

# LED VIP Light User Guide

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## Introduction

This VIP light system is designed to produce a dynamic and attention-grabbing flashing pattern, commonly used in emergency, priority, or escort vehicles. The circuit utilizes a 555 timer IC configured in astable mode to generate continuous clock pulses, which drive a CD4017 decade counter. The counter sequentially activates its outputs, triggering red and blue LED arrays in a timed sequence. By alternating between color groups, the system creates a visually striking effect that enhances visibility and conveys urgency. Its compact design and low component count make it ideal for integration into custom lighting modules or educational demonstrations.

## Key Features

- Sequential LED control using CD4017 to drive LEDs in a timed rotating pattern
- Dual color output with separate red and blue LED arrays for high-contrast signaling
- Astable clock generation provided by the NE555 timer for stable pulse timing
- Transistor switching ensures efficient current control to the LEDs
- Automatic reset of CD4017 after ten pulses for continuous operation
- Diode isolation prevents signal backflow and maintains clean transitions
- Compact design with minimal components for easy PCB integration

## Typical Applications

- Emergency or priority vehicle lighting
- VIP escort signaling
- Educational electronics projects

## Working Principle

This circuit functions as a VIP light system, commonly used in emergency or priority vehicles to create a distinctive alternating flashing pattern. At its core, a 555 timer IC generates continuous clock pulses that drive a CD4017 decade counter. The NE555 timer (U2) is configured in astable mode, producing a continuous square-wave signal, and the flashing speed can be adjusted using the variable resistor.

The CD4017 counter sequentially activates its outputs (Q0 to Q9). In this design, outputs Q0, Q2, and Q4 control the blue LED array, while outputs Q5, Q7, and Q9 control the red LED array. As the counter steps through these outputs, the blue and red LED arrays turn on alternately, creating the classic emergency-light effect.

Both LED arrays are powered through switching transistors (Q1 and Q2), which are driven by the counter outputs through protective diodes to ensure safe operation. After completing all 10 output

steps, the CD4017 automatically resets and starts the sequence again, resulting in a continuous and repeating flashing cycle.

## Circuit Diagram

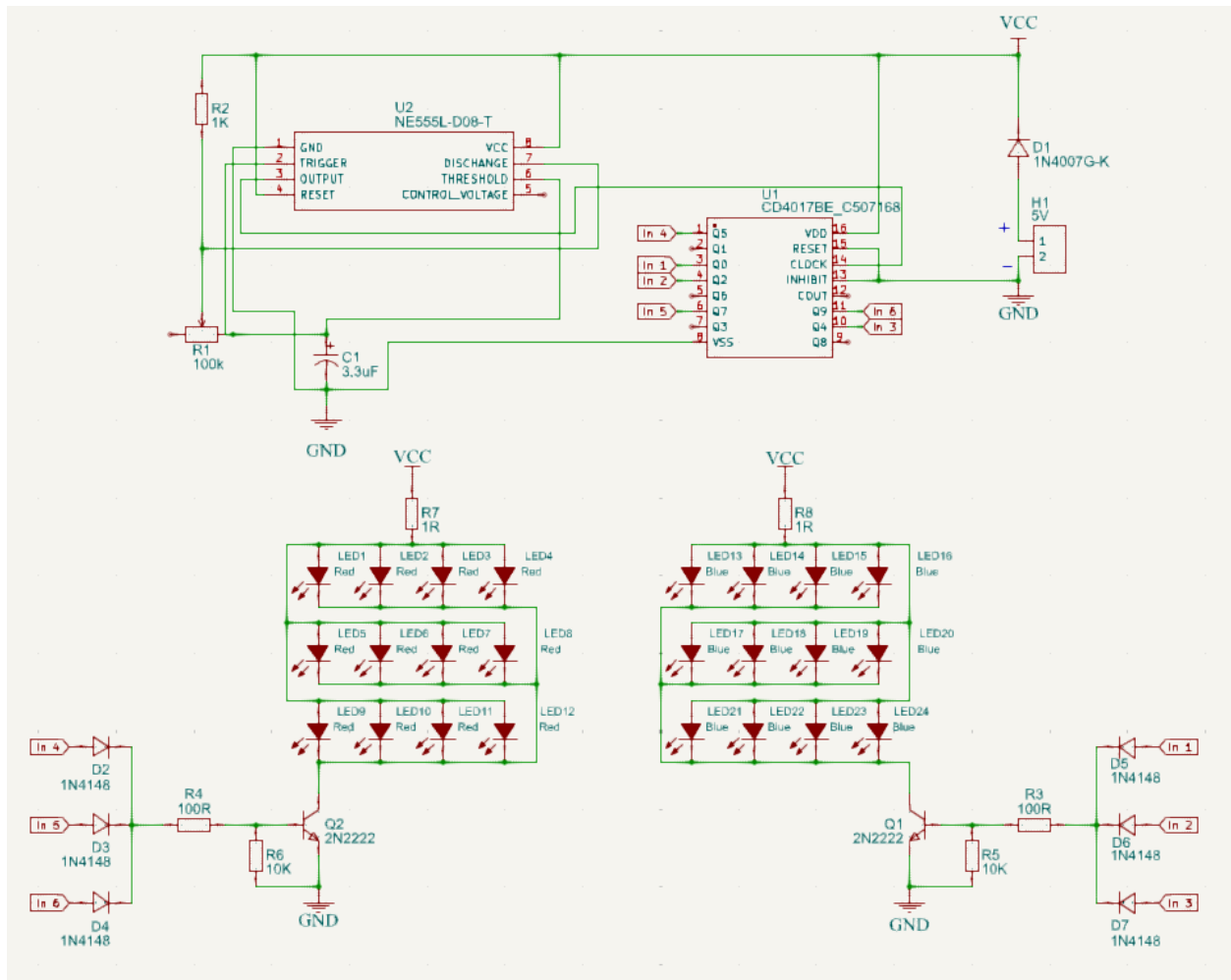


Figure 1 : Circuit diagram

## Power Supply

Supply Voltage: 5V

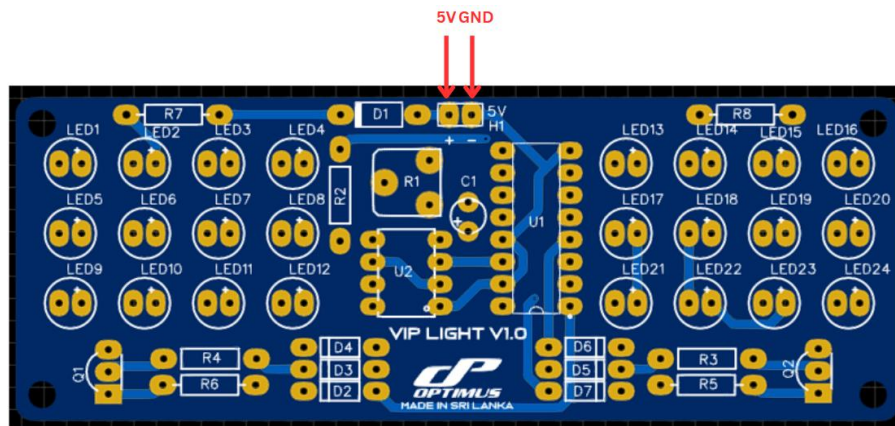















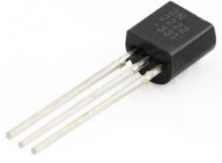


Figure 2 : Power supply connection diagram

## Required Components

Value	Designation	Quantity	Image
3.3uF	C1	1	
1N4007	D1	1	
1N4148	D2 - D7	6	
Header	H1	1	

100k variable resistor	R1	1	
1k	R2	1	
10k	R5, R6	2	
1 Ohm	R7, R8	2	
100 Ohm	R3, R4	2	
CD4017	U1	1	
16 pin IC base	U1	1	
NE555	U2	1	

8 pin IC base	U2	1	
5mm red LED	LED1 - LED12	12	
5mm blue LED	LED13 - LED24	12	
2N2222	Q1, Q2	2	



## Pin Assignments

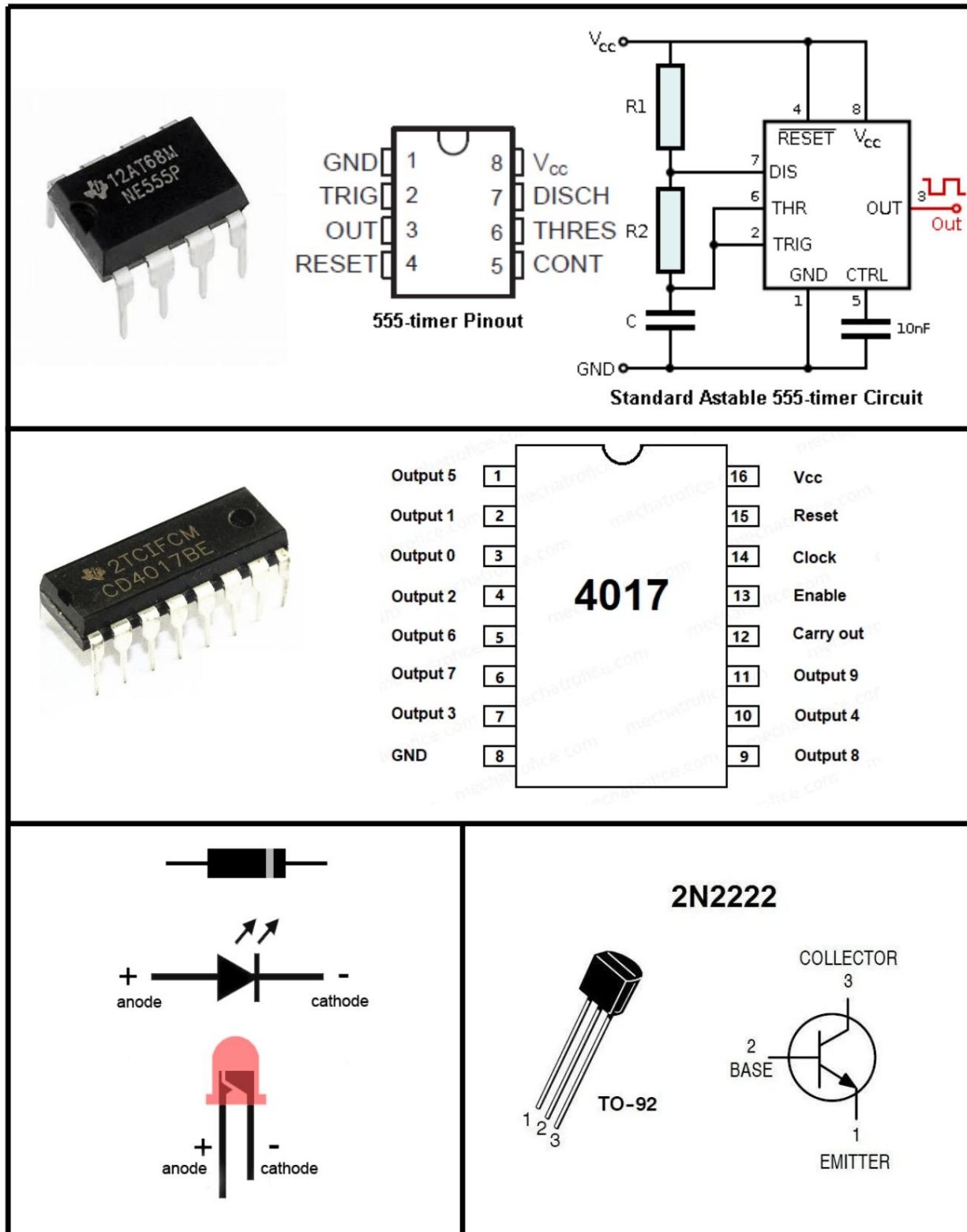


Figure 3 : Pin assignments

## Components and Final Assembly

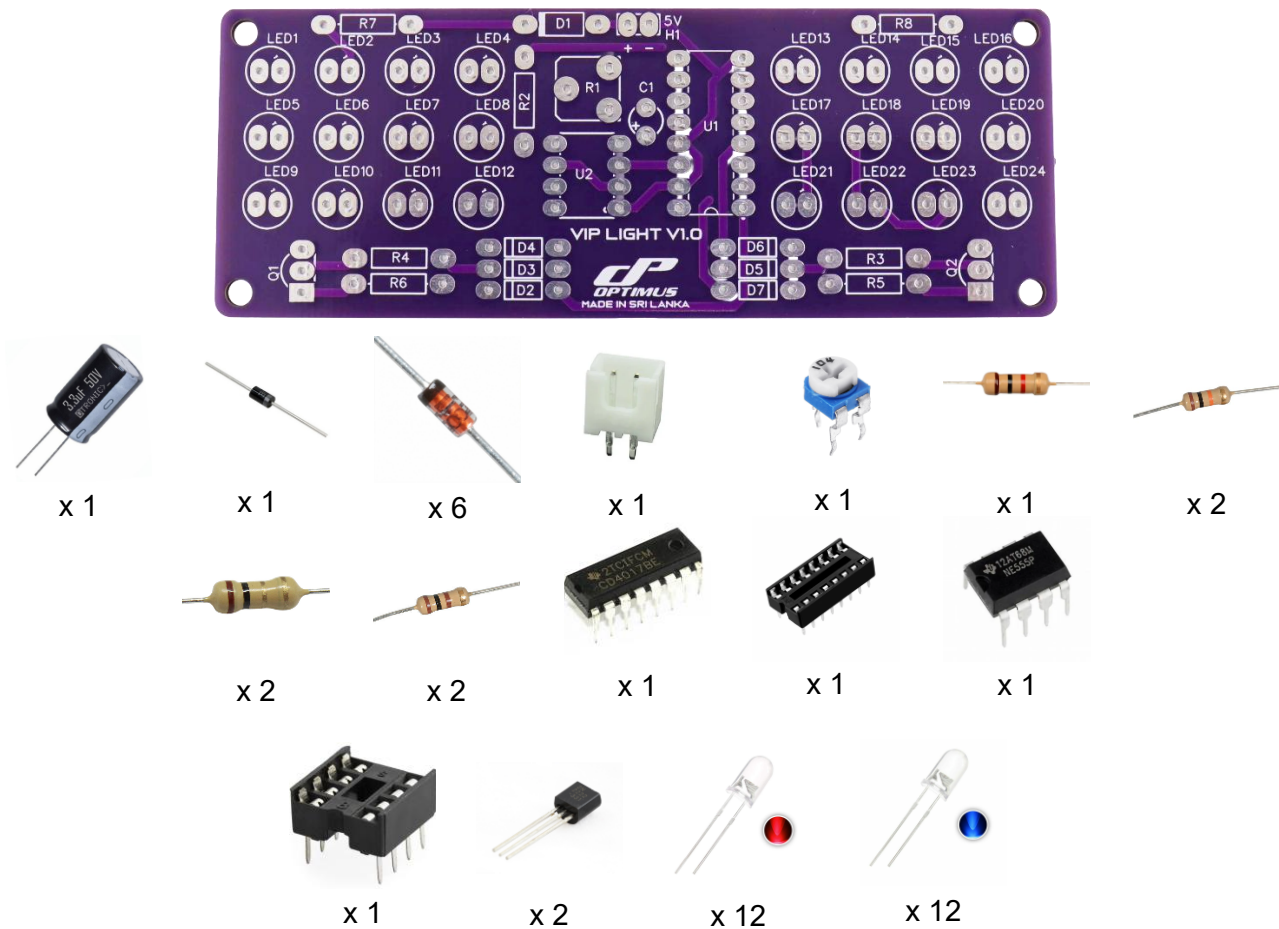


Figure 4 : PCB and required components



Figure 5 : Final assembly

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