Flashing LED Project

This project introduces the Light Emitting Diode (LED), the 555 timer/oscillator integrated circuit (IC), resistors and electrolytic capacitors. You will assemble on the mini-breadboard a circuit to flash the LED at a frequency around 3Hz (3 times per second).

Parts Included:

Resistors - value identified by stripe colour code.

470 Ohms (470R) – Yellow/Violet/Brown/Gold
1000 Ohms (1k) – Brown/Black/Red/Gold
220,000 Ohms (220k) – Red/Red/Yellow/Gold

Capacitor - Identified by the value printed on the casing.

1 micro-Farad (1uF) 50V
Important: This is a polarised electrolytic capacitor and must be connected the right way round to operate correctly. The longer lead indicates the positive side and a white stripe on the casing points to the negative side.

LED – 5mm red.

As with the capacitor, the LED must also be connected the right way round to operate. The longer lead indicates the positive (anode) side and is shown as the bent lead in the assembly image below.

IC – 555 timer/oscillator.

This is an 8-pin integrated circuit. The pins are numbered from 1 to 8 in an anti-clockwise direction starting in the top left corner. Look for a notch in the casing at the top edge and/or a dimple close to pin 1.

Mini Breadboard

This is where you assemble your circuit. The holes in the breadboard are connected inside in columns either side of the central channel, as shown in the image (right). This means that any component lead or wire occupying holes in that column become electrically joined.

Jumper wires and a battery clip are also included.
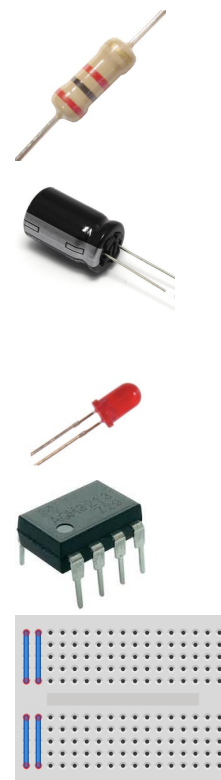
Assembly:

Assemble the circuit on the breadboard by plugging the components into the appropriate holes according to the diagram below. Jumper wires are shown in red and black (the supplied colours may vary). Be sure to get the LED, capacitor and IC the right way round. Only connect the battery when you have double checked your work.

1k Resistor

220k Resistor

LED long lead

Capacitor - Stripe on the negative side.

470R Resistor
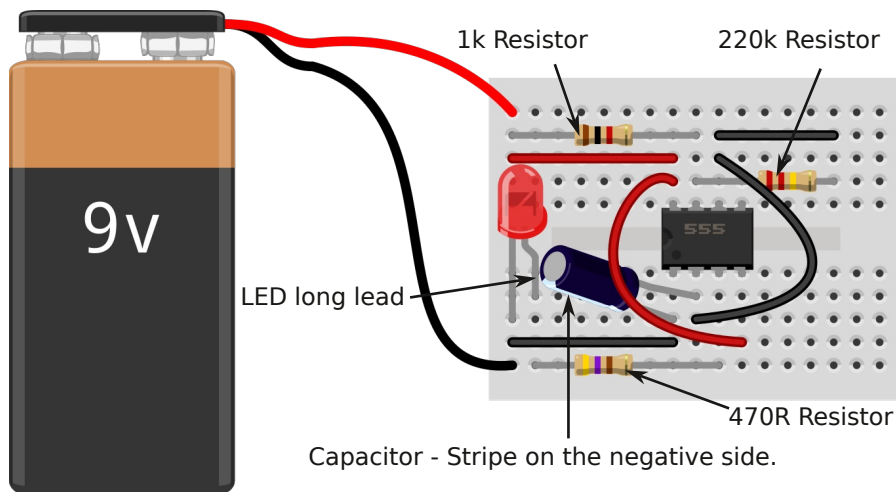
If everything has been assembled correctly you should see the LED flash at around 3Hz or 3 times per second.

Troubleshooting: If the led does not start to flash straight away, disconnect the battery immediately. The cause of any failure will, almost certainly be due to getting components in the wrong position. Check that the polarised components are the right way round and that all leads are pushed fully into the breadboard.

Circuit Diagram:
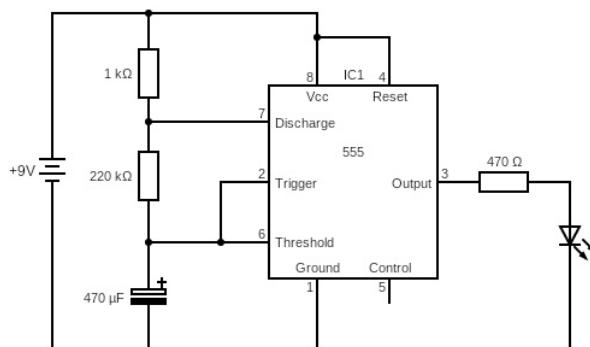
Circuit Description:
The 555 is connected in astable mode meaning that its output will switch back and forth between 9V (high) and 0V (low). In this mode it senses the charging of the capacitor to a preset voltage, discharges it, then repeats the cycle, switching the state of the output at each charge and discharge point. The charge and discharge rates, and hence the LED on and off times, are governed by the resistor values - 1k and 220k here.