

# SOUND OPERATED INTRUDER ALARM



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The Present circuit has been designed to make it a true burglar's alarm that operates automatically picking up sounds like those of opening of a door, the clicking sound of a key in the lock etc. The gadget provides both flashing light and an intermittent audio tone indications.

## Circuit Description

Initially, the opamp output and also the (Q) output of the flip flop are low. 555 timer (IC3) that is wired as an astable multivibrator is reset due to the reset terminal (pin - 4) being held low. Transistor (Q 1) is in cut - off and the relay coil stays de - energised. Both the normally open contacts of the relay are thus open. One of these contacts (marked relay contact - 1) keeps the lamp extinguished whereas the other (marked relay contact - 2) disconnects the output of another timer IC (IC4) also wired as an astable multivibrator from

reaching the speaker.

In the presence of a sound pulse, there is a positive going pulse at the opamp output which clocks the flip flop. The output state of the flip flop toggles (It becomes high if initially low and vice versa). The (Q) output of the flip flop thus goes high and stays so till there is another sound pulse. The relay coil on and off. The on and off time periods are given by:

$$\text{On-time} = 0.69 (R4 + R5) C2$$

$$\text{Off-time} = 0.69 R5 C2$$

With the chosen component values, on and off times are 1.4 and 0.7 seconds respectively. When the relay coil is energised, relay contact - 1 passes on the AC power to the bulb and it lights up.

Relay contact - 2 allows the output of the astable multivibrator built around IC4 to the speaker and there is an audio tone. The frequency of this tone is given by:

$$f = \frac{1}{0.69[(R6 + R7) C4 + R7C4]}$$

It is about 500 Hz for the chosen component values. Thus, there is a flashing light and an intermittent audio tone as long as flip flop output is high. With another sound pulse, flip flop output goes low, the bulb extinguishes and the tone vanishes.

## Construction Guidelines

The PCB layout the components layout are shown in Figs. 2 and 3 respectively.

## Testing Guidelines

The sensitivity adjust control should be carefully set. Repeated testing should be done to ensure that there are no false triggers and that the gadget responds when intended with almost 100 percent reliability.

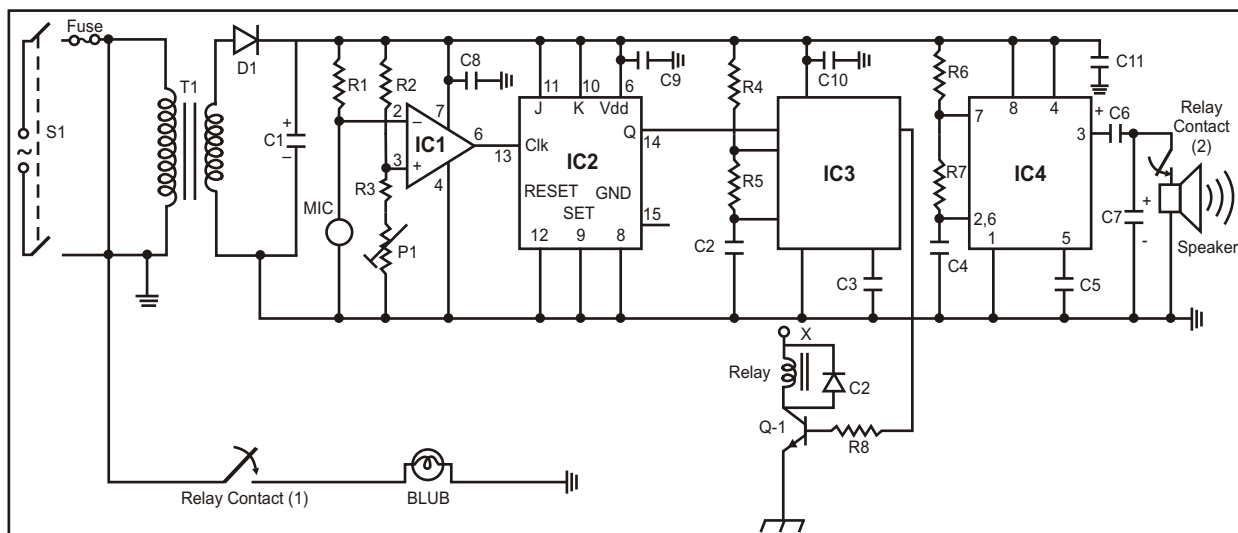


Fig. 1: Circuit diagram of the Sound Operated Intruder Alarm.

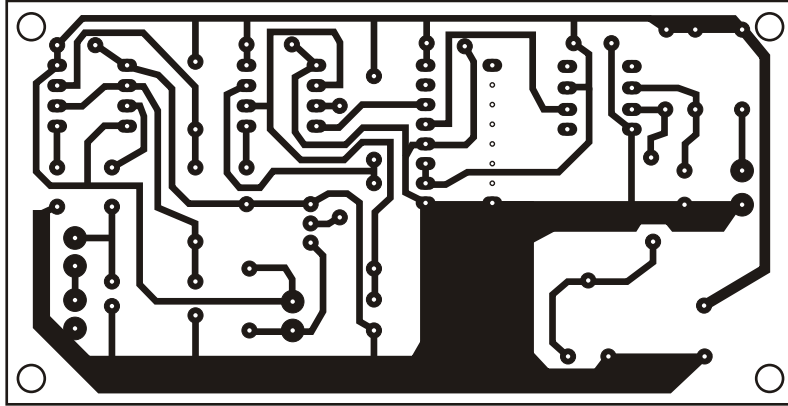


Fig. 2: Actual - size, solder-side PCB layout.

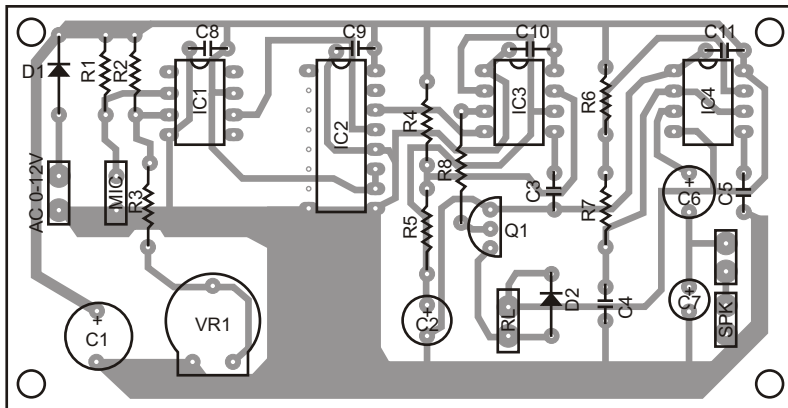


Fig. 3: Component layout for the PCB.

**SEMICONDUCTORS**

- IC1 741
- IC2 CD4027B
- IC3,IC4 NE555
- Q1 2N2222
- D1,D2 1N4001

**RESISTORS**

- R1,R6,R7 10k
- R2 1k
- R3 470
- R4,R5 470K
- R8 2.2K
- VR1 1K Preset

**CAPACITORS**

- C1 1000 $\mu$ F/25V (Electrolytic)
- C2 2.2 $\mu$ F/25V (Electrolytic)
- C3,C5 0.01 $\mu$ F (Ceramic Disc)
- C4 0.1 $\mu$ F (Polyester)
- C6 100 $\mu$ F/16V (Electrolytic)
- C7 10 $\mu$ F/16V (Electrolytic)

**MISCELLANEOUS**

- T1 230V AC Primary to 0-12V, 250mA  
Secondary Transformer
- Speaker 4 Ohms
- Relay 12V, 200 , 2C/O
- Bulb 60W (Electric Bulb)
- Fuse 0.5 A with holder
- S1 Mains On-Off Switch

