How-To #6: Make an Infrared Headlight

Background:

An infrared (IR) headlight is a small device that shines infrared light in only one direction, much as a hand-held flashlight shines light in only one direction. IR headlights are commonly used on small rolling robots to detect obstacles or illuminate some path to be followed.

An infrared-emitting diode (IRED) cannot be used for this purpose all by itself because, while it focuses infrared in the forward direction, it also allows emissions from the sides and the back.

IR headlights are very simple, consisting of an IRED and some sort of cover that prevents these spurious emissions by surrounding the diode with an infrared-opaque material. A rough analogy is putting a light bulb in a soup can that is open at one end.

This method of making infrared diodes is simple and inexpensive. The materials are available almost everywhere.

Materials:

Quantity	Part	Image	Notes	Catalog Number
1	Infrared-emitting diode		---	1303
1 inch	3/8-inch diameter shrink tubing		The tubing must be opaque to infrared light.	4105

Heat shrink tubing comes in many colors, but black seems to work best because other colors are often transparent to infrared.

You will also need a pair of scissors and a butane lighter. Other heat sources will work, including matches. But matches and candles tend to darken the tubing.

Procedure:

1. Using the scissors, cut the 1-inch tubing into two pieces of length ½-inch each.

Figure HT6-1. Heat-shrink tubing

2. Place one of the pieces of tubing over the IRED, allowing the end of the diode to project just beyond the tubing.
3. Shrink the tubing by applying heat from the butane lighter. Move the flame while rotating the diode with the tubing. The tubing will shrink tightly around the diode.
4. Repeat step 3 with the second piece of tubing. Pay special attention to the tubing around the wires. It needs to be as flat as possible.

The final diode should look something like Figure HT6-2.

Figure HT6-2. IR Headlight