

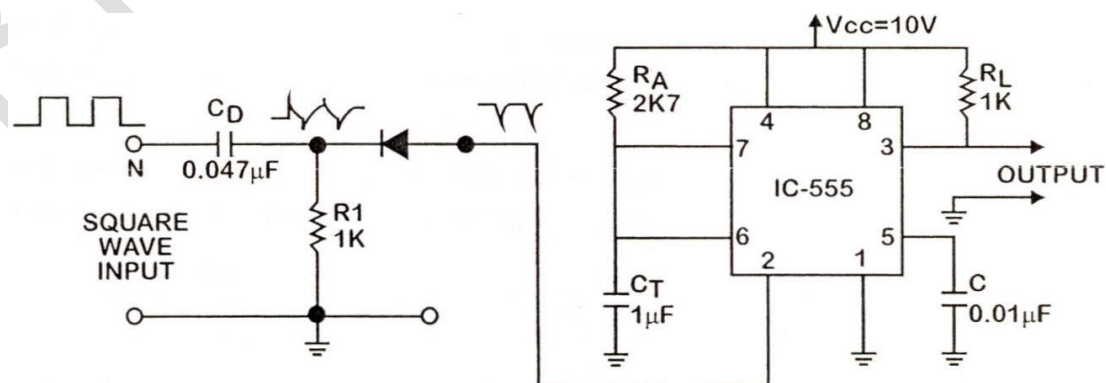
Monostable multivibrator

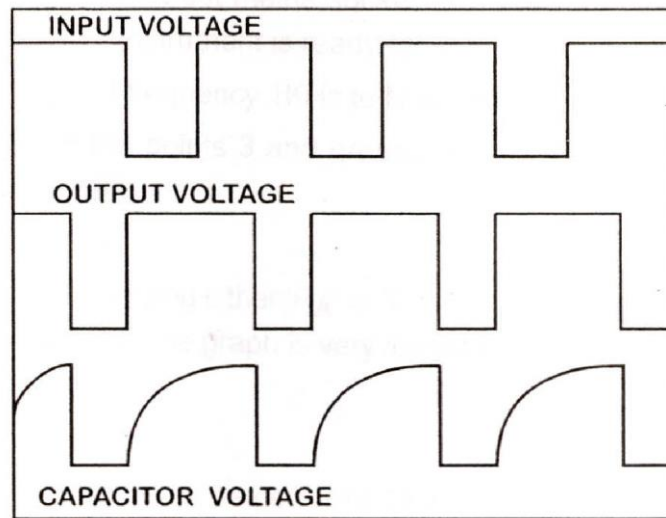
Monostable multivibrator often called a *one shot* multivibrator is a pulse generating circuit in which the duration of this pulse is determined by the RC network connected externally to the 555 timer. In a stable or standby state, the output of the circuit is approximately zero or a logic-low level. When external trigger pulse is applied (See circuit diagram) output is forced to go high ($\approx V_{CC}$). The time for which output remains high is determined by the external RC network connected to the timer. At the end of the timing interval, the output automatically reverts back to its logic-low stable state. The output stays low until trigger pulse is again applied. Then the cycle repeats. The monostable circuit has only one stable state (*output low*) hence the name *monostable*.

Initially when the circuit is in the stable state i.e, when the output is low, transistor Q in IC 555 is ON and the capacitor C is shorted out to ground. Upon the application of a negative trigger pulse to pin 2, transistor Q is turned OFF, which releases the short circuit across the external capacitor C and drives the output high. The capacitor C now starts charging up towards V_{CC} through R. When the voltage across the capacitor equals $2/3 V_{CC}$, the upper comparator's (see schematics of IC 555) output switches from low to high, which in turn drives the output to its low state via the output of the flip-flop. At the same time the output of the flip-flop turns transistor Q ON and hence the capacitor C rapidly discharges through the transistor. The output of the monostable remains low until a trigger pulse is again applied. Then the cycle repeats. The pulse width of the trigger input must be smaller than the expected pulse width of the output waveform. Also the trigger pulse must be a negative going input signal with amplitude larger than $1/3 V_{CC}$ (Why?). The pulse width can be calculated as (How?): $T = 1.1 R.C$.

Once triggered, the circuit's output will remain in the high state until the set time, T, elapses. The output will not change its state even if an input trigger is applied again during this time interval. The circuit can be reset during the timing cycle by applying negative pulse to the reset terminal. The output will remain in the low state until a trigger is again applied. The circuit is designed as shown in the circuit diagram, the left part of which shows how to generate negative a trigger pulse from a square wave signal.

Circuit Diagram:





Applications

Monostable Multivibrators are used in applications such as television circuits and control system circuits.