

Experiment 21-

Audible Infrared Proximity Detector

In this experiment you will build an audible infrared proximity detector that emits sound when an object gets close to it. The circuit combines the infrared transmitter of experiment 18, with the audible infrared detector of experiment 19. Both circuits are built on the same board.

The IR LED of the transmitter (L1), emits an IR light beam that bounces from 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. If desired, you can modify the circuit built in experiment 20 by replacing the LED L2 with the speaker and making R5 a 10 Ω resistor instead of 220 Ω . Be sure that the IR LED L1 is pointing up. When done, verify that the circuit has been properly assembled per figure 2, and connect a fresh 9V battery to the snap.

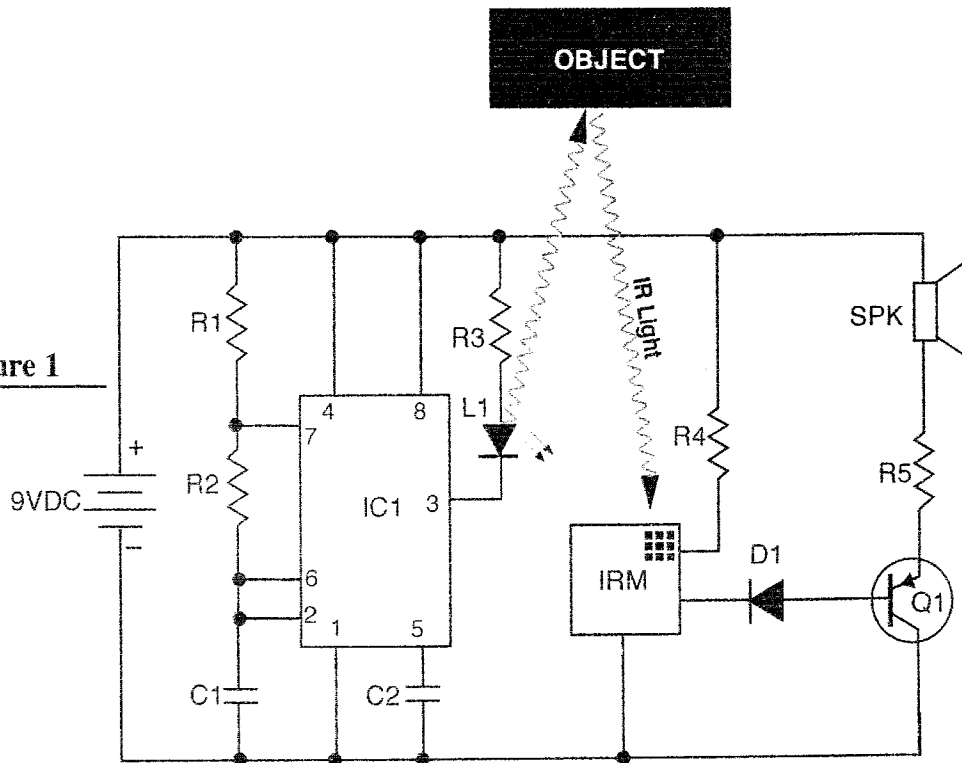
- Test the circuit by sliding your hand about 3 inches in front of the IR LED L1. As you do this, the speaker should emit a sound, indicating the detection of the object, in this case your hand.

Determine the maximum distance of detection for several objects.

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: 10 Ω Resistor (Brown, Black, Black)
C1: .1 μ F Disc Capacitor (104)
C2: .01 μ F Disc Capacitor (103)
IC1: 555 IC
L1: Infrared LED (Clear LED)
IRM: Infrared Receiver Module
D1: 1N4148 Diode (tiny silicon diode)
Q1: PNP Transistor 2N3906
SPK: Speaker
Misc.: Battery snap, breadboard, and wires.

Figure 1



NOTE: If the speaker emits a continuous sound, slightly bend IR LED L1 away from the IRM module to avoid direct IR light reaching the IRM module.

