PHYSICS PROJECT REPORT

PH102 PROJECT

Clitch - Clap Controlled Switch

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INTRODUCTION

This project represents an innovative clapper-activated switch engineered to manage the on-off operations of both AC and DC appliances. It leverages a system incorporating relays, integrated circuits (ICs), and transistors to deliver a seamless and adaptable switching solution. Furthermore, the potential for future enhancements exists by incorporating sound pattern recognition capabilities through programmable chips, allowing for the addition of unique functions for each recognized pattern.

A switch is an electronic device that is used to connect or disconnect the power supply to the circuit and the fundamental concept of the clap switch is that the microphone used in this circuit receives the clap sound & generates a small signal to control an LED.

A clap-controlled switch, also known as a sound-activated switch, relies on a simple principle of sound wave detection and amplification - sound waves are variations in air pressure that propagate through air.

Clap activated switch device will serve well in different phono-controlled applications. Clap switch is generally used for a light, television, radio or similar electronic devices that the person will want to turn on/off from a distance.

For good output efficiency, a filter needs to be installed in order to separate out the unwanted sounds. All such high-definition components make these products expensive and less accessible.

CAPACITORS

A capacitor is a device for storing electrical energy, consisting of two conductors in close proximity. Electrolytic and electrostatic capacitors viz. Polarized and Non-Polarized respectively find their application in this circuit. A polarized capacitor as the name suggests inherits polarity – it allows the flow of voltage only in one direction while a non-polarized capacitor is the one which does not possess an inherited polarity – it can be connected in either direction in a circuit. Capacitors have many applications - used in digital circuits so that information stored in large computer memory is not lost during a momentary electric power failure. The electric energy stored in such capacitors maintains he information during temporary loss of power. Capacitors play an even more important role as filters to divert spurious electrical signals and thereby prevent damage to sensitive components.

CHALLENGES FACED

The sensitivity of the condenser mic used matters a lot. It is required that the mic possesses an appreciable amount of sensitivity in order to detect the sound signals easily and from a good distance. But the mic we used was a little less sensitive which caused difficulty in receiving the sound vibrations due to which the circuit was unable to respond simultaneously when we clapped. Moreover, it is also happened that the IC gets triggered unintentionally. Our mic was responding to a particular frequency of each pair of a clap due to which it happened that the LED did not turn OFF in the second clap.

CONCLUSION

While working for the project each team member was enlightened with the different concepts involved in the working of the switch. This switch works on the principle of sound detection and amplification. The mic receives sound vibrations and converts them into electrical signals. These signals then travel in the circuit produce current which lights up the LED. The integrated circuit plays a crucial role in the working of a clap-controlled switch. It is triggered by the electrical signals and serves as a clock pulse generator and turns ON the LED. The LED is ON until the next clock pulse i.e., until the next clap. Op-Amp i.e., Operational Amplifier amplifies the difference in voltage between two inputs. All the resistors used provide the required amount of power to all components. The turning ON and OFF of the LED on each clap ensures that all connections are correct.

ACKNOWLEDGEMENT

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