

Experiment 13-

Fiber Optics: Dual Color Transmission

In this experiment you will observe how optical fibers can carry light of different colors. You will light up a red and a green LED and observe how the light travels through the fiber preserving its frequency (color).

The schematic diagram of this experiment is shown in figure 2. The current flows in this circuit from the negative side of the battery toward the positive side, passing through LEDs L1 and L2, and resistors R1 and R2. The LEDs light up, as current flows through them. Resistor R1 and R2 limit the current flowing in the circuit to a safe value that will not damage the LEDs.

Parts List:

R1: 1K Ω Resistor (Brown, Black, Red)

R2: 100 Ω Resistor (Brown, Black, Brown)

L1: Clear LED with mark on the case

L2: Green LED

Misc: Battery Snap, Breadboard, Optical Fiber, Wires.

Procedure:

- Using the large breadboard the circuit shown in figures 1 and 2. Be sure to install the LEDs with the flat side in the proper direction, as shown in figure 1.

- Connect a fresh 9V battery to the circuit. As you do this, the LEDs will light up.

- Take an optical fiber and hold one end against the lens of the red LED. Observe the light on the other side of the fiber.

- Move the fiber to the green LED and observe how the light is carried to the other end and the color is maintained.

- Take a white piece of paper and hold the end of the fiber close to it, as shown in figure 3. Observe how light is emitted from the end of the fiber and projected on the paper. Repeat this procedure for both LEDs with the room darkened, if possible.

Figure 2

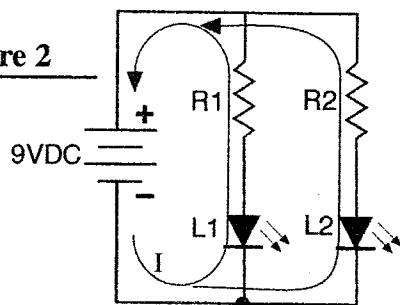


Figure 1

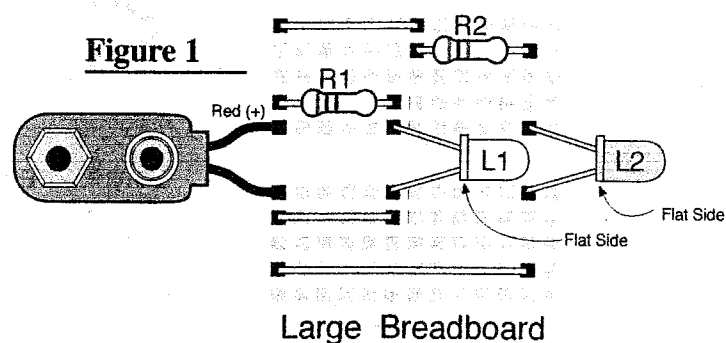


Figure 3

