**Backlighting**

Illumination by an indicator of a front panel legend from behind, without protrusion of the LED through the panel.

**Bicolor LED**

A component that contains two LED dice of different colors in a single substrate or lead-frame carrier. The components have either two, three (common cathode) or four lead wires for turning the devices on and off.

**Bilevel CBI**

Two LEDs stacked vertically in a single housing.

**CBI**

The trademarked name of Dialight's Circuit Board Indicator (CBI) Series of LED indicator solutions.

**Candela (cd)**

The standard unit measure of luminous intensity which is used to calculate lumen and foot candle measurements.

**Continuous forward current**

The current that must be applied to the p-side of an opto-electronic device - such as, an LED to produce a given output.

**Crosstalk (light bleed)**

The undesired illumination of one indicator position by the light source from another.

**Current-limiting resistor**

A protective resistor added in-line between the power source and the light source to regulate current delivered to the device. The value of the resistor depends on the operating voltage of the circuit.

**Diagnostic application**

One of two applications served by circuit board indicators (the other being front panel applications). In diagnostic applications, the indicator is mounted on a circuit board, generally without secondary optics, and is viewed at close range by a service technician inside a piece of equipment.

**Die**

The basic semiconductor device or "chip" inside the LED assembly.

**Diffusant**

Glass particles suspended in the epoxy lens of an LED that diffuse the light and broaden the device's viewing angle.

**Direct view**

The application of an indicator in which its lens protrudes through the front panel and is viewed directly.
**Dominant wavelength**

The wavelength at which the human eye perceives light emitted from an LED to be strongest.

**Electroluminescence**

The nonthermal conversion of electrical energy into light. In an LED, it is produced by electron-hole recombination in the p-n junction.

**Epoxy**

A resin characterized by high adhesiveness, toughness, and corrosion resistance. Used to surround LED die to provide attributes - such as, diffusion and lens shape.

**Foot-candle**

A unit for measuring illumination. One foot-candle equals the amount of light delivered by a 1-candela light source to a 1 sq. ft. surface 1 ft. away.

**Foot Lambert**

A unit of light measurement. 1 foot Lambert is equivalent to 3.4 cd/m².

**Front panel application**

The application of an LED in which the light is viewed at the front panel of the host equipment. This usually requires either backlighting or direct-view configuration.

**Forward voltage**

The voltage that must be applied to the p-side of an optoelectronic device - such as, an LED to produce a given output.

**Incandescence**

Emission of light through thermal excitation resulting from the superheating of a conductor. The excitation must be sufficient to produce enough photons to make the light source visible.

**Incandescent lamp**

A light source based on incandescence in which voltage is passed through a filament that heats to create light.

**Integral resistor**

An LED design option in which the current-limiting resistor is contained within the package.

**Infrared**

The region of the electromagnetic spectrum between the long-wavelength extreme of the visible spectrum (700 nm) and the shortest microwave frequencies (1 mm). Nearly all of the infrared portion of the spectrum is invisible to the human eye. Infrared LEDs are used in sensing, data transmission, ambient light detection and other various applications.

**Lead frame**
A metal structure to which a semiconductor die is attached. The lead frame provides stability for the devices and completes the electrical path to the die.

**Lens**

The epoxy enclosure molded to an LED die to provide optical characteristics.

**Light Emitting Diode (LED)**

A p - n junction semiconductor device that emits incoherent, monochromatic optical radiation when biased in the forward direction.

**Light pipe**

An optical conduit made of molded plastic that directs the light from an LED to the viewing location, often at a right angle from the circuit board.

**Lumen**

A unit of luminous flux, equal to the luminous flux emitted by a standard point source having a luminous intensity of one candela.

**Millicandela (mcd)**

One thousandth of a candela.

**Nanometer (nm)**

One billionth of 1 meter. Often used (along with angstroms) to quantify the wavelength of light.

**Neon lamp**

A light source that generates a blue or amber light by exciting a neon gas plasma with heated electrodes.

**Operating current**

The current which a device - such as, an LED is designed to draw from the power source.

**Operating temperature**

The range of temperature over which a device will safely operate.

**Operating voltage**

The voltage or range of voltages at which a device is designed to operate.

**P-n junction**

Holes and electrons combine in the negative (n) region of a positive-negative (p-n) junction semiconductor diode. During these shifts in energy, photons are generated, some of which are absorbed by the semiconductor material and some of which are emitted as light energy.

**Power dissipation**

The amount of power dissipated as heat by a device.
Prism

A device used to separate a light beam into its spectral components. In LEDs, the prism directs light output from an LED to the viewing location. Also the trade name for Dialight's patented through-process SMT LED indicator.

Quad-level CBI

Four LEDs stacked above each other in a single housing.

Reflector cup

A coined portion of a lead frame that forms a reflector around the periphery of an LED die, and directs its light output. The reflector cup is an integral part of the device, and is unique to the lead-frame type rather than substrate-type chip carrier.

Right-angle viewing

A type of indicator application in which the light output must be viewed at a right angle (i.e., in a direction parallel to the circuit board).

Reverse breakdown voltage

The reverse voltage applied to a diode, which, if exceed, will cause the device to fail. Specifically, the value when a diode is reversed biased, that avalanche breakdown occurs.

Secondary optics

Devices that are used to enhance or redirect the light output of an LED, Examples include lenses and light pipes.

Super-bright LED

An LED designed to produce exceptionally high light intensity.

SMD

Acronym for surface mount device.

SMT

Acronym for surface mount technology.

Surface-mount LED

LED designed to conform to the requirements of the surface mount circuit-board manufacturing environment. Surface mount devices must withstand the infrared soldering process, and must be physically compatible with automated pick-and-place equipment.

Through-hole LED

The most common type of LED package. It is connected to the circuit board via its leads that also serve as the inter-face to the power source. The through-hole LED is not surface mountable.

Tint
A color added to the epoxy lens of an LED to identify its color when on.

**Transparent substrate**

A characteristic of an LED die which increases its light output. The substrate on which the upper portion of the die is grown is a transparent semiconductor material that does not absorb the light energy.

**Trilevel LED**

Three LEDs stacked above each other, generally realized with light piping.

**Tricolor LED**

A component that contains two LED dice of different colors in a single substrate or lead-frame carrier. The components have either two, three (common cathode) or four leads for turning the devices on and off. This LED can also be called a bicolor LED.

**Viewing angle**

The area in front and to the sides of an LED at which light output falls off 50 percent. The viewable area appears as a cone-shaped pattern.

**Visible spectrum**

The light spectrum between 400 and 700 nm which is detectable by the human eye.

**Water clear LED**

An LED die combined with a clear lens that has no tinting is sometimes referred to as a water clear LED.