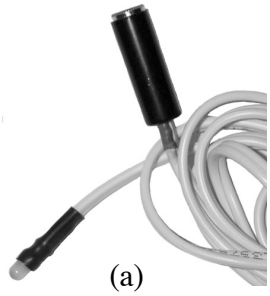
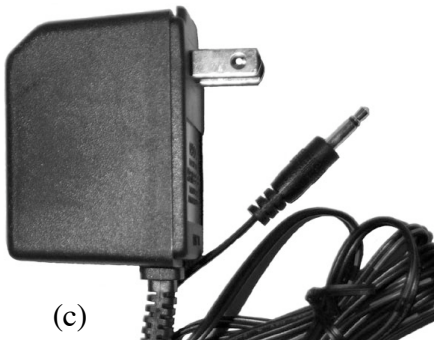
DESCRIPTION OF CAPE-tech "Tri-Color LED" APPARATUS


(a)


(b)


(c)

(a) ***LED cable*** with a 3.5mm (1/8") phone jack at one end and a Red/Green Bi-color LED (light-emitting diode) lamp at the other end. A current-limiting resistor is incorporated into the cable at the LED end.

(b) ***Battery connector*** with a 3.5 mm (1/8") phone plug at one end and two alligator clip leads at the other. The battery connector is intended for use with a 9-volt battery (not supplied).

(c) ***120VAC in - 9VAC out transformer*** with integral 2-prong polarized plug at the input and a two-conductor cable terminated by a 3.5mm (1/8") phone plug at the output.

SUGGESTED USE

1. To demonstrate the behavior of each of the two individual LED's within the LED bulb, plug the BATTERY CONNECTOR into the LED CABLE jack. Then, attach an alligator clip to each of the terminals of a 9-volt battery. One of the LED's within the bulb will light. Note whether the color is red or green and also the location of the light source within the bulb.

2. Now hold the BATTERY CABLE at a convenient distance from the lamp end so that the lamp can be swung in a vertical circle. A circle of light is produced. (Darkening the room enhances the effect.) Observe the color consistency along the circumference of the circle.

3. Now switch the battery leads. The color will shift, and the location of the source within the bulb will change. The LED's are connected in parallel, with their conducting polarities opposite. The LED that is activated depends on which way the leads are connected to the battery. Again, swing the lamp in a vertical circle.

4. The peak wavelength of the red light is 625nm, and that of the green is 565nm. The red light is brighter in the ratio of 5:4. So far, the third color of the promised "TRI-COLOR LED" has not appeared. It can elicited as follows.

Unplug the BATTERY CONNECTOR from the LED CABLE, and connect the LED CABLE to the 9-VOLT AC TRANSFORMER. Plug the transformer into an outlet. Behold! The third color appears.

To explore the source further, swing the lamp in a vertical circle, as before. The contributions of the two individual LED's are now revealed, each in a segment along the circle. The faster the lamp travels around the circle, the longer the color streak from each of the lamps becomes. They alternate, with a dark region in between each color segment. Each LED is on for the major portion of half a cycle of the alternating current. When the voltage drops below about 2 volts, neither lamp will light.

With the AC source, each of the two colors produced by the LED is present for less than 1/120th of a second. The colors alternate, repeating the cycle every 1/60th of a second. This is too fast a change for the brain to resolve, and colors are perceived to be concurrent. The third color is the result of the brain-constructed response to a mixture of red and green light signals. Most observers will report a golden hue; however differences in visual acuity for different colors among observers may result in an inability to reach a consensus. They may literally be seeing different colors. This could be the point of departure for a whole new discussion.