

## SOUND CONTROL HOME AUTOMATION

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### **Abstract:**

*This is a sound control home automation project that uses sound to turn on or off any electrical circuit. This is a circuit that works by creating sound from a distance. When a person claps or makes a sound that can be caught by a condenser microphone, the circuit's output light turns on. If another person claps, the light will turn off. The basic idea behind this project is that the condenser microphone catches up your claps, coughs, and the sound of a book being knocked off the table. It generates a weak electrical signal that is amplified by the transistor stage that follows. Each signal changes the state of two transistors coupled in a bistable multivibrator. One of these transistors controls a bulb through a heavier transistor. This is a sound-activated switch. Sound, for example, may be used to turn on or off a fan, a fluorescent light, a television, and other equipment.*

### **I. INTRODUCTION**

Converting sound into electrical energy is the basis of sound control home automation circuits. The input component of a transducer is sound, which is converted to an electrical pulse. The electric microphone captures your claps, coughs, even the sound of a book being knocked off the table [1-3]. Home automation is gaining popularity as a result of its multiple advantages. Home automation refers to the use of local networking or remote control to operate household equipment and features [4-6]. Artificial Intelligence gives us the tools we need to make real-time decisions and automate processes for the Internet of Things (IoT) [7-10]. A lot of research works have been done to facilitate home automation using different methodologies. In [2], the notion of home automation, in which smart gadgets are installed in residential buildings has been facilitated to monitor and control operations.

In [4], centralized control of remote household appliances has been demonstrated using speech control using a Kinect V2 as a voice receiver. A computer system has been trained to recognize a set of voice commands in this prototype. Then, using Arduino and LED bulbs, a circuit was created that mimicked real-life appliances.

The user's smartphone features a hall effect (HE) sensor, and an in-house Android software has been shown in [9]. The smartphone was made ready to receive voice instructions from the user by loading the Google speech recognizer module into the app after enabling the HE sensor. Another home automation system design has been developed in [10] for certain scenarios that demand special care, such as elderly individuals, sick patients, and disabled persons, and can aid them in doing their daily activities.

## **II. PROPOSED METHODOLOGY**

To make home automation more convenient and user friendly, we propose a sound- based home automation system that can cater to needs of different types of in-house users. This is a project on sound control home automation by the sound of a clap, which may turn on or off any electrical circuit. The circuit has a straightforward functioning. Clapping turns on the lamp, and clapping or producing sound again turns it off. The sound of your claps, coughs, and that book being knocked off the table are picked up by the condenser microphone. It generates a weak electrical signal that is amplified by the transistor stage that follows. Each signal changes the state of two transistors coupled in a bi-stable multi vibrator. One of these transistors is used to control a bulb through a heavier transistor. The sound of a clap can be used to turn on or off a light, a fan, or a radio. Basic electronic components such as resistors, transistors, transformers, and capacitors are used to make this circuit. For the first clap, this circuit turns on the 'ON' light. Until the next clap, the light will turn on. The light shuts off after the following clap. This circuit's operation is dependent on the transistor's amplifying and switching properties. This is essentially a sound-activated switch.

Basic electronic components such as resistors, transistors, relays, transformers, and capacitors are used to make this circuit. This circuit is working with 9V voltage and for controlling high voltage consuming components with this switch. We can use this circuit and optimize the various factor so that we can operate many electrical components with the help of this circuit by just using the electrical appliance and 220 Voltage power supply with relay of the accordingly matching with the amount of power supply. Use of relay helps the circuit to protect the circuitary components, led and electrical appliances which is being operated by this circuit. Output of this circuit is very helpful for the mobility-impaired persons and senior citizens and this circuit can be used by persons of any age like children, youngsters, and senior citizens etc.

## **III. CIRCUIT DESCRIPTION**

In the circuit, sound signals are converted into electrical signals when a clap sound hits the condenser microphone. T-1 is an audio amplifier working in the AC amplifier mode, T-2 & T-3 are flip flop. When the

sound strikes the mike, T-1 conducts and changes states of T-2 & T-3 i.e., if T-2 is conducting, then T-3 is not conducting and vice versa. Again, when sound waves strike the microphone states of T-2 & T-3 are reversed. T-4 is the drives for the relay. Hence whenever there is a clapping sound the relay either energizes or de-energizes as per the state of the transistor T-2 & T-3. Accordingly, the appliance connected through the relay gets on or off. Figs. 1 and 2 show the circuit of the proposed method and the PCB circuit for the same.

#### **IV. COMPONENTS**

##### **Semiconductors:**

1. T-1 to T-4 NPN SILICON TRANSISTORS
2. D-1 to D-4 SILICON DIODES

##### **Resistors:**

1. R-1, R-8, R-9, R-13 -- 10 KILO OHMS
2. R-2, R-5, R-12 2.2 MEGA OHMS
3. R-3 270 MEGA OHMS
4. R-4 2.2KILO OHMS
5. R-6, R-10 22 KILO OHMS
6. R-7, R-11 1.5 KILO OHMS
7. R-14 390 OHMS

##### **Capacitors:**

1. C-1 0.01 MICRO FARAD CAPACITOR
2. C-2, C-3 0.04 MICRO FARAD CAPACITOR

##### **Miscellaneous:**

1. CONDENSER MICROPHONE SMALL TYPE
2. LED- LIGHT EMITTING DIODE
3. RELAY (OPTIONAL) 6 V 100 OHMS TYPE
4. BATTERY 6 OR 9 VOLT DC.

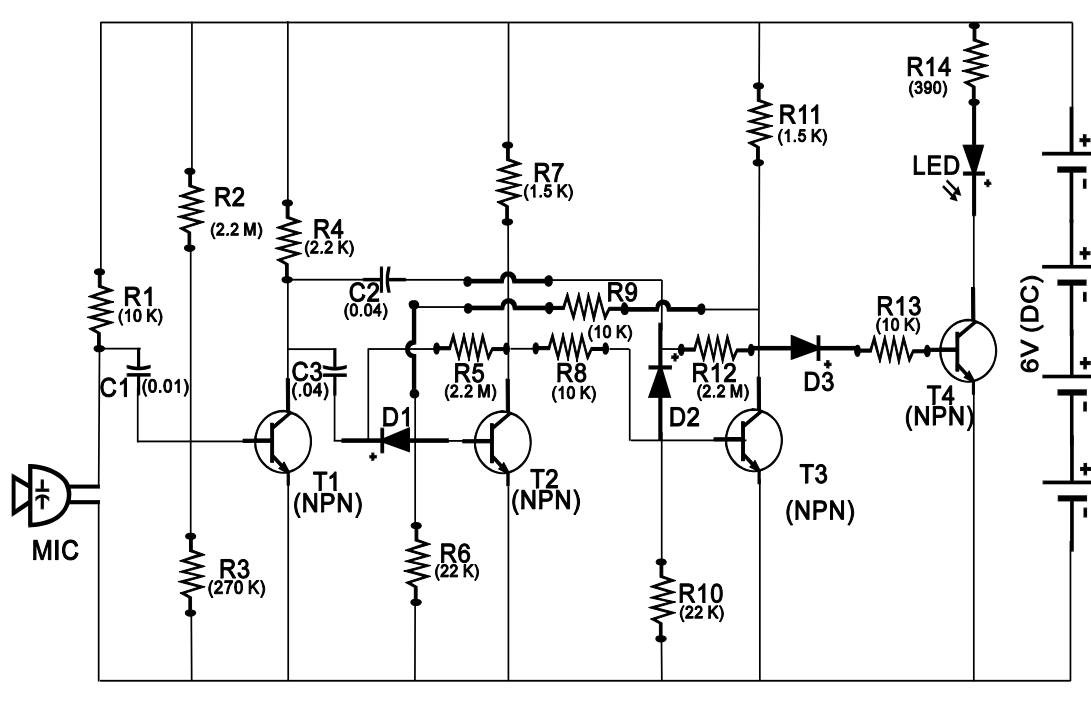


Fig.1. Proposed circuitry for sound control automation system

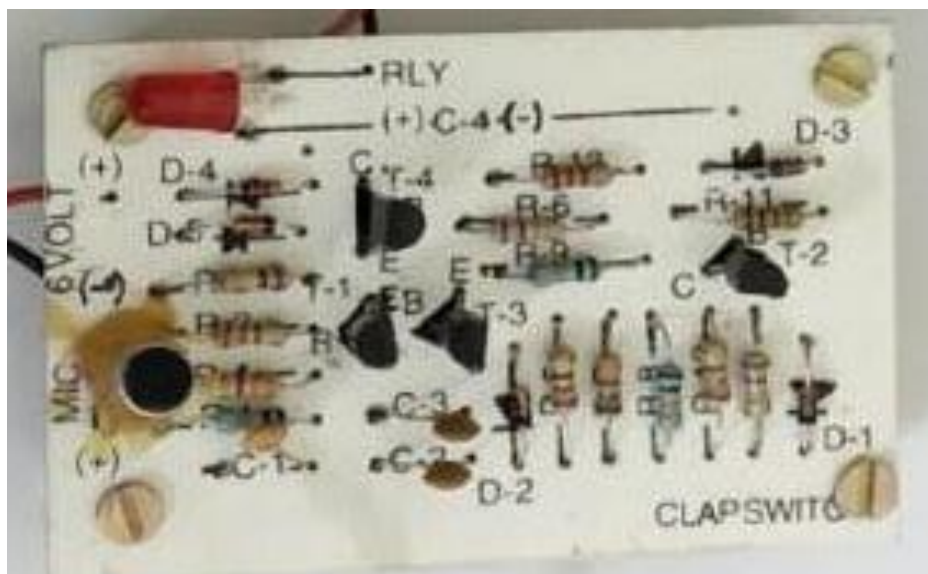
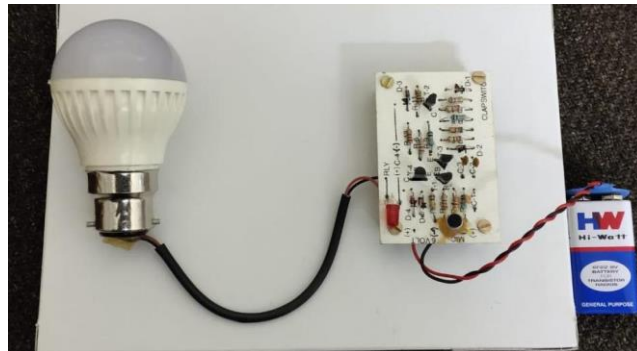


Fig.2. Image of proposed circuit

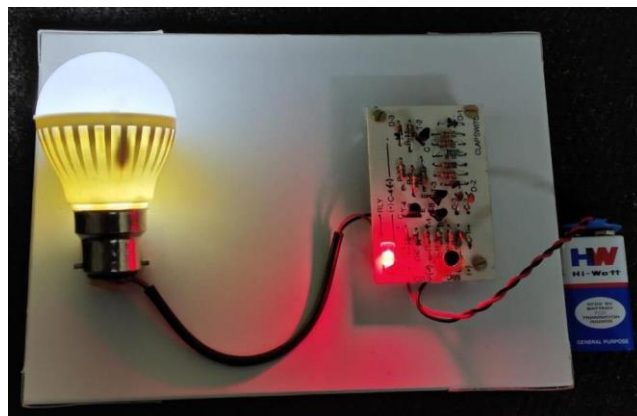
## V. RESULT

Because both hand claps and finger tap sounds are low frequency noises that create the same pulse wave properties, the sound actuated switching device responds appropriately to both from around three to four metres away and at extremely close range. The visuals for the proposed module before and after the sound are

shown in figures 3 and 4, respectively. The end product is a gadget that can be built, is reliable, and is reasonably priced. On a general-purpose PCB, assemble the circuit. In the world of electronic circuits, this circuit is quite helpful. This application's scope may be broadened in a variety of ways with a little tweaking. It may be used to sound an alert in a security system and employed in places when silence is required.



**Fig.3. Before sound produced**



**Fig.4. After sound produced**

## **VI. CONCLUSION**

**Put the circuit together on a general-purpose PCB and put it in a box. In the world of electronic circuits, this circuit is quite helpful. Its application area can be expanded in a variety of sectors with simple modifications. It may be used to sound an alert in a security system and employed in places when silence is required. This project teaches us a lot about 555 timer chips, how clocks operate, and how relays function. This contraption demonstrates how NE555 timer chips and relays function.**

Relays are switches that only offer a conducting route when electricity passes through them. When the second timer activates the relay in this project, a conducting route is constructed between the load's terminals, and the device is thus switched on. The elderly and physically impaired will appreciate the

minimal cost of this changeover. However, erroneous triggering is a significant drawback of this switch. Any two noises, such as clapping hands, can be used to activate the switch. As a result, extreme caution must be exercised to avoid erroneous triggering, and the switch should only be utilised in the most critical of circumstances. It's exclusively intended for usage in the house.

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