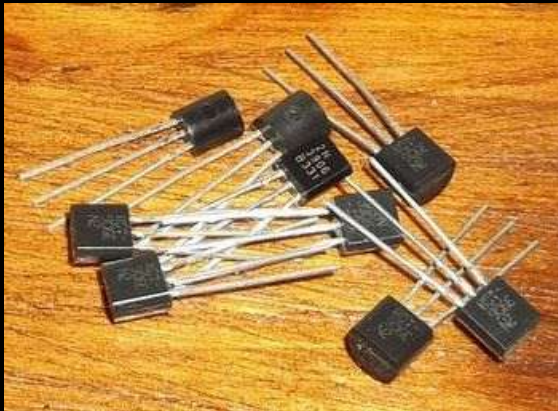


What Is A 555 Timer?

- ❑ A 555 Timer is an 8 pin mini dual-in-line package IC .
- ❑ The 555 IC is capable of producing accurate time delays and/ or oscillations.
- ❑ Introduced in 1972 by *SigNetics*.
(*Signal Networks Electronics*)
- ❑ The 555 is still in widespread use, thanks to its ease of use, low price, and good stability.

A standard 555 IC package consist of :

➤ 25 Transistors



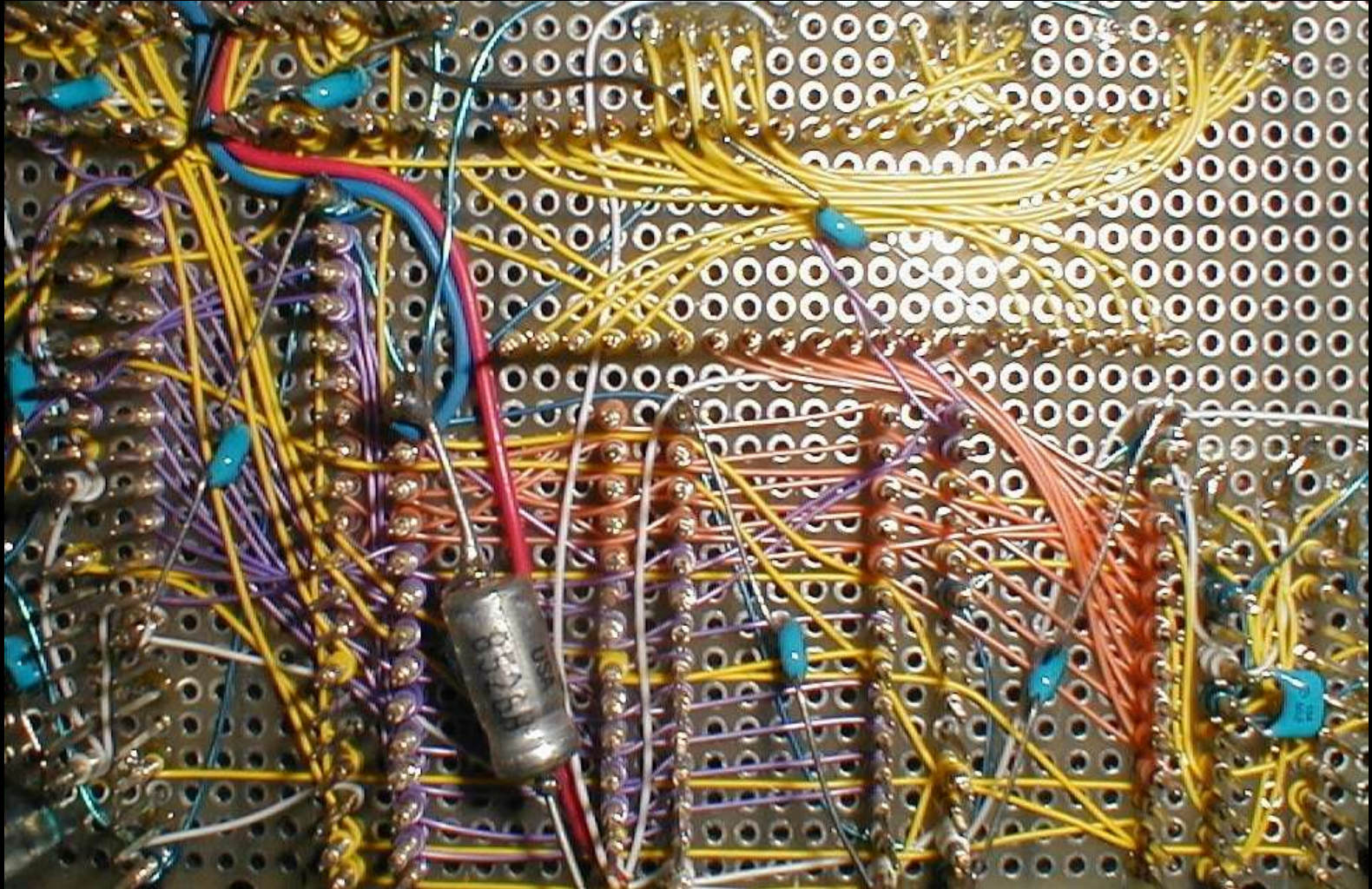
➤ 2 Diodes



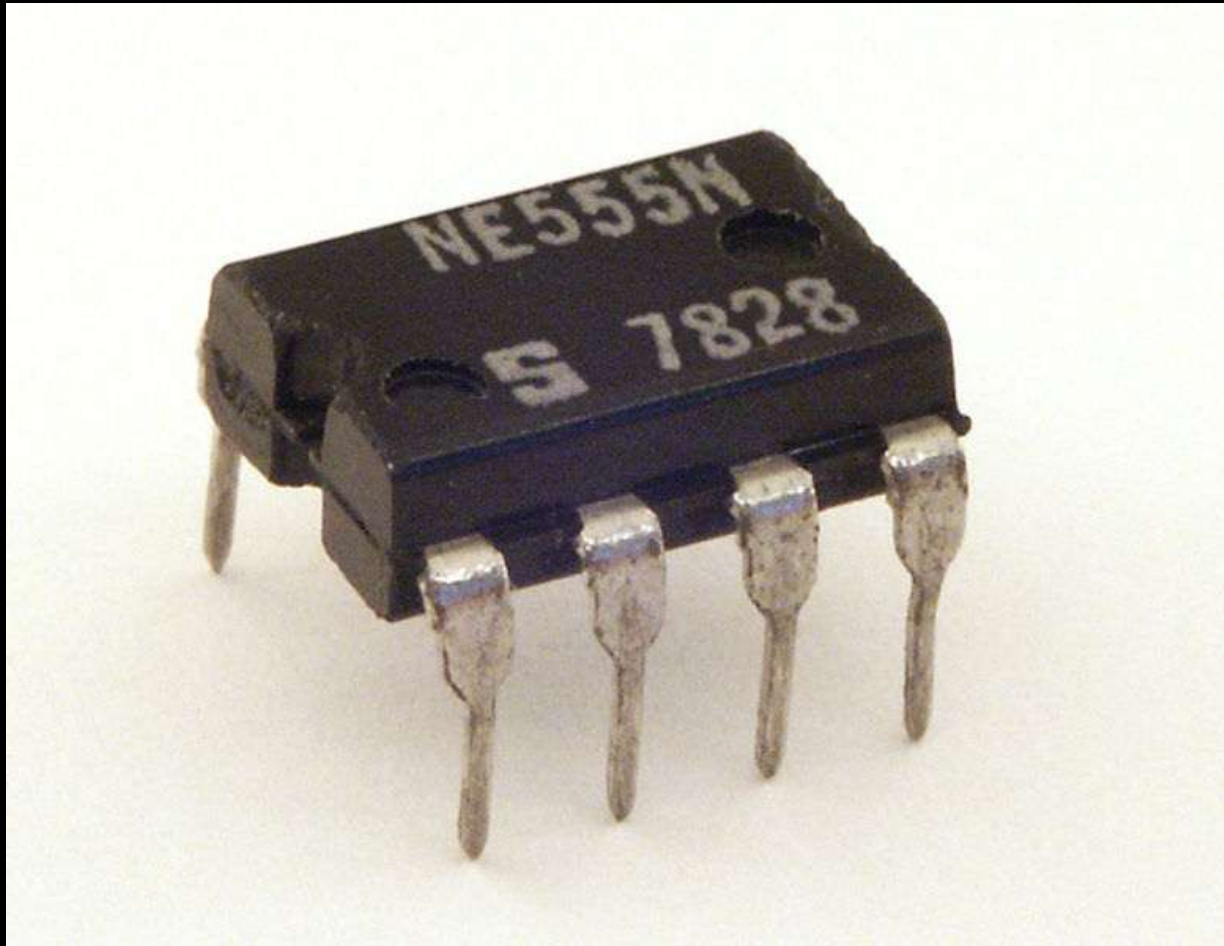
➤ 15 Resistors



Imagination

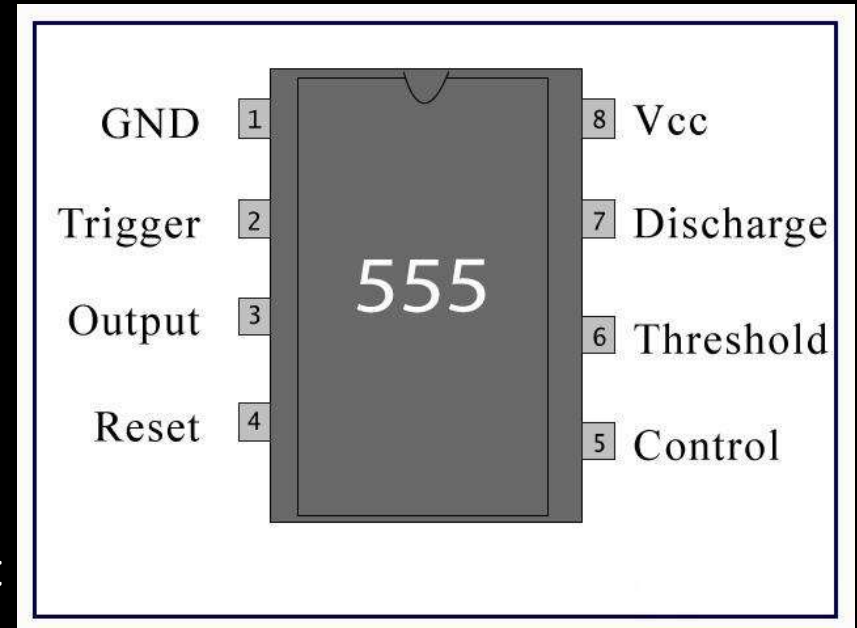


Reality

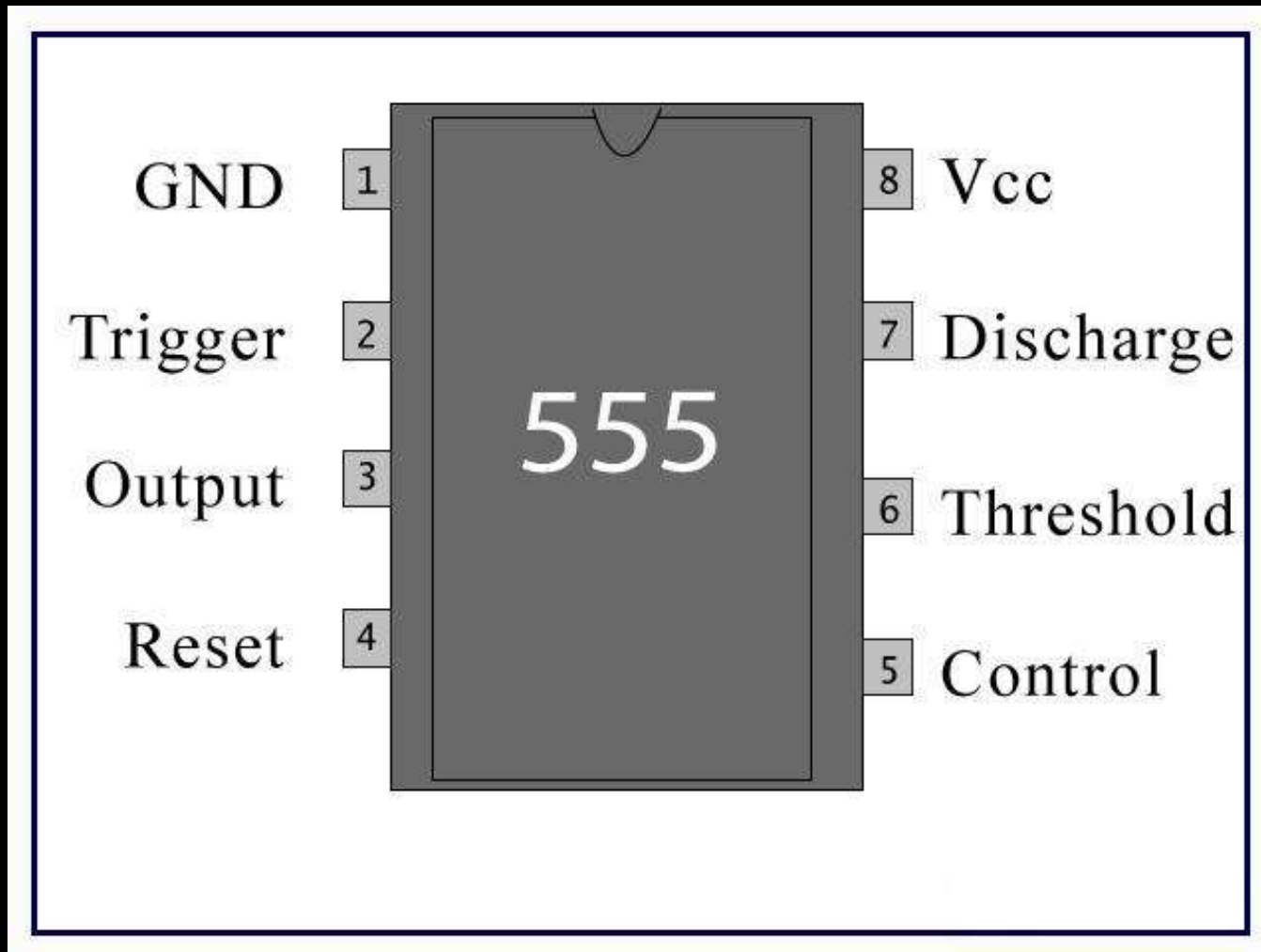


Pin configuration of IC 555 :

- **Pin 1**: It is a GROUND pin.
- **Pin 2**: As name indicates, it starts the timing cycle of IC.
- **Pin 3**: It is the OUTPUT pin.
- **Pin 4**: This is RESET pin.
- **Pin 5**: This pin is known as CONTROL VOLTAGE pin.
- **Pin 6**: This is known as THRESHOLD pin. It finalizes timing cycle of IC
- **Pin 7**: This is known as DISCHARGE pin
- **Pin 8**: This pin is used to provide positive supply to the IC 3v-18v.

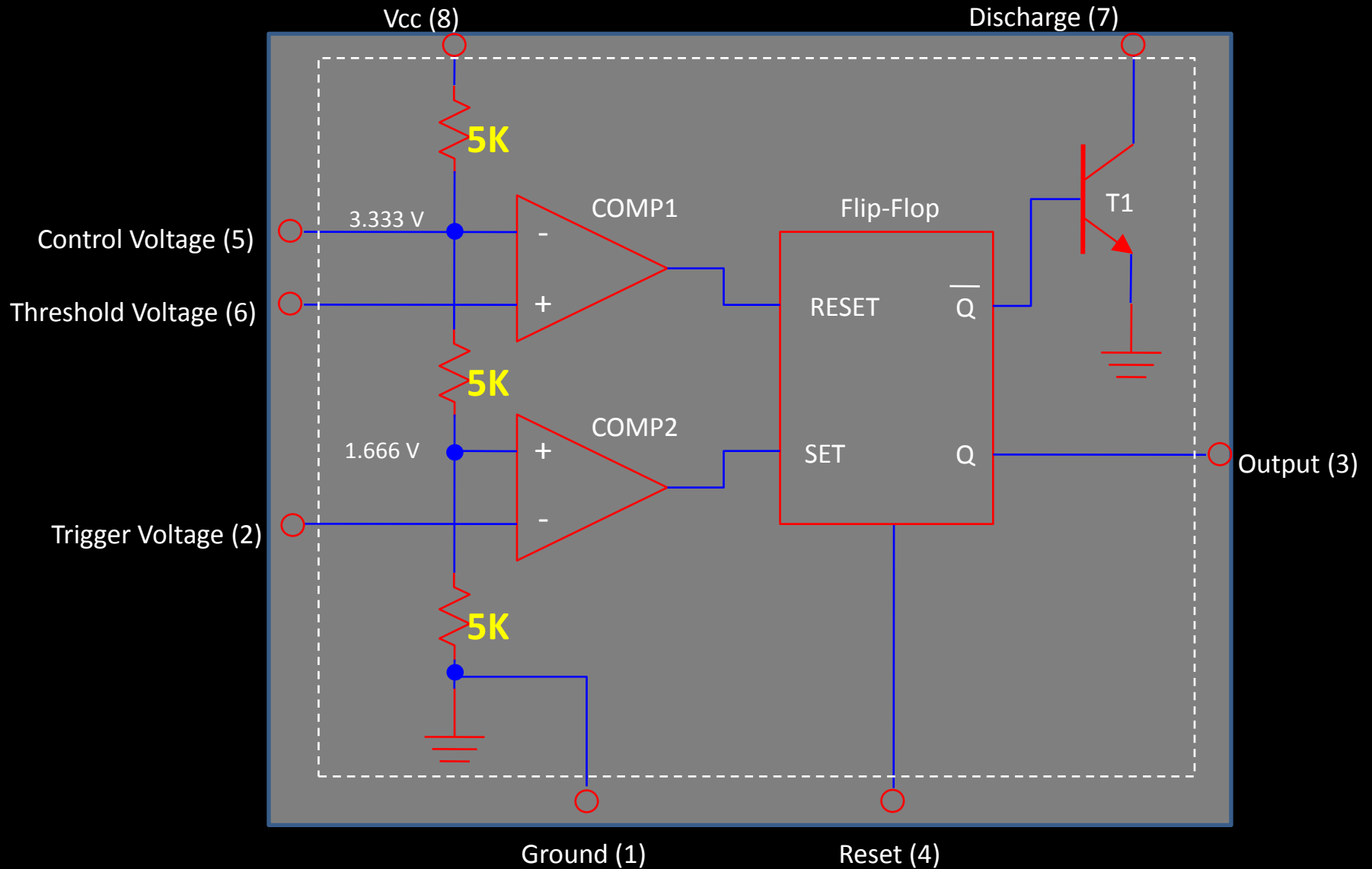


Pin configuration of IC 555 :

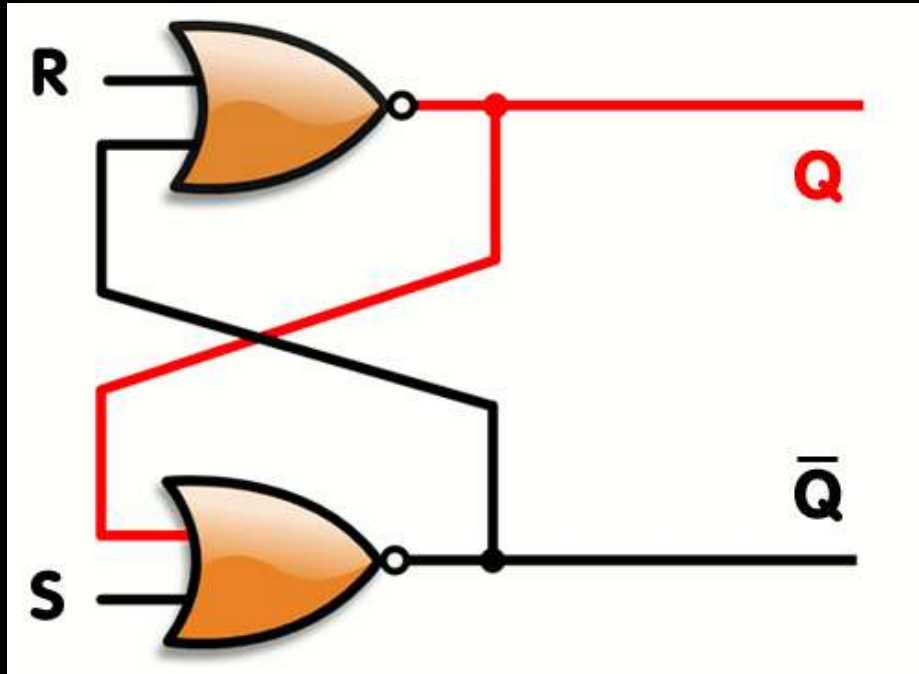


FAQ:-<http://vsagar.com/2011/12/30/faq-ic-555-highly-elaborated-questions-answers/>

BLOCK DIAGRAM OF IC 555



Truth Table For S R Flip Flop

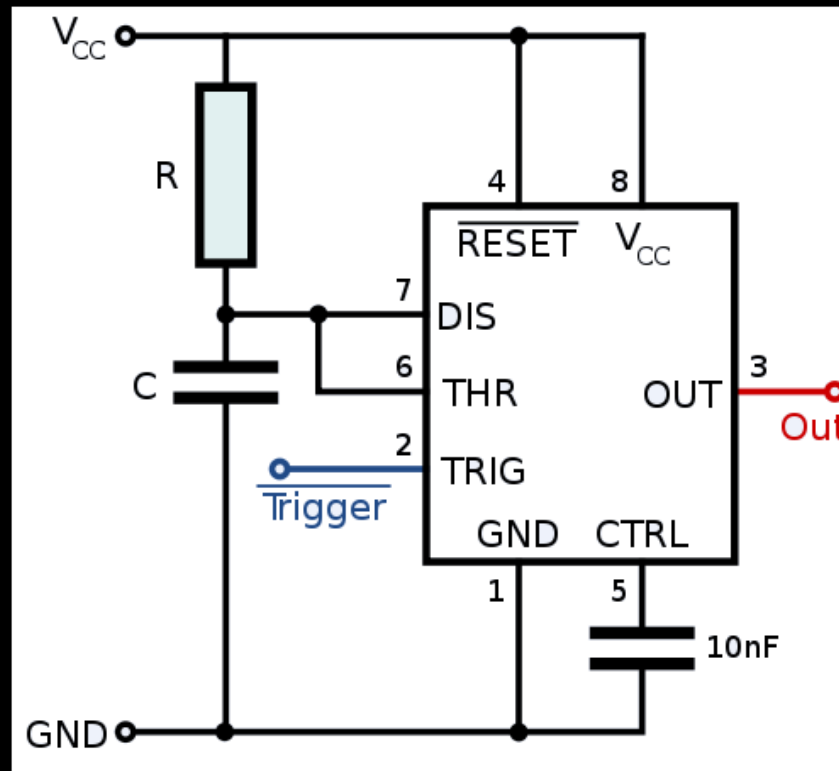


| S | R | Q_n | \bar{Q}_n |
|---|---|-----------|-----------------|
| 0 | 0 | Q_{n-1} | \bar{Q}_{n-1} |
| 0 | 1 | 0 | 1 |
| 1 | 0 | 1 | 0 |
| 1 | 1 | 0 | 0 |

Modes of Operation-1:

A 555 Timer has 'THREE' operating modes.

- **Monostable** : In this mode 555 functions as a 'one shot' pulse generator. e.g. Timers, touch switches, pulse-width-modulation(PWM)



- The output pulse width of time t , which is the time it takes to charge C to $2/3$ of the supply voltage, is given by

$$t = RC \ln(3) \approx 1.1RC$$

where t is in seconds, R is in ohms and C is in farads.

Modes of Operation-2:

- **Astable** : The 555 can operate as an oscillator.
Uses include LED & Lamp flashers, Logic Clocks, Security Alarms.

$$f = \frac{1}{\ln(2) \cdot C \cdot (R_1 + 2R_2)} \quad [7]$$

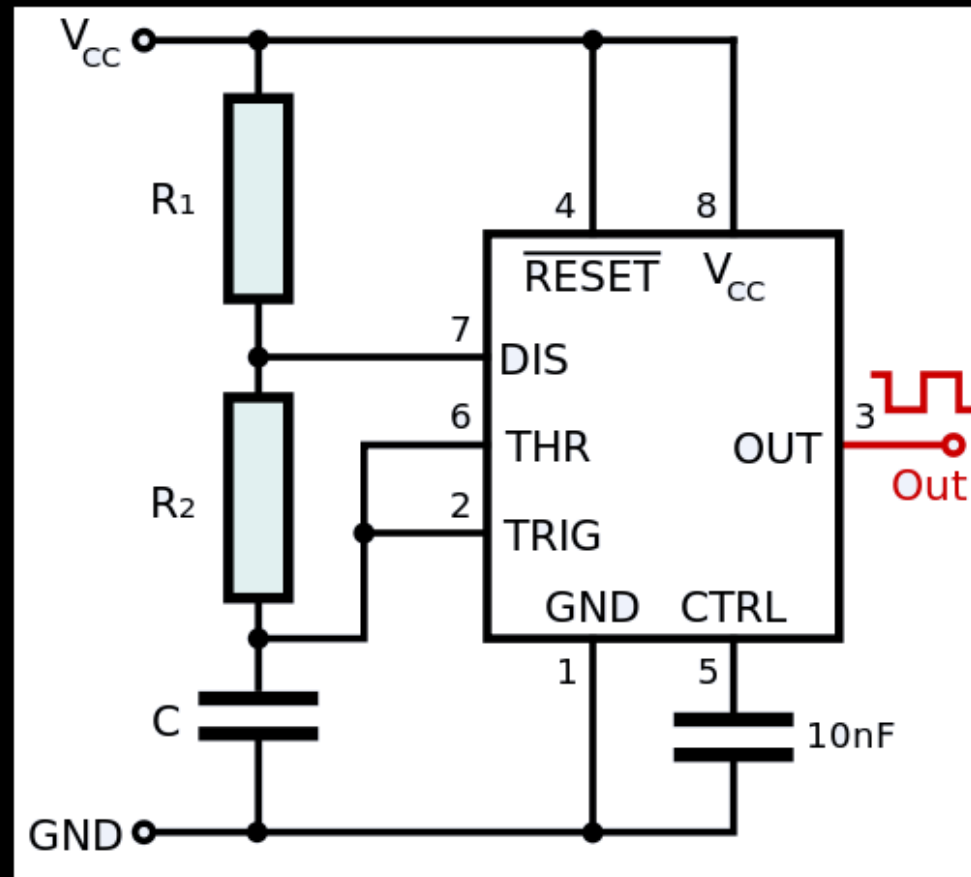
The high time from each pulse is given by:

$$\text{high} = \ln(2) \cdot (R_1 + R_2) \cdot C$$

and the low time from each pulse is given by:

$$\text{low} = \ln(2) \cdot R_2 \cdot C$$

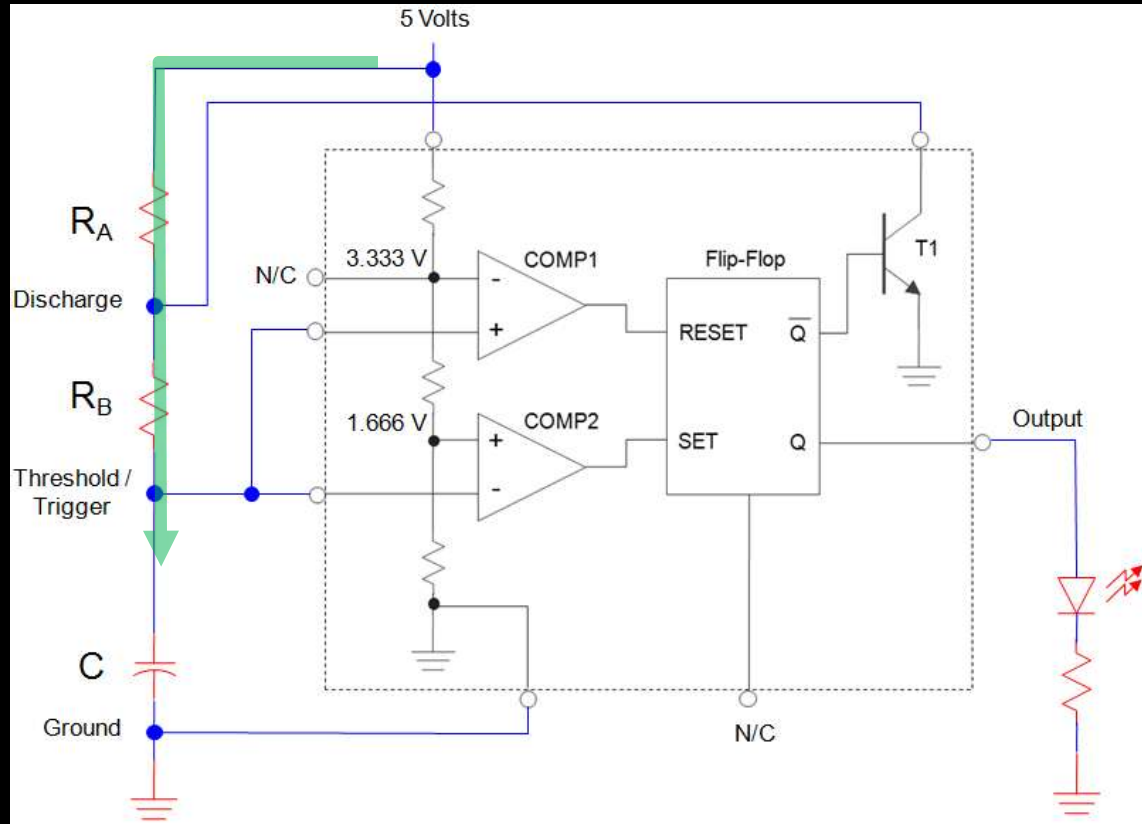
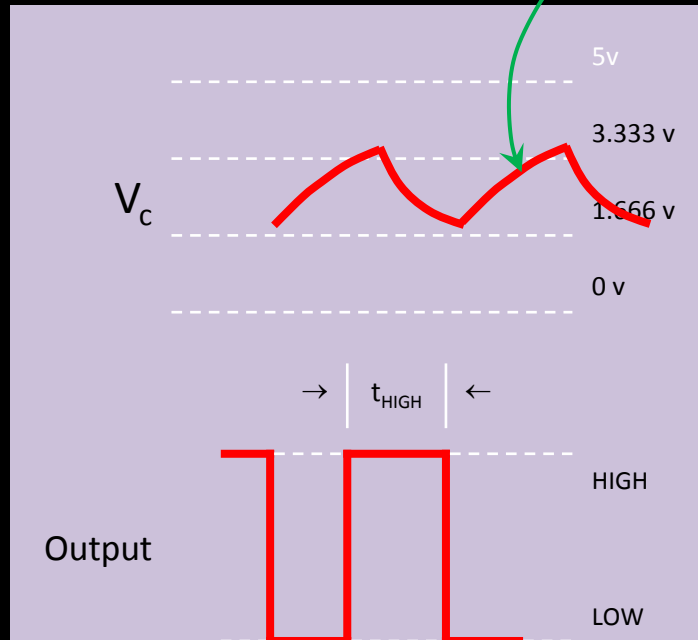
Where,
R is in ohms & C is in farads



555 Timer Design Equations:

t_{HIGH} : Calculations for the Oscillator's HIGH Time

THE OUTPUT IS HIGH WHILE THE CAPACITOR IS CHARGING THROUGH $R_A + R_B$.

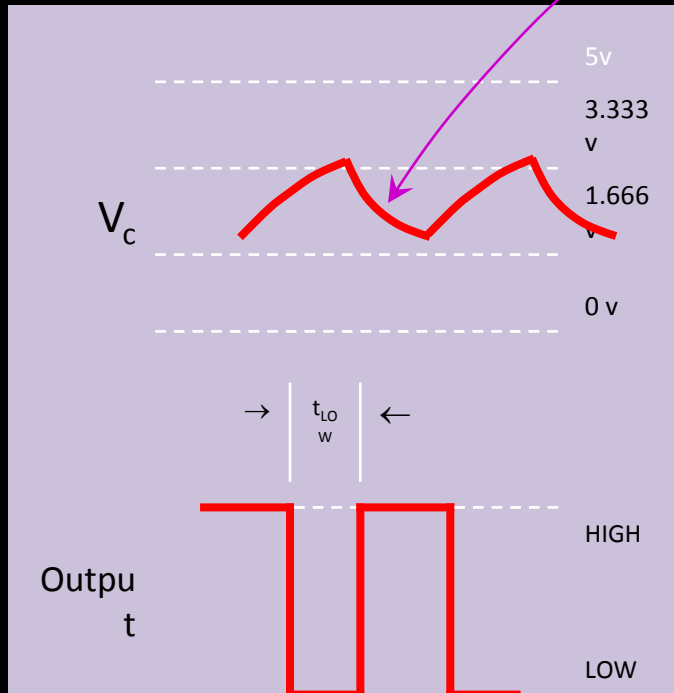


$$t_{\text{HIGH}} = 0.693(R_A + R_B)C$$

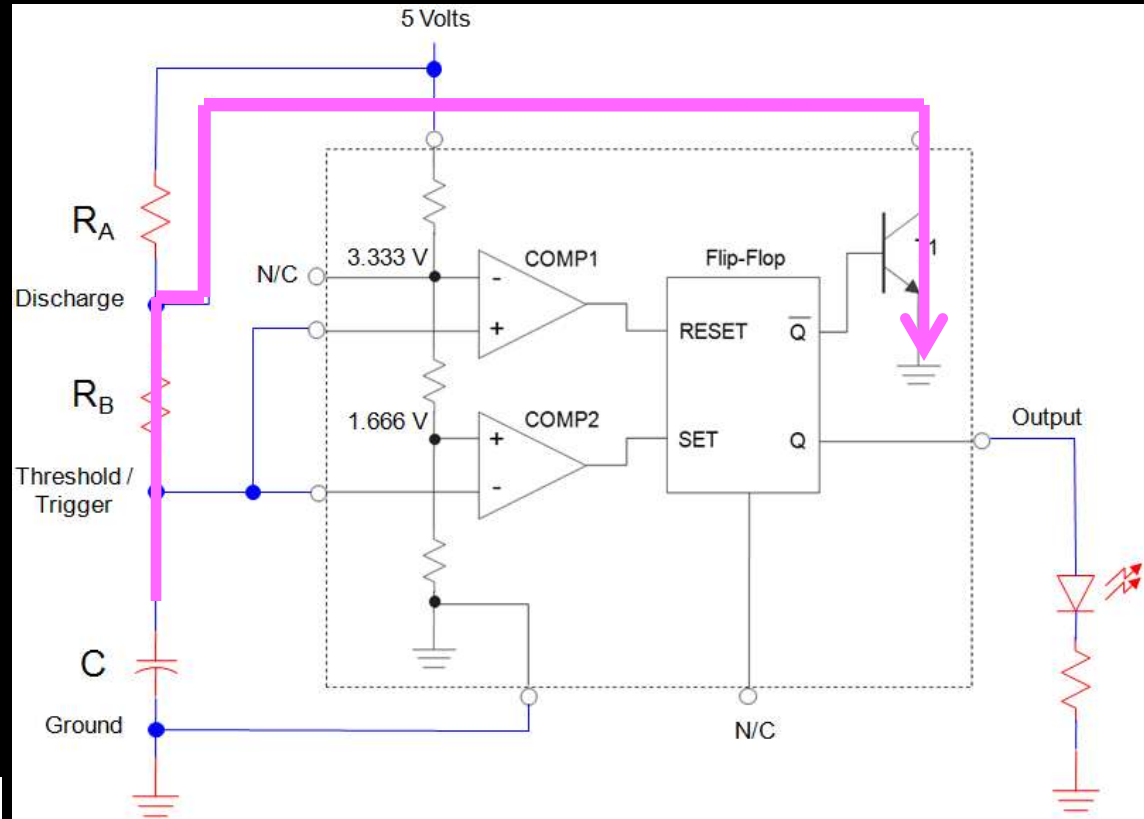
555 Timer Design Equations:

t_{LOW} : Calculations for the Oscillator's LOW Time

THE OUTPUT IS LOW WHILE THE CAPACITOR IS DISCHARGING THROUGH R_B .



$$t_{LOW} = 0.693 R_B C$$

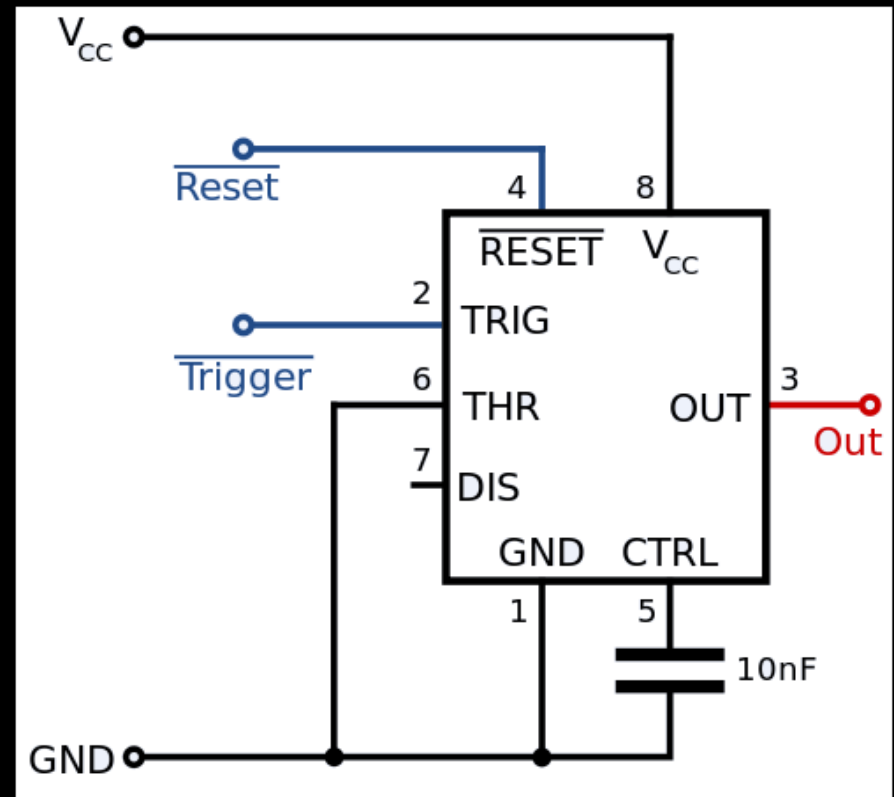


Modes of Operation-3:

- **Bistable** : The 555 can operate as a flip flop . If DIS pin is not used and no capacitor is connected.

- When Pin 4 is grounded through pull up resistor it works as 'reset'.

- When Pin 2 is grounded through pull up resistor it works as 'set'.



Derivatives of IC 555:

- **IC 556 :**

It is a dual timer IC. It features two 555 lcs in 14 pin DIP package.

- **IC 558 :**

It is a quad version of 555 timer IC. It features two 555 lcs in 16 pin DIP package.

Control, voltage and reset lines are shared by all 4 modules.