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*Garden of Knowledge and Virtue*

# **4-Way Traffic Signal with IC 555 Timer**

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DLD & Microprocessor Project (MCTE 2332)

Section: 01

## Introduction:

Traffic signal lights are very Important to regulate vehicles and traffic on roads, simple four-way traffic light circuit is designed with timer IC 555 and counter IC CD4017. we know each traffic signal light setup will have three colours and representing Red for STOP, Yellow for WAIT, and Green for GO, those signals are works based on time intervals.

## Objectives:

The main objective of this 4 way traffic light signal is to:

- Apply class work in real life
- Implement theoretical knowledge and critical thinking ability in practical applications.

## Design Process:

In this simple four-way traffic light circuit we have used timer IC 555 as astable multivibrator to produce pulse based on timing Resistor and timing Capacitor, then output pulse from IC 555 is fed into counter IC CD4017 clock input this counter integrated circuit counts pulse and changes the output line (Q) logic into HIGH or LOW, by connecting proper color LED at this counter IC output, we can obtain traffic signal light.

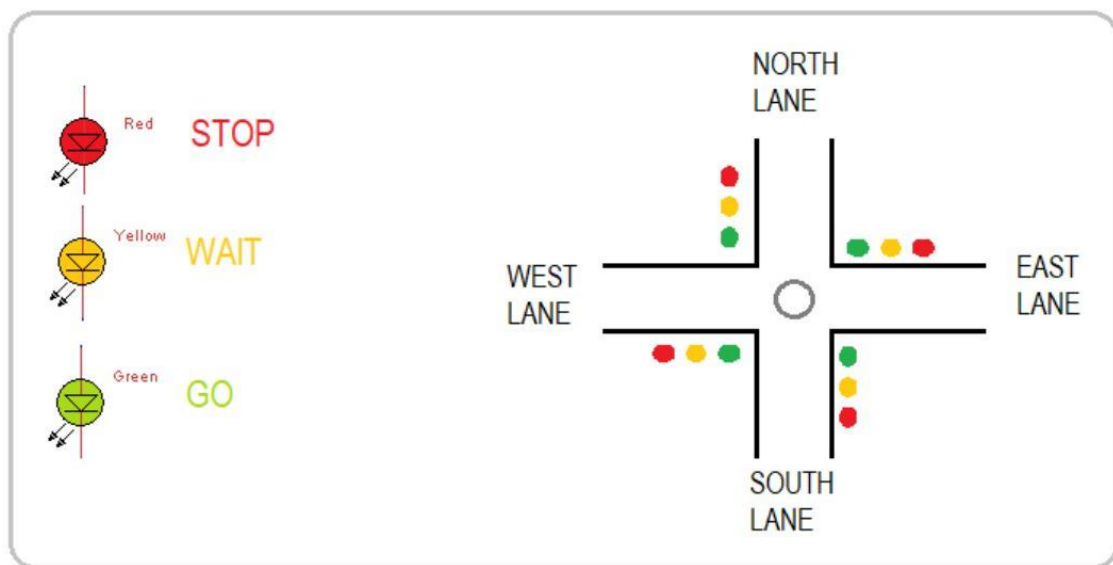


Figure 1: 4-way traffic light (road state)

## Components Required

1. Timer IC 555
2. Counter IC 4017
3. 5V power supply
4. Resistor  $1\text{ K}\Omega = 1, 10\text{K}\Omega = 10,000\Omega = 10\text{K}$
5. Capacitor  $1000\mu\text{F}, 200\mu\text{F}$ .

## Construction & Working

This simple four-way traffic light circuit has two stage one is timing & counting stage another one is Indication lights stage. Those indication lights are should be properly placed on four lanes. Here timer IC 555 placed with timing Resistor R1, VR1 and timing Capacitor C1 based on these elements value output pulse delivered at output pin. These pulse are deciding the timing interval of traffic light signals.

$$\text{period} = t_H + t_L = 0.693(R_A + 2R_B)C$$

$$\text{frequency} \approx \frac{1.44}{(R_A + 2R_B)C}$$

For this equation  $R_A = R1$ ,  $R_B = VR1$  and  $C = C1$ .

Output pulse from timer IC is fed into Counter IC CD4017 clock input through R2 Resistor. Counter IC output Q0 to Q3 will drive Green signal for North & South Lane, Red signal for East & West Lane. Output Q4 drives Yellow signal for North & South Lane.

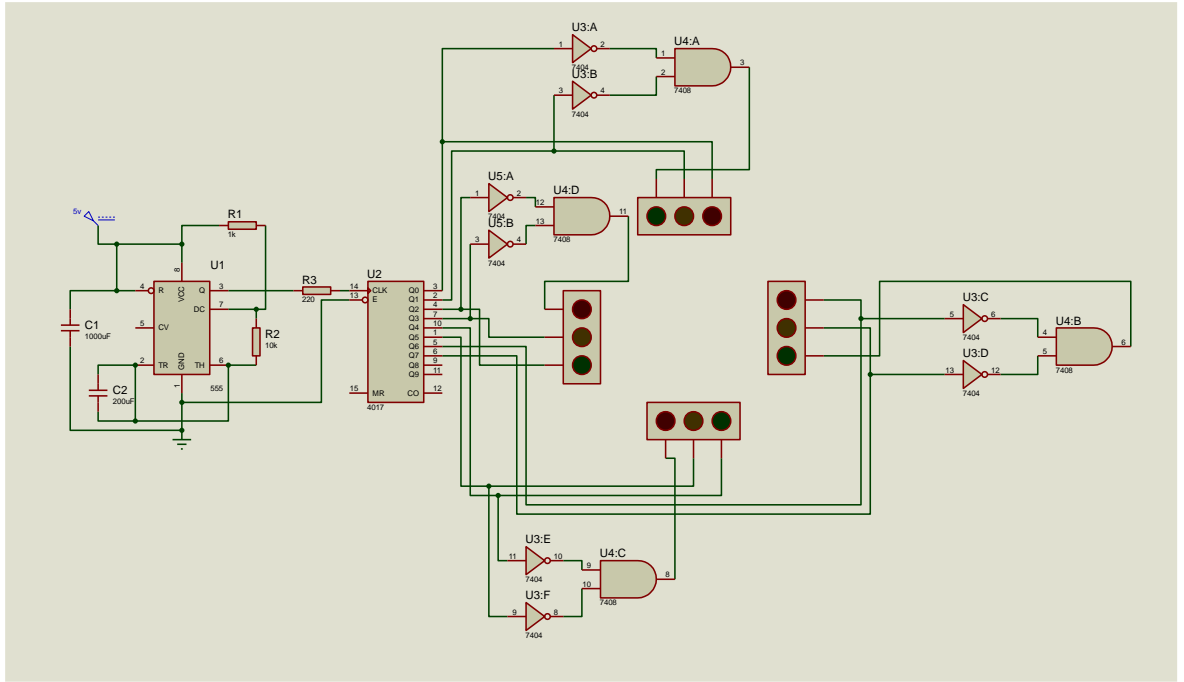


Figure 2: Circuit diagram for 4-way traffic signals (Proteus 8 Professional)

## Conclusion:

In conclusion, it is clear that the objectives of this project has been achieved. A working 4-way traffic signal light is designed and the simulation is done to verify the design. The design simulation is available in Github. The design verification is done by Proteus 8 Professional