LED Chaser User Guide

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Introduction

The LED Chaser Circuit is a simple, reliable, and visually engaging electronic module designed to generate a sequential running-light effect using ten LEDs. Controlled by a combination of an NE555 timer and a CD4017 decade counter, the circuit produces evenly timed pulses that drive the LEDs in a skipping sequence, creating a smooth chasing or stepping pattern.

This product is ideal for students, hobbyists, and beginners who want to learn about timing circuits, counters, and basic digital electronics. With its straightforward design and clear visual output, this circuit serves as an excellent learning tool as well as a practical lighting effect generator.

Key Features

- LEDs light up in an alternating skipping pattern to create the classic Knight Rider scanning effect
- NE555 timer-based clock generator with adjustable speed control
- CD4017 decade counter for reliable, step-by-step LED activation
- Low-power operation
- Simple circuit design ideal for education and experimentation
- Smooth and consistent LED transition for decorative effects

Typical Applications

- Educational electronics & learning kits
- Decorative lighting & LED effects
- Hobby models & DIY projects
- Sequential signaling & timing circuits

Working Principle

This product is based on two main integrated circuits: the NE555 timer and the CD4017 decade counter. The NE555 is configured in astable mode, where it continuously generates square-wave clock pulses. The pulse frequency is determined by the timing components (R1, R2, C1), and this frequency controls the speed of the LED sequence. The R1 potentiometer allows you to adjust this speed.

These clock pulses are fed into the CD4017, a decade counter with ten decoded outputs. Each incoming pulse causes the CD4017 to activate the next output in sequence.

According to this circuit diagram, the LEDs do not light in a normal 1-to-10 order. Instead, they turn on in a skipping forward sequence:
LED1 → LED3 → LED5 → LED7 → LED9 → LED10

After the last LED turns on, the sequence reverses in a skipping backward direction: LED8 → LED6 → LED4 → LED2

Once the CD4017 completes its last output and resets, the sequence restarts from LED1, continuing the cycle.

When the clock pulse width is low (fast pulses), this skipping forward-and-backward pattern produces the classic Knight Rider effect, giving a smooth scanning light movement.

Circuit Diagram

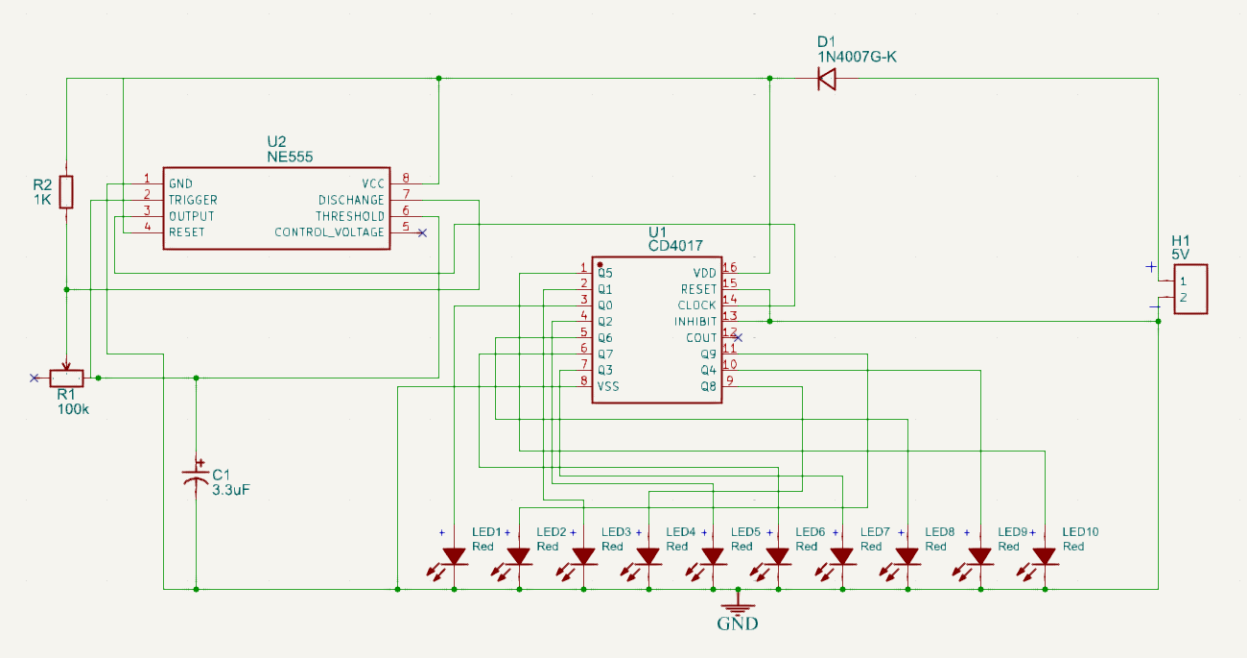

Figure 1 : Circuit diagram

Power Supply

Supply Voltage: 5V

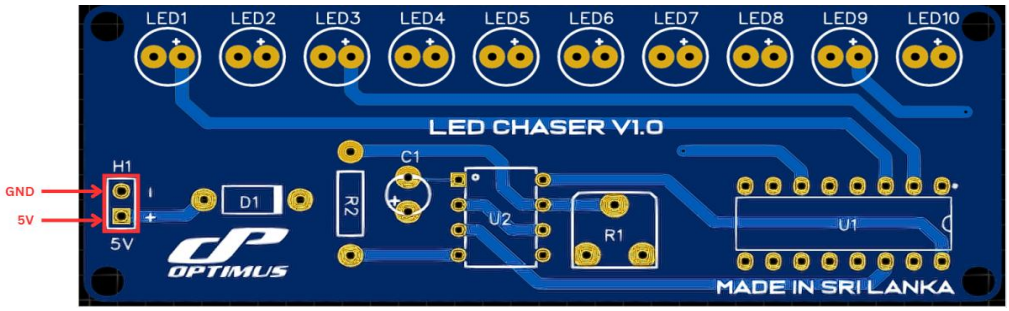

Figure 2 : Power supply connection diagram

Required Components

Value	Designator	Quantity	Image
3.3uF	C1	1	
1N4007	D1	1	
Header	H1	1	
5mm red LED	LED1, LED2, LED3, LED4, LED5, LED6, LED7, LED8, LED9, LED10	10	
100k variable resistor	R1	1	
1k resistor	R2	1	
CD4017	U1	1	

16 pin IC base	U1	1	
NE555	U2	1	
8 pin IC base	U2	1	

Pin Assignments

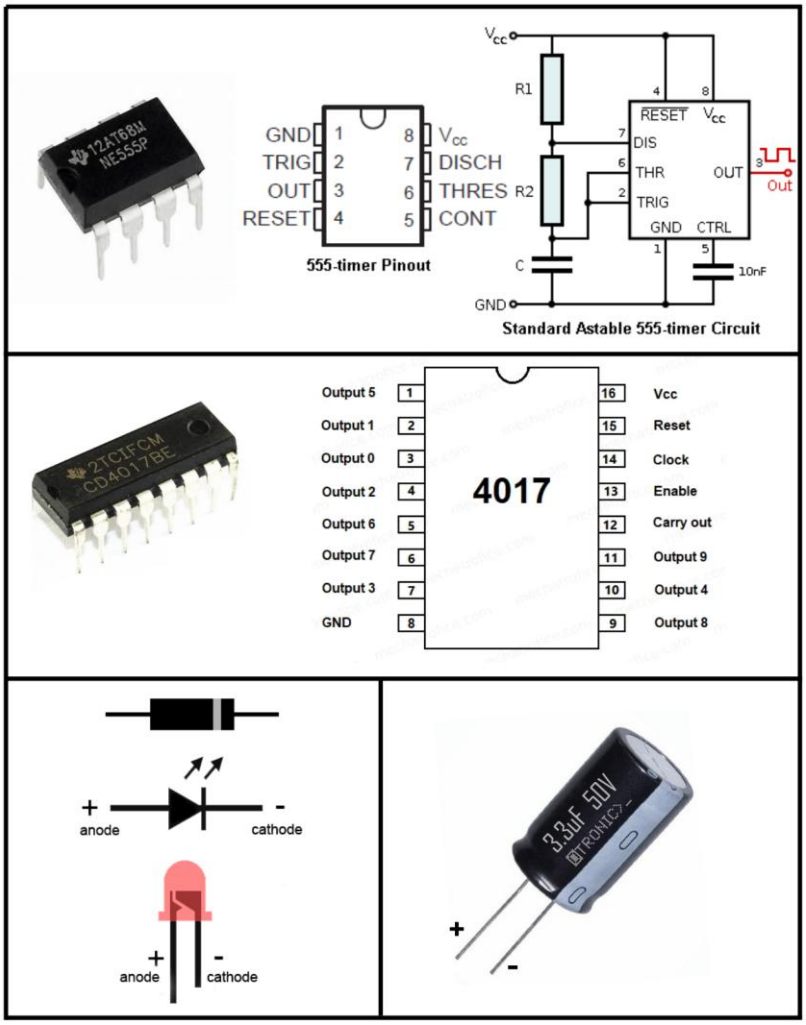

Figure 3 : Pin assignments

Components and Final Assembly

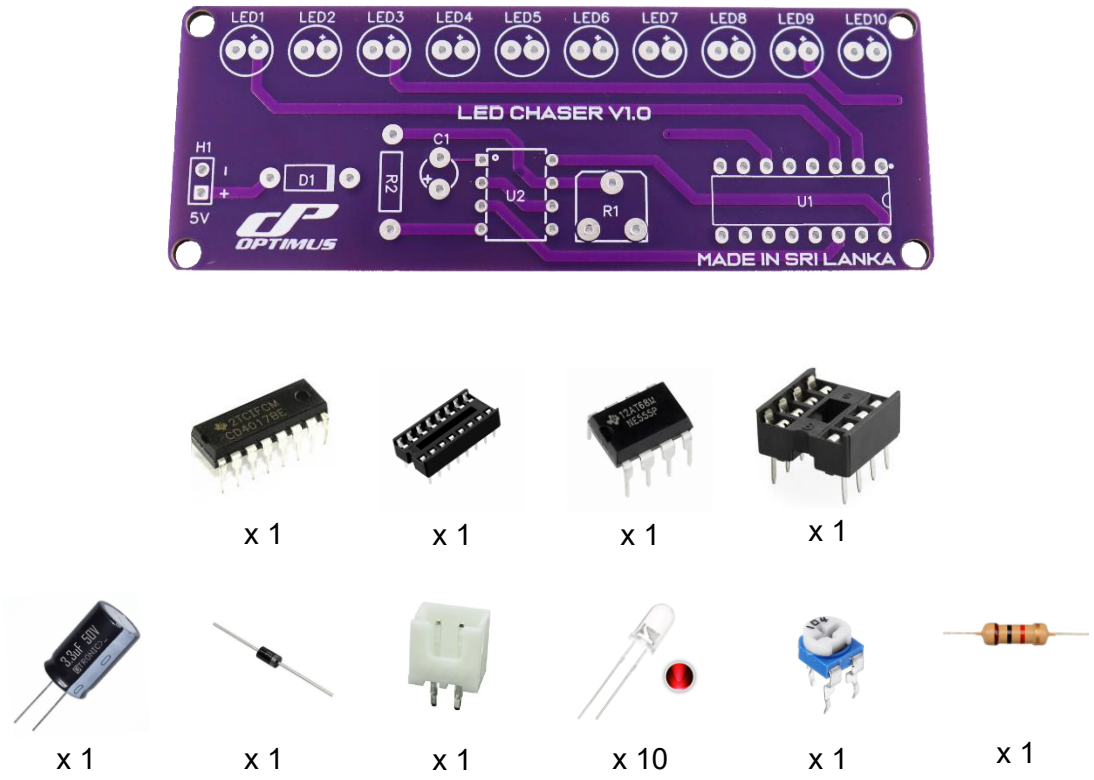

Figure 4 : PCB and required components

Figure 5 : Final assembly

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