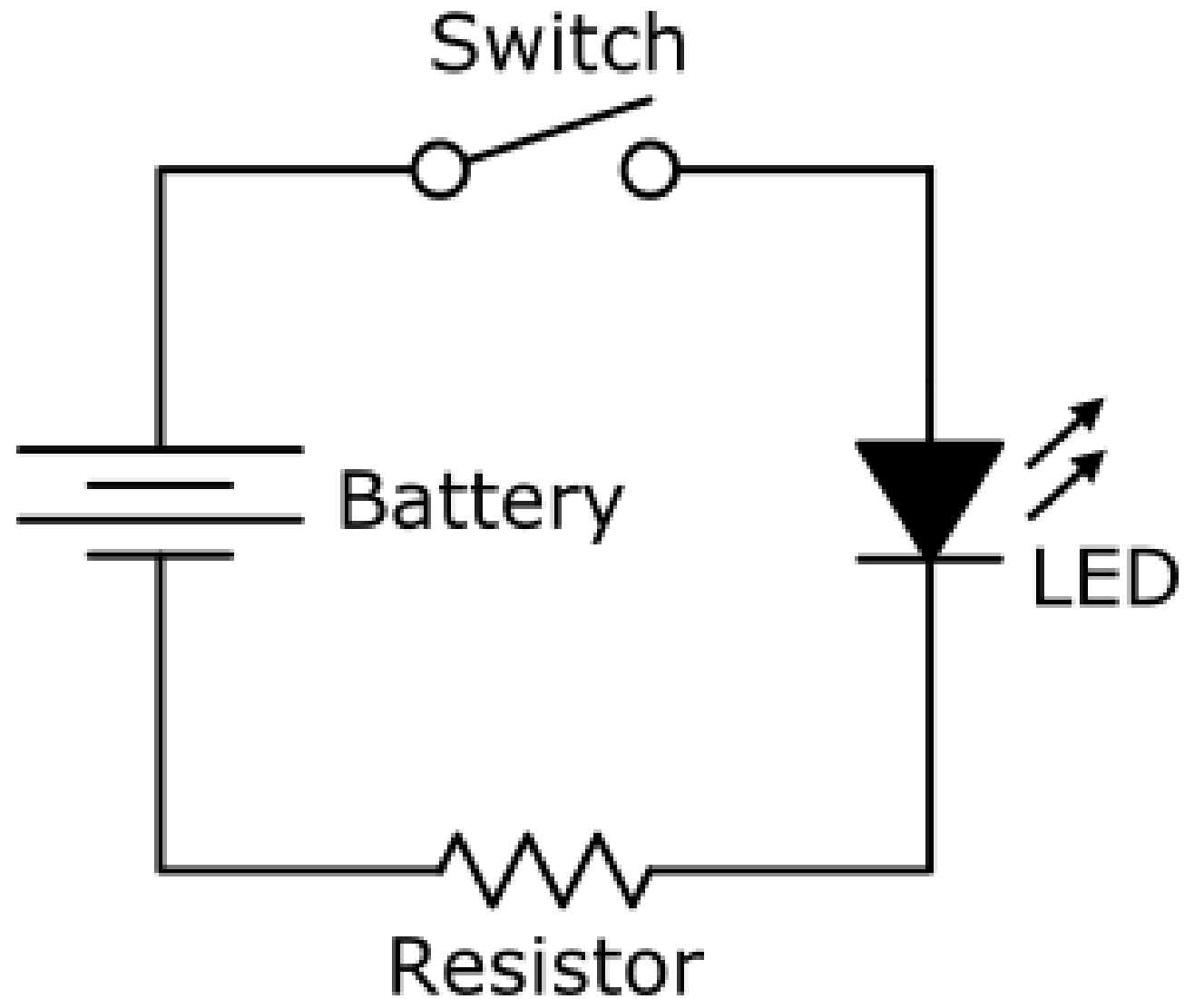


Schematics



Our Schematic

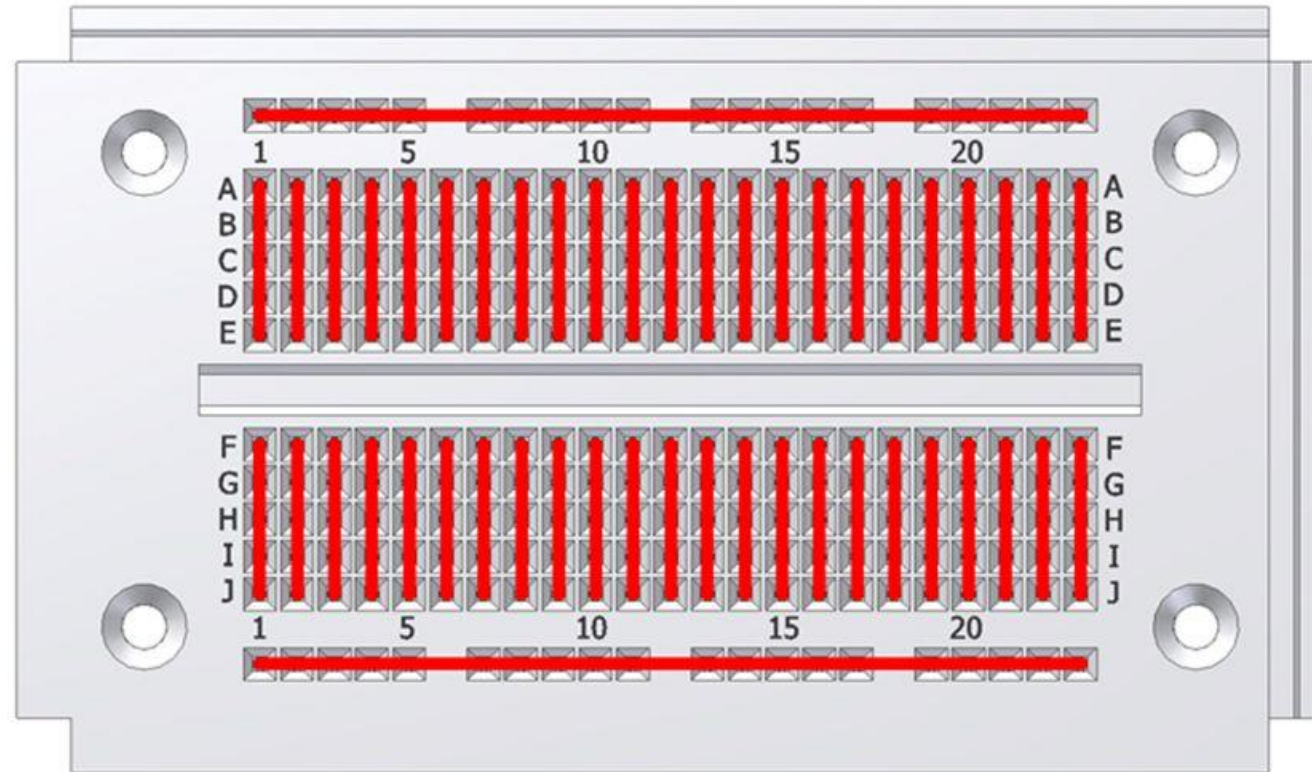
Schematic: a
simplified or symbolic
representation of a
circuit



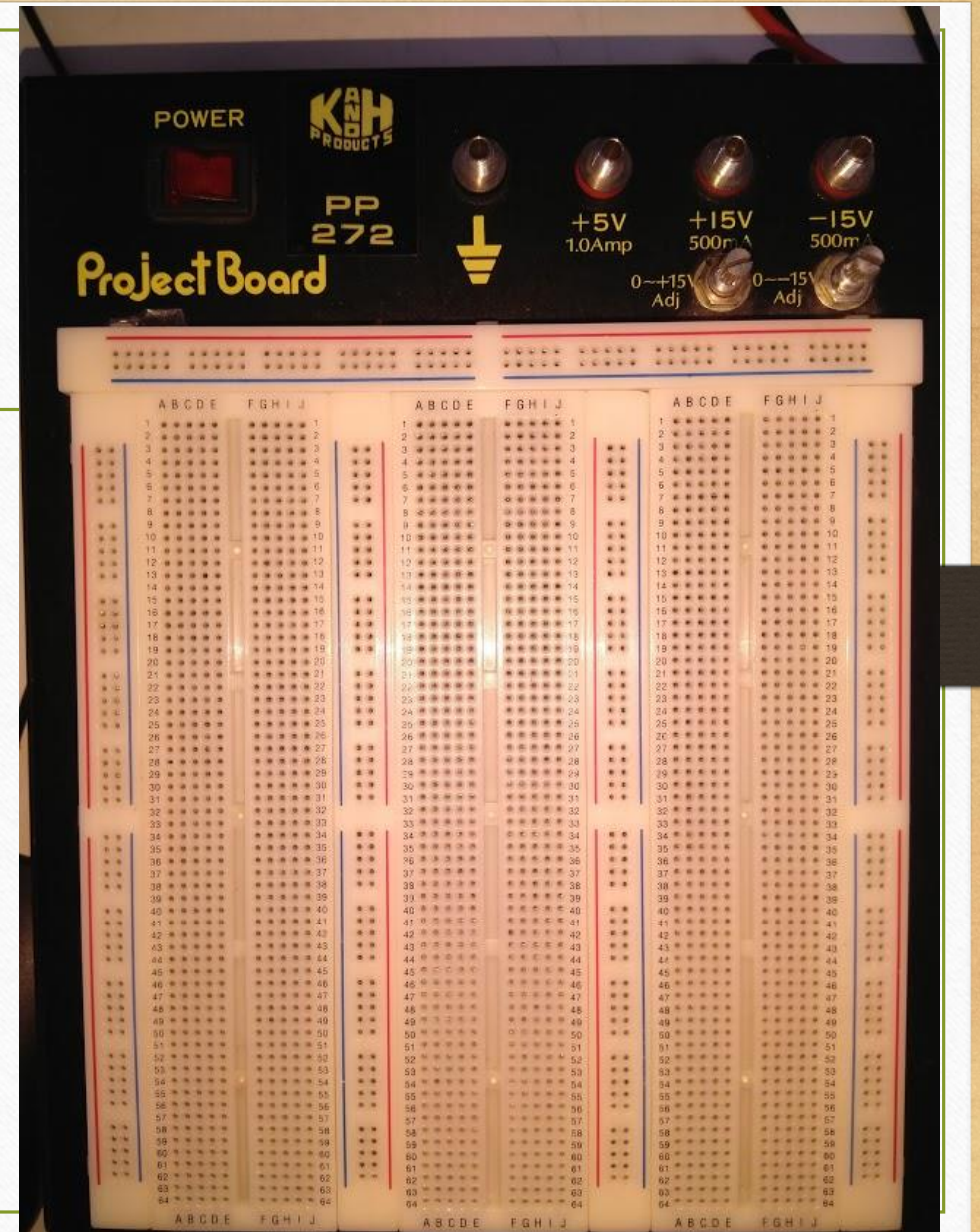
What we are doing

1. Building a series and parallel circuit on a breadboard
2. Soldering a series circuit

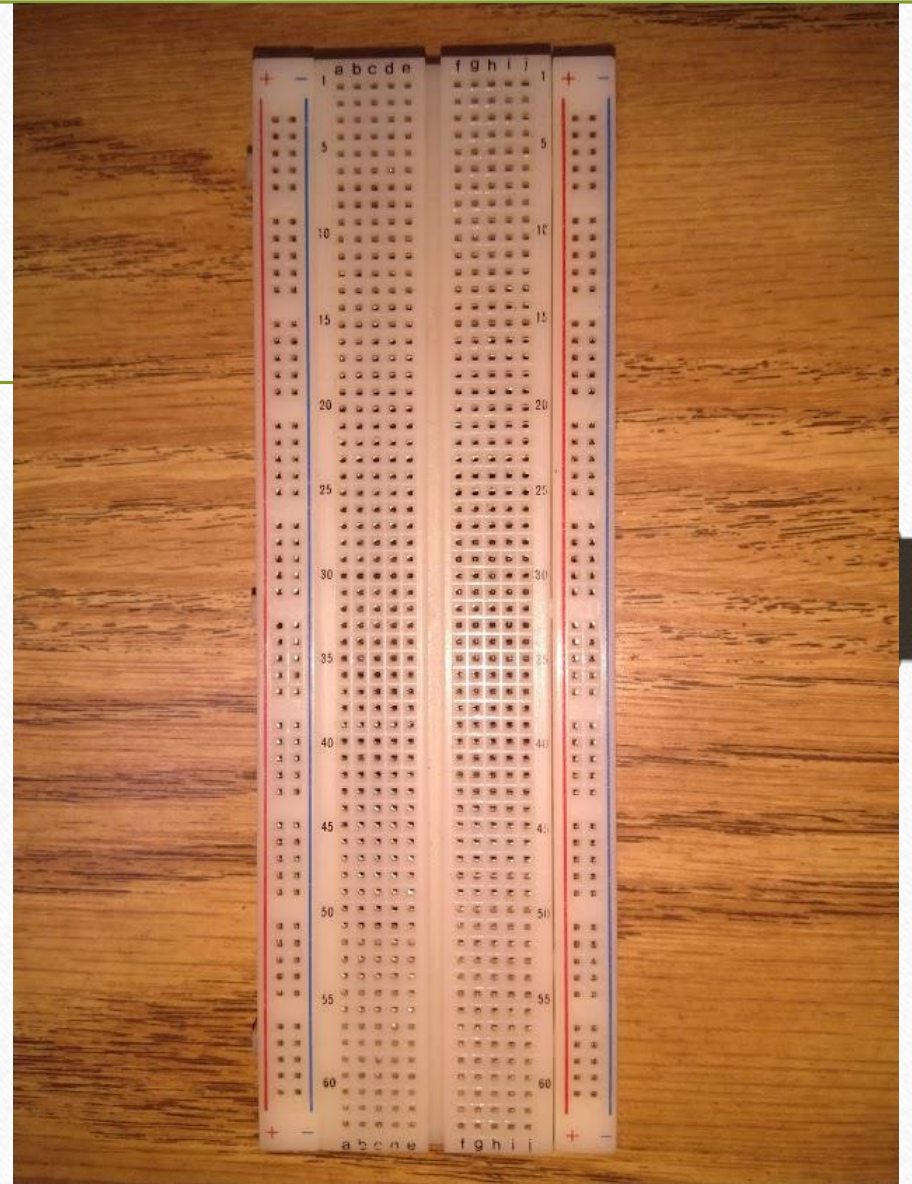
Breadboard Connections



Sometimes also called a
project board



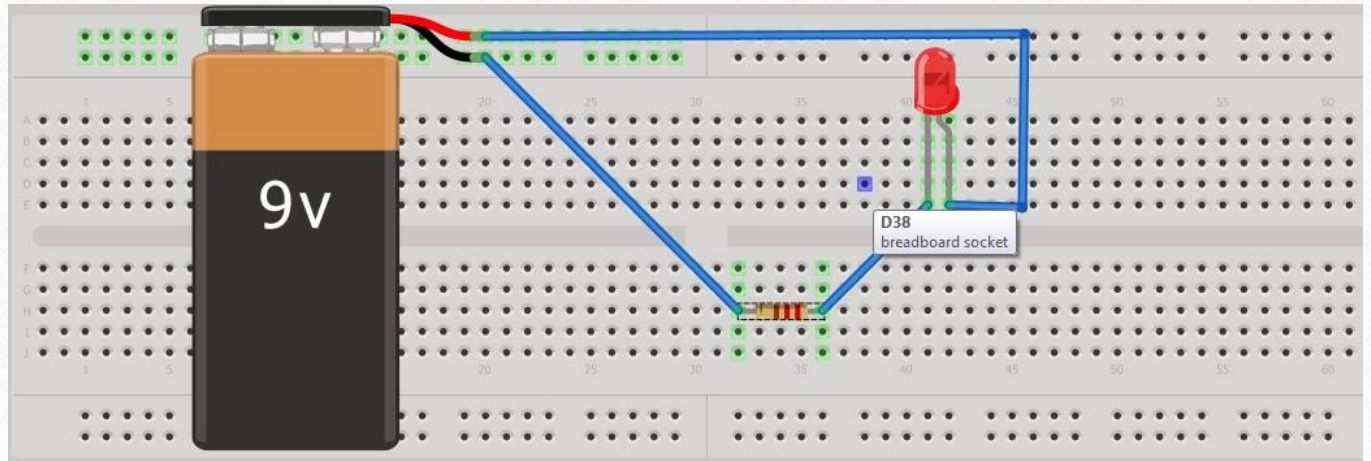
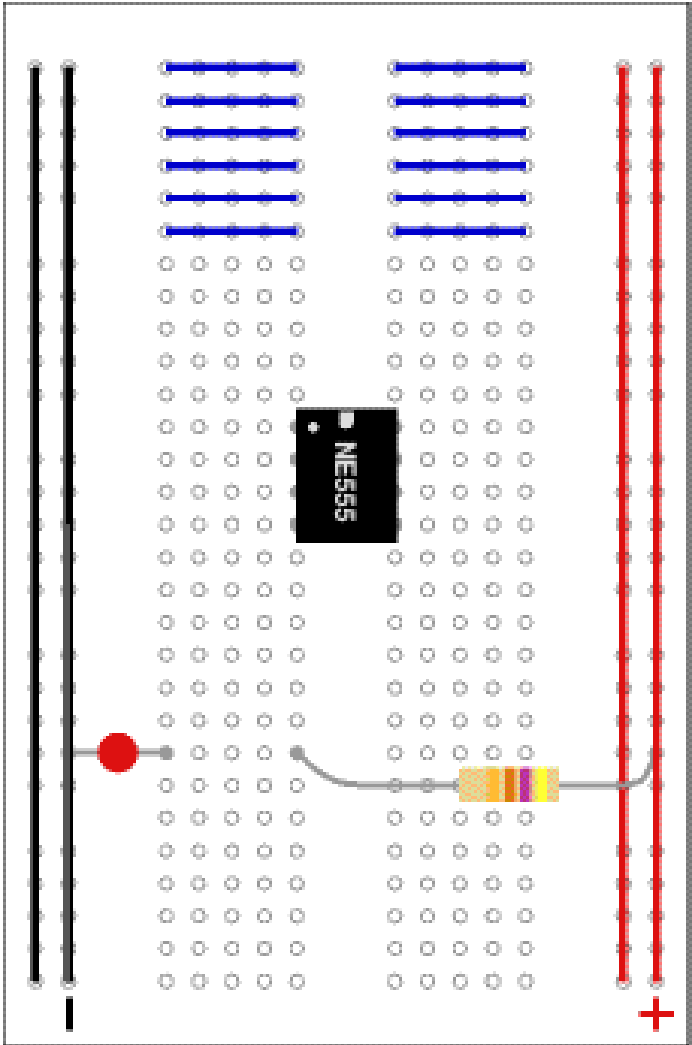
Look at this beautiful
breadboard



Simply Stunning



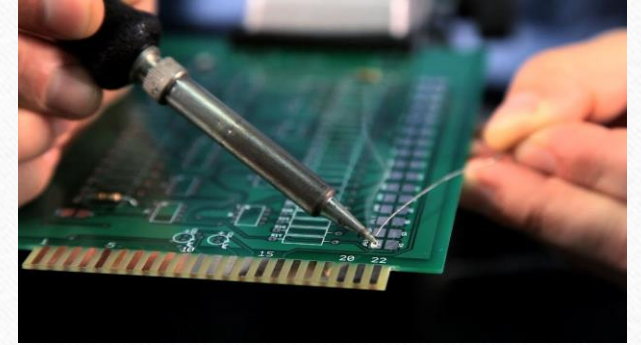
Breadboard Examples



Important caveats to building a breadboard circuit

- Understand what power and ground
- LED's only work in one orientation
- LED's have no resistance (need a resistor or they will EXPLODE)

Soldering – The tools



Soldering iron



Solder



Helping hands

Soldering – The principle

- The soldering iron heats up to $\sim 350^{\circ}\text{C}$
 - At this temperature, solder melts but the wire will not (and you will hurt so don't touch)
- Most solder contains lead which is a carcinogen (the solder I've bought does not have lead but there is still lead in this room) so wash your hands before you eat
- The goal is to heat the wire/metal up to 350°C with the soldering iron and then apply the solder (theoretically the iron never should touch the solder)

Soldering two wires together– The process

1. **Strip** and **Tint** one wire
2. **Strip** and **Tint** the second wire
3. Hold the two tinted wires together and then touch them with the iron to fuse them together
4. Cover the exposed wire

Strip: removing the insulation from the wire to expose the bare metal

Tint: covering the exposed wire with solder

I'm done preaching! Go do one of the following

Breadboarding

1. Build a series circuit to turn on an LED
2. Build a series circuit to turn on 2 LEDs
3. Build a parallel circuit to turn on 2 LEDs

Soldering

1. Solder together a series circuit to turn on an LED