



Category: Oscillators

CIRCUIT IDEAS FOR DESIGNERS

Schematic no. osc\_42001.0

## 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=  $1.46/((RA + 2RB) \times C)$ . Initially, Capacitor C charged towards 2/3 V+ via Ra and Rb. 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 TH= .693(RA +RB) × C. The output low time period is determined by TH= 0.693 RB × 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 RA and RB is limited by the input leakage specifications of the timer at pin7, pin2 and pin6. RA and RB resistor values are also limited by the internal leakage current at the capacitor C. C usually has a range from 10,000µF 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

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