

# LED Blinky Dual LED Flasher

## Dual LED Flasher

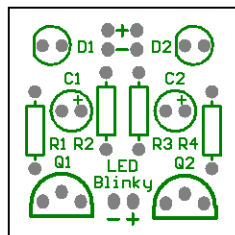
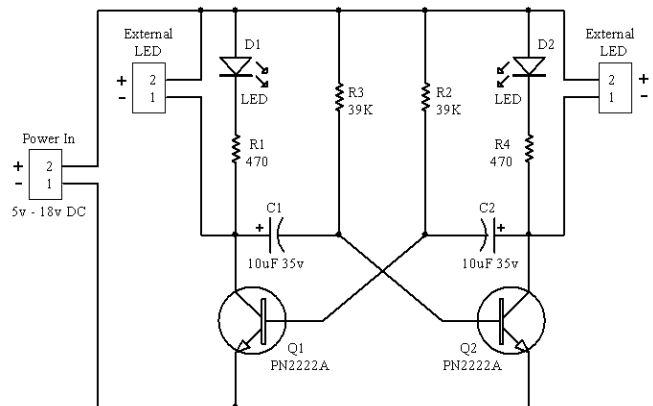
The **LED Blinky** is one of the most basic systems you will ever build, but offers so much fun in seeing your results displayed with a dual-blinking LED display. With only a limited number of components, consisting of two transistors, two capacitors, four resistors and two LEDs of your choice – this system can be assembled by a novice in a matter of minutes with common parts from around your workbench.

Available in several configurations from fully assembled and tested units, kit of components you can build, or just the bare board allowing you to supply your own components. Average assembly of the system in less than 15 minutes is possible. The PC board is a high quality, double-sided design, complete with solder masks on both sides, plated holes along with a high-contrast silk-screen labeling component positions measuring only 1.2" x 1.2" (31mm x 31mm). The design allows for the placement of a variety of sizes of LEDs on the board (at D1 and D2), ranging from 3mm to 5mm all the way up to the huge 10mm models.

As can be seen in the schematic, the design is based on an astable multivibrator utilizing two NPN transistors. Choice of transistors is not critical in this circuit, almost any NPN transistor at **Q1** and **Q2**, such as a 2N2222, 2N3904 or NTE123A or NTE159 will work. Flash rate is determined by the 39K ohm resistors (**R2** and **R3**) and the 10uF capacitors (**C1** and **C2**). To add additional effect to your display, adjust the duty-cycle on each side by changing the values of **C1/C2** or **R2/R3**. 470ohm resistors (**R1** and **R4**) adjust the current flow through the LEDs, which you want to limit to about 20mA total.

To run external loads or LEDs, a connection area is provided between **D1** and **D2**. There is no current limiting provided at this output point, so you must provide it when needed at your LED.

Power is applied to the circuit just between **Q1** and **Q2** to the positive (+) and negative (-) connection points.



### Component List

#### Resistor 1/4 watt, 5% Carbon Film:

- [ ] (2) 470 Ω (yellow-violet-brown-gold)..... **R1, R4**
- [ ] (2) 39K Ω (orange-white-orange-gold)..... **R2, R3**

#### Capacitors:

- [ ] (2) 10uF 25v Electrolytic Capacitor..... **C1, C2**

#### Semiconductors:

- [ ] (2) PN2222A/2N2222A NPN Transistor... **Q1, Q2**
- [ ] (2) LEDs ..... **D1, D2**

#### Connectors:

- [ ] (1) 9v Battery Clip (Optional)

### Assembly of Your LED Blinky

With only a limited number of parts needed to assemble the **LED Blinky**, you should be able to complete this project in less than 30 minutes.

Assembly order is not critical with this project – you can choose to follow our recommendations or proceed on your own.

#### **Step 1:**

Install and solder to the board, the two 39K ohm resistors (orange-white-orange-gold) at position **R2** and **R3**.

#### **Step 2:**

Install and solder to the board, two 470 ohm resistors (yellow-violet-brown-gold) at position **R1** and **R4**.

#### **Step 3:**

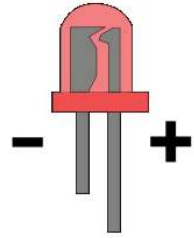
Install and solder to the board, two NPN transistors (PN2222A) at position **Q1** and **Q2**. Notice the transistors have a flat side, which should match the flat marketing on the PCB.

#### **Step 4:**

Install and solder to the board, two 10uF electrolytic capacitors at position **C1** and **C2**. The capacitors are polarized, so you must get the correct leads in the correct holes on the board. Capacitors typically have the negative lead marked on the component case, this should go into the hole on the board which does not have the Positive (+) marking.

#### **Step 5:**

Install and solder to the board, two LEDs at position **D1** and **D2**. It is important to note that LEDs are polarized, meaning they must go in the correct way or they will not work. When looking at an LED from the side, you will notice one lead is longer than the other. The longest lead is the Anode (positive) while the shorter lead is the Cathode (negative). The shorter Cathode should go into the LED position on the board where the flat-side of the component marking on the board is indicated.



#### **Step 6:**

The final step is the connection to the 9v battery clip to apply power to your **LED Blinky**. The clip has two wires, a Red lead and a Black lead. Located towards the bottom of the board, between the transistors **Q1** and **Q2** you will find two pads labeled + and -. The Red wire from the battery clip will go to the + lead while the black wire will go to the - lead.

This completes the assembly of the system. Simply connect the 9v battery for hours of LED Blink'in.

Enjoy!