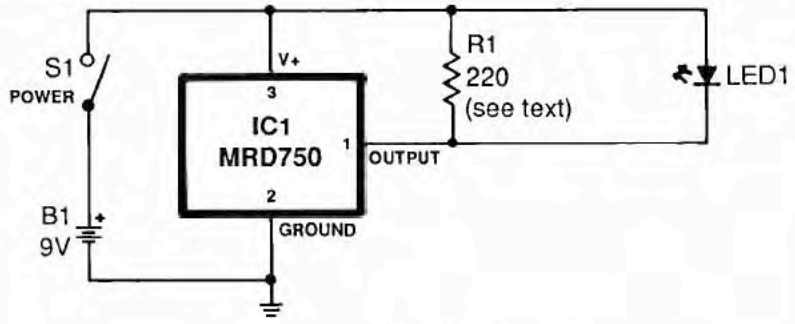
An Infrared Detector

Simple tester gives visible indication of whether or not invisible infrared energy from, say, a hand-held remote controller is being generated

By Jeff Orthober

Have you ever had to check out the hand-held infrared remote-control transmitter for your TV/VCR/audio system to determine if it was working? Or have you been experimenting with infrared and need a device that will let you know if your IR emitter is actually emitting? As you know, you can't exactly look into a powered infrared emitter to see the radiation it's emitting because it's invisible to the human eye.

Here's a "tool" you can put together in about 10 minutes that will let you check out the invisible signal. It's a simple five-component Infrared Detector that "sees" infrared energy. When it does detect infrared energy, it turns on a light-emitting diode to let you know that the device being tested is operating.



PARTS LIST

B1—9-volt battery
IC1—MRD750 infrared detector with logic output
LED1—Jumbo light-emitting diode
R1—220-ohm, ¼-watt resistor (value not critical—see text)
S1—Spst slide or toggle switch
Misc.—perforated board and suitable hardware or solderless breadboarding socket (see text); suitable enclosure (see text); battery snap connector for B1; hookup wire; solder; etc.

Note: The following items are available from JL Electronics, 43 White Plains Dr., Nashua, NH 03062: MDR750 detector, $3 or two for $5; complete kit of parts (does not include power switch or enclosure), $10.

Complete schematic diagram of the simple circuitry that makes up the Infrared Detector.

Circuit Operation & Construction

Refer to the schematic diagram of this simple project's circuit during the following explanation. The project is built around Motorola's MRD-750 infrared detector chip, shown here as *IC1*. This device has a built-in detector element and Schmitt-trigger logic output that lights *LED1* whenever it detects the presence of infrared energy.

As you can see, the MRD750 has only three pins, one each for power, ground reference and output. When *IC1* does not detect IR energy, its OUTPUT pin is in the tri-state condition and *R1* serves as a pull-up resistor. Now when *IC1* does detect the presence of IR radiation, its output goes to a logic low. This allows *LED1* to turn on, providing you with an invisible indication of the presence of the IR energy.

The value of *R1* is really not important. Though 220 ohms is specified on the schematic and in the Parts List as a commonly available value that can be used for *R1*, the value of this resistor can be anywhere within the range from 50 to 1,000 ohms.

Power for the circuit is supplied by *B1*, a 9-volt battery. It is switched in and out of the circuit via *S1*.

This circuit is so simple that it can easily be assembled and wired together in just a few minutes on perforated

board with suitable hardware or even on a small solderless breadboarding socket. You may wish to house it in an enclosure. If you do, make sure to use an enclosure that will accommodate the circuitry and battery without crowding. Also, make sure that the IC has a clear, unobstructed view to the outside and that you mount the LED in a location where it will easily be seen by you.

To use the Infrared Detector, place the sensor window on *IC1* so that is directly in line with and 2 inches or less from the source of the IR radiation. Flip on power to the project and device being tested, and observe whether or not the LED on the Infrared Detector comes on. If it does, the device under test is emitting IR radiation; if not, something is wrong with the device under test. That's all there is to it. ME