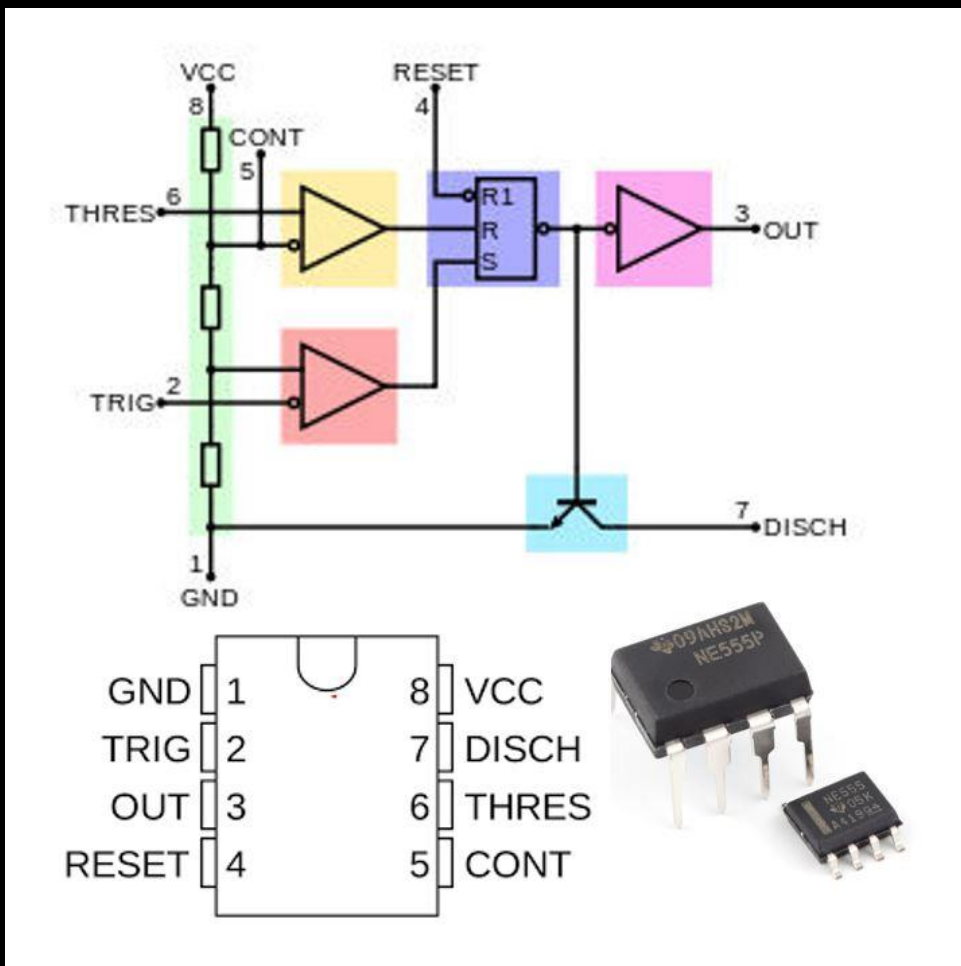




STEAM CLOWN™ PRODUCTIONS

555 / 556 TIMER



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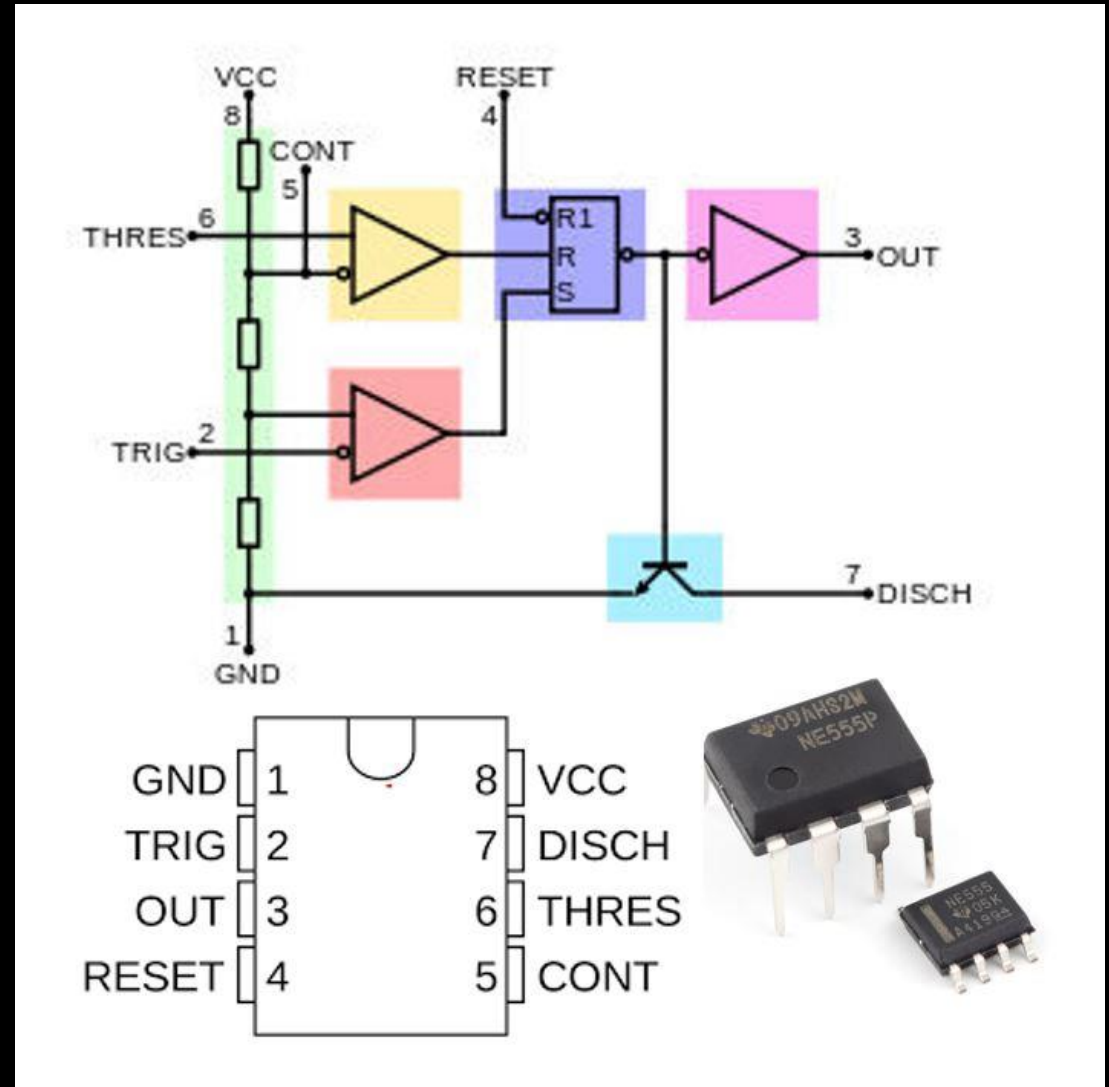
NEW WORDS...

- Oscillator
- Relaxation Oscillator
- Duty Cycles
- Monostable
- Bistable
- Astable

- The **555 Timer Oscillator** which is more commonly called the “**555 Timer**” is a dedicated IC’s
 - Designed to produce an output waveform
 - It can create square waves, as well as other wave forms
 - It requires just a few extra external Resistors and Capacitors as timing components

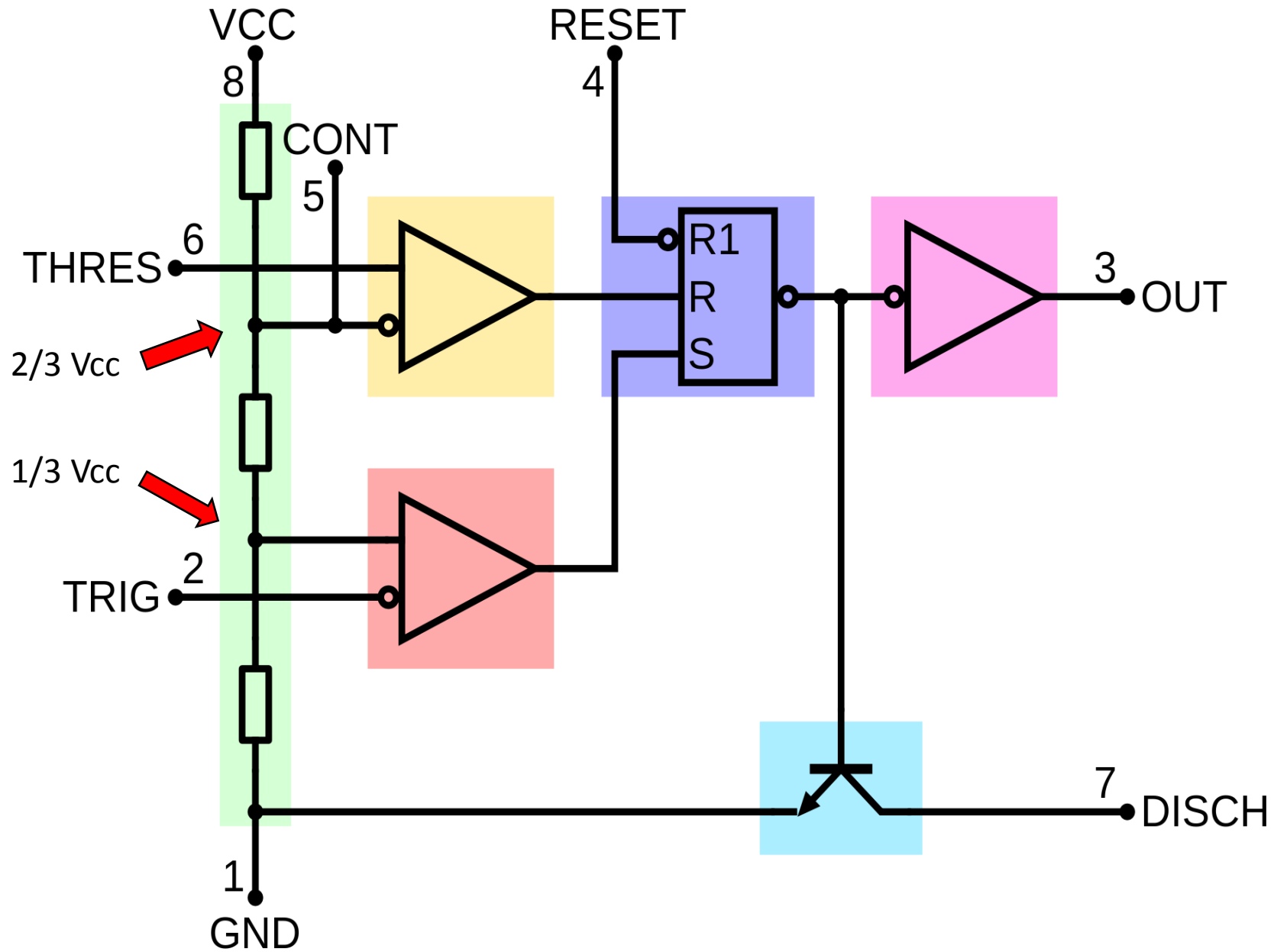
WHY 555?

- The **555 timer** gets its name from the three 5kΩ resistors it uses to generate the two comparators reference voltage
- It is a very cheap, popular and useful precision timing device
- It can act as either a simple timer to generate single pulses or long time delays
- Bistable, where it can be used as a On/Off switch
- Or as a relaxation oscillator producing stabilized waveforms of varying duty cycles from 50 to 100%.



- How A 555 Timer Works

- https://www.youtube.com/watch?v=i0SNb_dkYI





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LAB TIME

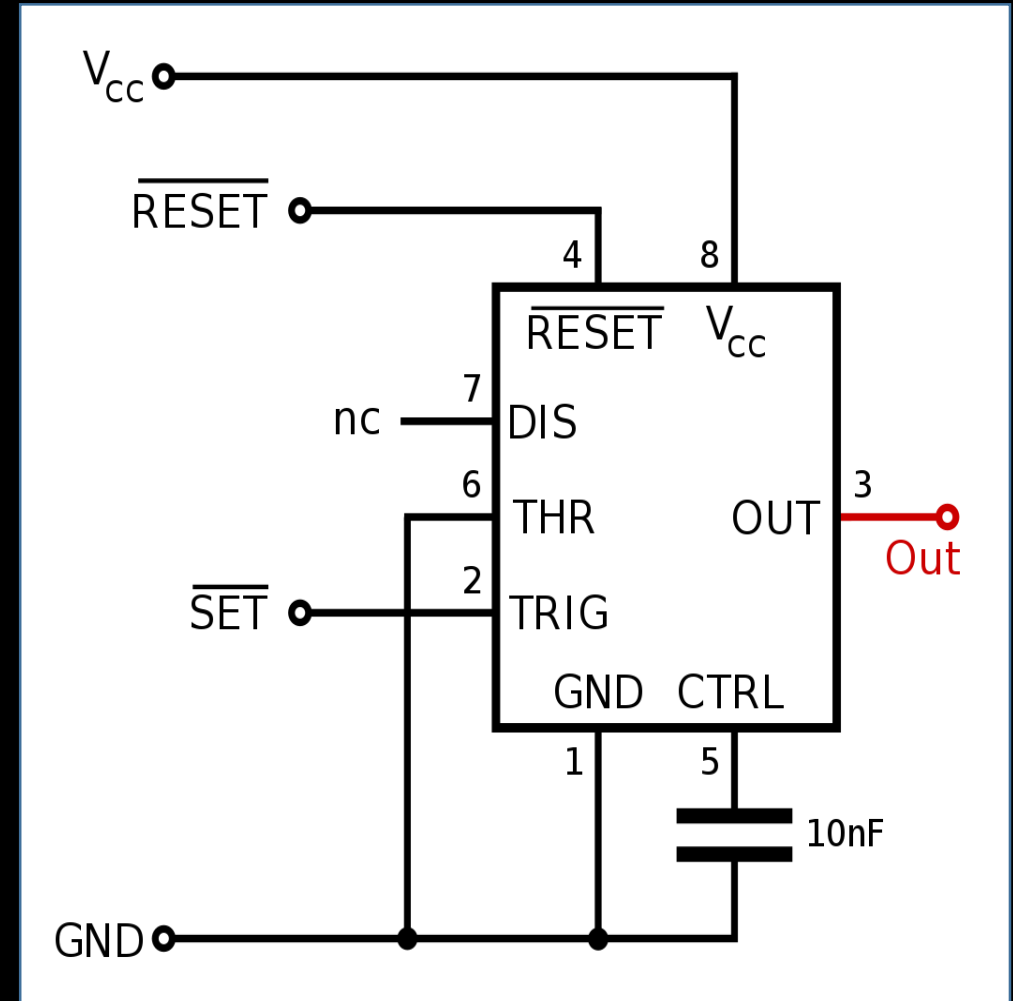


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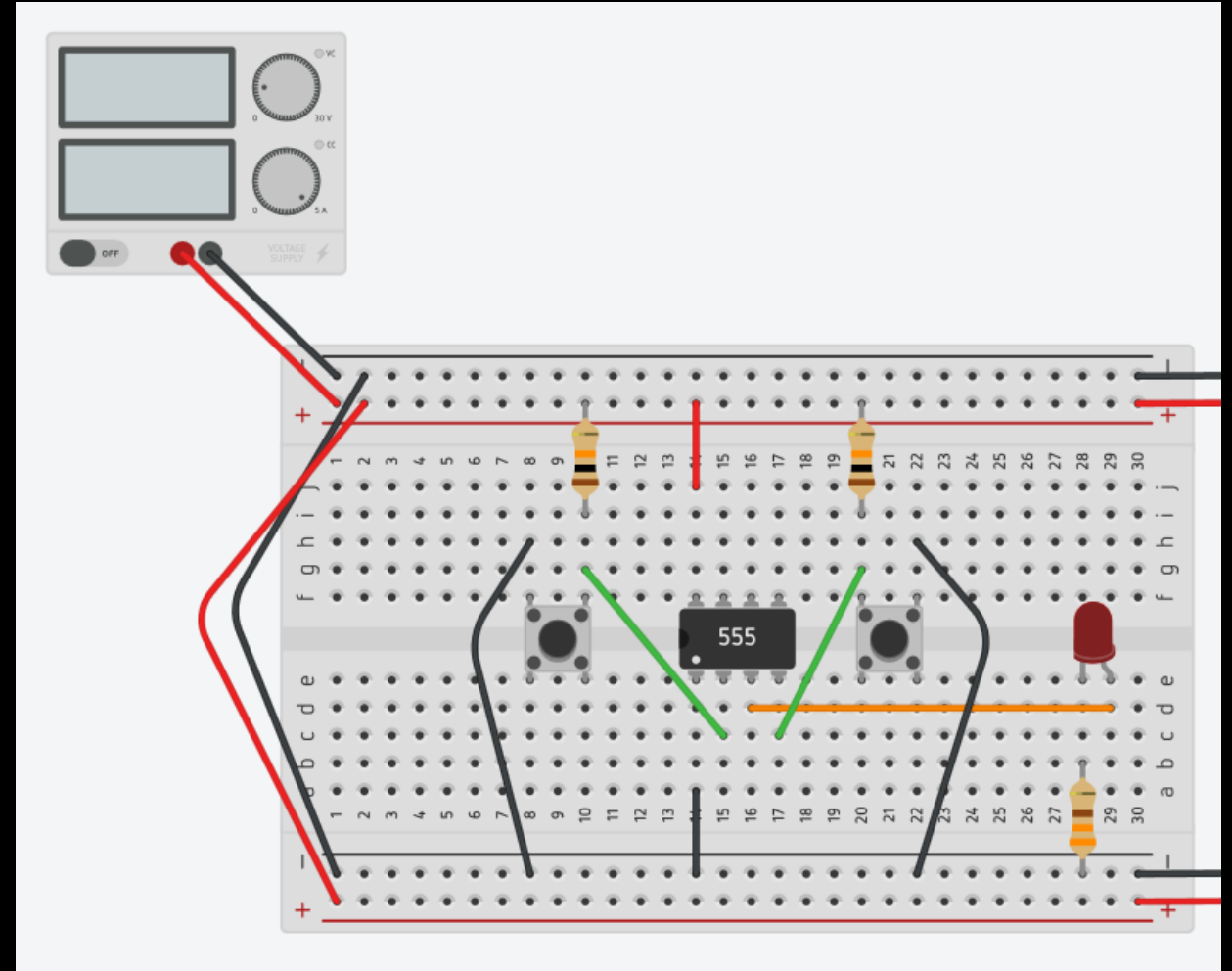
BISTABLE

- Acts like a Flip/Flop
- Presenting a “low” on the reset or trigger pins will cause the output to change



BISTABLE TIMER LAB

- Using a bread board...
- Build a Bistable circuit
- Show me... and...
- Turn in to IC Why you might use a circuit like this, rather than just a switch?

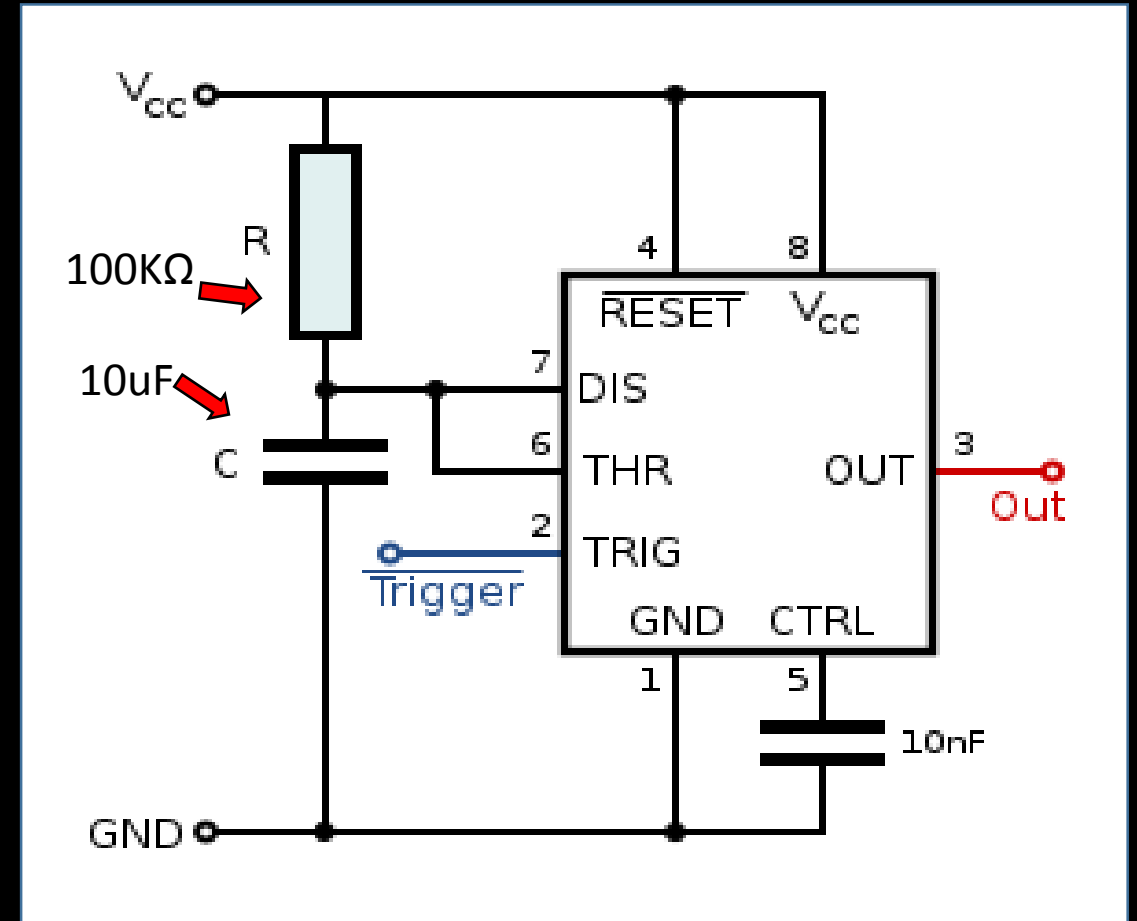


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MONOSTABLE

- Triggers a pulse of variable width
- $t = 1.1R_1C_1$
- MonoStable Calculators
 - Solve for time
 - Solve with components



$$t = 1.1R_1C_1$$

$$\frac{t}{1.1} = R_1 C_1$$

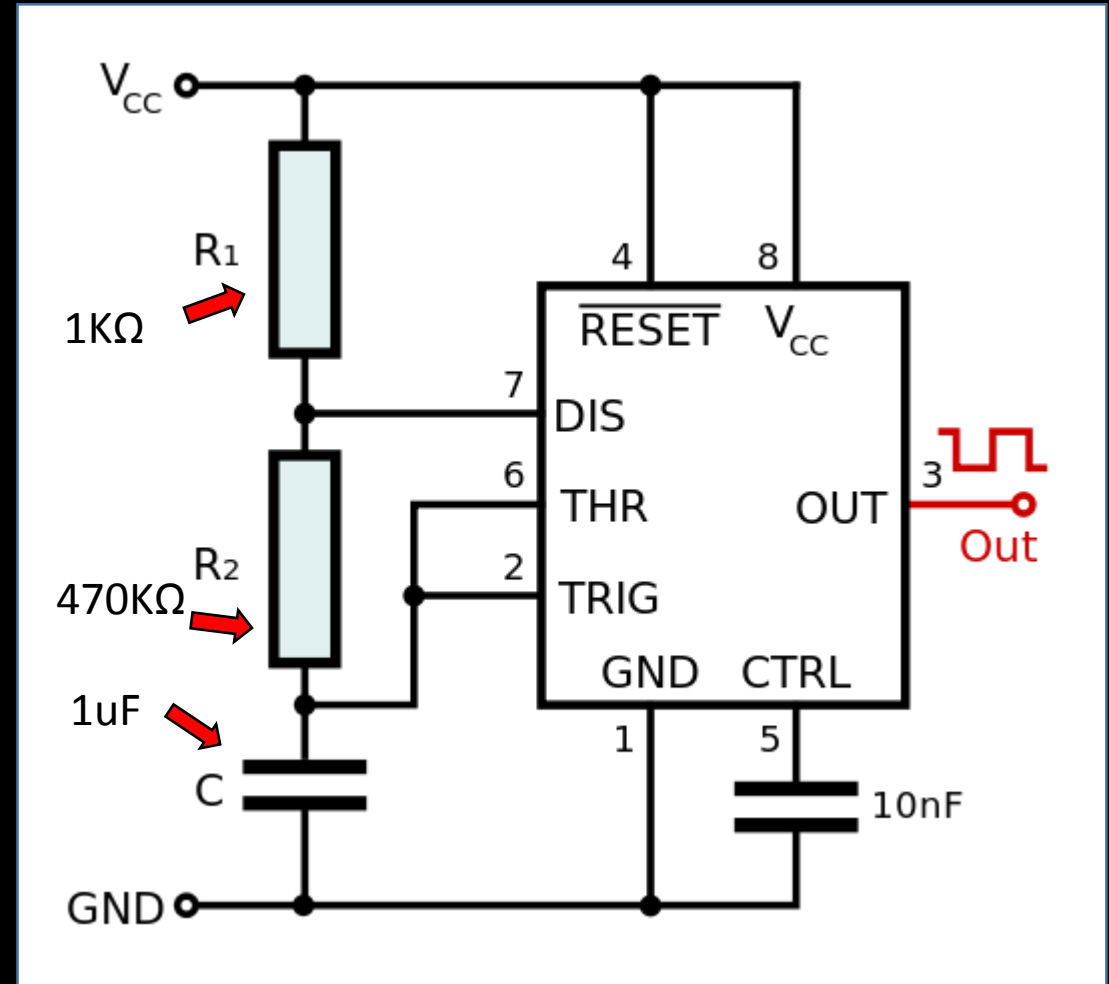
$$\frac{(t/1.1)}{C_1} = R_1$$

$$R_1 = \frac{\left(\frac{t}{1.1}\right)}{C_1}$$



ASTABLE

- Generates a repeating output wave form
- $t_{on} = 0.69 * C_1 * (R_1 + R_2)$
- $t_{off} = 0.69 * C_1 * R_2$
- 555 Timer Calculators
- Solve for time
- Solve with components



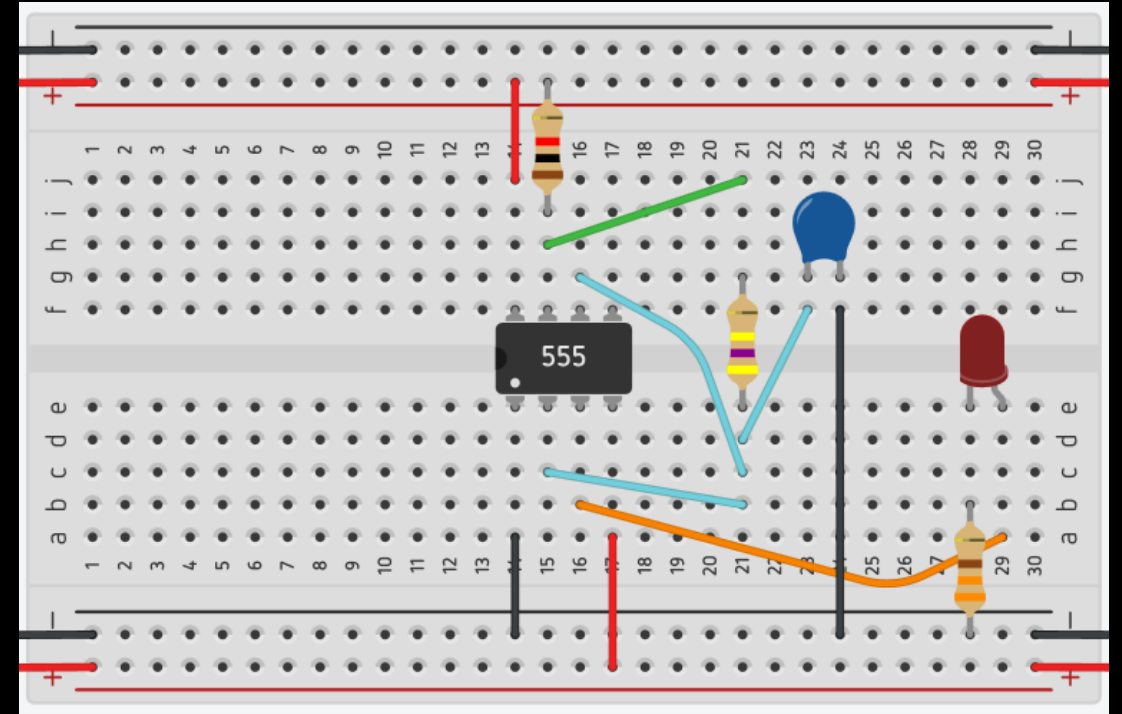
Increase C to increase the period (reduce the frequency).

Increase R1 to increase High Time (T1), without affecting the Low Time (T0).

Increase R2 to increase High Time (T1), increase Low Time (T0) and decrease the duty cycle.

ASTABLE TIMER LAB

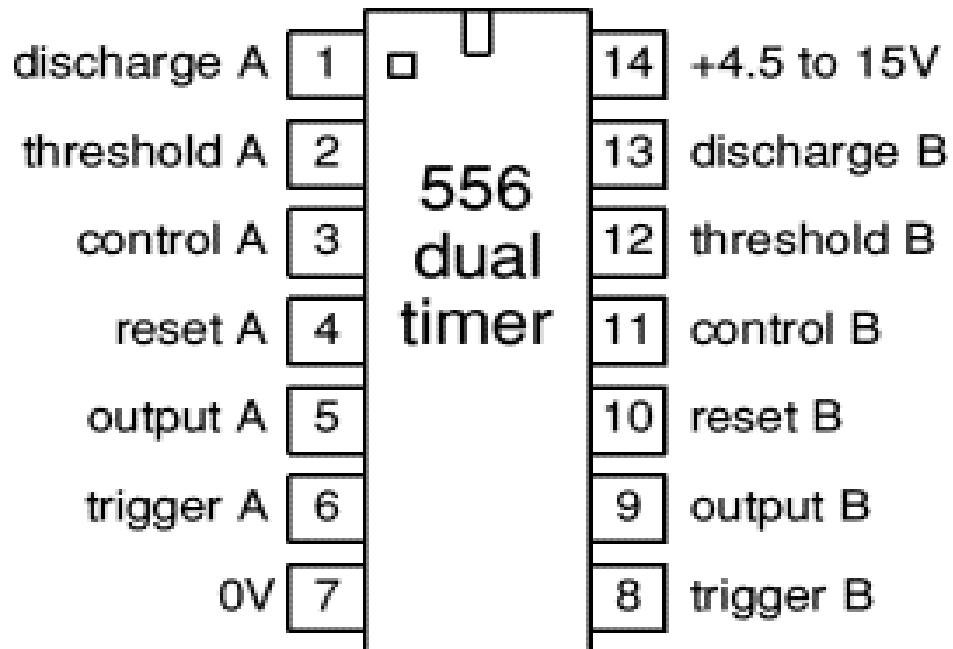
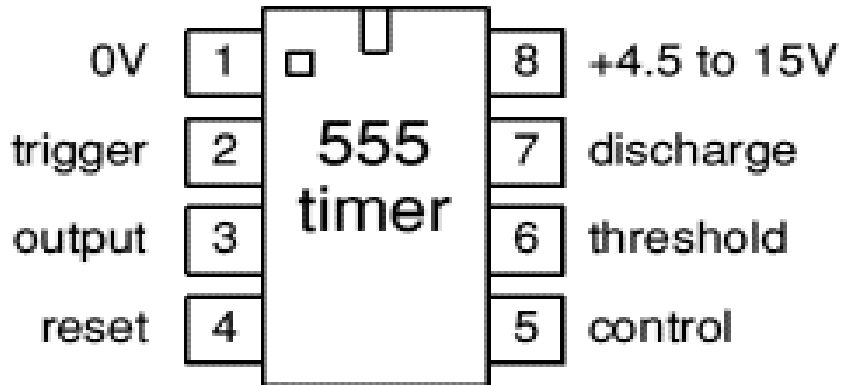
- Using a bread board...
- Build a Monostable circuit
- Show me... and...
- Turn in to IC what the R_1 , R_2 and C_1 values are needed for a
 - 1 sec Square Wave
 - 0.5 sec Square Wave



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555 VS 556?



- 556 Timer is a Dual 555
- This means there are 2 555 in a 556 Timer
- See pins for Timer "A" and Timer "B"

LETS BUILD SOME CIRCUITS

- 555 Time in STEAM
Clown's Closet

- Flashing LED Circuit



HOME | LEARNING | CIRCUITS | LINKS | FORUM **555 Timer Circuits**

555 Timers are fun and a great way to start learning electronics

2018 Robotics Guidebook

New Waypoint Robotics Guide Helps Easily and Accurately Spec Your Next Robotics Project waypointrobotics.com

Learning

The 555 timer is a simple integrated circuit that can be used to make many different electronic circuits. With this information you will learn how how the 555 works and will have the experience to build some of the circuits below.

- 1. An Overview
- 2. Pin Configuration
- 3. Inside The 555
- 4. Operating Modes
- 5. Using The Output
- 6. Calculator
- 7. Common Mistakes
- 8. 555 Datasheets

Fun Circuits

The following are complete electronic circuits that you can build, they all utilize the 555 Timer circuit.

- 3x3x3 LED Cube
- 555 Amplifier
- Automatic Curtain Closer
- Bike Turning Signal
- Bi-Polar LED Driver
- Car Tachometer
- Clark Zapper
- Continuity Tester
- Dark Detector
- Driving A Bi-Coloured LED
- Driving A Relay
- Laser Ray Sound
- Latch
- LED Dice
- LED Dimmer
- Light Detector
- Machine Gun
- Metal Detector
- Metronome
- Model Railway Time
- Mosquito Repeller
- Motor PWM
- Servo Tester
- Siren 100dB
- Stepper Motor Controller
- Stun Gun
- Ticking Bomb
- Tilt Switch
- Touch Switch
- Toy Organ
- Traffic Lights
- Traffic Lights - 4 Way
- Transistor Tester



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REFERENCE SLIDES



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APPENDIX



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