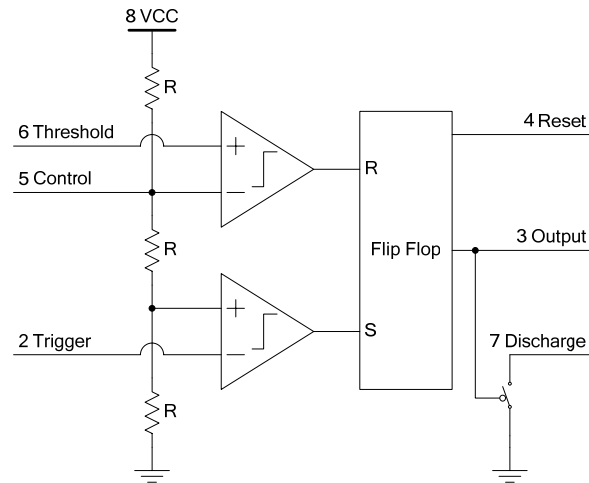
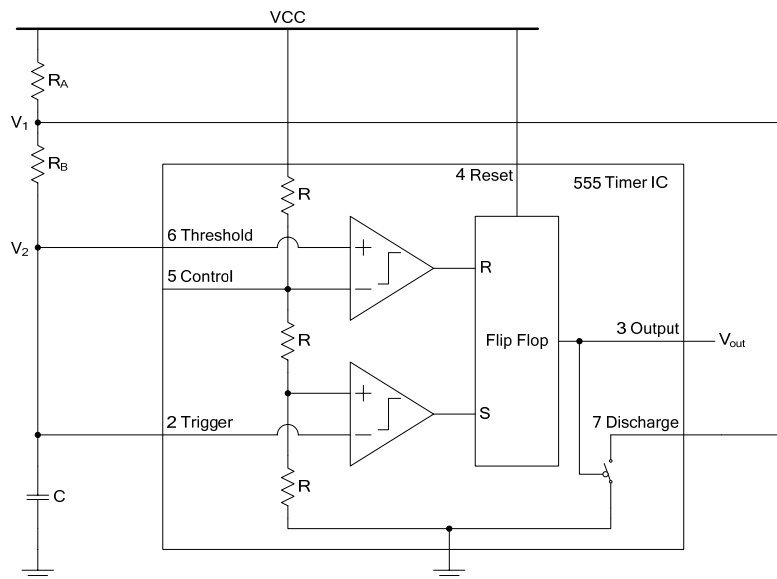


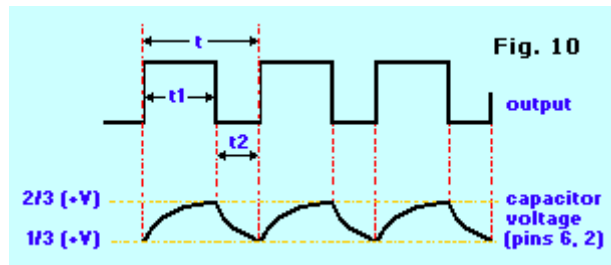
The figure below illustrates the different functions realized by the chip. Three resistors establish the reference voltages supplied to two comparators (the amplifier-like symbols with a thresholding sign). The flip-flop is a 1-Bit memory. A pulse on the R input sets the output to VCC where it stays until a pulse is applied to the S input after which the output switches to ground. The ground state is also stable: only a renewed pulse on R turns the output back on. The discharge switch uses negative logic: it is on when the output is low, and off when the output is high.



The circuit below shows how the 555 timer can be configured as an oscillator. Suppose that the output is high and, consequently, the discharge switch turned off. The capacitor charges through R_A and R_B and the voltages V_1 and V_2 rise. When V_2 reaches the control voltage ($2/3$ of V_{CC}), the flip-flop is reset and the output goes low. The discharge switch turns on and V_1 is immediately pulled to ground. Because of the flop-flop the output stays low and the discharge switch on. The capacitor now discharges through R_B into node V_1 , which is held at ground by the discharge switch. When V_2 reaches the threshold of the bottom comparator ($1/3 V_{CC}$), the flip-flop is set high again and the process repeats.



The figure below illustrates the output and the voltage across the capacitor for several cycles.



An excellent tutorial can be found online:

<http://www.uoguelph.ca/~antoon/gadgets/555/555.html>