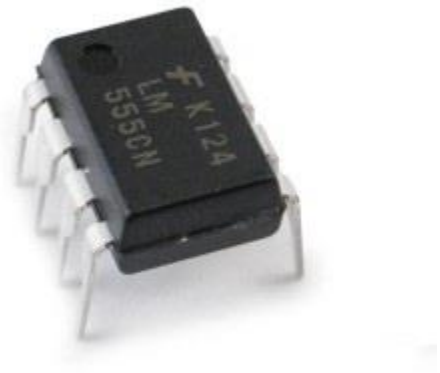
INTRODUCTION TO 555 TIMER IC



555 timer IC

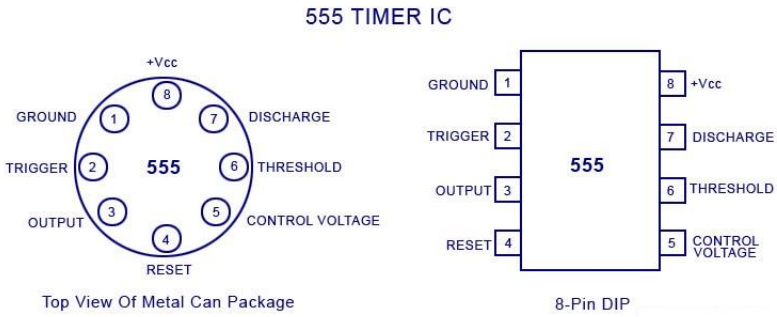
One of the most versatile linear ICs is the **555 timer** which was first introduced in early 1970 by Signetic Corporation giving the name as **SE/NE 555 timer**. This IC is a monolithic timing circuit that can produce accurate and highly stable time delays or oscillation. Like other commonly used op-amps, this IC is also very much reliable, easy to use and cheaper in cost. It has a variety of applications including **monostable** and **astable multivibrators**, **dc-dc converters**, digital logic probes, **waveform generators**, analog frequency meters and tachometers,**temperature measurement** and control devices, **voltage regulators** etc. The timer basically operates in one of the two modes either as a monostable (one-shot) multivibrator or as an astable (free-running) multivibrator.The **SE 555** is designed for the operating temperature range from – 55°C to 125° while the **NE 555**operates over a temperature range of 0° to 70°C.

The important features of the 555 timer are :

- It operates from a wide range of **power supplies** ranging from + 5 Volts to + 18 Volts supply voltage.
- Sinking or sourcing 200 mA of load current.
- The external components should be selected properly so that the timing intervals can be made into several minutes Proper selection of only a few external components allows timing intervals of several minutes along with the frequencies exceeding several hundred kilo hertz.
- It has a high current output; the output can drive TTL.

- It has a temperature stability of 50 parts per million (ppm) per degree Celsius change in temperature, or equivalently 0.005 %/ °C.
- The duty cycle of the timer is adjustable with the maximum power dissipation per package is 600 mW and its trigger and reset inputs are logic compatible.

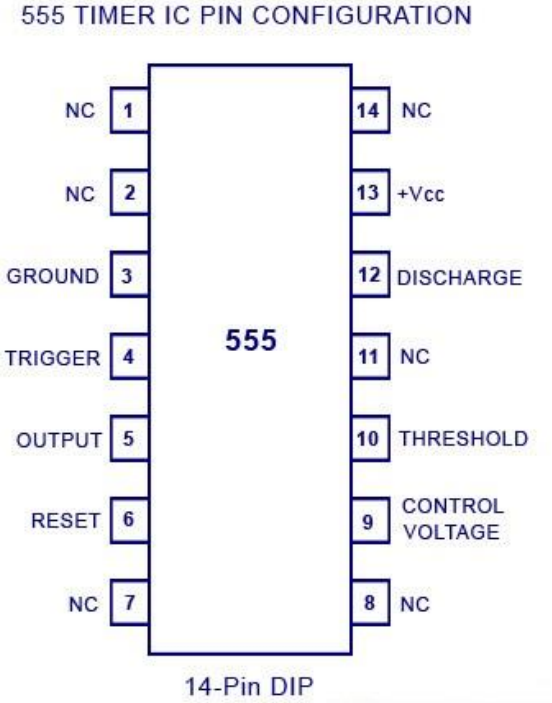
IC Pin Configuration



555 Timer IC Pin Configuration

The **555 Timer IC** is available as an 8-pin metal can, an 8-pin mini DIP (dual-in-package) or a 14-pin DIP.

This IC consists of 23 transistors, 2 diodes and 16 **resistors**. The explanation of terminals coming out of the 555 timer IC is as follows. The pin number used in the following discussion refers to the 8-pin DIP and 8-pin metal can packages.



Pin 1: **Grounded Terminal:** All the voltages are measured with respect to this terminal.

Pin 2: Trigger Terminal: This pin is an inverting input to a comparator that is responsible for transition of **flip-flop** from set to reset. The output of the timer depends on the amplitude of the external trigger pulse applied to this pin.

Pin 3: Output Terminal: Output of the timer is available at this pin. There are two ways in which a load can be connected to the output terminal either between pin 3 and ground pin (pin 1) or between pin 3 and supply pin (pin 8). The load connected between pin 3 and ground supply pin is called the ***normally on load***and that connected between pin 3 and ground pin is called the ***normally off load***.

Pin 4: Reset Terminal: To disable or reset the timer a negative pulse is applied to this pin due to which it is referred to as reset terminal. When this pin is not to be used for reset purpose, it should be connected to + V_{CC} to avoid any possibility of false triggering.

Pin 5: Control Voltage Terminal: The function of this terminal is to control the threshold and trigger levels. Thus either the external voltage or a pot connected to this pin determines the pulse width of the output waveform. The external voltage applied to this pin can also be used to modulate the output waveform. When this pin is not used, it should be connected to ground through a 0.01 micro Farad to avoid any noise problem.

Pin 6: **Threshold Terminal:** This is the non-inverting input terminal of comparator 1, which compares the voltage applied to the terminal with a reference voltage of 2/3 V_{CC}. The amplitude of voltage applied to this terminal is responsible for the set state of flip-flop.

Pin 7 : **Discharge Terminal:** This pin is connected internally to the collector of transistor and mostly a capacitor is connected between this terminal and ground. It is called discharge terminal because when transistor saturates, capacitor discharges through the transistor. When the transistor is cut-off, the capacitor charges at a rate determined by the external resistor and capacitor.

Pin 8: Supply Terminal: A supply voltage of + 5 V to + 18 V is applied to this terminal with respect to ground (pin 1).

Source : http://todayscircuits.blogspot.com/2011/06/555-timer-complete-basic-guide.html#.VUBpt9Kqqko