

## 555 Timer/Oscillator Tester

by Tony van Roon



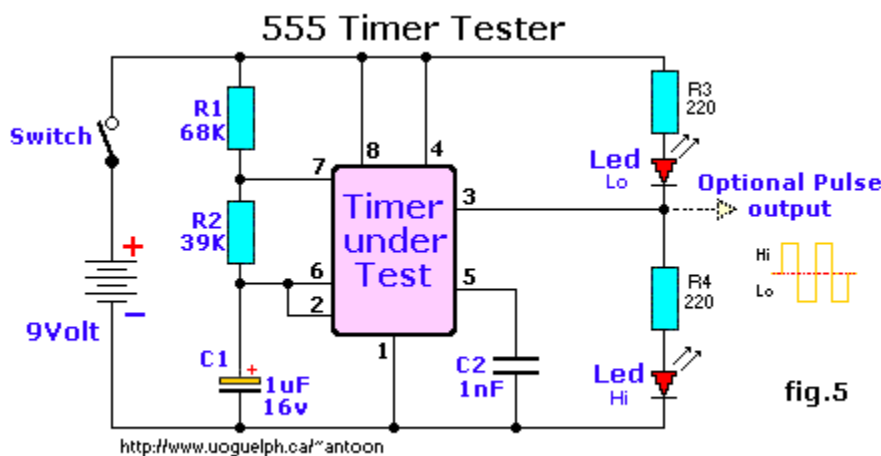
### Description 555 Tester:

The 555-tester above is basically a led flasher circuit but with the 555 removed. Imagen the output being a square-wave pulse with a high and low pulse, and is so indicated by the two leds, one 'Hi' and the other one 'Lo'. When you have a good 555 under test, the hi and lo leds are flashing steadily. If you have a defective 555 you may get both leds off, one or both on steady, or one or both on faintly. In all these case the 555 is defective. Oh yeah, just in case you are just starting out in electronics; do NOT insert a 555 (or take it out) with the power on. The flash-rate can be changed with different values for C1 and R2. Try it, its fun. At pin 5 there is a small ceramic 10nF capacitor. It is just there to filter out any noise and is optional. Experiment with leaving C2 out. C2 can be a value of 0.001 to 0.01 $\mu$ F, but the latter is the most common value. The datasheet for the 555 documentation specifies to use a general purpose ceramic 0.01 $\mu$ F capacitor.

Read the [555 Timer/Oscillator Tutorial](#) for more information of the

pin functions.

In regards to R3 and R4; depending on your Led type; start with 220 ohm and go up or down from 100 to 330 ohms, again, depending on your Led (e.i. regular, high, ultra bright, 2mm, 3mm, 5mm, etc.). The prototype was constructed with as few parts in mind as possible. In that regards you could save money by replacing the two leds with a bi-color (3 legs) one if you have a unit in your junkbox somewhere; it will then flash green/red. The second unit was smaller, but the third unit I build was so small it was about 2 x 1 x 1/2 inch and fitted nicely in my pocket.



### Parts List:

R1 = 68K, 5%  
 R2 = 39K, 5%  
 R3 = 100 to 330 ohm depending on LED  
 R4 = Same as R3  
 C1 = 1 $\mu$ F, 16V  
 C2 = 0.01 $\mu$ F ceramic (see text)  
 Two led's, red or green.  
 8-pin dip socket  
 On-off switch or momentary 'push=on' switch  
 Solderless breadboard: Radio

Shack #276-175, or vero-board

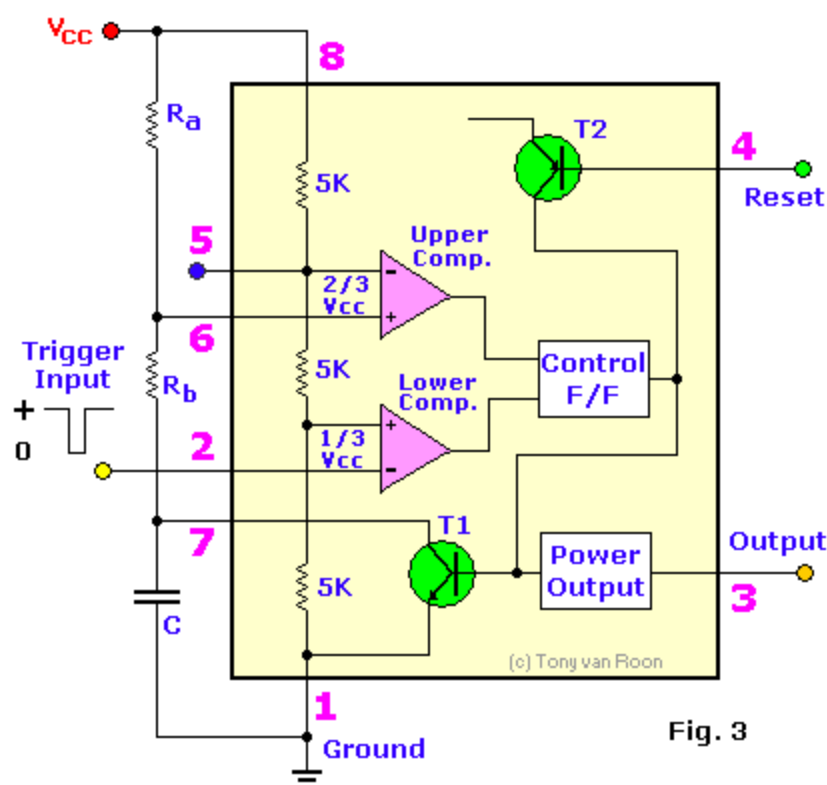


Fig. 3

### Description 555 Timer/Oscillator:

Have a look at the block diagram above. To make the 555 work, a trigger pulse at pin 2 initially sets the 555's internal flip-flop 'on'. It does so by comparing the input pulse to  $1/3$  of the supply power to a second comparator. This turns off the transistor across the timing capacitor and allows the timing capacitor to start the charge cycle. The 555 stays 'on' until this timing cycle turns it 'off' again by resetting the control flip-flop.

The timing cycle can be made to start over again by applying a pulse to pin 4 (reset). This turns on the transistor that discharges the timing capacitor, and so delaying the charge from reaching  $2/3$   $V_{cc}$ . In some applications, the reset (pin 4) is connected to the trigger input (pin 2) so that each new input trigger signal restarts the timing cycle.

When the threshold at pin 2 drops, at the end of a timing cycle, that voltage drop can be used to start a new timing cycle right away by connecting pin 6 (threshold) to pin 2, the trigger input. This type of system is called an "astable, free running, oscillator" and is the most common one. If you look at a variety of diagrams where a 555 is used you notice that in most cases pins 2 and 6 are connected.

The 555's output circuit includes two high current transistors, each capable of handling at least 200mA. One transistor is connected between the output pin 3 and  $V_{cc}$ , and the other between pin 3 and ground. This way you can use the output pin 3 to either supply  $V_{cc}$  to your load (source) or provide a ground for your load (sink). If you have heard mentioning about 'sink' or 'source' this is exactly what it means. This tester will flash the led's alternately with good 555 under test, because both led's are driven from the single output pin 3 because of the way the 555 is designed. What an awesome chip!

If you wish to learn more about the 555 Timer/Oscillator, I invite you to read the [555 Timer/Oscillator](#) tutorial.

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