

INDIAN INSTITUTE OF
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INFORMATION TECHNOLOGY
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EAES

PROJECT

Group 9

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S.no	Name	Roll no.
1	Shantal Raj	IEC2014056
2	Pradeep Meena	IEC2014058
3	Vijay Meena	IEC2014059
4	Anand Kumar Verma	IEC2014060
5	AJS Ramakrishna	IEC2014061

Clap Switched Music Box

- Introduction

Clap Switch is a basic Electronics mini-project, made with the help of the basic components. Clap Switch has the ability to turn ON/OFF any electrical component or circuit by the clap sound.

It is known as Clap Switch, because the condenser mic which will be used in this Project will have an ability to take the sound having same pitch as the Clap sound as the input.

Music Box generator is a circuit that can make high and low frequency sounds as we increase or decrease the resistance thus offering a wide variety of frequencies generating a whole music box

- Apparatus Required

- ✚ Two 555 ICs
- ✚ Two BC547 transistors
- ✚ Resistors (in ohms)
 - two 1k
 - 4.7k
 - 6.8k
 - 47k
 - 330
 - 470
 - 39
- ✚ Capacitors (in farads)
 - two 100uF
 - 0.1uF
 - two 100nF
- ✚ Electric condenser mic
- ✚ Speaker/Piezo Buzzer
- ✚ LED
- ✚ Power Supply

- Circuit Diagram

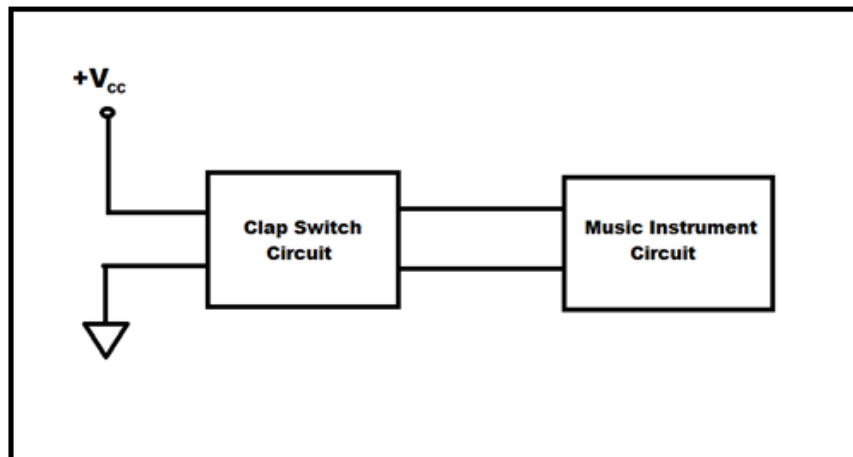


Fig.1: Block Diagram for experiment

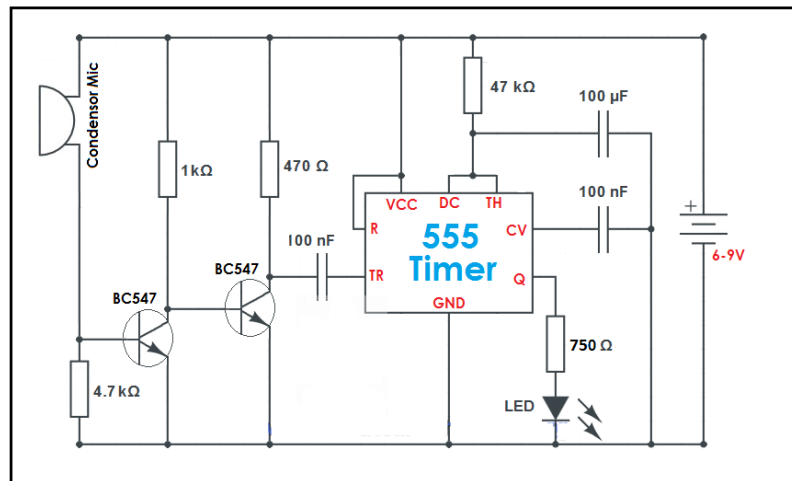


Fig.2: Clap Switch Circuit

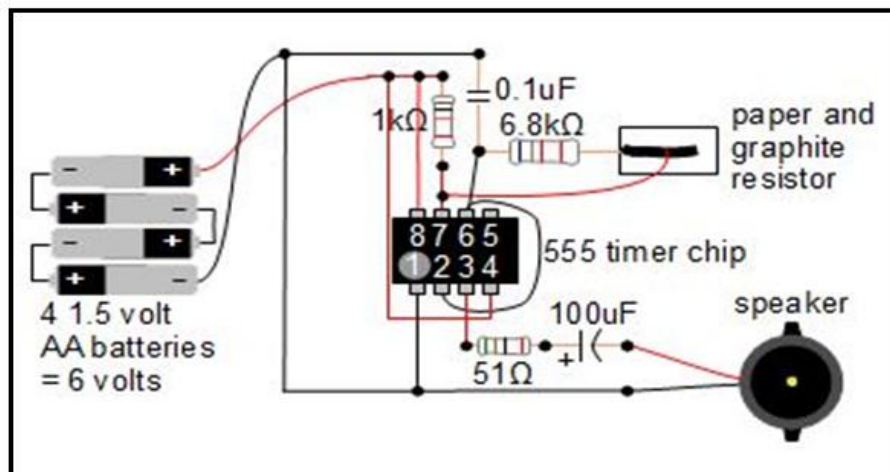


Fig.3: Music Box Circuit

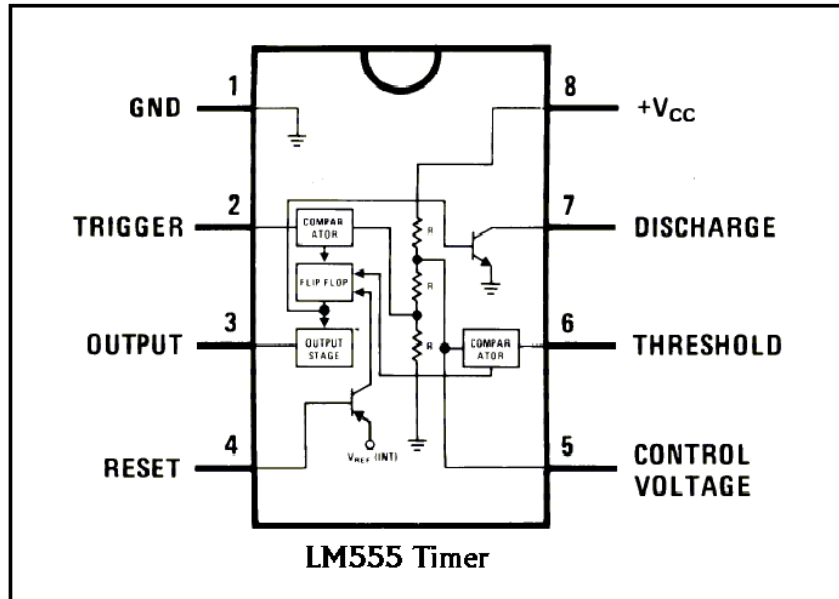


Fig.4: Pin diagram of IC 555

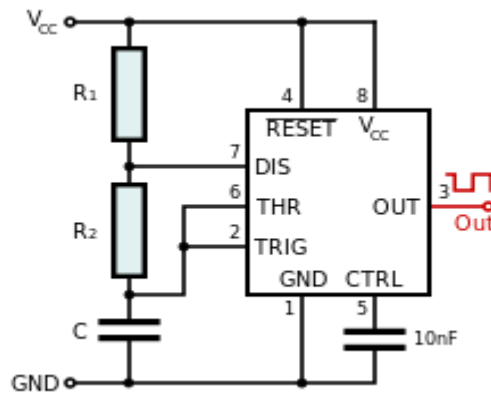


Fig.5: Circuit 2

- Theory

CLAP SWITCH CIRCUIT

This circuit (Fig.2) is made with the help of Sound activated sensor, which senses the sound of Clap as input and processes it to the circuit in order to give the Output. When sound is given as the input to the Electric Condenser Mic, it is changed into the Electrical Energy as the LED turns on. LED turns ON, as we give sound input and it turns OFF automatically after few seconds. Turn-On LED timer can be changed by varying the value of 100uF capacitor as it is connected with 555 timer whose main purpose is to generate the pulse.

As soon as the sound input is given to the circuit, it amplifies the sound signals and proceeds them to the 555 timers which generates the pulse to the LED, making it turn ON. It should be made sure, that the negative side of the Condenser mic is connected with the amplifier or the circuit will heat-up and

may not working with different models of transistors etc. The sensitivity of the Condenser mic cannot be increased for long usage, it has short range by default. It is also applicable for the LAMP, so this circuit has many opportunities for modification.

MUSIC BOX

In monostable mode, the 555 timer puts out a continuous stream of rectangular pulses having a specified frequency. Resistor R_1 is connected between V_{CC} and the discharge pin (pin 7) and another resistor (R_2) is connected between the discharge pin (pin 7), and the trigger (pin 2) and threshold (pin 6) pins that share a common node. Hence the capacitor is charged through R_1 and R_2 , and discharged only through R_2 , since pin 7 has low impedance to ground during output low intervals of the cycle, therefore discharging the capacitor.

In the monostable mode, the frequency of the pulse stream depends on the values of R_1 , R_2 and C . The idea is *the value of C is kept constant and the value of R is changed using a paper with a pencil line as a variable resistance. Graphite is a very poor conductor so it offers high resistance. and R is directly proportional to length and one by area of cross section*

- **Procedure**

1. Connect the circuit as shown in the Fig.2
2. Across the 750 ohm resistor, connect the second block i.e. the maze solver circuit.
3. Connect the second circuit for the music box as shown in Fig.3

- **Advantages**

1. It can used to turn ON and OFF the LED or LAMP simply, by clapping your hands.
2. We can also remove LEDs and place a FAN or any other electric component on the output in order to get desired result
3. It can be used as a maze solver
4. It can be used as a musical instrument with 7 notes.

Note	Frequency (Hz)	resistance (ohms)
C3	131	2329095
D3	147	2067503
E3	165	1834475
F3	175	1727671
G3	196	1531650
A3	220	1357088
B3	247	1201563
C4	262	1130252
D4	294	999502

- **Disadvantage**

The Condenser Mic used in this circuit has the short range as a default, which cannot be varied.

- **Precautions**

1. Don't switch on the power supply before connecting the whole circuit.
2. All connections should be tight.
3. Power supply voltage should not exceed 9V and the 750 ohm resistor requires around 6V.
4. The electric condenser mic and the speaker should be handled carefully.
5. Switch off the power supply after performing the experiment.

- **Applications**

Clap Switch is not restricted to turn the LEDs ON and OFF and as we have shown, it can be used to switch ON the music box circuit, but it can be used in any electric appliances such as Tube Light, Fan, Radio or any other basic circuit which you want to turn ON by a Sound.