

Title: *Clap Switch*

I. Summary

A Clap Switch circuit uses a microphone within the circuit to detect noises to turn the LED on. A clap switch circuit can be used in homes and businesses to turn on things such as: lights, TVs, or whatever it is set up to the clap switch. In many cases you can snap your fingers, clap your hands, or even speak to it. In fact, with modern technology, you can use commands to activate a piece/pieces of technology to allow it to turn on/off from anywhere within the room of the Clap Switch.

II. Objective

Individuals will construct a Clap Switch circuit and gain based knowledge on the 555 timer IC, BC547 Transistor and the condenser microphone. Also, individuals will get to see exactly how you can turn things on by a simply clap, snap, and/or the use of the voice.

III. Industry

Clap Switches can be installed into businesses and homes to allow individuals to turn lights and a number of technology on or off by using claps, snaps, or his/her voice. Clap Switches gives individuals the ability to remain seated or lying down to turn devices on or off. Also, this device is important to industries because technology is growing at an extreme rate and with the component within the Clap Switch it can help advance technology even more. In today's world, we use voice control within our mobile devices, as well as, devices like the Echo, Google Home, etc. Within these

devices that I previously listed, you can turn on a number of technologies by giving it simple voice commands, which is something that a great number of companies are working on – on a daily basis.

The Clapper was released in the 1980s, allowing individuals to activate appliances by using claps all without having to get up to turn on an appliance manually. (i) The Clapper was only the beginning of audio activation technology. Now, there are devices like the Google Home smart speaker – which has similar functionalities like “The Clapper”, yet it is more advanced. For instance, you can speak to the speaker and ask it to turn on any smart appliances, play music, and ask it to do whatever you need it to do. (ii)

IV. Methodology

a. Parts

- i.** 555 timer IC
- ii.** Two BC547 Transistor
- iii.** 3.3 Ω Resistor
- iv.** 1k Ω Resistor
- v.** Two 270 Ω Resistors
- vi.** 100nF Capacitor
- vii.** 22uF Capacitor
- viii.** Two Light-emitting Diode
- ix.** Condenser Microphone
- x.** Breadboard
- xi.** Digital multimeter

- xii. Power Supply
- xiii. Wires

b. Purpose of Parts

- i. 555 timer IC is used to timing function, such as turning the LED on for a short period of time.
- ii. The BC547 transistor is used for amplification.
- iii. Anode/ Collector of the transistor is pin 1.
- iv. Base of the transistor is pin 2.
- v. Cathode/Emitter of the transistor is pin 3.
- vi. The $270\ \Omega$ resistor determines the order at the output and the sensitivity.
- vii. The $22\mu\text{F}$ capacitor allows the LED to stay on for approximately 2.5 seconds.

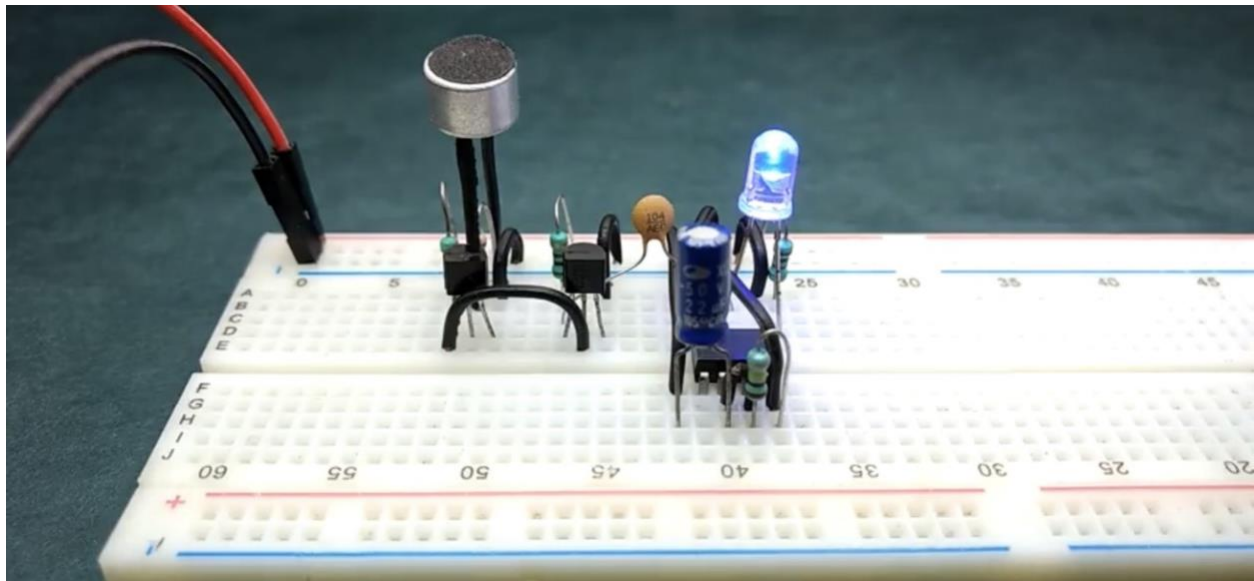
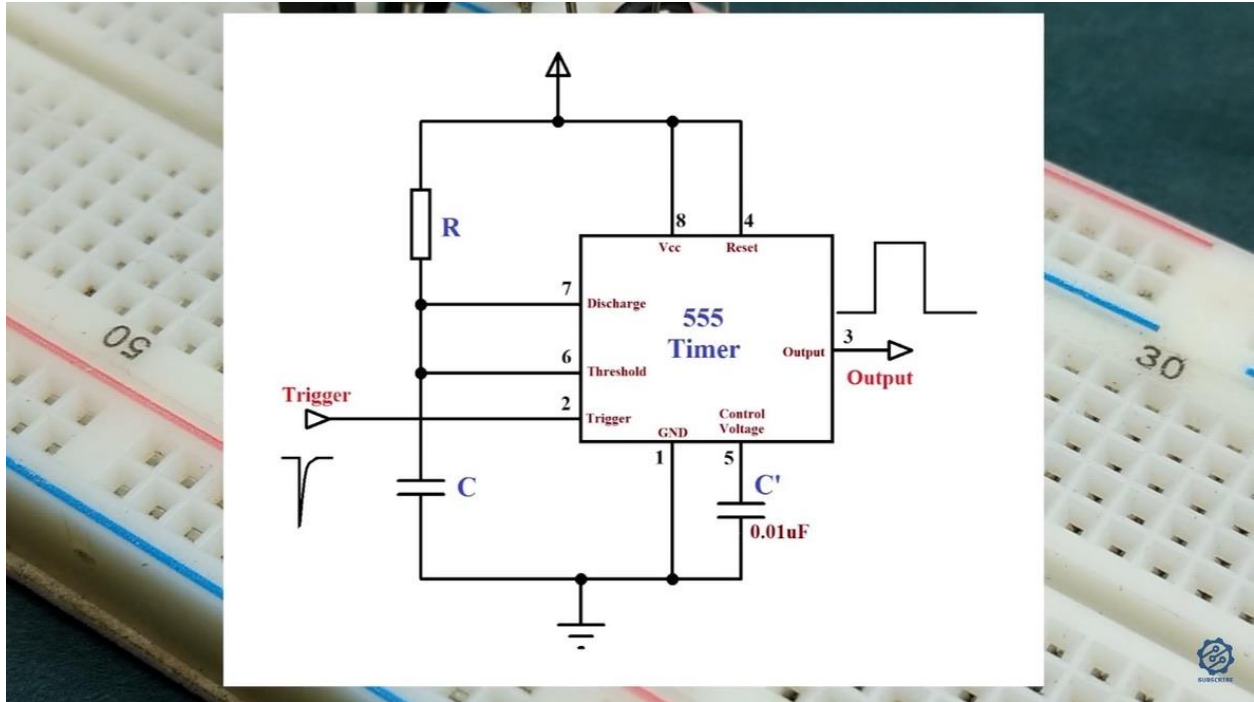
c. Procedure

- i. Connect the power supply and breadboard together to set the voltage to 5 volts.
- ii. Connect the ground to the breadboard
- iii. Connect one terminal of the $3.3\text{k}\Omega$ resistor.
- iv. Connect the positive end of the condenser microphone to the voltage source and place the negative end of the condenser microphone to the resistor.
- v. Connect the base of the BC547 transistor to the condenser microphone.
- vi. Connect the emitter of the transistor to the ground.

- vii. Connect the resistor to the voltage source and the collector of the transistor.
- viii. Place the second BC547 transistor onto the breadboard.
- ix. Connect the collector of the first BC547 transistor to the base of the second BC547 transistor.
- x. Connect the emitter of the second BC547 transistor to the ground.
- xi. Place the 555 timer IC onto the breadboard.
- xii. Connect pin 6 with pin 7 of the 555 timer IC.
- xiii. Connect pin 4 with pin 8 of the 555 timer IC.
- xiv. Connect the 100k-ohm resistor to pin 7 and pin 8.
- xv. Connect the anode of the 20uF capacitor to pin 6 of the 555 timer IC.
- xvi. Connect the cathode of the 20uF capacitor to the ground.
- xvii. Connect a LED to pin 3 of the 555-timer.
- xviii. Connect a 270-ohm resistor to the cathode of the LED and to the ground.
- xix. Connect pin 1 of the 555-timer to the ground.
- xx. Connect pin 4 of the 555-timer to the voltage source.
- xxi. Connect a 1k-ohm resistor to the anode and the voltage source.
- xxii. Connect a 100nF Capacitor to the anode of the second transistor and into pin 2 of the 555-timer IC.

d. References and Photos

- i. <https://home.howstuffworks.com/clapper.htm>
- ii. <https://support.google.com/googlenest/answer/9286728?hl=en>
- iii. <https://www.youtube.com/watch?v=DkbfBIMSdgo&t=102s>





- 1. Emitter**
- 2. Base**
- 3. Collector**