LED Flasher - How it works

Components

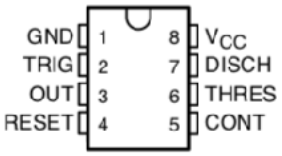
Resistors


Resistors are used to regulate the amount of electrical current flowing in a circuit — the higher the resistor's value, the less current that flows and vice-versa. It's like bending a garden hose, the reduced pipe size increases resistance in the pipe that results in reduced water flow.
Resistor values are measured in ohms (Ω) and are the value of their resistance is identified by the colour bands on their bodies. They may be connected into a circuit either way around (ie, they are not polarised).

Capacitors

Capacitors store energy, like a small rechargeable battery. They can be recharge and discharged very quickly. Capacitors can be Polarised or non Polarised. If they are polarised, they have a "+" and a "-" lead and must be put in the circuit the right way around or they can be damaged.

7555 Timer



The 555 timer IC can be used as a Timer, pulse generator, and Oscillator. It has about 28 transistors and 12 resistors. But you don't need to know all about what inside to understand how it works in this circuit.

All you need to know for this circuit is that it has two input pins (pin 6 and pin 2) and an output pin (pin 3),

Input Pins

Pin 2. – Trigger, - When the voltage at this pin drops below ⅓ of the supply voltage the output (pin 3) switch from a "LOW" (0 volts) to a "HIGH" state (9volts)

Pin 6. – Threshold,When the voltage applied to it exceeds ⅔ of the supply voltage, the output (pin 3) to switches from "HIGH"(9 Volts) to "LOW" (0 Volts) state.

Output PIn

Pin 3. – Output,- the output voltage at pin 3 switches between either the positive supply rail) (in this circuit +9V, at pin 8 or the negative supply rail (0V, at pin 1) — depending on the voltage we apply to its input pins.

Putting it all together

When you apply power to the circuit, the capacitor C1, starts to charge up, as its connected between 0 and 3v with the resistors R2, and R3,

And as it charges, the voltage across the capacitor C1 gradually rises. Since pins 2 and 6 of the IC are connected to the top of the capacitor, the IC can of course 'monitor' this rising voltage. When the capacitor voltage rises to about 2V (2/3 of 3V), the IC suddenly switches its output (pin 3) voltage down to the negative rail.

When pin 3 switches low, the capacitor also stops charging. Instead it begins to discharge. by connecting it internally to the negative rail via pin 7 (discharge pin) . So the voltage across the capacitor (and as sensed by pins 2 and 6) begins to fall.
When the capacitor voltage drops down to about 1V (1/3 of 3V), the IC again switches the voltage at its output pin 3. This time it switches up to +3V again,

The end result is that Pin 3 "Oscillates" slowly between a high and low voltage, and this is what make the LED Flash by connecting the bottom end of R1 to Ground (negative terminal of the battery)
R1 is used to limit the current into the LED so its not damaged.

Circuit Diagram