

**Astable Mode Operation (Free Running Oscillator)****Description**

This circuit is configured in astable mode of operation, which is a basic oscillator circuit using a 555 type of timer. The circuit is also sometimes referred to as a free running oscillator, with the oscillation frequency given by $f = 1.46 / ((R_A + 2R_B) \times C)$. Initially, Capacitor C charged towards $2/3 V_+$ via R_A and R_B . When the voltage on C reaches that threshold level, the Discharge Output on pin7 is turned on, discharging C. When voltage on C is discharged to $1/3 V_+$, it triggers the comparator inside pin2, turning off the Discharge Output and starts the C charging cycle again. Hence through the charging and discharging cycles, an oscillator circuit is implemented. The output high time period is determined by $T_H = .693(R_A + R_B) \times C$. The output low time period is determined by $T_L = 0.693 R_B \times C$. Using CMOS versions of 555 timer circuits, a very wide frequency range at very low level of voltage spikes and power dissipation can be achieved. Selection of the values of R_A and R_B is limited by the input leakage specifications of the timer at pin7, pin2 and pin6. R_A and R_B resistor values are also limited by the internal leakage current at the capacitor C. C usually has a range from $10,000\mu F$ down to 0. When C is at 0 value, the timer will oscillate without an external C, relying entirely on the internal parasitic capacitor inside the 555 timer for oscillation.

For full schematic diagram and notes, please register and login at aldinc.com