

StudentName: YANA

SRIVASTAVA

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Branch: CSE

Subject Name DE LAB

Aim:

Design a pulse width modulated signals generator using 555.

Task to be done

PWM (Pulse Width Modulation) is an important feature of today's every microcontroller due to its requirement for controlling many devices in every field of Electronics almost. PWM is widely used for motor controlling, lighting controlling etc. Sometime we do not use microcontroller in our applications and if we need to generate PWM without microcontroller then we prefer some general purpose ICs like op-amp, timers, pulse generators etc. Here we are using a 555 timer IC for generating PWM. 555 timer IC is a very useful and general purpose IC which can be used in many applications.

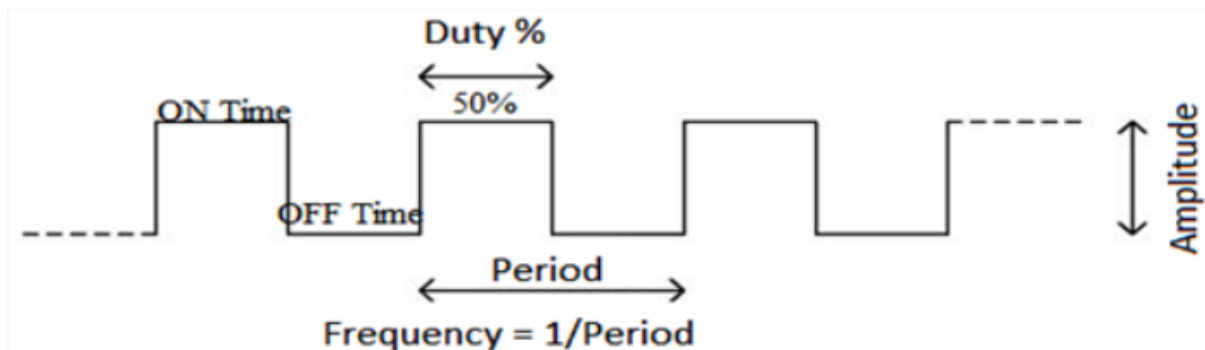
Frequency of a PWM:

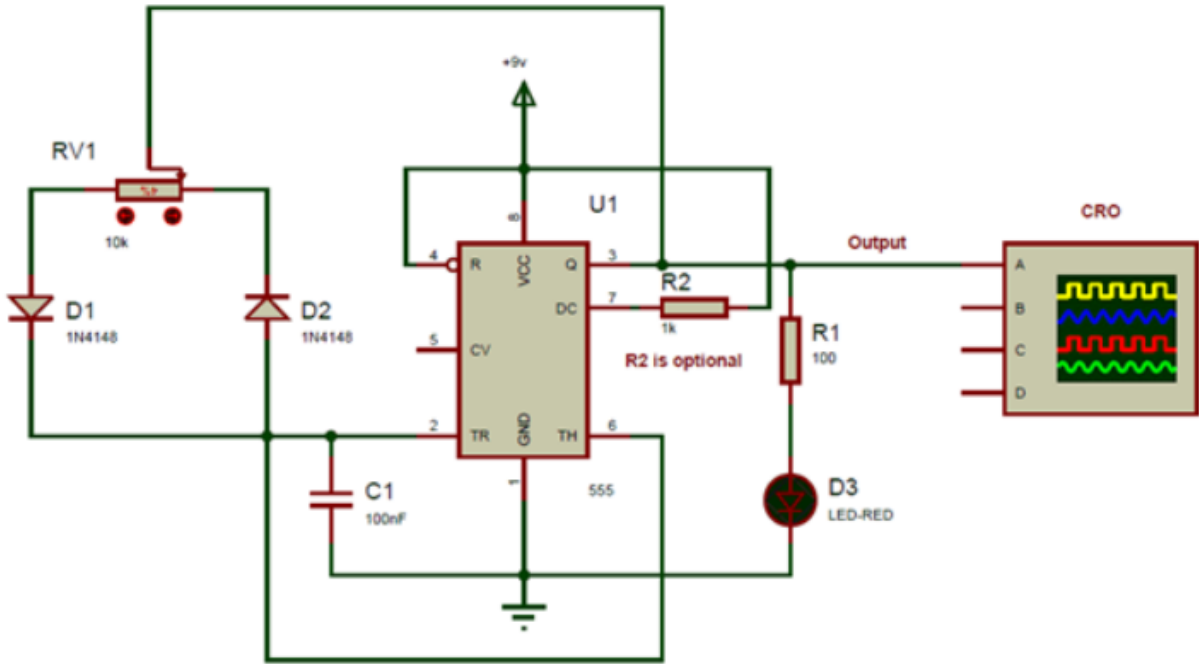
The frequency of a PWM signal determines how fast a PWM completes one period. One Period is complete ON and OFF of a PWM signal.

Requirements

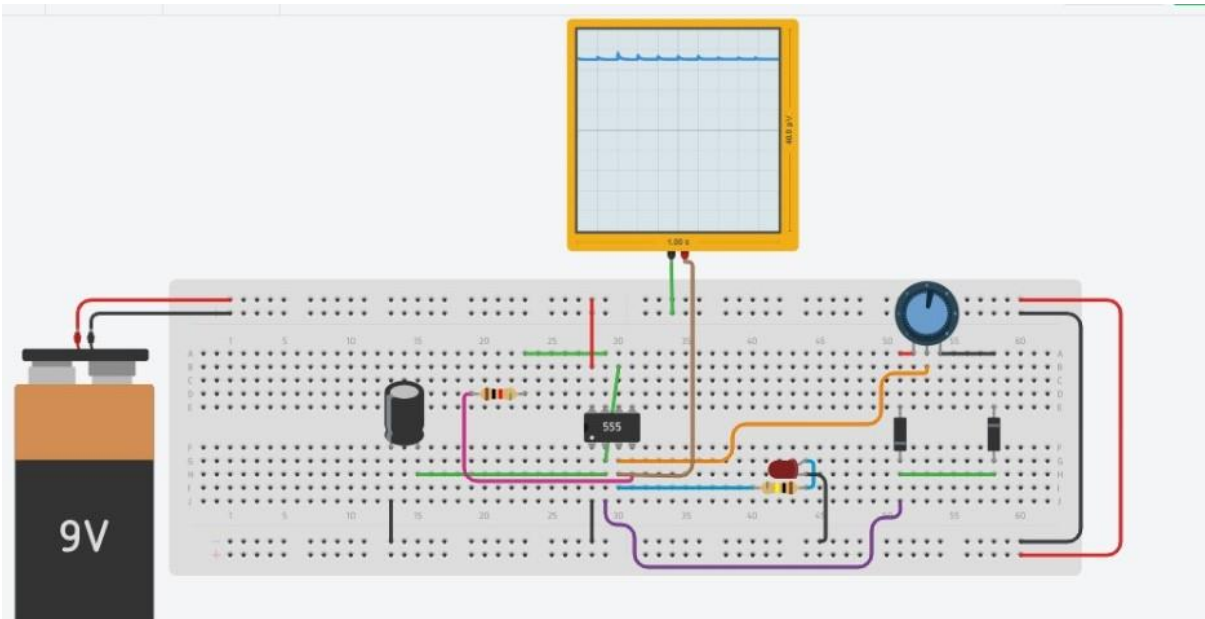
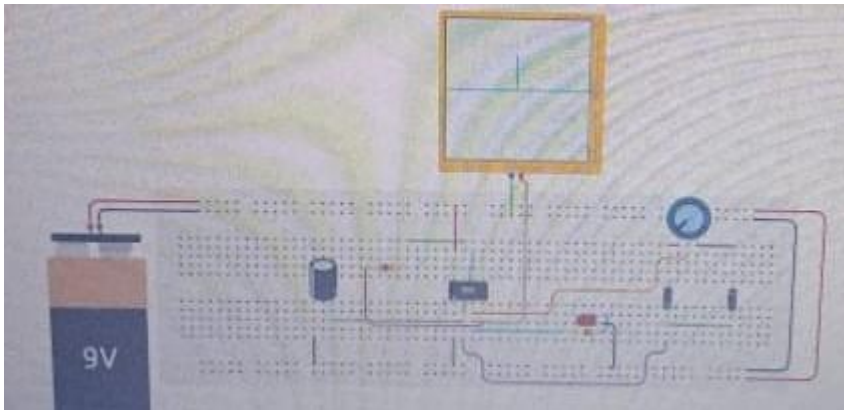
555 timer IC, 10K potentiometer, 1kohm resistor, 0.1uF capacitor ,Bread board, 9v Battery, CRO ,Jumper wire, Battery connector,Tinkercad simulator.

Circuit diagram/ Block diagram





Simulation Results:



Concept used

In this PWM generator circuit, as we mentioned above we have used 555 Timer IC for generating PWM signal. Here we have controlled the output frequency of the PWM signal by selecting resistor RV1 and capacitor C1. We have used a variable resistor in place of fixed resistor for changing duty cycle of the output signal. Capacitor Charging through D1 diode and Discharge through D2 diode will generate PWM signal at 555 timer's output pin. Formula is used for deriving the frequency of the PWM signal:

$$F = 0.693 * RV1 * C1$$

Learning/ observation

The pulse width modulation has been done on CRO using 555 timer.

555 Timer : It is a device which produces oscillation frequency waveform.

Trigger : It transfers input data into output.

Control voltage : It provides control access to the internal voltage divider.

Threshold Voltage: Minimum voltage at which a circuit starts.

Troubleshooting

No Errors.