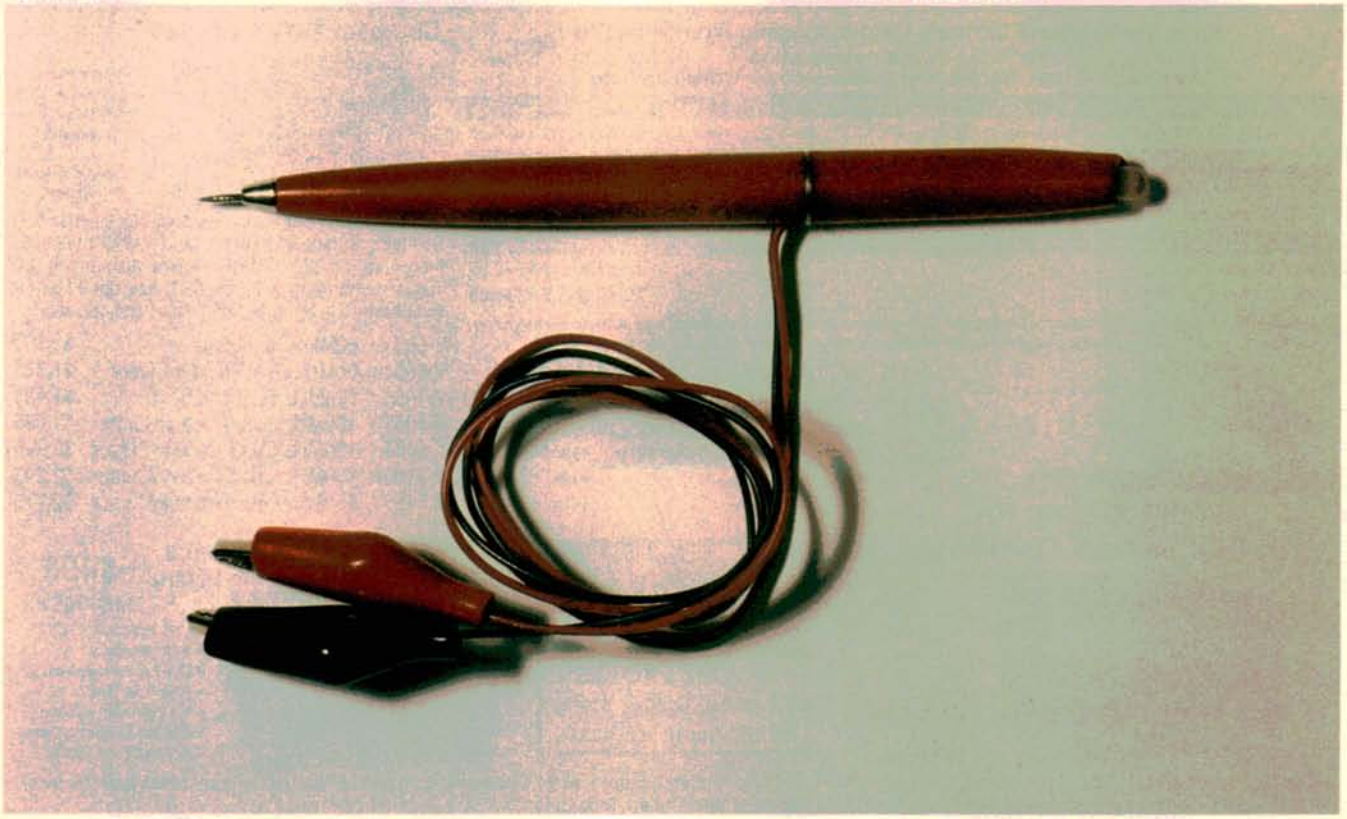


LED Test Lights

We've been hammering on you for the past few years about the dangers of using a standard test light to troubleshoot delicate automotive electrical circuits. From the cards and letters we've been getting, we know that many of you are now using logic probes for your circuit testing. We're also pretty sure that there are still some test light die hards out there.

If you're one of those guys who can't warm up to a logic probe and insists on using a test light (you know who you are), there is a safe alternative called an LED test light. An LED test light isn't as fancy as a logic probe. But it will tell you everything your original test light could, and is just as convenient to use. Best of all, it won't leave burned-out electrical components in its path.

Gentlemen, Start Your Soldering Irons

Both of the LED test lights we'll describe here are do-it-yourself projects that you can easily make in a few minutes with a few dollars worth of supplies from an electronics store. The practical uses for these testers are limited only by your imagination.

Most garden variety LEDs are designed to operate on approximately 2 volts DC. Your LED test light won't last too long if you give it a taste of an automotive electrical system's much higher DC voltage. So we need to match the LED with a ballast resistor that has the correct ohm rating to protect the LED from a voltage overload.

We won't bore you with a long description of the electrical formula that's used to select the proper ballast resistor to protect the LED. But we will tell you that a ¼ watt 1250 ohm resistor is the right choice for matching a 2 volt LED to the 12 or more volts found in automotive electrical systems. If you can find 12 volt LEDs and decide to use them instead, substitute ¼ watt 330 ohm resistors to protect your LEDs.

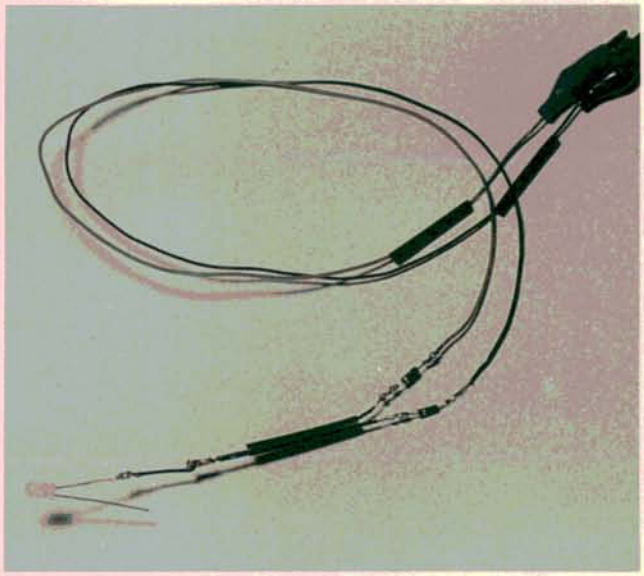
Observing proper polarity is especially important when assembling an LED test light and also when it's hooked up for testing. All LEDs have anode and cathode leads, or legs. The cathode leg will always be the shorter of the two LED legs. The LED's anode leg is the longer leg. For proper operation, make sure you follow the soldering instructions in our photo captions. We'll start with the basic economy model LED test light first.

LED Test Lights

1 To make the LED test light, you'll need a 2 volt LED, a ¼ watt 1250 ohm resistor, wire, shrink wrap tubing, and two color-coded alligator clips. Solder one end of the resistor to the shorter, cathode leg of the LED. Solder a length of wire to the resistor's other end. Use heat sinks while soldering.

2 Solder a matching length of wire to the LED's longer, anode leg. Cover your solder joint with heat shrink tubing. Now solder the black (negative) alligator clip to the cathode wire and the red (positive) clip to the anode wire. Always observe proper polarity when testing circuits.

3 Now we'll get fancy. This battery powered LED test light tells you whether you're probing a negative or positive voltage source. You'll need two 1250 ohm ¼ watt resistors, two color-coded alligator clips, a 2 volt two-color LED, heat shrink tubing, a ball point pen body, and light gauge wire.



4 Solder the resistors, alligator clips, and wiring together as shown. Then solder the free end of the wire to the shorter, cathode leg of the two-color LED. Protect the solder joints with heat shrink tubing. We'll hook the two alligator clips to the battery when we're ready to use the test light.

5 Solder the LED's longer anode leg to a large needle or other pointed object. Use the tip for probing wiring terminals and connections. Enclose everything in the pen body, with the two color LED at the top and the test probe at the bottom. Feed the battery leads through a hole in the side of the pen.

6 Hook the alligator clips to the vehicle's battery. The test light resistors drop the battery voltage to a safe level, protecting the LED and test leads. The two color LED glows green when the probe touches a ground source. Switch to positive voltage and the LED glows red.