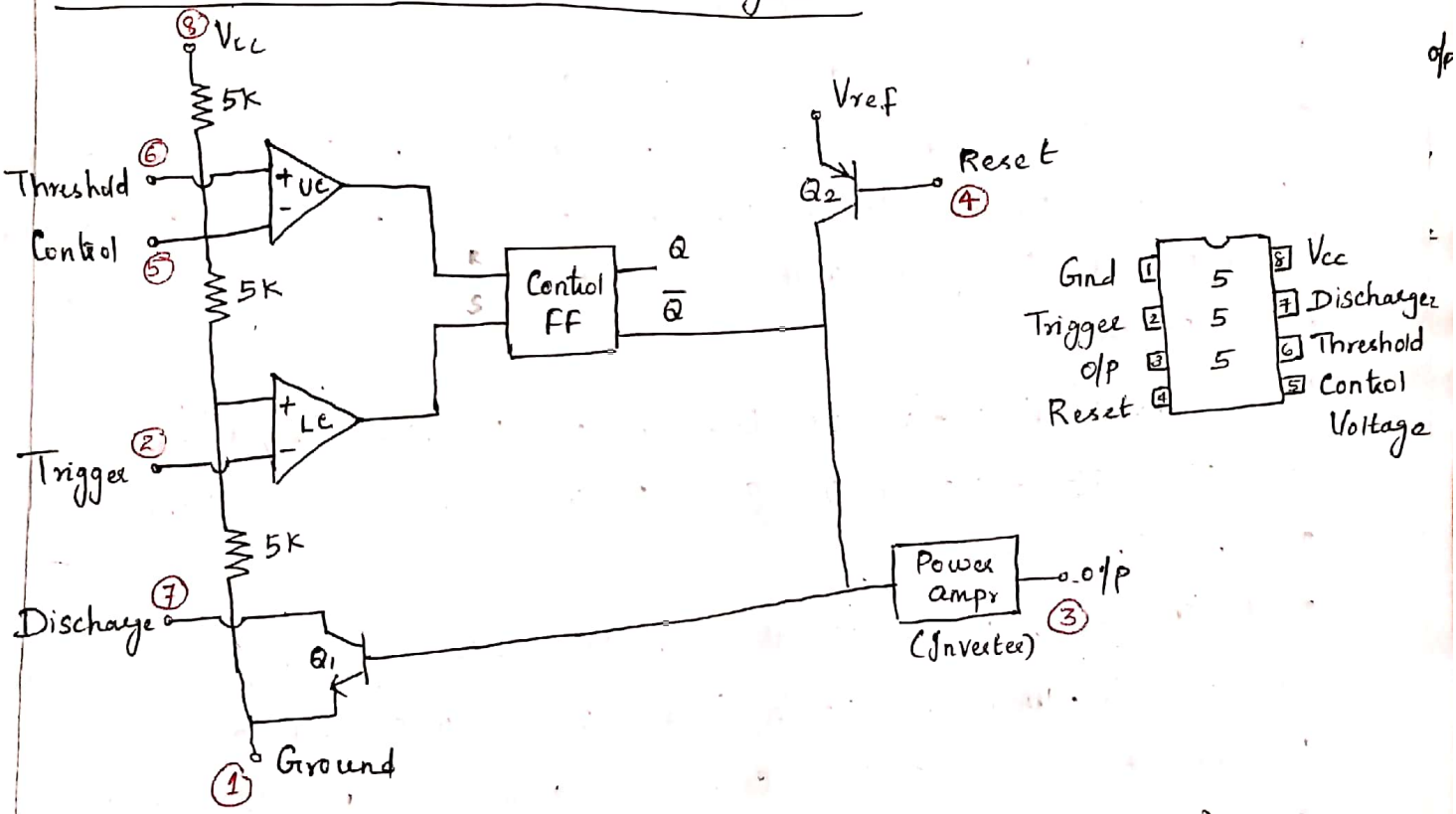
TIMER IC 555

The 555 timer is a highly stable device for generating accurate time delay or oscillation. Supply voltage range +5V to +18V and can drive load upto 200mA. Compatable with both TTL and CMOS logic circuits.

Application : Oscillator, Pulse generator, ramp & Square wave generator, monoshot multivibrator, burglar alarm, traffic light control, Voltage monitor etc.

Functional Diagram and Pin Diagram



The Three 5K internal resistors (so known as 555) act as voltage divider providing 2/3 Vcc to UC and 1/3 Vcc to LC. Since these two voltages fix the necessary comparator threshold voltage, they also aid in determining the timing interval.

In stable state the o/p $\bar{Q}$ of control flip flop is high. This makes the o/p low because the power ampr is basically an inverter. A -ve going trigger pulse is applied to pin 2 and should have its dc level greater than the threshold level of LC (ie 1/3 Vcc). As the trigger passes through 1/3 Vcc, the o/p of LC goes HIGH and sets the FF ($Q=1$ and $\bar{Q}=0$). o/p voltage is high. The time the o/p remains high determined by external

During the +ve excursion when the threshold voltage at Pin 6 passes through $\frac{2}{3}V_{cc}$ the o/p of UC HIGH and resets the FF ($Q=0$, $\bar{Q}=1$) and o/p = 0.

The 555 timer can be reset by applying a -ve pulse to this pin. When the reset pin is not in used, it is connected to V_{cc} to avoid any possibility of false triggering. Transistor Q_3 serves as a buffer to isolate the reset i/p from the FF and transistor Q_1. Q_2 is driven by an internal reference voltage U_{ref}. When a -ve i/p is applied to Q_2, it turns ON and i/p of Power amp is U_{ref} (HIGH), hence o/p is forced to Zero.

Pin 5 (control Voltage): By imposing a voltage on this pin or by connecting a pot between this pin and gnd, the pulse width of the o/p waveform can be varied. When not in used the control pin should be bypassed to gnd with a 0.01 μF capacitor to prevent any noise problems.

Pin 6 (Threshold): +ve i/p terminal of UC, when the voltage at this pin $\geq \frac{2}{3}V_{cc}$, o/p of UC goes 1 which in turn switches the o/p of the timer low.

Pin 7 (Discharge): This pin is connected internally to the collector of transistor Q_1. When the o/p is high Q_1 is off and act as an O.C to the external capacitor connected across it. If the o/p is low Q_1 saturated and act as a short ckt, shorting the capacitor to gnd. The capacitor in this pin in connection with a resistor is used to control the timing interval.

MONOSTABLE MULTIVIBRATOR USING 555 IC

Monostable Multivibrator is also called as one shot multivibrator as it has single stable state. The pin diagram and functional diagram of monostable multivibrator using IC 555 is shown in figure.

In the standby state, FF holds transistor Q_1 ON, thus clamping the external capacitor C to gnd. The o/p is zero. As the trigger