555 timer Oscillators – Sensors

ELTN 130
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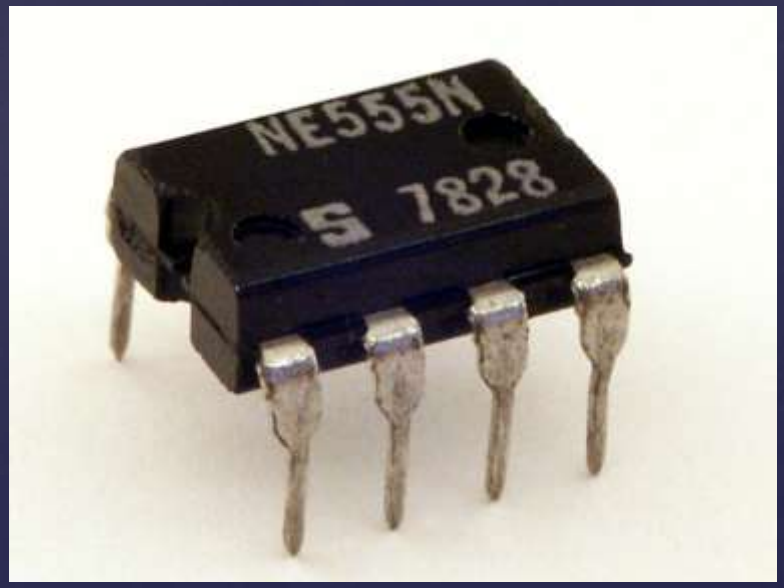
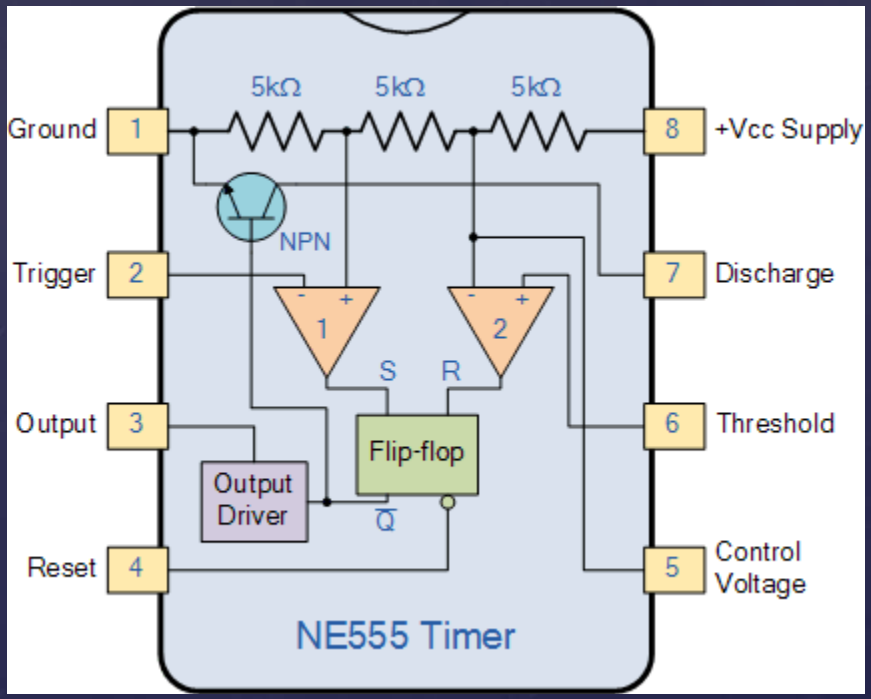
Teacher / Student / Hobbyist / Inventor

A popular IC from the past is the *555 timer*. It is still used in circuits today and as of 2014 approximately 1 billion are sold each year.



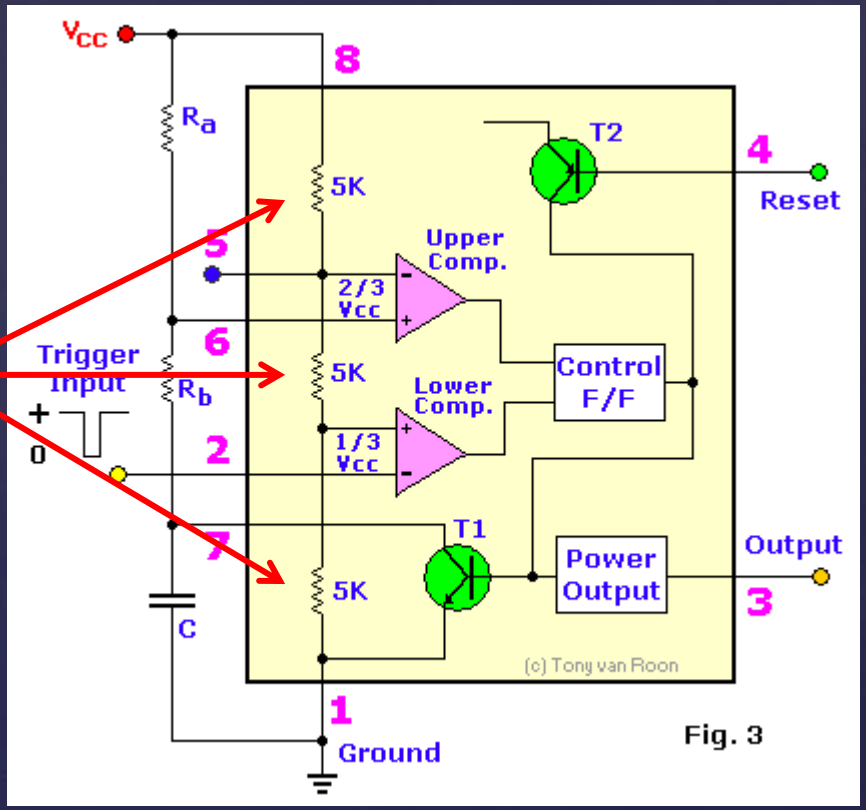
What makes it so special?

The designer created several “sub-systems” on the chip so that it can be configured to create many different types of circuits.



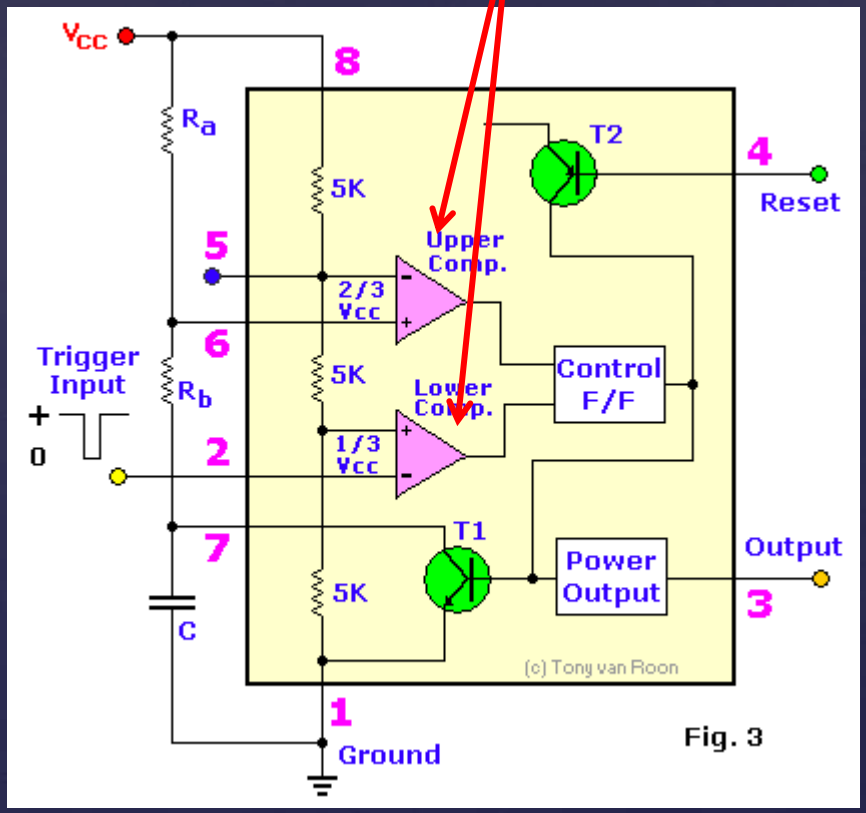
Let's look at some of the parts:

3 resistor voltage divider

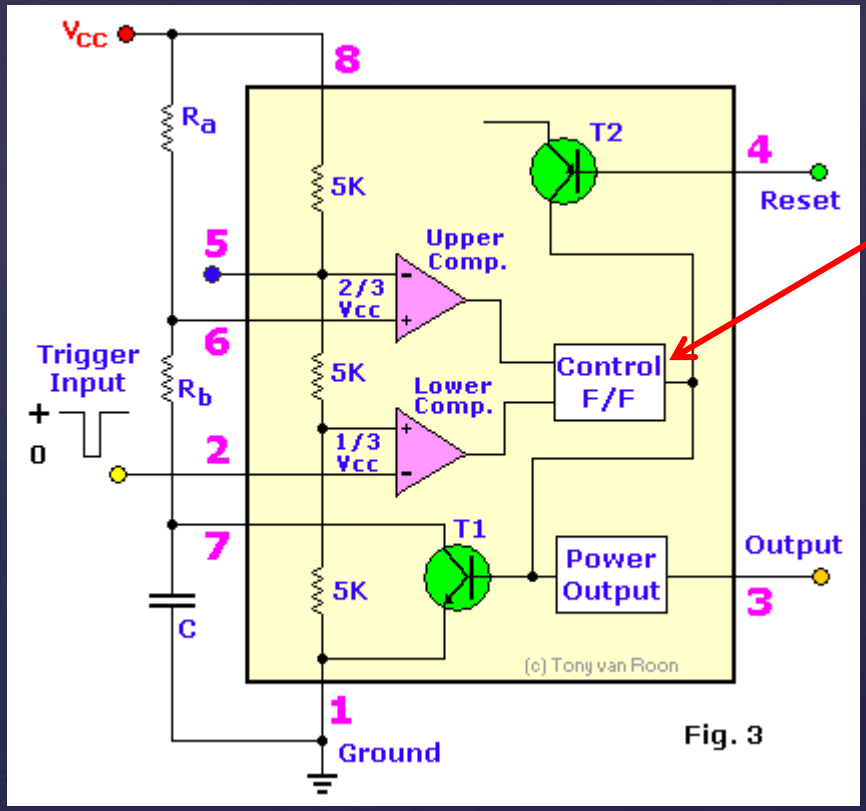


Let's look at some of the parts:

Upper and lower voltage comparators

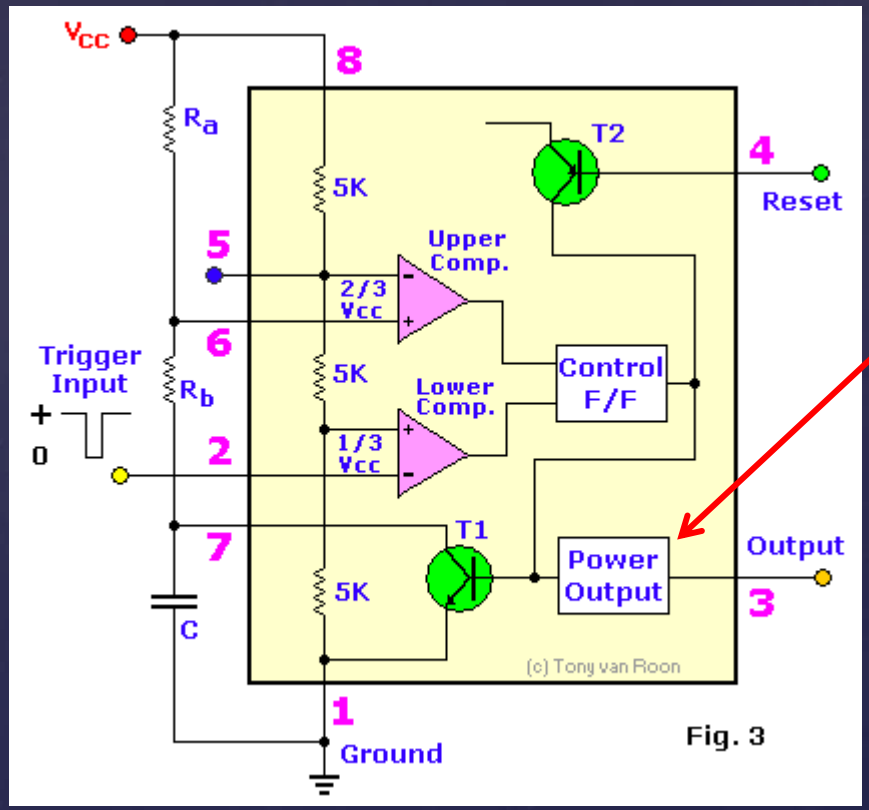


Let's look at some of the parts:



Flip - Flop

Let's look at some of the parts:



Output driver

By adding just three external components (2 resistors and a capacitor) we can create many different circuits:

External Timing components

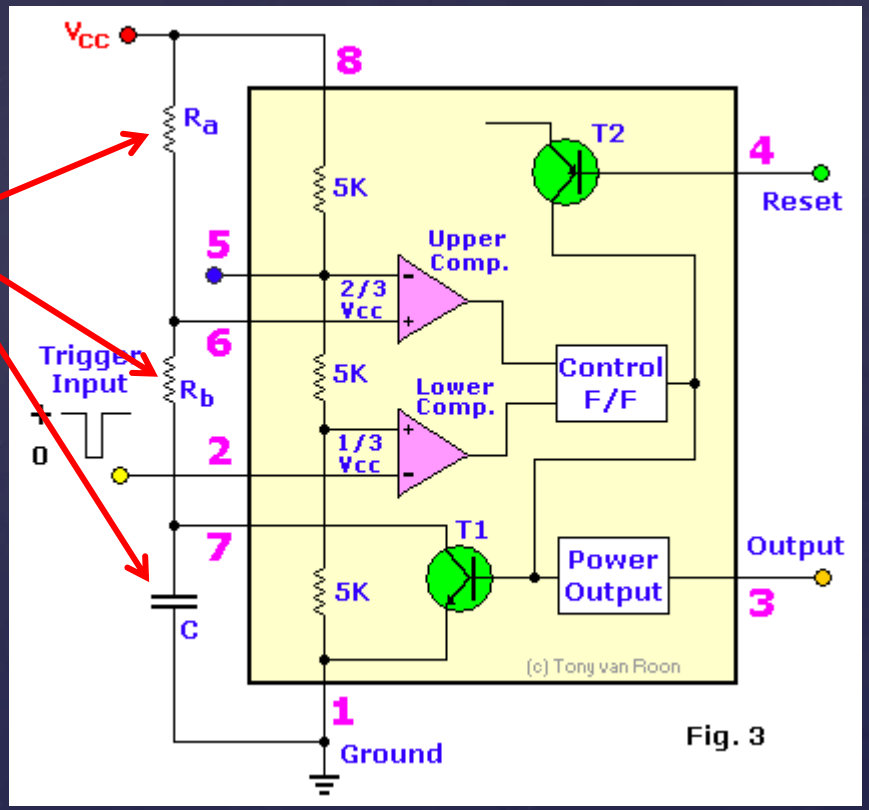
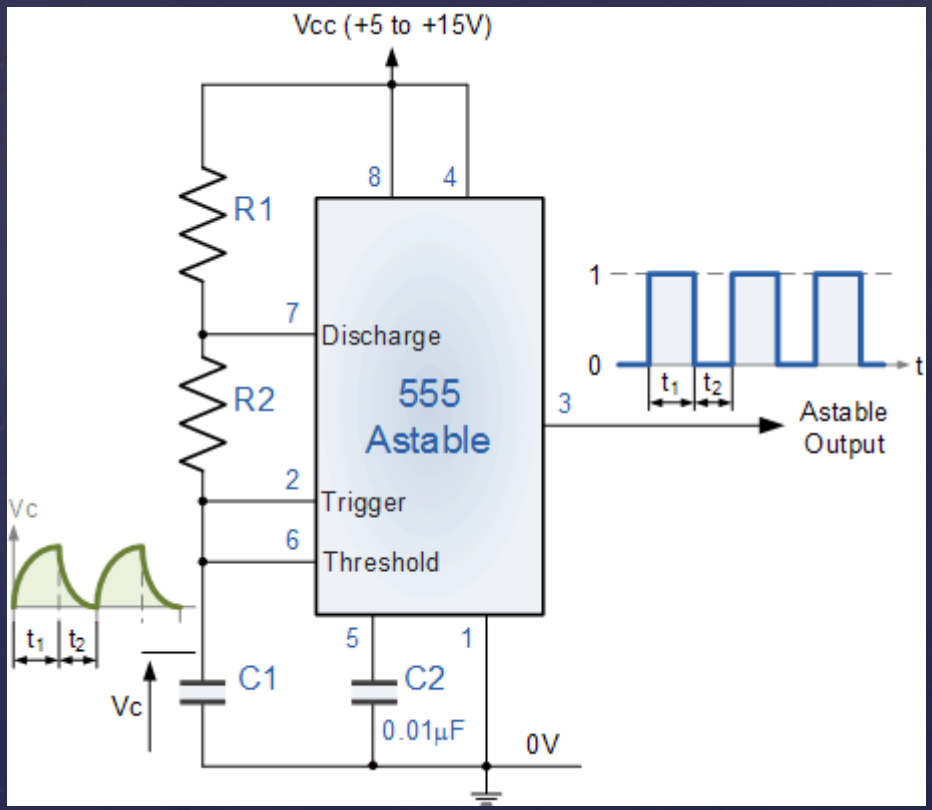
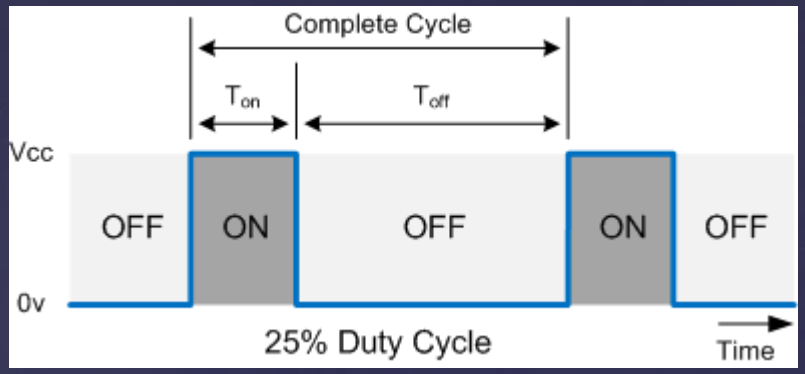


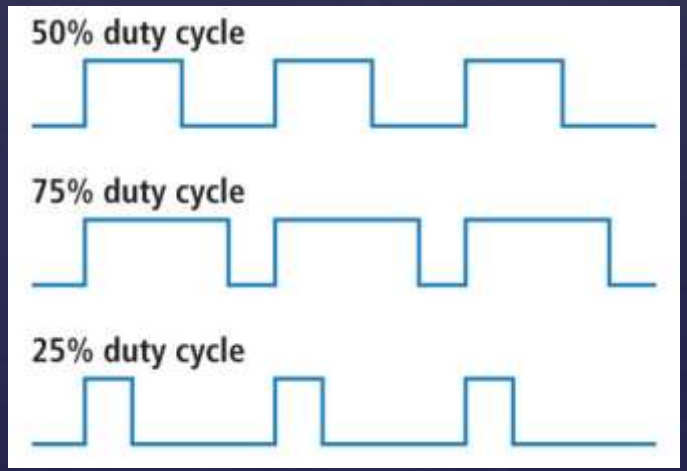
Fig. 3

An *oscillator* is a device that can produce a series of pules (think 1's and 0's) at a specific *frequency* or *duty cycle*:

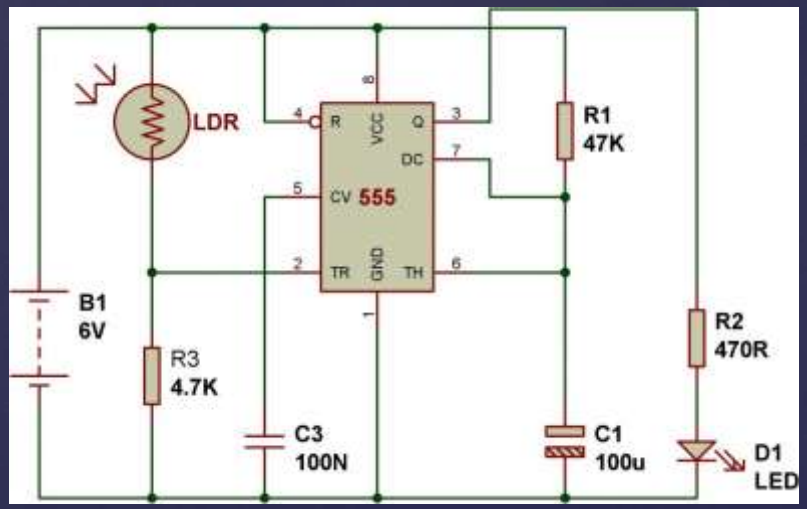


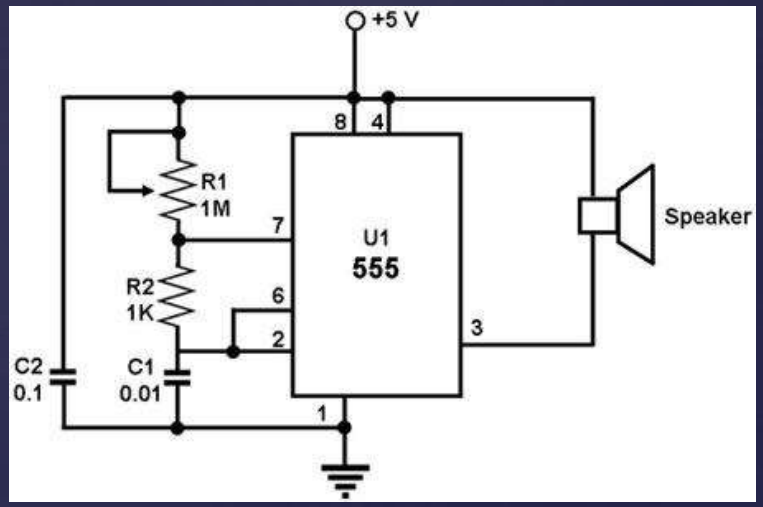
Duty cycle = time on / period





We can also connect sensors to the input to control the output frequency. Also, since the output is a series of pulses, we can flash LED's or even create tones on a speaker:





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