

CLAP SENSITIVE AUTOMATED MULTI SWITCH FOR DAY TO DAY ELECTRICAL POWER SAVING AND SAFETY APPLICATIONS

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ABSTRACT

Electric switch is used as a device for completing and breaking an electric current, or for changing the path of a current. Electric switches are among the most common types of control devices and are in wide use wherever electricity is available. There are two basic types of switches, electromechanical and electronic. The clap sensor switches are mostly available in the normal market. But that switches are only can use for the one purpose. This circuit is used as a multipurpose circuit. The condenser mike picks up from the clap and generates a voltage and it will compare with the reference voltage. When the condenser mike voltage is higher than the reference voltage the comparator output will be high .The comparator output is connected to the PIC microcontroller interrupt pin. After that the PIC program will be run and provide the appropriate output. Using the frequency filter with such enhanced features of this circuit and can be implement the real world applications. The proposed switching circuit is safety and power saving application. The voltage which generates from the clap was observed by using the oscilloscope and noted down.The special noise reduces IC was used to develop the comparator circuit. The various clapping pattern and the response of the proposed circuit was observed by using LED, oscilloscope as output source.

Keywords: *Interrupt driven microcontroller, Electronic switch, Clap sensitive circuit*

1.0 INTRODUCTION

Clapping sound of hand is one of the simplest percussive sounds because its production does not involve any tools or musical instruments¹. Hand clapping is used as a substitute for language. It is used virtually in everyday aspect of human life, and this form of human expression is found in almost every culture, and in particular as a rhythmic musical instrument. Clapping is also used to indicate agreement and appreciation where it is repeated for a few seconds, and often replicated by the group. From an

acoustician's viewpoint, clapping can be studied individually as a sound generated by the act of hitting both hands together, or collectively, as claps generated by a group of people². Clap sensitive switches are available in the market. But they can be used for only one purpose. The multipurpose clap switch can use for many purposes. Generally the clap switch is expensive in the market. But this proposed design is cheap, safety and power saving application for the day to day life.

2.0 METHODOLOGY

It uses very small and very sensitive condenser mic. Received the clap from the environment and generated a voltage by charging and discharging capacitor in the condenser mike. It will compare with the constant voltage by using the LM 358 noise reduce comparator IC. The output of the IC will get from the PIC microcontroller as an interrupt and execute the interrupt program and provide the output.

1.1 Preparation circuit

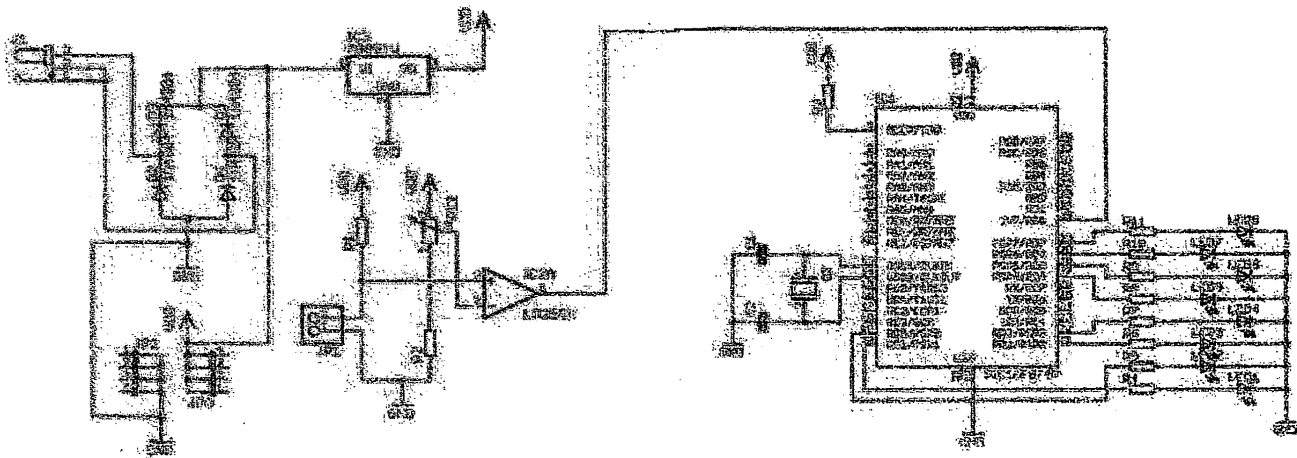


Figure 1: Circuit diagram

In this circuit 22K resistor and condenser mike set the series and the condenser mike was set in the parallel with oscilloscope. The clap was applied with different intensity and then the voltage on the screen was measured.

Moreover the diode bridge is used for the safety of this circuit. J1 pin base is connected to the 12 v power pack. The diode bridge is providing the protection to the circuit when the AC current comes through the switch the diode bridge will convert it into DC current.

The external pin headers apply to the circuit. When we need to get the power to the external circuit this pin header can be used.

Condenser mike has a capacitor. After applying a clap the capacitor will charge and the 3rd pin of the LM358 becomes a higher voltage than the 2nd pin. Such as the output pin(6th) will become higher. The output pin is connected to the PIC microcontroller. When output pin is high, it provides an interrupt to the PIC microcontroller. After that the program will be executed and provide the output according to the instructions.

3.0 OBSERVATIONS AND DISCUSSION

The proposed clap sensitive multi switch was designed to work as, when apply one clap the PIC microcontroller gets it as an interrupt and execute the program. The LED was connected to the PIC microcontroller PORTD as the output. According to the program one clap is applied the RD0 port will high and ON the LED and after applying one clap RD0 will low and the LED will OFF. Also applying two claps the RD1 port will high and the LED will ON and after applying two claps the RD1 will low and LED will OFF.

The one purpose clap sensor switch which is available in the general market cannot be used as multi switch. Hence our proposed circuit designed can be used for the multi purposes.

The usages of the proposed switch mention in following

- The primary application involves an elderly or mobility-impaired person
- It can be used to turn something ON and OFF (e.g. a lamp) from any remote location in the room gets by clapping with hands³.

The primary advantages are

- Low cost and reliable circuit
- Complete elimination of man power
- Energy efficient and power saving
- It is a safety switch(without touching even switch)⁴

The disadvantages are

- It is generally cumbersome to have to clap one's hands to turn something ON or OFF and it is greatly seen as simpler for most use cases to use a traditional light switch
- Handicaps person without both hands may find problems
- The completed circuit is not only activated by a clap signal. Some it may activated to the high sound like human cough.

4.0 CONCLUSION

The clap sensor electronic multi switch is a switch which activated by a human clap. This can be activated one or more electronic equipment in day to day life. It uses low cost circularly and cheaper than commercially available once.

Most of the clap switches built for a single purpose. But this can be used for the different purpose by developing the PIC program.

Further, this circuit can be developed using following ideas

- The operating range can be increased by using better mike.
- With the use of the frequency filter the clap frequency can be filtered out. Hence the output can be triggered only for the clap
- This circuit can further expand as an advanced multi switch (three, four or five switches) as with the use of the PIC microcontroller.
- This proposed switching device is proposed to the Wayamba University light system and the university street light system as primarily power saving application.

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