

## Near-infrared LED assemblies prove illuminating for day/night security cameras

As digital security cameras have become more sophisticated, so has the need to provide the optimal illumination required to produce high-resolution video images in all kinds of ambient light conditions. One of the most widely used types of security cameras is the day/night vision camera, designed to operate during daylight hours using visible light, and during darkness by using near-infrared light, which has a wavelength ranging from approximately 760nm to 1000nm and is invisible to the human eye. These cameras use a CCD (charge-coupled device) as their sensing/imaging source, and are designed to operate with extreme sensitivity to low levels of visible light. More importantly, because CCDs are inherently sensitive to near-infrared light, they can capture high-resolution images in total darkness, provided the target area is illuminated by a near-infrared light source.

LEDs make an ideal illumination source for these day/night vision cameras. They can be produced to emit near-

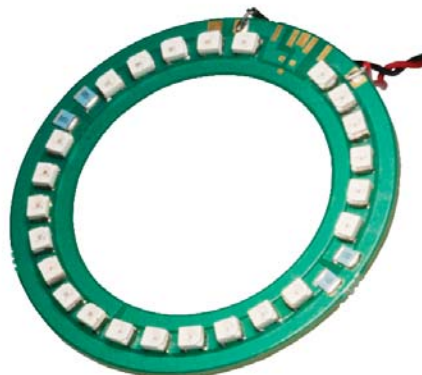
infrared light tuned to a specific wavelength, they are inherently directional, and they have significantly lower power consumption than other light sources. By mounting the LEDs to a ring-shaped PCB substrate designed to fit the diameter of a standard camera lens, the LED assembly is always aimed in the same direction as the lens to provide optimal infrared illumination.

Because many remote security cameras operate using battery power or networked power sources (PoE), minimizing

the overall power consumption by the security camera and the illumination source is critical. Because many security cameras now feature pan, tilt and zoom (PTZ) functions, or are integrated with

automatic motion detection and tracking systems, they consume more of the designer's power budget. To further lower the LEDs' power consumption, an ambient light sensor can be added to the illuminator ring assembly, which will ensure that the LEDs are only switched on at lower light levels.

The development of these specialized near-infrared LED light ring assemblies requires a combination of technical expertise with infrared LED technology, as well as advanced application experience in designing LED assemblies for



specialized uses such as security cameras. After being approached by a customer for a compact way to illuminate a security camera's field of vision with near-infrared light, TT electronics OPTEK Technology developed two series of near-IR LED light ring assemblies, each containing from 10 to 24 LEDs with center wavelengths of 850nm or 880nm, matched to provide optimum illumination for the CCD image sensors used in many security cameras.

To match the lens diameters of most popular security cameras, these near-IR light rings are available in a variety of ring sizes: 0.625" ID/1.25" OD; 1.0" ID/1.75" OD; 1.25" ID/2.0" OD; and 1.5" ID/2.25" OD. Depending on the available operating voltage at the camera, customers can specify either 5V or 12V assemblies.

Typical security camera range and field of vision also were considered in developing these near-IR illumination rings. For shorter-range, wide field of vision cameras, surface-mount LEDs with a viewing angle of 100° can be specified; while longer-range, narrowly focused cameras require the use of through-hole 3mm LEDs with a viewing angle of 18°.

Both series of light ring assemblies are available with an optional ambient light sensor, which will turn off the LEDs under daylight conditions, when there is sufficient visible light to produce a high-resolution image from the camera's CCD image sensor. This feature minimizes power consumption and

prolongs the life of the LEDs.

Supplemental information:

Link to near-IR LED light ring assemblies product specifications on OPTEK's website: <http://www.optekinc.com/viewparts.aspx?categoryID=82>

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