The square wave generator and pulse generator are generally used as measuring devices in combination with the oscilloscope. The basic difference between square wave generator and pulse generator is in the duty cycle. The duty cycle is defined as the ratio of average value of a pulse over one cycle to the peak value. It is also defined as ratio of the pulse width to the period of one cycle.

\[
\text{Duty cycle} = \frac{\text{Pulse width}}{\text{Pulse period}}
\]

The average value is half of peak value. Both the average value and peak value are inversely proportional to time duration. The average value of a pulse is given as,

\[
\text{Average value} = \frac{1}{2} \text{Peak value}
\]

Duty cycle of square wave = 0.5

Thus square wave generator produces an output voltage with equal ON and OFF periods as duty cycle is 0.5 or 50% as the frequency of oscillation is varied. Then we can state that irrespective of the frequency of operation, the positive and negative half cycles extend over half of the total period.

**Laboratory type square wave and pulse generator:**
The circuit consists of two current sources, a ramp capacitor, and a Schmitt trigger circuit as well as a current-winding circuit. The two current sources provide a constant current to a ramp capacitor for charging and discharging. The ratio of these charging and discharging currents is determined by the setting of the symmetry control. The symmetry control determines the duty cycle of the output waveform. In the current source, an appropriate control voltage is applied to current control transistors which control the frequency, i.e., the sum of two currents. The multiplier switch provides decade switching control of the output frequency. While the frequency dial provides continuous vernier control of the output frequency.

The block diagram of the laboratory type square wave and pulse generator is as shown in the figure: