Paper Electronics

PART 1

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PAPER

Origami

Pop Up

Folding Structures

ELECTRONICS

Materiality

Conductive materials

- Copper tape
- Conductive Ink

Electricity

Circuits

- Parallel
- Serial
- Imput
- Output

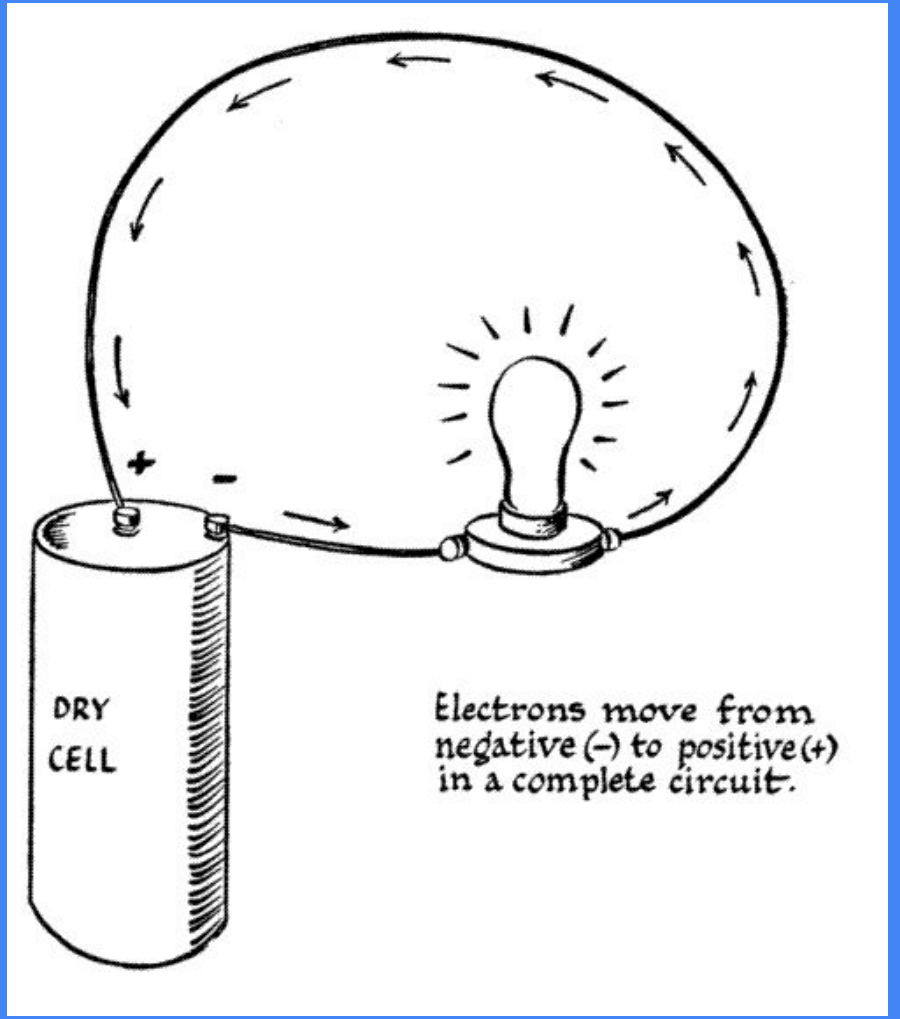
Trigger

Imput

Output

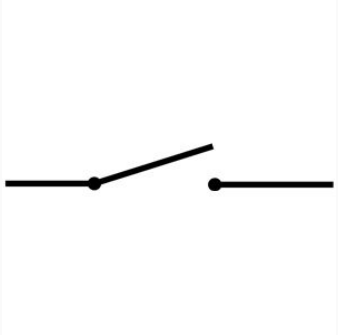
What is Circuit?

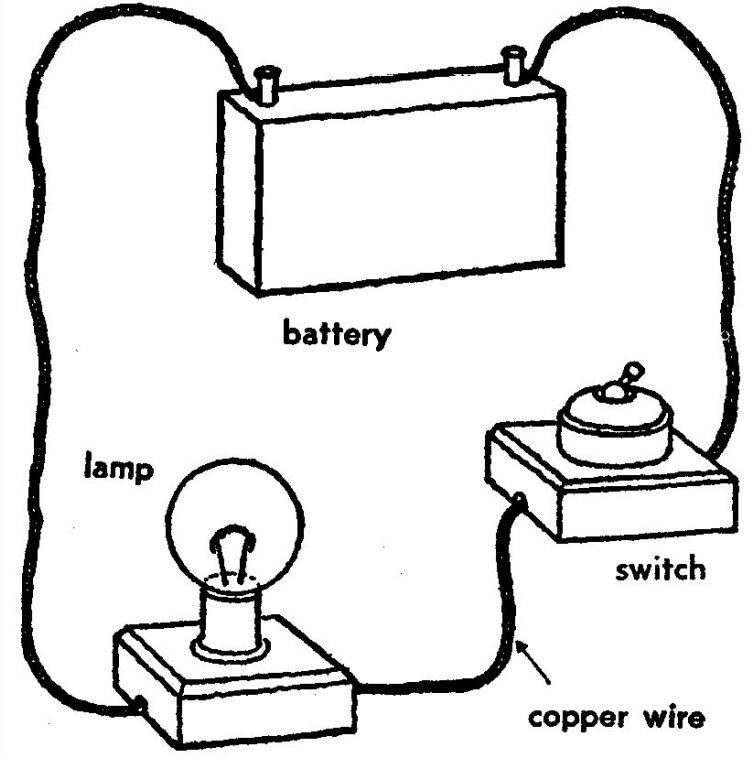
It makes a complete connection so the electricity can flow



CIRCUITS

If you make disconnections such as adding a switch or push button, then the electricity cannot flow, thus the lamp will not light up unless you push the button and restore the connection.





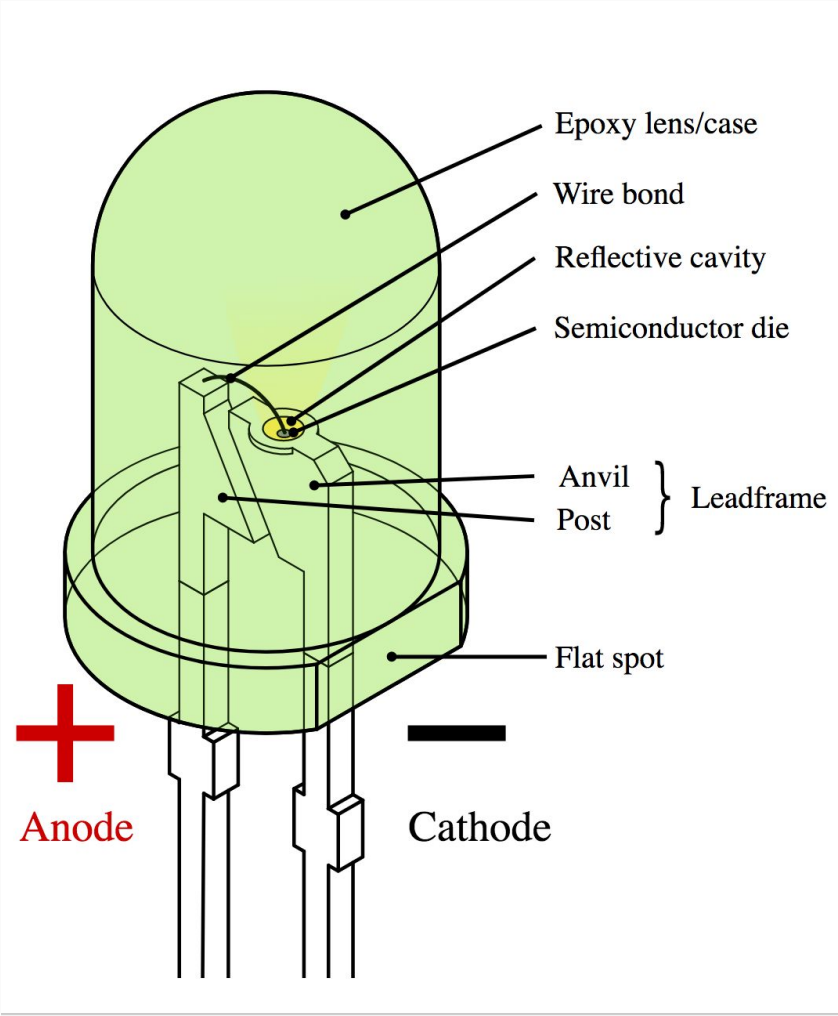
LED

the length of the legs. The longer one is + (Anode)

- the size of the Leadframe in the plastic casing. The smaller leadframe is + (Anode)

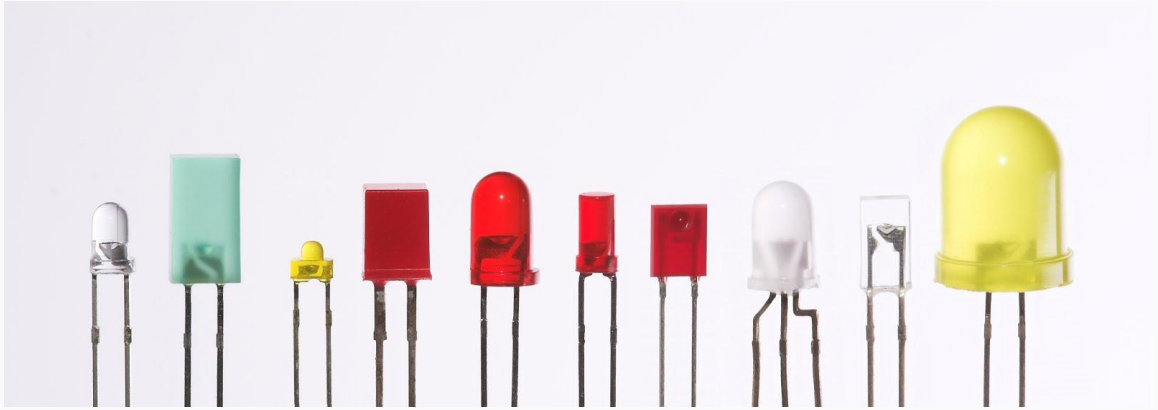
- SMD (Surface Mount Device) usually has triangular mark on the back. The direction of the triangular shows the direction of current flow

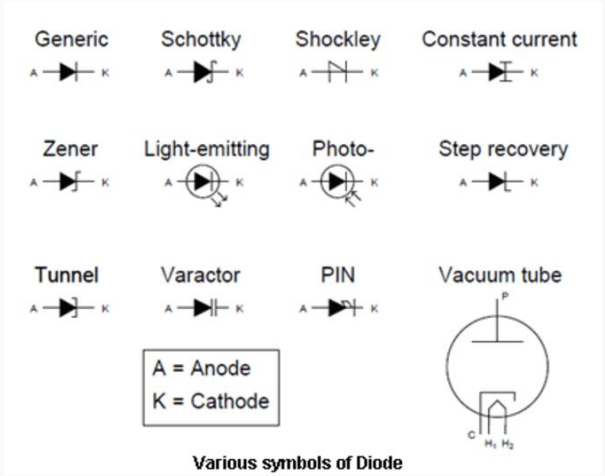
- some SMD LED has a mark on a corner. The marked corner is Cathode side.



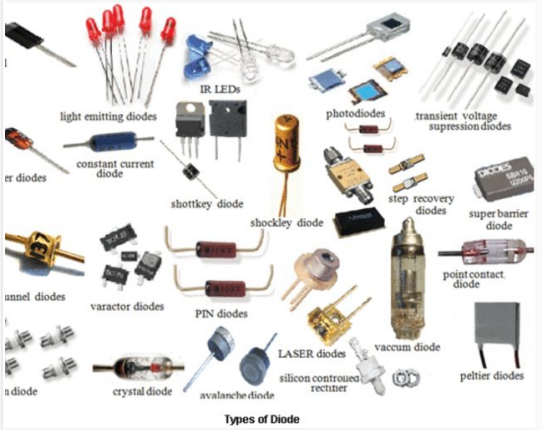
DIODES /LED

In electronics, a diode is a two-terminal electronic component that conducts primarily in one direction (asymmetric conductance); it has low (ideally zero) resistance to the flow of current in one direction, and high (ideally infinite) resistance in the other.





Various symbols of Diode



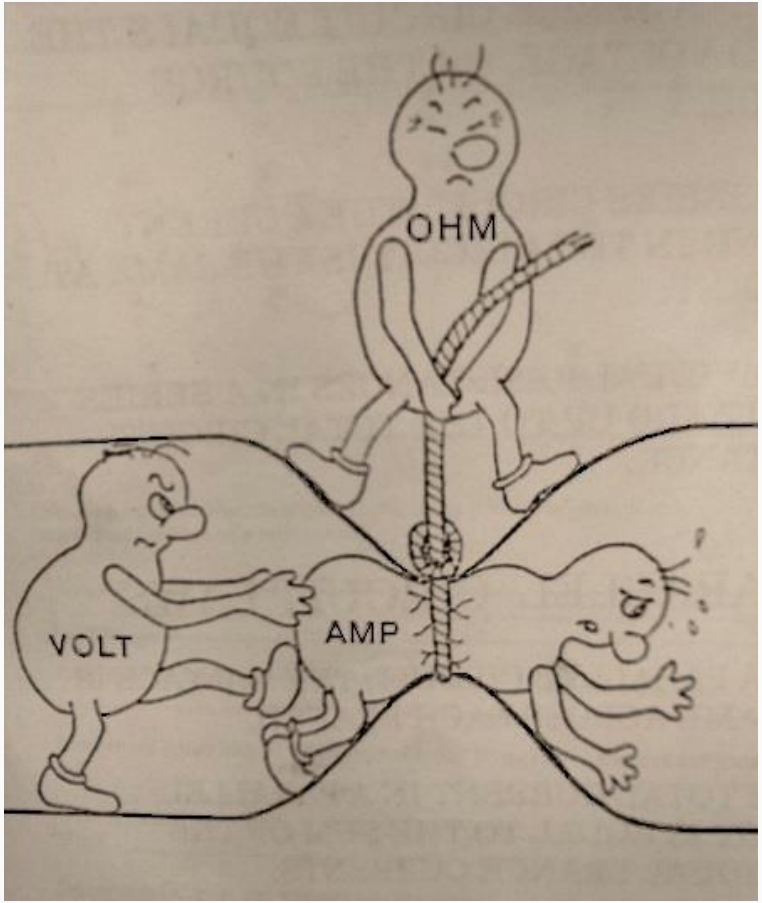
Types of Diode

Ohm's Law

This is an analysis example…

The Voltage, Current (Amp) and Resistance (Ohm) is related. If one value changes, the other value will change.

Measurement of the resistance for the LED



V(voltage) = **I** (current) x **R**(resistance)

LED Resistor Calculation

$$R = \frac{(V_s - V_{LED})}{I_{LED}}$$

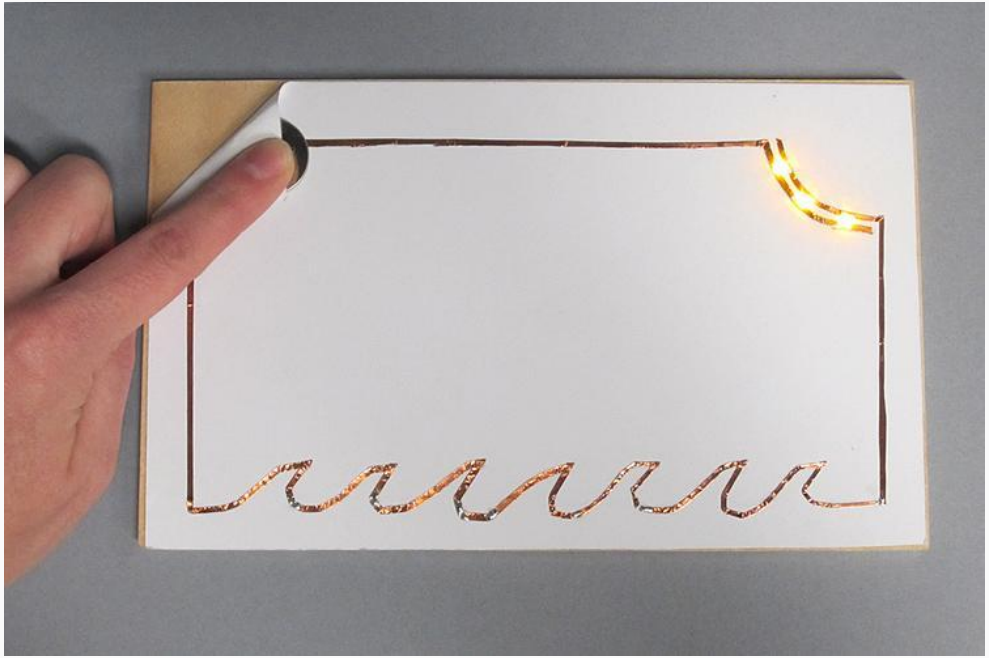
1. ***VS:*** is the source voltage, measured in volts (V).
2. ***VLED:*** is the voltage drop across the LED, measured in volts (V)
3. ***ILED:*** is the current through the LED*
4. measured in Amperes (Amps/A),
5. ***R:*** is the resistance, measured in Ohms (Ω).

Example

Textile

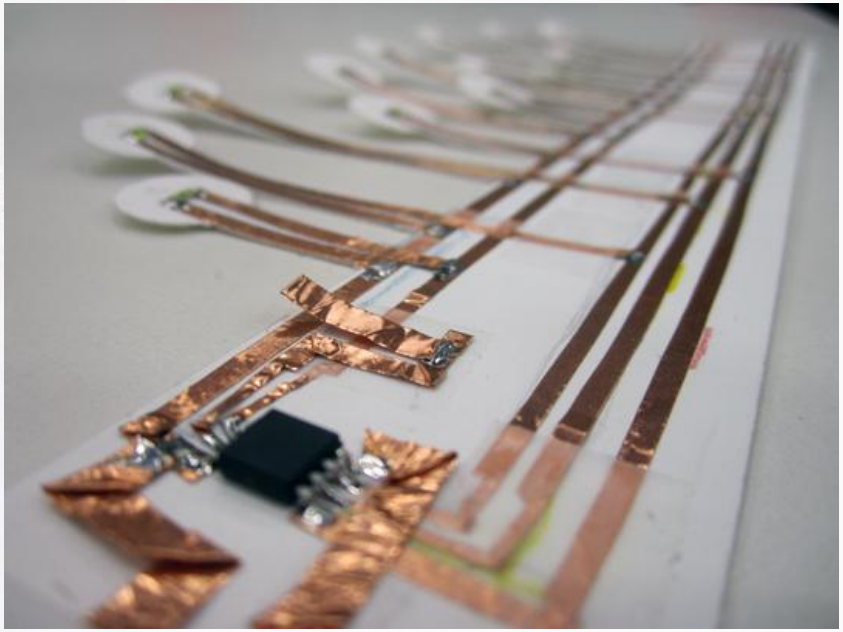
Example

Copper Tape

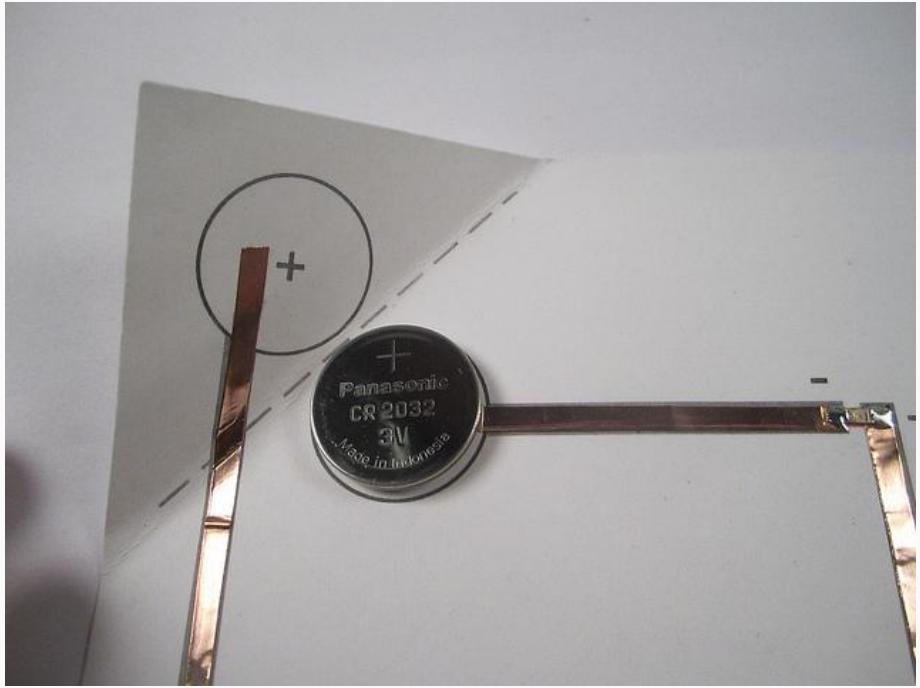


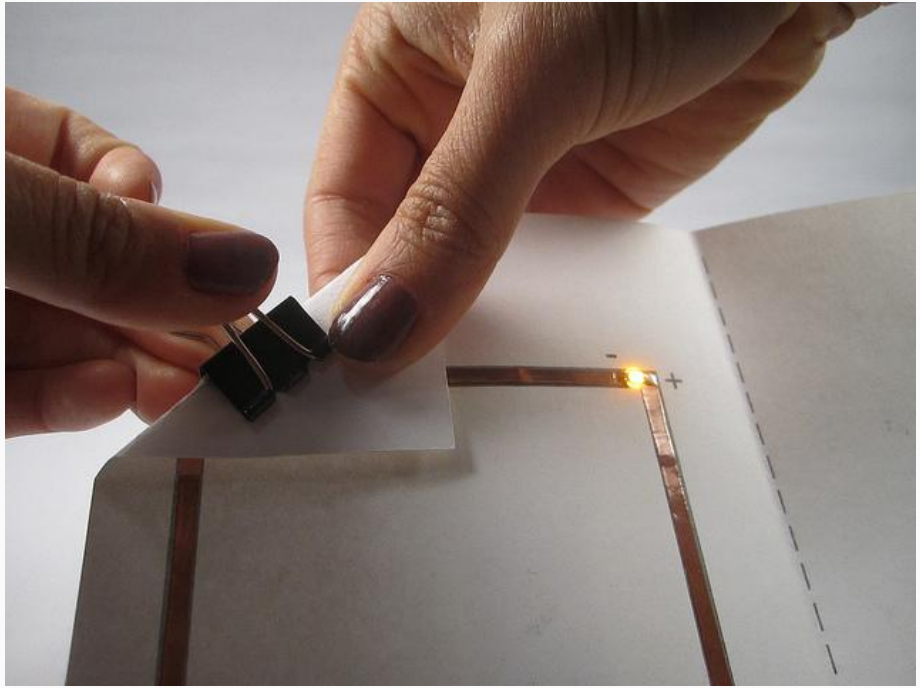
Example

Button / Switch



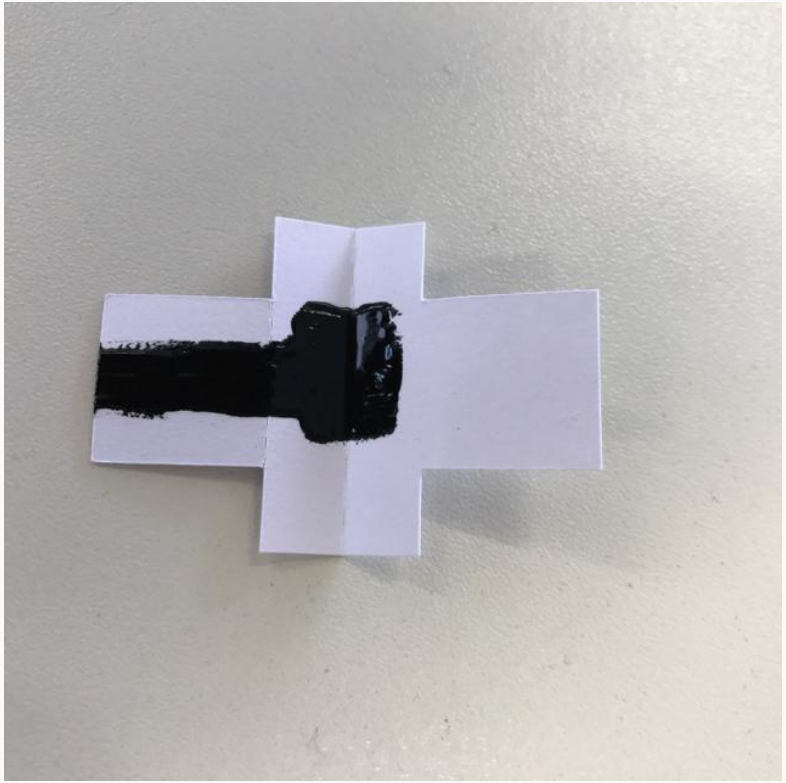
Battery Holder

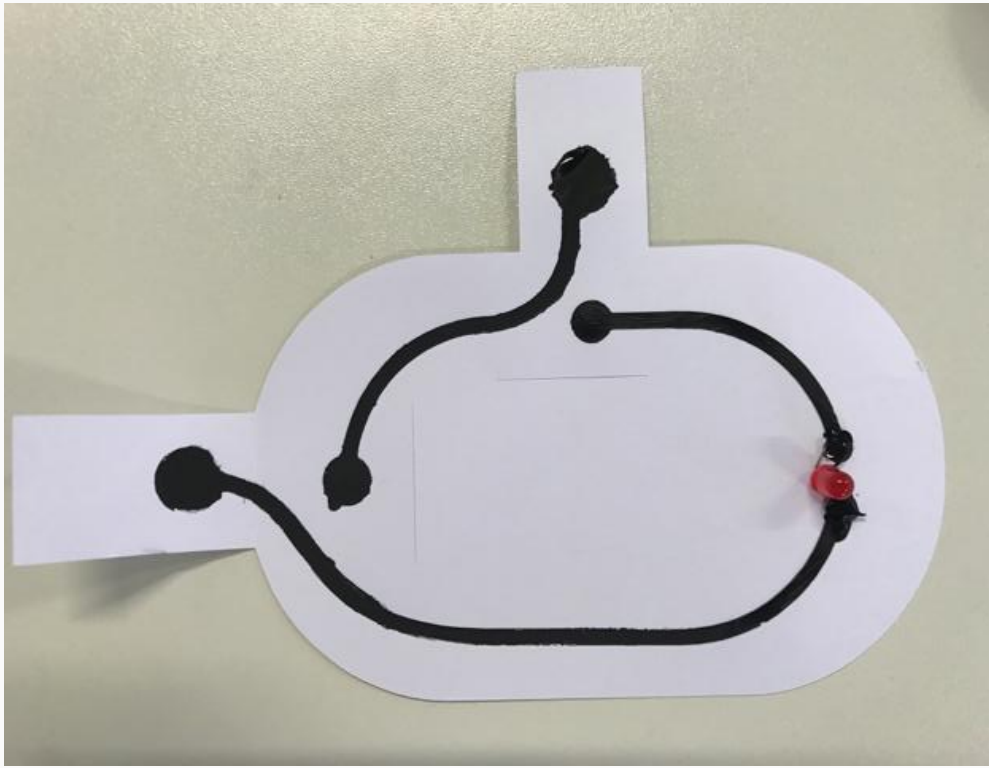




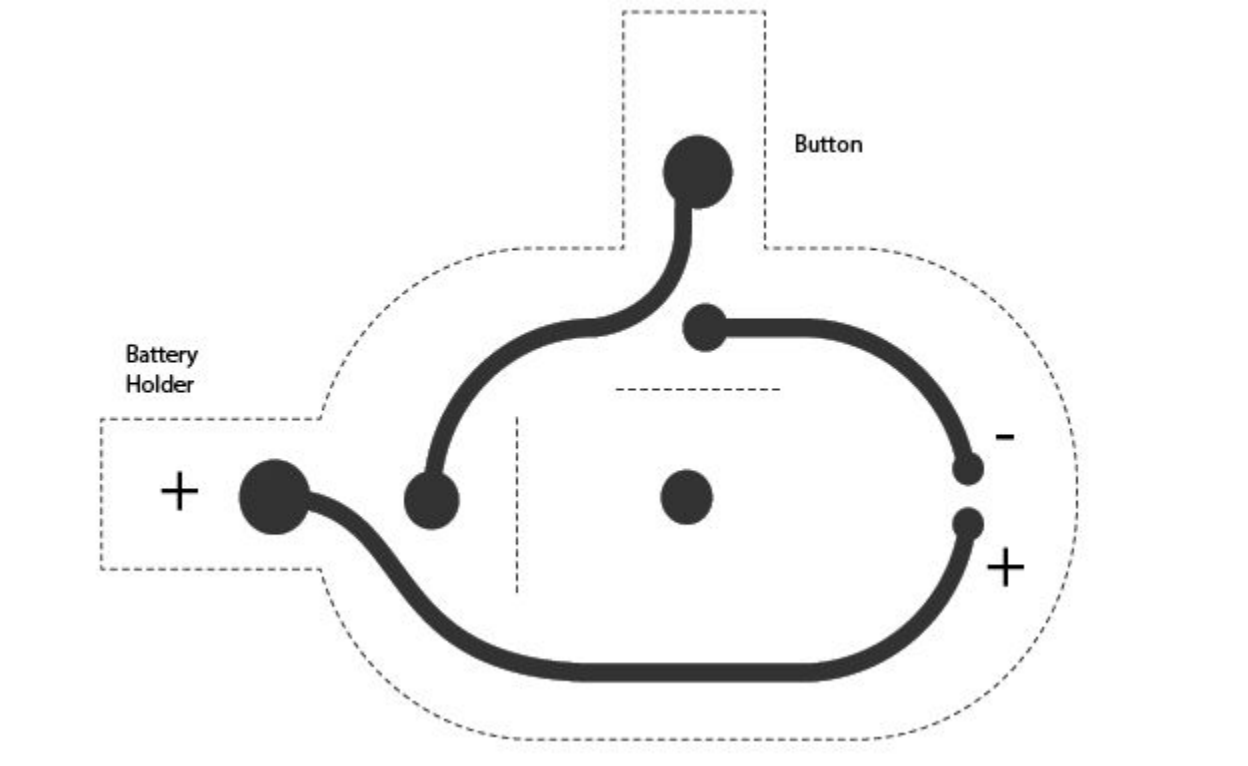
Connection

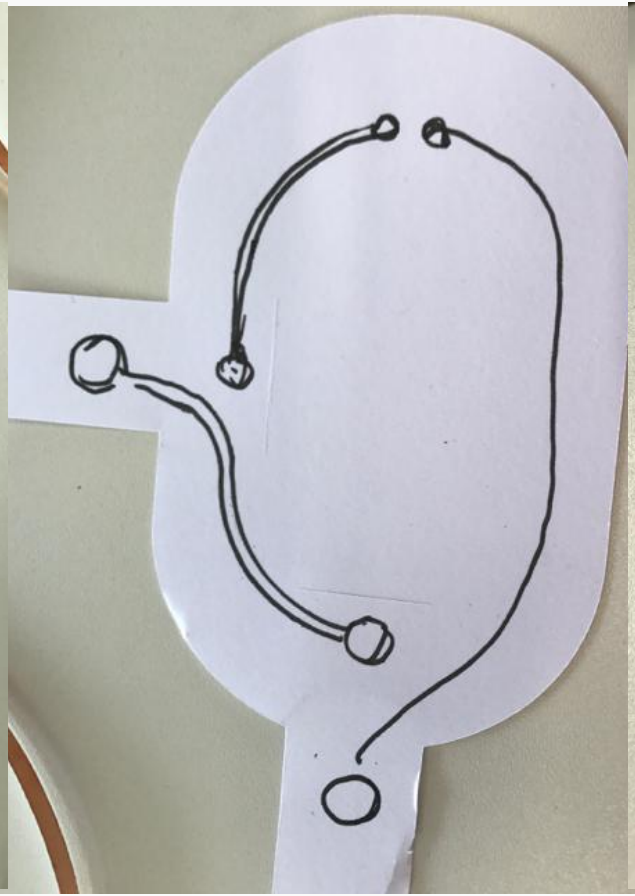
Conductive Ink



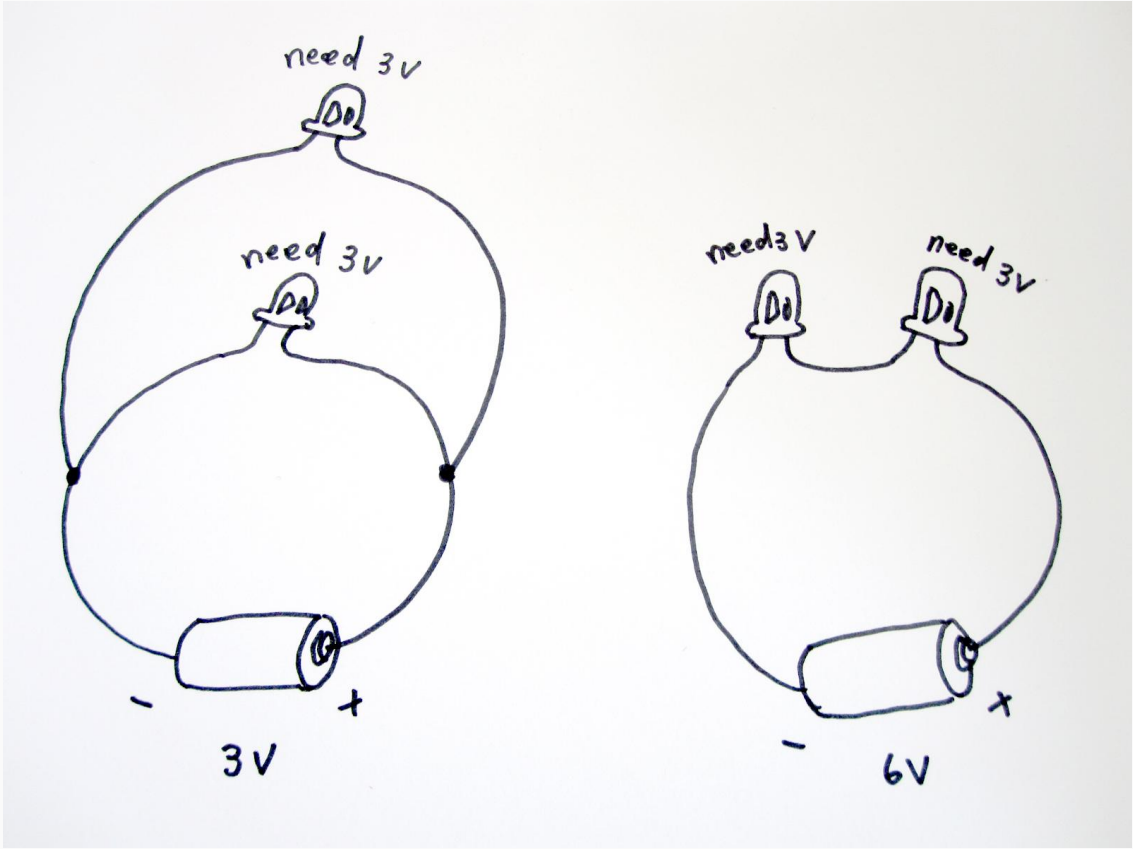


Circuits

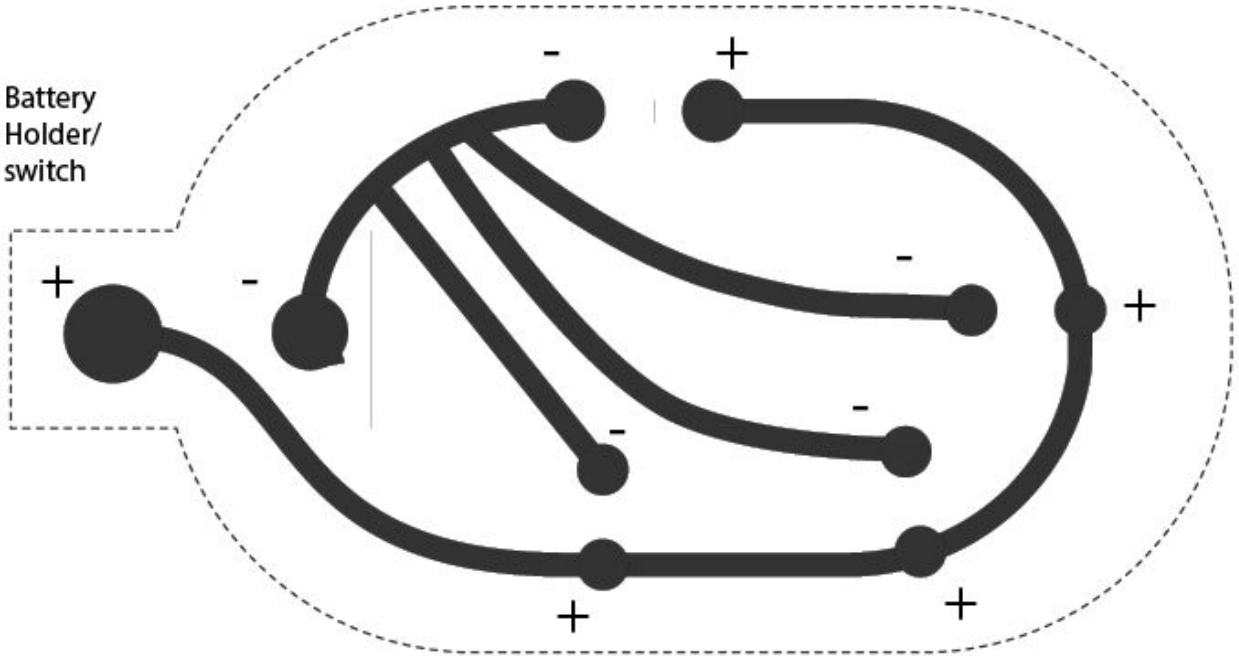




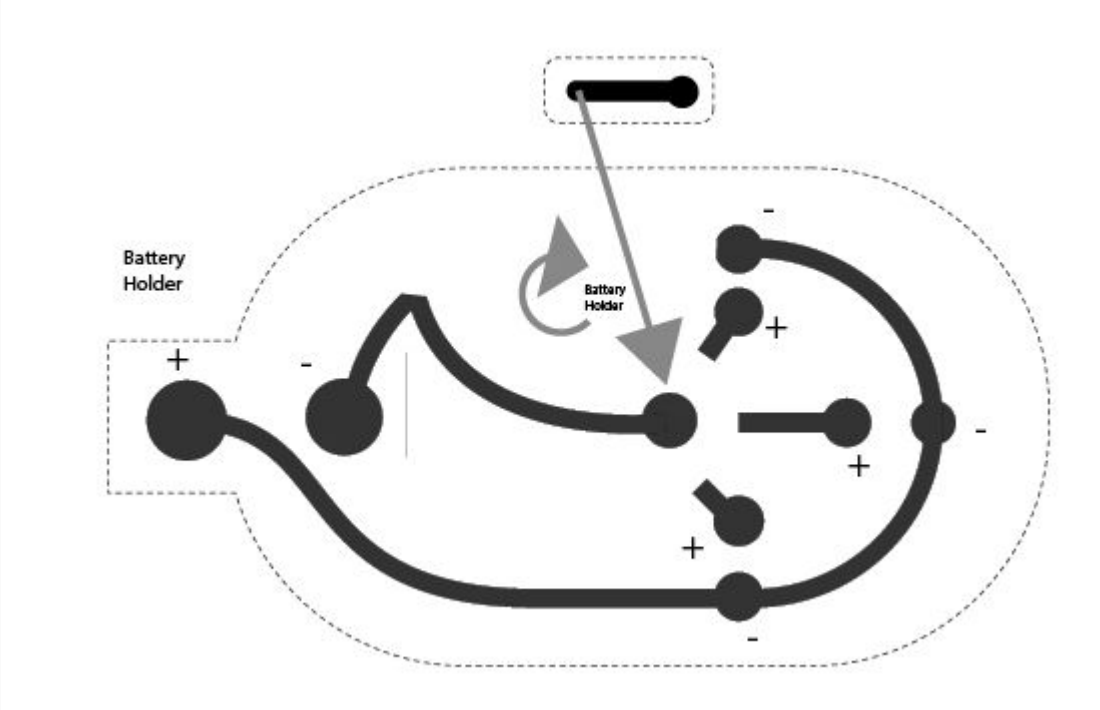
Add an LED



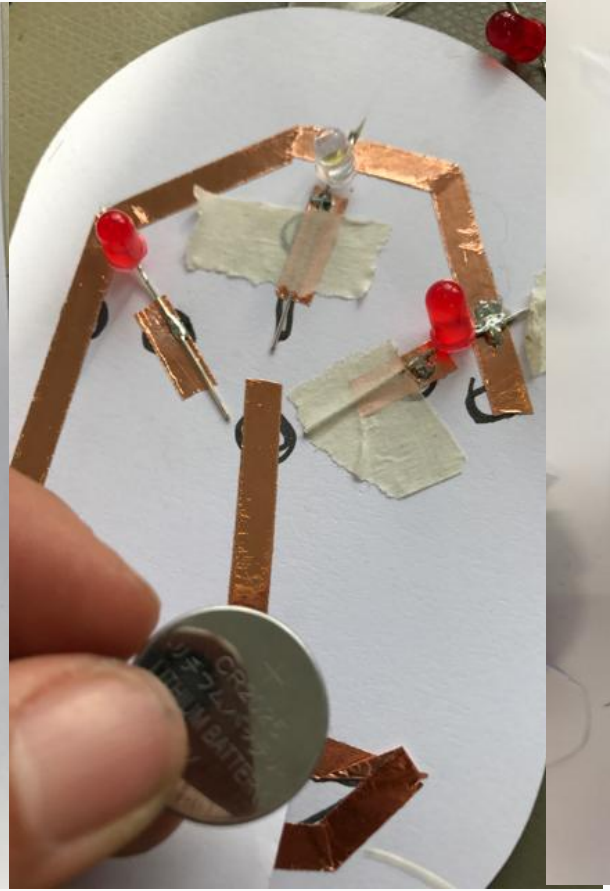
Parallel

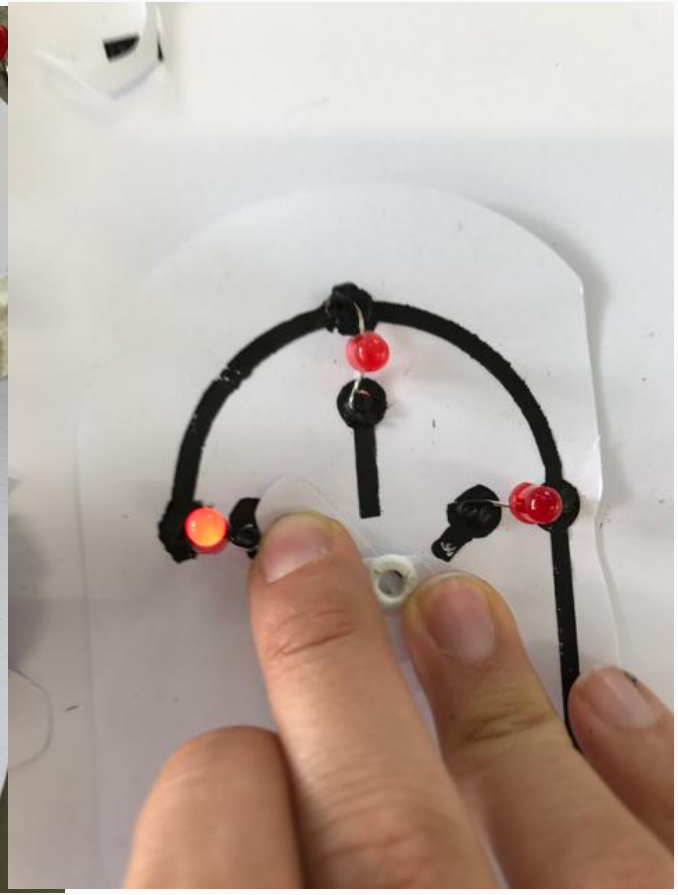


Rotary Switch



Hand on

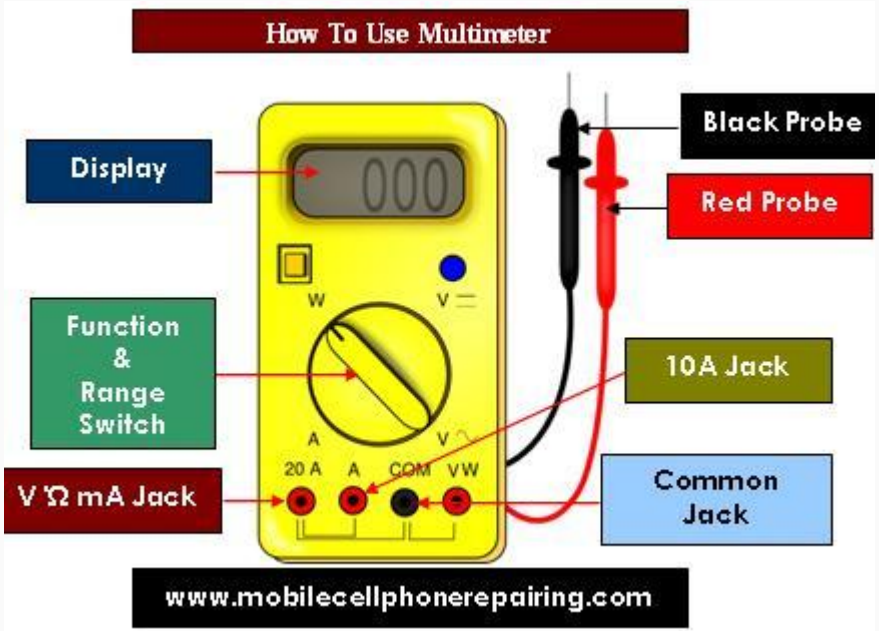




Multimeter

Measurement of voltage, current, resistance

The most basic things we measure are voltage and current. A multimeter is also great for some basic sanity checks and troubleshooting. Is your circuit not working? Does the switch work?



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