DEPARTMENT OF
ELECTRONICS AND COMMUNICATION ENGINEERING

College of Engineering and Technology, SRMIST

MINI PROJECT REPORT

ODD Semester, 2022-2023

Lab code & Name : Analog and Digital Communication (18ECC205J)

YEAR & Semester : 3rd YEAR / 5th SEM

Project Title : Visible Light Communication

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Reg. No Mark split up	RA2011004010048	RA2011004010051	RA2011004010049
Novelty in the project work (2 marks)			
Level of understanding of the design formula (4 marks)			
Contribution to the project (2 Marks)			
Report writing (2 Marks)			
Total (10 Marks)			

Date:

Signature of Lab Supervisor

Visible Light Communication

OBJECTIVE

To make a Flashing/Blinking LED circuit based on Visible light communication (VIC) application using 555 timer IC on a breadboard.

ABSTRACT

Visible light Communication (VLC) creates technology revolution in network sector. In this technology, visible light is used to transmit or receive data. In this, OOK [ON-OFF keying] modulation is used to send and receive data using LED lights.

INTRODUCTION

As we all got to know what is VLC now, in this circuit LED will flash lights at regular intervals of time and the flashing rate can be adjusted by using a potentiometer. This circuit can is made to flash 2 LED's one after the other, and can also be used to flash LED strips / Lights that operate on AC power.

HARDWARE/SOFTWARE REQUIREMENTS

1. 555 Timer IC
2. LED or any output device
3. 10uF Capacitor
4. Resistors: 100K, 1K, 220R
5. Breadboard
6. Wires
7. (5-12)V Power Supply
8. Potentiometer

LED

Led is a semiconductor device that emits light when current flows through it.

CAPACITOR

A capacitor is a device that stores electrical energy in an electric field by virtue of accumulating electric charges on two close surfaces insulated from each other. It is a passive electronic component with two terminals.

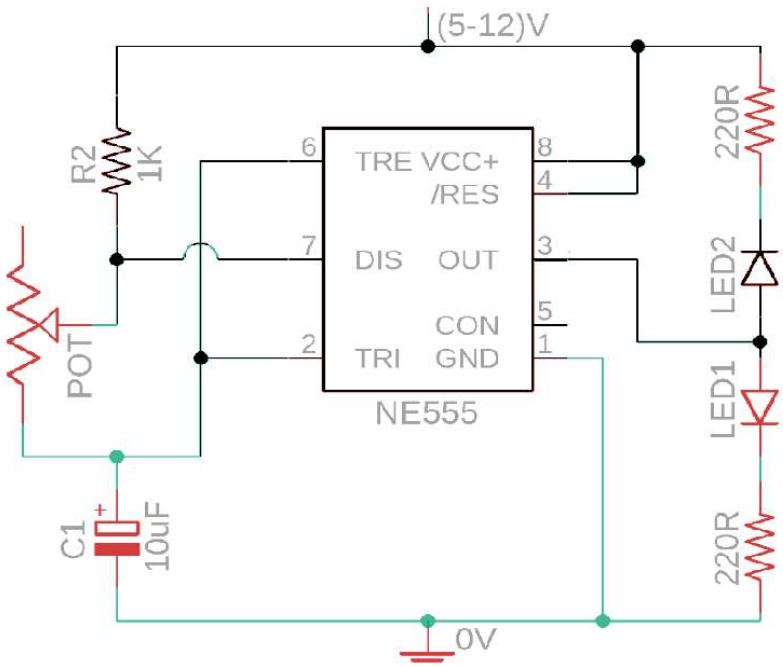
RESISTORS

A resistor is a passive two-terminal electrical component that implements electrical resistance as a circuit element. In electronic circuits, resistors are used to reduce current flow, adjust signal levels, to divide voltages, bias active elements, and terminate transmission lines, among other uses. High-power resistors that can dissipate many watts of electrical power as heat may be used as part of motor controls, in power distribution systems, or as test loads for generators.

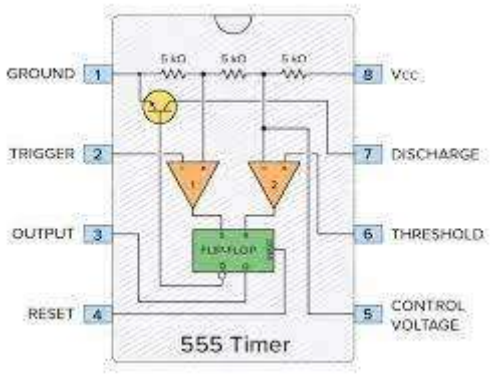
POTENTIOMETER

A potentiometer is a three-terminal resistor with a sliding or rotating contact that forms an adjustable voltage divider.

BLOCK DIAGRAM



555 TIMER CIRCUIT



The standard 555 timer IC is used in a variety of timer, pulse generation and oscillator applications. It can be used to provide time delays, as oscillators and as flip-flop elements. The 555 timer IC is an integral part of electronics projects.

CONCEPTS/WORKING PRINCIPLE

1. If the Trigger Pin (Pin-2 of the 555 timer IC) senses any voltage less than 1/3rds of the supply voltage, it turns ON the output
2. If the Threshold Pin (Pin-6 of the 555 timer IC) senses any voltage more than 2/3rds of the supply voltage, it turns OFF the output
3. Whenever the output of the 555 timer IC is in OFF state, the Discharge Pin (Pin-7) acts as ground/negative rail i.e, it is internally connected to 0V

Keeping the above 3 points in mind, lets try to understand how this circuit works.

1. Immediately after the power supply is turned on, the capacitor (C1) will be in discharged state and so the voltage at Pin-2 will be 0V.
2. Since this voltage is less than 1/3rds of the supply voltage, the output turns ON.
3. Simultaneously Pin-7 will internally disconnect from 0V and so the capacitor starts charging via resistors R1 & R2.
4. Immediately after the voltage across capacitor (C1) crosses 2/3rds of the supply voltage, Pin-6 senses it and turns OFF the output.
5. Simultaneously Pin-7 will reconnect internally to 0V, which results in capacitor discharging via resistor R1.
6. And once the voltage across the capacitor falls below 1/3rd of the supply voltage, Pin-2 will turn ON the output and this whole cycle repeats again and again. (The sequence continues from the 3rd step)

APPROACH/METHODOLOGY/PROGRAMS

The resistors R1 and R2, along with the capacitor C1 control the blinking rate. While capacitor C1 and resistor R1 influence both On and Off times of the LED, Resistor R2 is

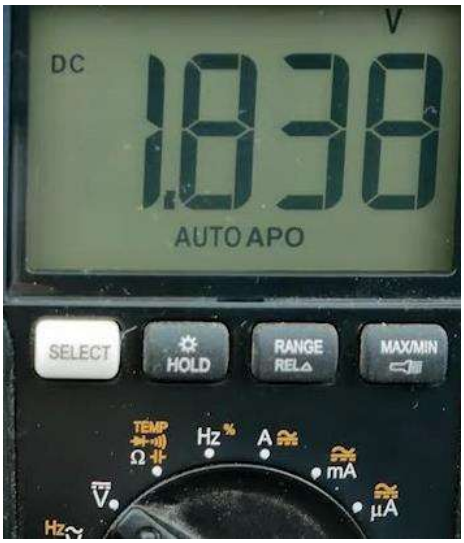
responsible only for the On time. So if you want to try out different resistor values and change the flashing rate, you can experiment by changing the value of resistor R2.

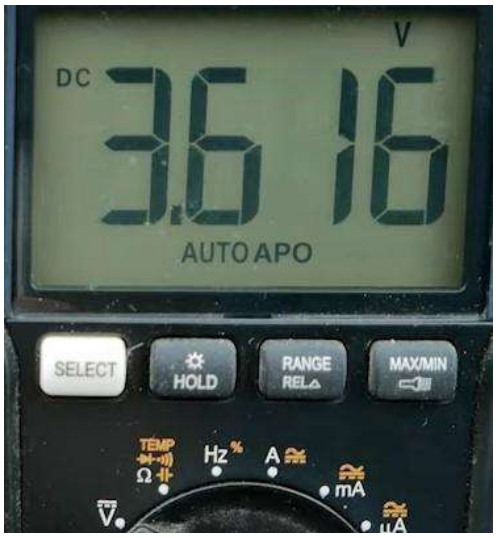
FORMULA

Time period (T) = 0.693*(R2+2*R1)*C1

OUTPUT

You can practically observe this charging and discharging of the capacitor by measuring the voltage across it using a multi-meter.





CONCLUSIONS

In this way we can contruct a flashing/blinking LED circuit based on Visible light communication (VIC) application using 555 timer IC on a breadboard. We can use them in our day-to-day life

1. 1.In turning indicator circuits of all types of vehicles and cycles
2. 2.In Strobe lights / SoS signalling circuits (To signal that someone is in danger or needs help)
3. 3.To control wiper motors and create to and fro motion

REFERENCES

http://www.elonics.org/adjustable-led-flasher-using-555-timer