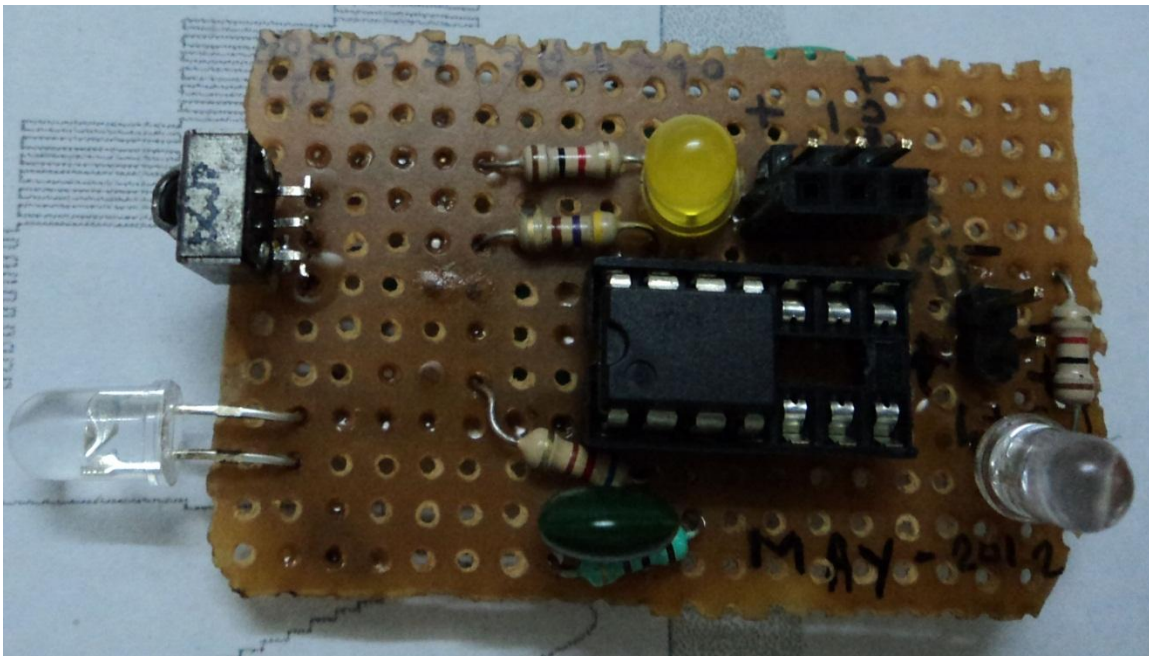


Obstacle Detector Sensor Using TSOP Proximity Sensor



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Introduction

The TSOP module is commonly found at the receiving end of an IR remote control system; e.g., in TVs, CD players etc. These modules require the incoming data to be modulated at a particular frequency and would ignore any other IR signals. It is also immune to ambient IR light, so one can easily use these sensors outdoors or under heavily lit conditions.

Such modules are available for different carrier frequencies from 32 kHz to 42 kHz. In this particular proximity sensor, we will be generating a constant stream of square wave signal using IC555 centered at 38 kHz and would use it to drive an IR led. So whenever this signal bounces off the obstacles, the receiver would detect it and change its output. Since the TSOP 1738 module works in the active-low configuration, its output would normally remain high and would go low when it detects the signal (obstacle).

Pin Configuration

TSOP comes in two different physical sizes. Both have different pin configurations. Figure 1 shows the pin configuration of both type of TSOP Sensors.

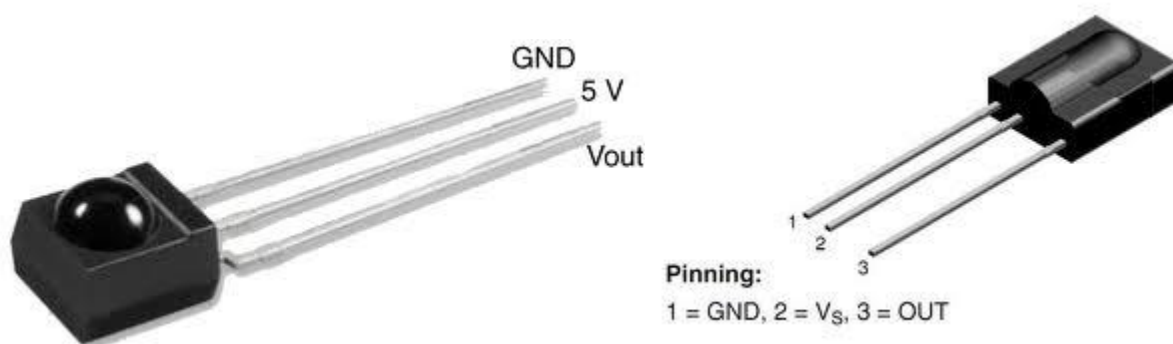


Fig. 1: TSOP sensors

IR Transmitter Circuit

We require to generate the IR signal of frequency 38 kHz. This can be done by with the help of 555 timer IC. Figure 2 shows the circuit diagram of transmitter circuit. 555 timer IC is used in astable multivibrator mode to generate the signal. Formula for output frequency in astable mode is given below.

$$f = \frac{1}{T} = \frac{1.44}{(R1 + 2 \times R2) \cdot C}$$

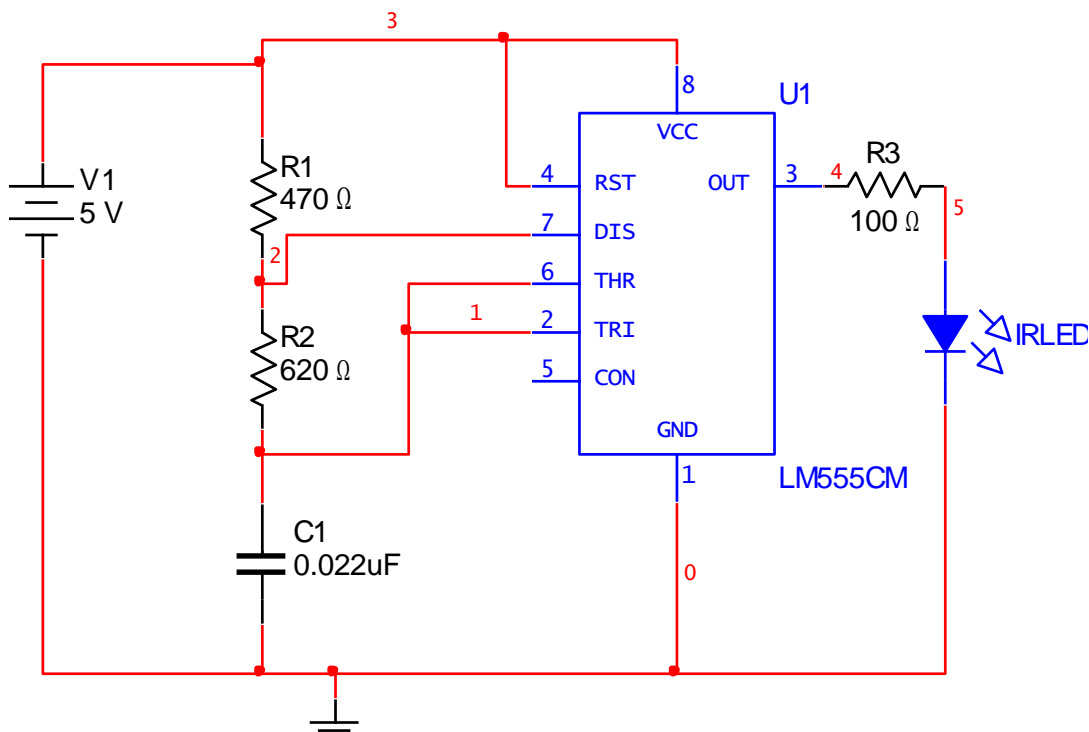


Figure 2: IR Transmitter Circuit

Value of Resistance R1 and R2 and Capacitor C1 depends upon the availability of components.

IR Detector Circuit using TSOP

TSOP gives output low when it detects the IR signal of 38 KHz. It is advised to connect the LED for visualizing the output of the TSOP. Figure 3 shows the connection diagram for TSOP Sensor.

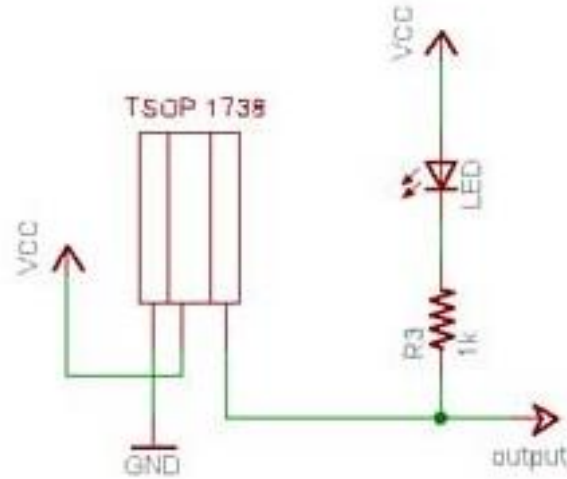


Figure 3: TSOP connection Diagram

Testing the TSOP Sensor Receiver Circuit

Testing of TSOP sensor is very simple. Connect TSOP sensor as shown above circuit and press the button of T.V. Remote control in front of the TSOP Sensor. If LED starts blinking then your TSOP sensor and it's connection is correct.