

Experiment 20-

Infrared Proximity Detector

In this experiment you will build an infrared proximity detector that turns on a LED when an object gets close to it. The circuit combines the infrared transmitter of experiment 18, with the infrared detector of experiment 17. Both circuits are built on the same board.

The IR LED of the transmitter (L1), emits an IR light beam that bounces off the object and strikes the infrared receiver module (IRM) in the receiver (figure 1). If no object is near, the IR beam emitted by the transmitter will go away and will not be detected by the receiver. This proximity detector will detect objects several inches away from the IR LED.

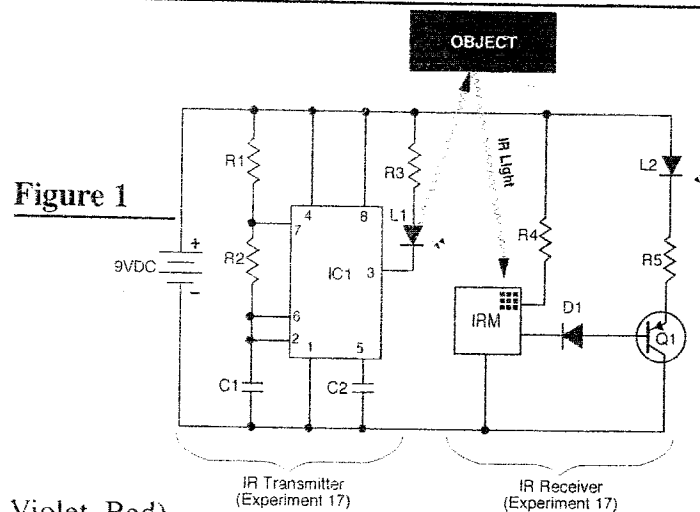
Procedure:

- Build the circuit shown in figures 1 and 2. Be sure to install the IC, transistor and LEDs in the correct direction. Be sure that the IR LED L1 is pointing up. When done, verify that the circuit has been properly assembled, and connect a fresh 9V battery to the snap.

- Test the circuit by sliding your hand in front of and about 3 inches from the IR LED L1. As you do this, LED L2 should turn on, indicating the detection of the object, in this case your hand.

Determine the maximum distance of detection for several objects.

Note: If the LED remains on all the time, slightly bend the IR LED L1 away from the IRM module to avoid direct IR light reaching the IRM module.



Parts List:

- R1: 4.7K Ω Resistor (Yellow, Violet, Red)
- R2: 1K Ω Resistor (Brown, Black, Red)
- R3, R4: 100 Ω Resistor (Brown, Black, Brown)
- R5: 220 Ω Resistor (Red, Red, Brown)
- C1: .1 μ F Disc Capacitor (104)
- C2: .01 μ F Disc Capacitor (103)
- IC1: 555 IC
- L1: Infrared LED (Clear LED)
- L2: Clear LED with mark on the case
- IRM: Infrared Receiver Module
- D1: 1N4148 Diode (tiny silicon diode)
- Q1: PNP Transistor 2N3906
- Misc.: Battery snap, breadboard, and wires.

