

Experiment 15-

Fiber Optics Audio Link

In this experiment you will build an opto transmitter that emits a pulse modulated light beam. You will use an optical fiber to link this transmitter to the opto receiver of experiment 5. You will observe how the modulated light is carried through the optical fiber and detected by the receiver.

The circuit of the transmitter in this experiment is shown in Figure 1. This circuit is identical to the one built on experiment 6. Refer to experiment 6 for a complete description of the operation of the circuit.

Procedure:

- Build on the breadboard the circuit shown on figures 1 and 2b. Be sure to install the LED and the IC in the proper direction, as shown in figure 2b. When done, verify that the assembly is correct and connect a fresh 9V battery to the snap.

- Take the breadboard with the opto receiver that you assembled in experiment 5 (figure 2a). Connect a fresh 9V battery to the snap of this receiver.

- Take an optical fiber and use both hands to hold it between the transmitter and the receiver, as shown in figure 2. As you do this, you will hear the audible tone produced by the transmitter (figure 2b) from the speaker of the receiver (figure 2a).

- Repeat the above procedure using two and three fibers and observe how the intensity of the sound increases with the number of fibers. Be sure the fibers have the same length and are perfectly aligned on both ends. If necessary, you may trim the fiber(s) with a pair of scissors.

Note: When done, do not disassemble any of the circuits as you will need them in the next experiment.

Parts List:

R1: 4.7K Ω Resistor (Yellow, Violet, Red)

R2: 1K Ω Resistor (Brown, Black, Red)

R3: 100 Ω Resistor (Brown, Black, Brown)

P1: 50K Ω Potentiometer

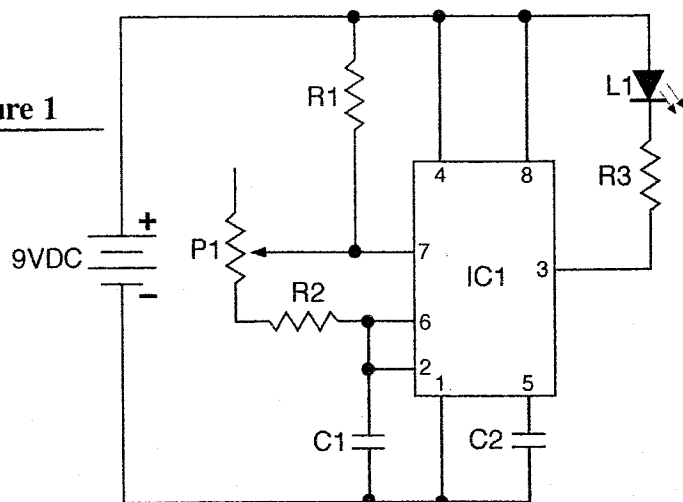
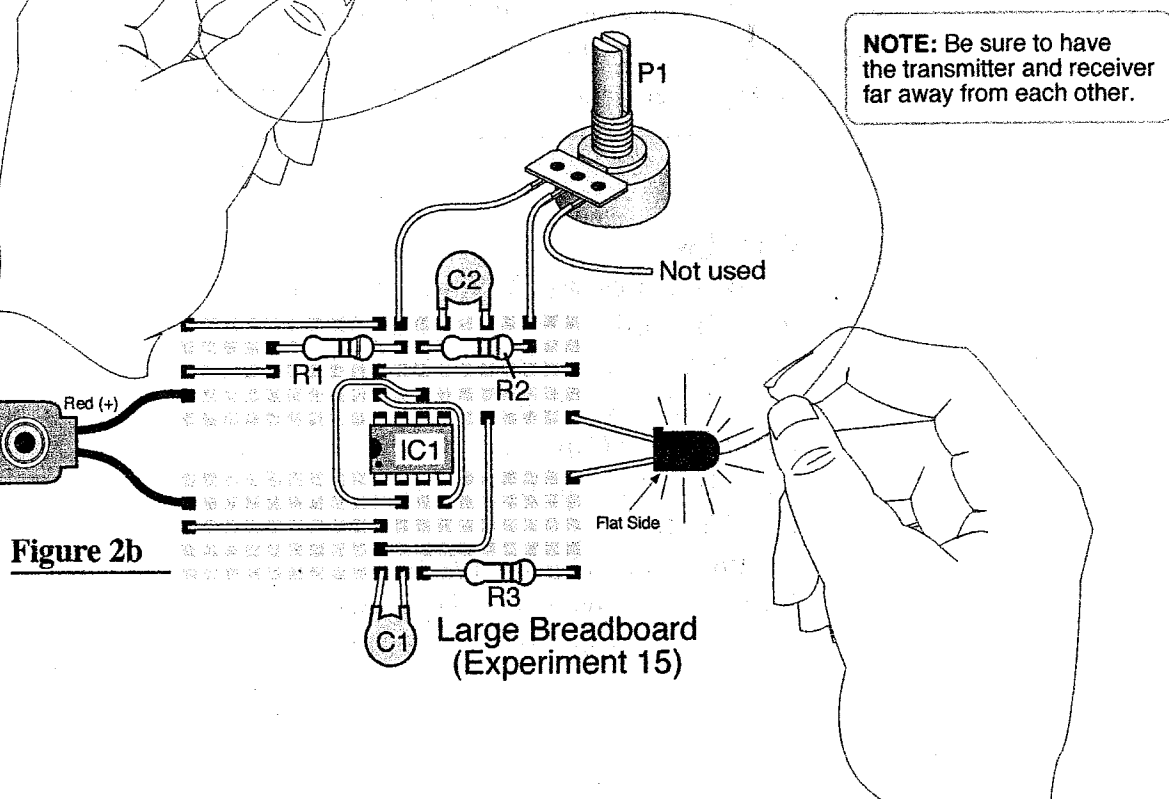
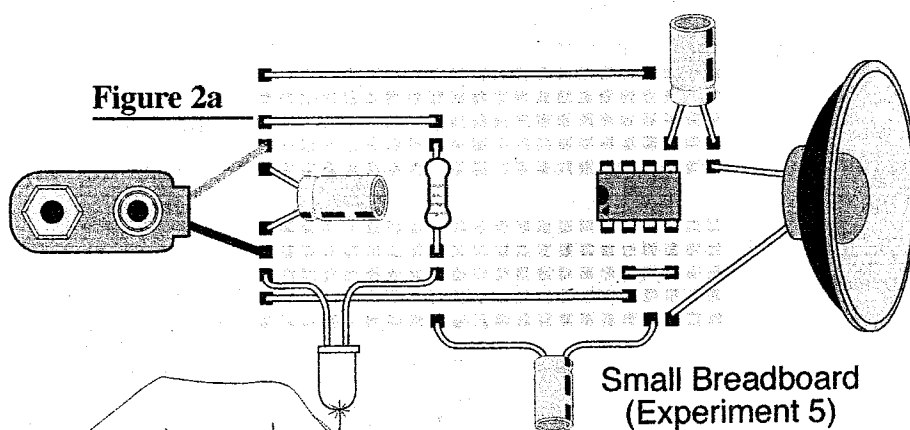
C1: .1 μ F Disc Capacitor (104)

C2: .01 μ F Disc Capacitor (103)

IC1: 555 IC

L1: Clear LED with mark on the case

Misc.: Battery snap, breadboard, wires, optical fibers, and assembled experiment 5.

Figure 1**Figure 2a****Figure 2b**