

Experiment 22-

On/Off Infrared Remote Control Switch

In this experiment you will build a remote control receiver that turns a LED on and off when it detects an infrared beam from any remote control transmitter. This circuit can be easily modified to incorporate a relay with the capacity to turn on and off many types of devices, such as: lamps, TVs, stereos, fans, etc.

The circuit of this experiment is shown in figure 1. The infrared receiver module (IRM) detects the infrared beam from the transmitter and sends a signal to the trigger (pin 2) of the one-shot pulse generator made with the 555 IC (IC1). IC1 will produce one pulse on its output (pin 3) every time the IRM detects an infrared beam. The length of this pulse is determined by the values of R3 and C3. The pulse produced by IC1 is sent to the input (pin 3) of the D flip-flop IC2. The output of the flip-flop (pin 1) will toggle between high (positive) and low

(negative) with every pulse arriving at the input, causing transistor Q1 to turn on (conduct) and off (cut off). When transistor Q1 turns on, LED L1 is on, when Q1 is not turned on, LED L1 is off.

To add a relay to this circuit, remove resistor R5 and connect a 6VDC relay in its place.

Procedure:

- Build the circuit shown in figures 1 and 2. When done, verify that the circuit has been properly assembled per figure 2, and connect a fresh 9V battery to the snap.

- Aim a TV or DVD remote control transmitter to the IRM of the receiver. You should be able to turn on and off LED L1 on the receiver, by pressing any button of the remote control, from several feet away. If you do not have a TV or DVD player remote control available, build the simple infrared transmitter of experiment 23. Using this simple transmitter the range will only be a few inches.

Note: *After completion do not take this circuit apart as you will use it to test the IR transmitter of the next experiment.*

Parts List:

R1: 100 Ω Resistor (Brown, Black, Brown)
R2: 4.7K Ω Resistor (Yellow, Violet, Red)
R3: 3.3M Ω Resistor (Orange, Orange, Green)
R4: 1K Ω Resistor (Brown, Black, Red)
R5: 100 Ω Resistor (Brown, Black, Brown)
C1, C4: .01 μ F Disc Capacitor (103)
C2, C3: .1 μ F Disc Capacitor (104)
L1: Clear LED
IC1: 555 IC
IC2: 4013 IC
IRM: Infrared Receiver Module
Q1: NPN Transistor 2N3904
Misc.: Battery snap, breadboard, and wires.

Figure 1

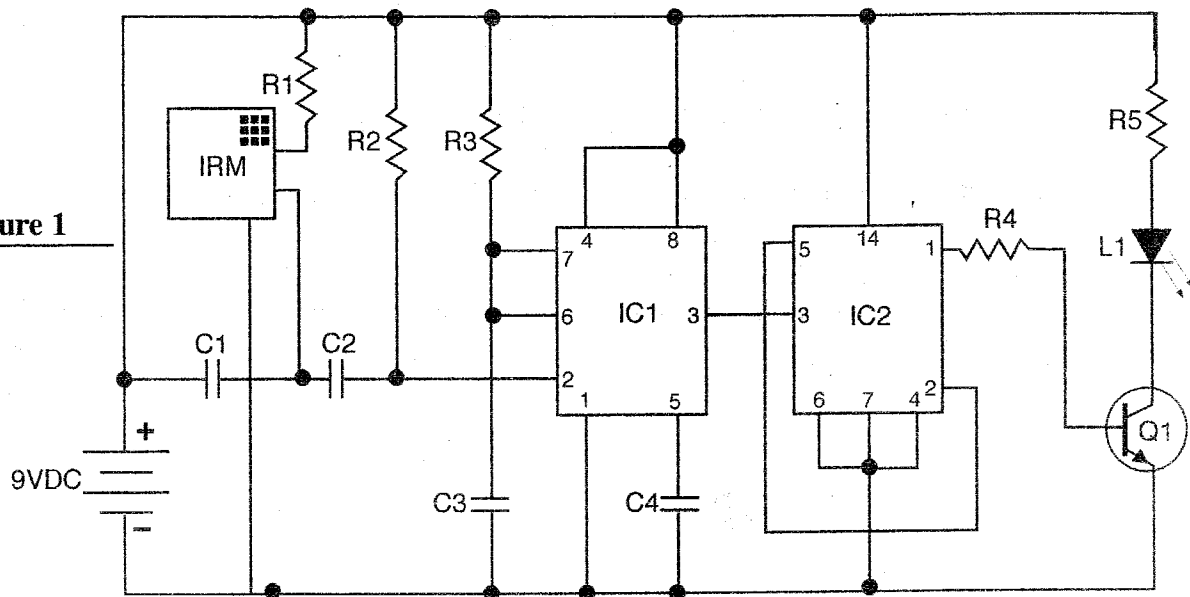


Figure 2

