

EP 315 – Microprocessor Lab Project

Infra-Red Burglar Alarm

Project By :-

Prashant Mishra (10D260004)

Ruturaj Apte (10D260002)

Niranjan Borkar (10D260003)

Akash Agrawal (10D260027)

What we did :-

Our main aim was to construct a burglar alarm system using IR transmitter and receiver.

We built a transmitter-receiver circuit. The transmitter circuit has been shown below. The function of receiver is performed by a TSOP.

The transmitter circuit needs to be set at a very specific frequency for the TSOP to give its output. In this way, stray IR rays do not affect the transmitter-receiver circuit and it can be used outdoors also. In our case, the frequency of the transmitter had to be set at around 12.75 KHz. As long as it is receiving signals from the transmitter, the output of the TSOP is low. As soon as it stops receiving the signals due to some obstacle, the output goes high.

The alarm circuit consisted of an IC 555 in astable multi-vibrator mode with its output going to the jack of a headphone/speaker to create the noise.

Initial Plan and improvisation :-

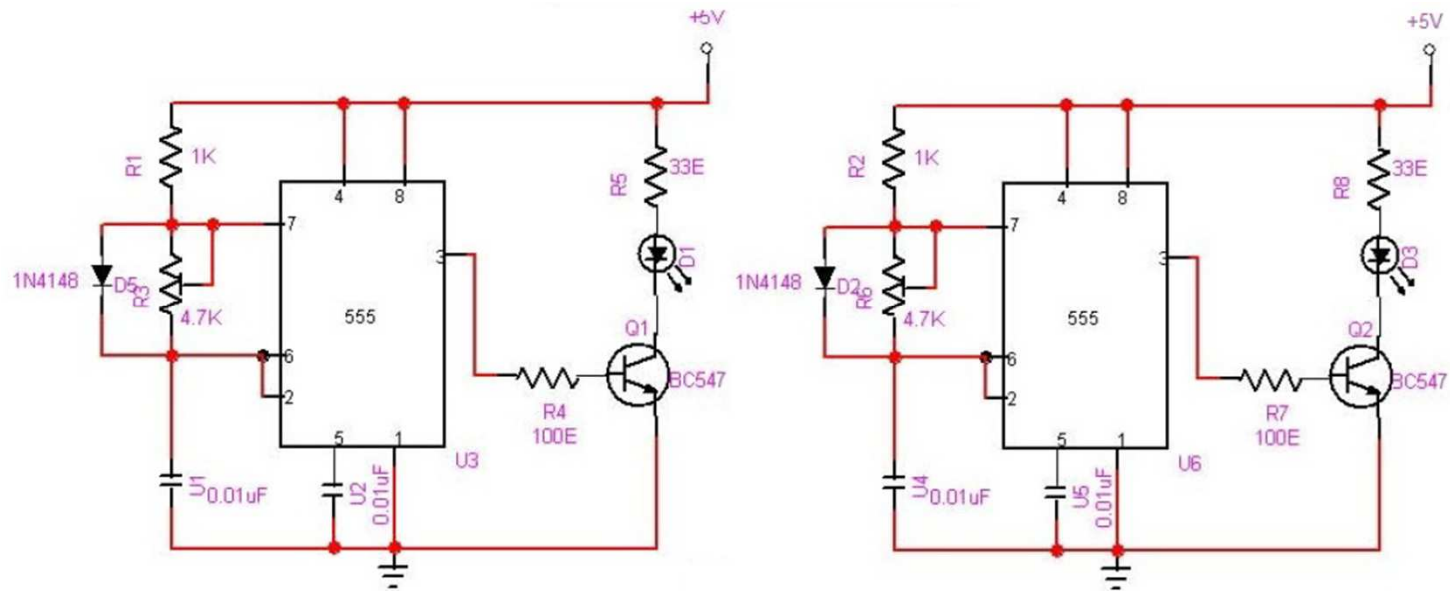
We had initially planned to make a bigger receiver circuit with an IR receiver as the main receiver component. However its receptive capability was quite poor. Hence we decided to use TSOP, which is commonly used as the receiver for our remote controls in TVs.

It has a built in analog to digital converter and gives the output as either 0V or 5V. we then made an arduino code to set off an alarm circuit whenever the output of the TSOP went high.

For the alarm circuit we had initially thought of using a car horn. However the car horn consumes a lot of power. Its current rating is around 5-8 A. Hence we decided to feed square wave pulses to the input jack of small speakers/headphones for noise generation. It worked perfectly fine and we could hear a shrill noise as the alarm when the obstacle was present.

Hardwares Used – Resistors, Capacitors, IR Receiver, IR Transmitter, TSOP, IC 555.

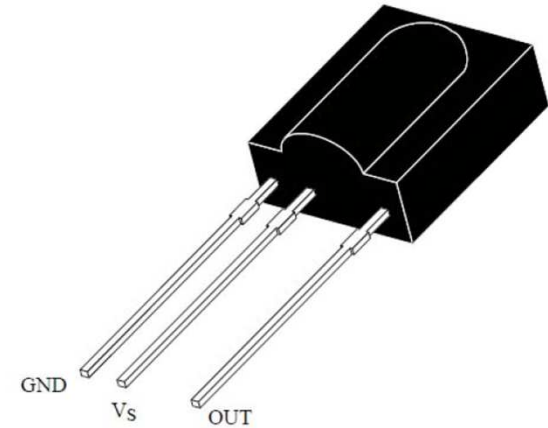
Below is a diagram which represents our transmitter circuit.



The above circuit consists of connecting the IR Diodes to a 555 timer IC in monostable mode. The IC acts as a pulse generator, generating a continuous stream of IR pulses.

Shown to the right is a TSOP.

TSOP stand for *thin small outline package*. It is used to catch or receive infra red signal at specific frequency. Its demodulated output is directly decoded with microprocessor and it support major transmission codes. There are different type of TSOP sensor available for different carrier frequency.



The TSOP 17XX series are miniaturized receivers for infrared remote control systems. TSOP 17XX is the standard IR remote control receiver series, supporting all major transmission codes. It has three pins .

GND and V_{cc} are connected to the power supply with V_{cc} as 5V. The third pin V_{out} becomes 0V - or GND - when the demodulated bit received is high i.e. 5V and vice versa.