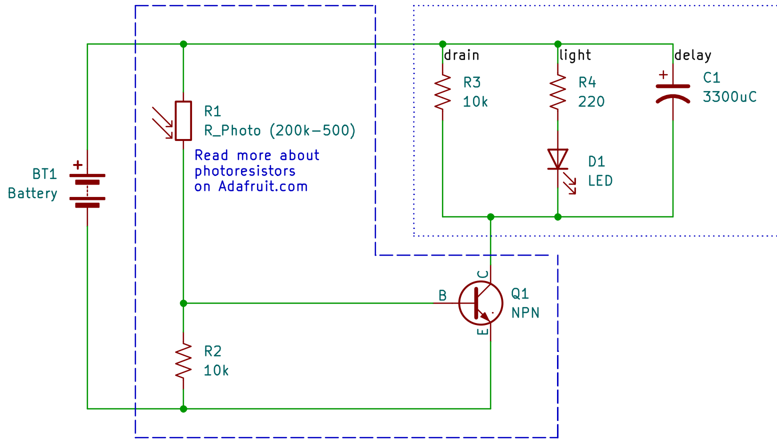


This voltage divider will turn on the transistor if there is enough light shining on the photo-resistor. If the transistor is ON, the other section of this circuit will be activated, since it can then be connected to the circuit's 'ground.'

The three parallel branches: "drain, "light", "delay" are the core of how this circuit works. They each provide a different resistance, and thus have different electric current supplied at the instant the transistor turns on. The interplay between these three branches is complex, and drives this analog circuit's operation.

Since this circuit is NOT consistent in its operation over time, let's consider what happens in order when the transistor is first turned on:

First, the 'delay' branch has no resistor, so it takes on the vast majority of the newly-supplied current. This starts to charge the capacitor: quickly at first, then slower.

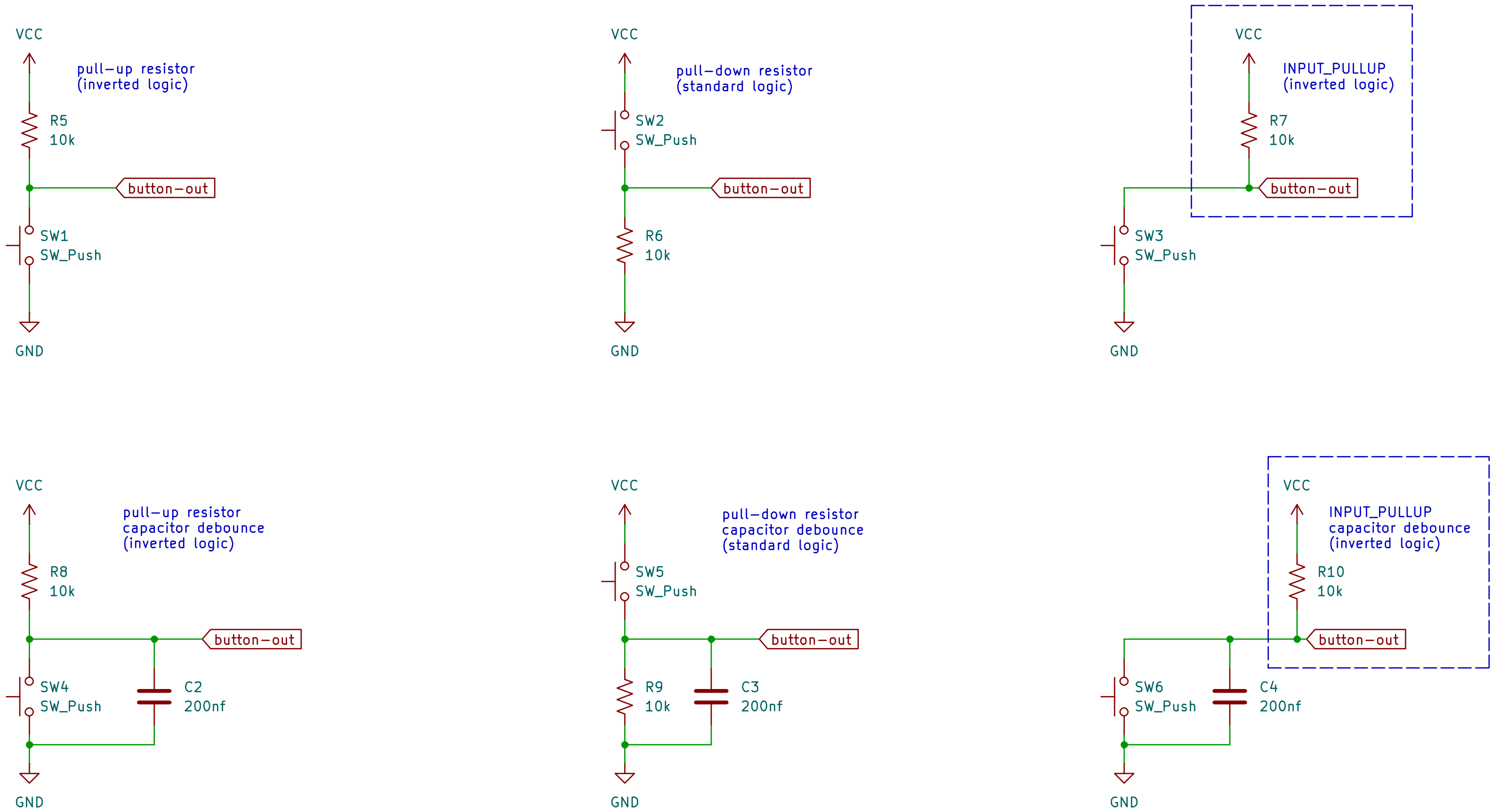
Second, as the capacitor fills, it builds up a voltage across its two plates. When that voltage equals the 'forward voltage' of the LED, a critical change happens:

The LED (and whole light branch) can turn ON when there is enough built-up voltage on the capacitor. Although it is dim at first, it quickly brightens as the capacitor charges asymtotically to its max.

While this whole parallel subcircuit is active, the 'drain' branch has too high of a resistance (compared to the other two branches) to be more than a leakage current. In the active state, you can basically ignore the 'drain' branch since it carries so very little current.

When the circuit is no longer active (the transistor turns off), the 'drain' branch has its useful moment. This resistor provides a path for hte capacitor to slowly drain its built-up voltage, so that it can rreset itself automatically to be ready for the next time this sub-circuit is activated by the transistor.

Mason High School Applied Technology	
Sheet: /scioly-delayed-light/	
File: scioly-delayed-light.kicad_sch	
Title: Science Olympiad Real-Life RC Circuit	
Size: USLetter Date: 2025-03-20	**Rev: v1.0**
KiCad E.D.A. 8.0.6	Id: 2/6



`Floating Pin` – without a pull–up or pull–down the value of the button can change erratically when the button is disconnected

`Standard Logic` – HIGH when pressed, LOW when un–pressed

`Inverted Logic` – LOW when pressed, HIGH when un–pressed

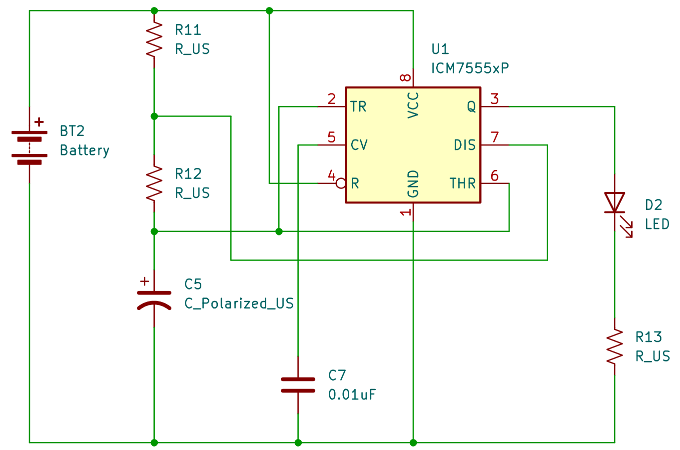
`Capacitor Debouce` – a capacitor will take time to charge, effectively applying a physical debounce: 100nF to 1µF common

Mason High School Applied Technology

Sheet: /momentary–button/
File: momentary–button.kicad_sch

Title: Button Implementation Strategies

Size: USLetter	Date: 2025–03–20	**Rev: v1.0**
KiCad E.D.A. 8.0.6		Id: 3/6



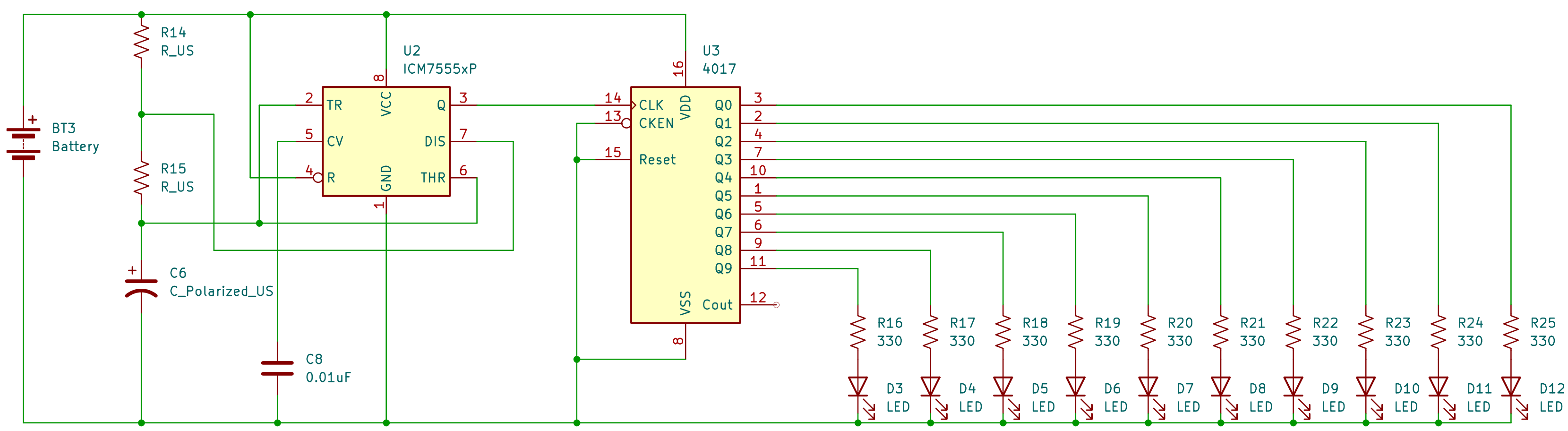
Mason High School Applied Technology

Sheet: /555-basic-blinker/

File: 555-basic-blinker_sch.kicad_sch

Title: 555 Basic Blinker

Size: USLetter	Date:	Rev: v1.0
KiCad E.D.A. 8.0.6		Id: 4/6



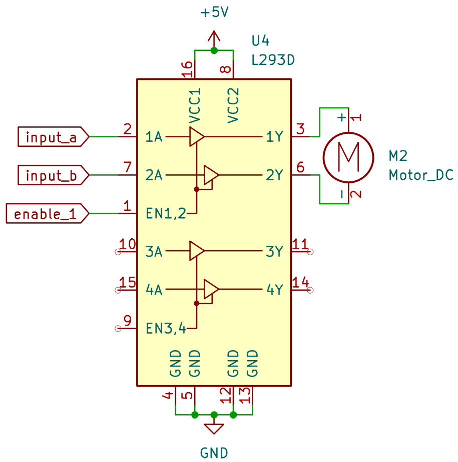
Video explainer: https://youtu.be/WdhzOjQjNrg
"Learn Electronics | LED chaser with 555 & 4017"
-- TheElectroBench, YouTube

Mason High School Applied Technology
Sheet: /night-rider/
File: night-rider.kicad_sch

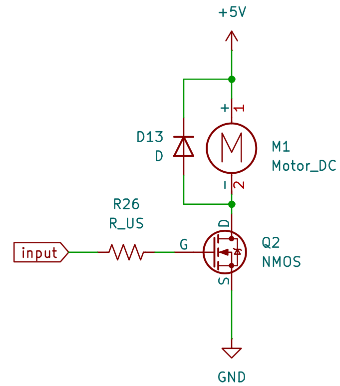
Title: Night Rider (LED Chaser)

Size: USLetter	Date:	**Rev: v1.0**
KiCad E.D.A. 8.0.6		Id: 5/6

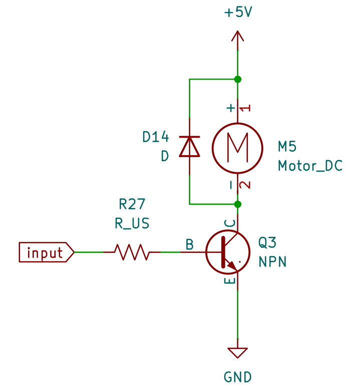
H−Bridge motor driver
"Forward" "Reverse" "Stop" "OFF"



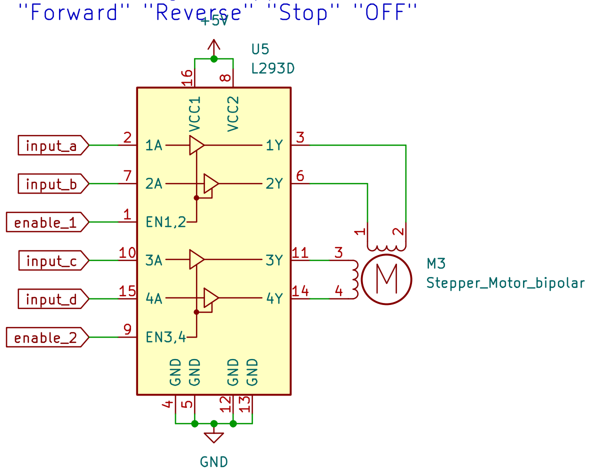
Single MOSFET control
DC brushed motor only
Only 'Forward' or OFF



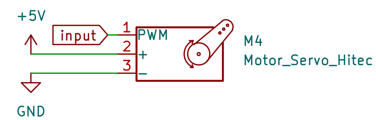
Single BJT Transistor control
DC brushed motor only
Only 'Forward' or OFF



Dual H−Bridge Motor Driver
For driving a stepper motor
"Forward" "Reverse" "Stop" "OFF"



Basic Servo Motor (5−6v)
with typical signal input



5 Ways to implement motors
1 simple servo motor
2x using common L293 motor driver
2x using simple transistor control

Mason High School Applied Technology

Sheet: /motors/
File: motors.kicad_sch

Title: Motors

Size: USLetter	Date: 2025-04-24	**Rev: v1.0**
KiCad E.D.A. 8.0.6		Id: 6/6