

LED Sensor and Infrared Applications

Andrew Zaneli

As a semiconductor component, Light emitting diodes (LEDs) are best known for their amazing energy-saving abilities. As we know, LEDs have several applications, however, LEDs can also function as simple light sensors in a variety of applications, making them highly versatile and useful in many other systems and purposes.

How LEDs Function as Light Sensors

LEDs can be used as sensors where it can be configured to detect ambient light. Here's how it works to use LEDs as light sensors:

First, you use two bidirectional CMOS I/O pins connected to an LED with both I/O pins set to output mode and LED in forward direction to emit light.

Second, you set up additional LEDs with I/O pins set to output mode but in the reverse bias direction. This charges the LED's inherent capacitor by inhibiting the current. By reversing the current, the LED power pin reads the current leakage of the diode, which in turn charges relative to the ambient light, thereby detecting it.

Essentially, as you shine light of a similar color with a slightly shorter wavelength on an LED, it produces electricity, with the voltage of that electricity increasing with the intensity of the light. This turns a simple LED into a light sensor.

You can use a simple experiment to see its working as a LED sensor – just connect the LED—when illuminated—across a voltmeter, you can observe a reading.

Often LED sensors are “infrared” LEDs which infrared refers to light with longer wavelengths when compared to visible light spectrum. Note that, when used as light emitters, the light projected from infrared LEDs is invisible to the human eye, though they can output a dull red glow when viewed directly. The operating voltage is usually set to 1.4 v, and current less than 20mA for IR LEDs. A very common application of IR LED is remote controller for household appliances; where wavelength used is 940nm.

How LEDs are used in Sensors and Infrared Technologies

You may be surprised to know how frequently LED sensors are used in a long list of applications. LEDs can be used in a wide variety of sensor and infrared applications such as:

- Remote controls
- Traffic lighting
- Night vision web cameras for security
- Indicator lights on electronics
- Web or video conferencing
- Photo couplers
- License plate readers
- Factory automation
- Digital camera range finders
- Smoke detectors
- Night video production

- Treatments for sports injuries and burns
- Total darkness or near darkness video surveillance
- Motion sensors for light switches and controls

LEDs from VCC Optoelectronics

VCC offers a large selection of LED products that can be used in sensor and infrared applications, including automated and semi-automated production environments, instrumentation, networking equipment, and more. VCC's custom design services further expand our offerings, allowing you to work with our technical staff to design and manufacture LED components for your project specifications.

Visual Communications Company, Inc.

12780 Danielson Court, Suite A
Poway, CA 92064 USA

Phone: 858.386.5666
Toll Free: 800.522.5546
Fax: 800.521.0844

For any sales or engineering inquiries: vccsales@vcclite.com



2012 List of Fastest Growing
Companies in America!