

Experiment 14-

Fiber Optics: Multiple Fiber Transmission

In this experiment you will observe how the intensity of the transmitted light is increased by holding several fibers together. You will light up a red and a green LED and observe how the light travels through the fibers and how the intensity of the light increases as more fibers are added.

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.

Procedure:

- For this experiment you will use the same circuit you build in the las experiment.

- 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 end of the fiber. Darken the room, if possible, to have a better look of the light.

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

- Take a white piece of paper and hold the end of the fiber close to it, as shown in figure 3.

- Repeat the three previous steps with two and three fibers, as shown in figure 3. Observe how the intensity of the light projected on the paper increases as the number of fibers is increased. Be sure the fibers have the same length and are perfectly aligned on both ends.

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 Fibers, Wires.

