

## Experiment 12-

### Introduction To Optical Fibers

In this simple experiment you will get acquainted with an optical fiber; you will see how it looks and how it allows light to travel through it.

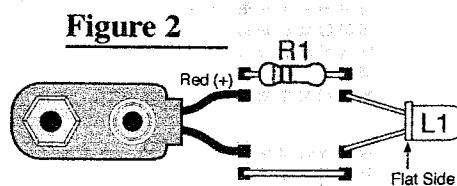
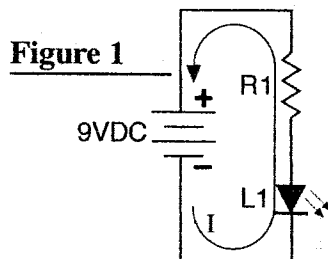
In this experiment you will light up a clear LED, which emits a visible red light beam, and hold one end of an optical fiber against the lens of the LED. You will observe how the light travels through the fiber and can be observed on its other end.

The schematic diagram of this experiment is shown in figure 1. The current (I) flows in this circuit from the negative side of the battery toward the positive side, passing through the LED L1 and resistor R1. The LED lights up, as current flows

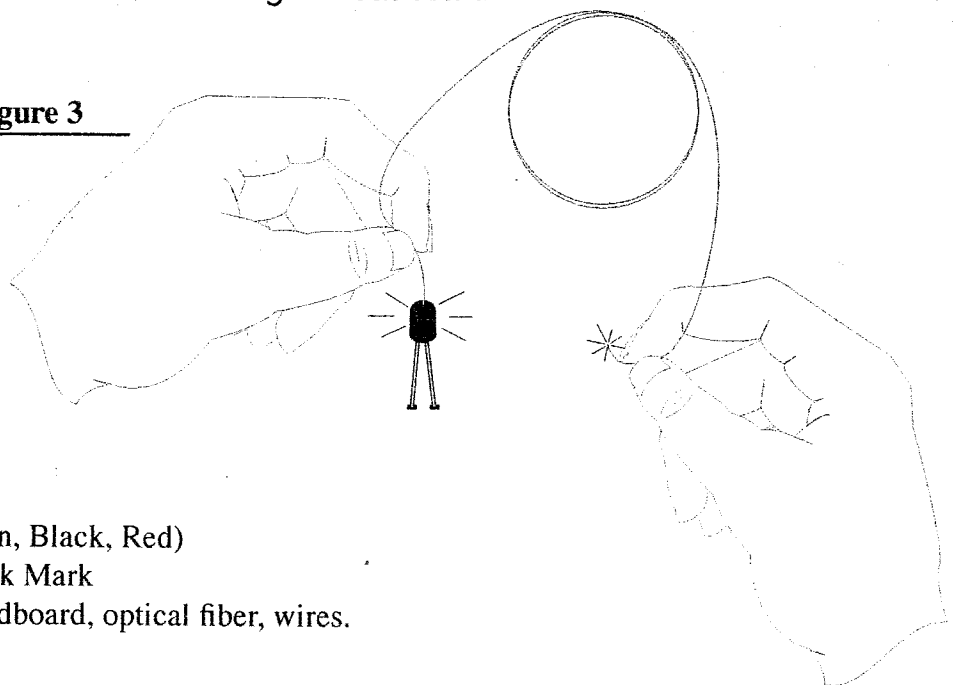
through it. Resistor R1 limits the current flowing in the circuit to a safe value that does not damage the LED.

#### Procedure:

- Using the large breadboard, build the circuit shown in figures 1 and 2. Be sure to install the LED with its flat side in the proper direction, as shown in figure 2.
- Connect a fresh 9V battery to the circuit. As you do this, the LED will light up.
- Get an optical fiber and hold one end against the lens of the LED, as shown in figure 3. Observe the light on the other side of the fiber. Darken the room, if possible, to have a better look of the light. Notice that you do not see the light along the fiber, but only on the end. This is due to the fact the light can not escape the fiber through its surface, as explained in lesson 6, but only through its core.



**Figure 3**



#### Parts List:

R1: 1K $\Omega$  Resistor (Brown, Black, Red)

L1: Clear LED with Black Mark

Misc.: Battery snap, breadboard, optical fiber, wires.