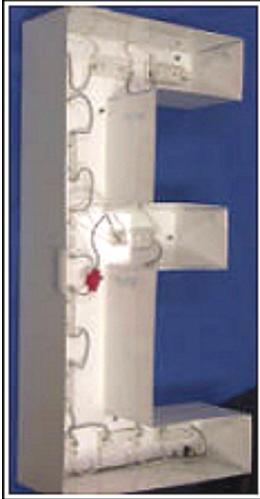




## LED CHANNEL LETTER MODULES 101



The age of neon channel letters is drawing to a close. Although neon will always have its place, light-emitting diode (LED) light sources are encroaching on their territory. Having conquered traffic signals, exit signs, outdoor video screens and scrolling-message displays, LED technology continues to advance in quality, brightness, color and energy efficiency.

No longer in its infancy, LED signage technology is starting to make serious inroads in the once neon dominated market. LEDs are solid-state devices that generate light without tungsten-coated cathodes or filaments. LED chips are small as grains of sand and are produced in large wafers, similar to a computer's integrated circuits. The process of this first level of production is called epitaxy.

The wafers are then cut into individual chips (or dies) which are mounted on a small reflector cup (it acts like a tiny floodlight), bond wires are attached from the Chip to the leads and the completely assembly is then encased in epoxy, which protects the device while acting like a lens. Driving the channel letter market are a new generation of advanced LED packaging that is now available that allows for greater brightness through better heat dissipating packages. These new packages have doubled and tripled the light output of what was available only a few years before using the typical 5 mm LED. These innovations are bringing down the cost per lumen making LEDs a cost effective alternative to Neon. Our Channel Letter Modules use 3 or 6 of these new high performance LEDs in each modules to optimize the light output.

### **Viable lighting systems**

Our new Channel lighting system is specifically designed to dissipate heat and guard against moisture. They are shock resistant, low voltage and noiseless.

LED installation requires almost no training or experience, as required with neon. Proper placement of LED modules and sealing of accent strips can help keep out corroding moisture. However, the modules themselves are sealed to prevent damage from the elements.





An LED chip prefers the cold but can operate efficiently at very high outdoor temperatures. This issue has been confused in the early adoption of LEDs in channel letters. The temperature at the light-emitting junction inside the LED is critical and must be kept below 212° F (100° C). To this end the new generations of Channel Letter Modules are using the Ultra Flux Piranha package which helps both in heat dissipation and moisture resistance.

In channel letters, each chip can dissipate heat to the outside air -- regardless of the ambient temperature inside the channel letter. This also allows retrofitting of existing neon-illuminated channel letters.

All light sources consume energy to create both heat and light. Today's LEDs create more light than heat per watt compared to incandescent bulbs, and they're rapidly approaching the efficacy (raw lumens of output per watt of electricity consumed) of fluorescent tubes.

However, it's the monochromatic nature of LEDs that enables the extraordinary energy savings of 80%-90%. Light comes in many different wavelengths (measured in nanometers) or colors.



Noonday sunlight has the full spectrum of color, as does a household incandescent light. But the incandescent lamp is much stronger in reds and yellows, the longer wavelengths (that's why it looks warm or yellowish). Put a conventional light source inside a red channel letter, and all the light energy in the red wavelengths will shine through, creating a fairly bright letter face.

But what happens to all the green and blue light energy that the incandescent lamp is emitting? The red filter won't transmit those wavelengths; instead, it absorbs the light energy and discards it. All the energy it took to create that light is wasted.



The best solution, red AlInGaP (pronounced Alan-gap, signifying aluminum indium gallium phosphide) LEDs, produce virtually all their light at a single wavelength (within a tiny range of approximately 50nm). We order red LEDs, not by name, but by wavelength -- 630nm or maybe 615nm for red-orange.

LED channel-letter modules also have the edge because all lumens (the unit of luminous flux) emerge at the front. It can be directed to illuminate the face more efficiently. Neon radiates light 360° around the tube, but in channel letters and building accent strips, much significant light is lost into the back of the enclosure.



Neon channel letters and building accent strips are the next major markets targeted for LEDs. Despite LEDs' higher initial cost, owners can save on energy costs, as well as maintenance. These systems' energy efficiency depends on the transformers and number of resistors used in the LED circuit. Comparing equally luminous letter faces, depending on the color, savings estimates range from 75%-90%.



Lighting Source: LED vs Neon  
Power Consumption: 10 W vs 180 W

## But how long will they last?

There's no solid answer to that question. With no moving parts, glass or filaments to break, LEDs are extremely rugged -- tough enough for traffic-signal and automotive applications. They won't last forever, but an LED product won't fail with a pop and a flash like an incandescent lamp. Existing applications have been in place for only the past few years. Where quality products were installed properly, failures are minimal. The expected average lives of these products are 10 years.

Most LEDs don't fail, they just fade away. Light loss over the years necessitates replacing LED products. The brightness of exit signs and traffic signals is strictly regulated by life-safety building codes. Signage has much looser brightness requirements, and, in some cases, LEDs may be replaced even though they're still operating.

Life ratings approach 100,000 hours for red, with less than 20% light loss. New technologies claim those same numbers for all colors -- for white, 50,000 hours with less than 30% light loss. That relates to 10 years at 12 burning hours per day.

There's no hard proof that today's generation of top-quality, brilliant, energy-efficient LEDs will last 100,000 hours. Come back in five years, and we'll see.

Quality, white LEDs with good efficiency and life will replace many older style sign configurations. A channel letter doesn't have to be 6 in. deep any more. By thinking outside the box, new sign construction methods will be based around the new technology.



## **In Summation.**

### **LED Channel Letter Modules offer the following advantages**

#### **Ultra Wide Emitting Angle**

Our Channel Letter Modules have been developed especially for sign illumination applications. Unique packaging of the ultra high intensity light emitting semiconductor chips results in uniform illumination throughout the wide emitting angle. In fact, the LED Channel Letter System will illuminate most 8 inch stroke channel letters by using a single row without creating "hot spots" and will illuminate most channel letters with depths as low as 2.5 inches.

#### **Neon Sign Retrofitting**

Flexibility and ease of installation makes our Channel Letter Module ideal for on site retrofitting of existing sign lighting systems. There is no need for sign removal or sign replacement.

#### **Enhanced Safety**

The LED light unit eliminates the need for the high voltage power as with neon lights, and thus improves greatly in fire and health safety.

#### **Energy Savings of up to 90%**

The LED lighting is very energy-efficient comparing to fluorescent and neon lights, with up to 90% saving of power consumption.

#### **LED Modules do not contain Glass / Rugged Structure**

Our Channel Letter Modules do not have any glass material in the manufacture; therefore they are more rugged and resistant to shock damages. Channel Letter Module glow immediately when the power is turned on, which means it does not have cold start problems that come with fluorescent and neon lights.

#### **Long Lifetime**

Our LED components are rated at 100,000 hours, or 11.4 years, of lifetime expectancy of continuous use at the recommended current.

#### **Virtually Maintenance Free**

The long life feature also makes Channel Letter Modules virtually maintenance free, and a much more cost-effective investment than fluorescent and neon lights, which have typically 10,000 to 25,000 hours of lifetime only.



## **Easy of Installation**

Channel Letter Module is designed for easy installation in new channel letter signs, as well as existing signs. The Channel Letter Module units can be serially connected via small wire harness and installed inside the channel letters with double sided tape as required. The LED lighting source generates little heat and thus does not require special mounting parts. The Channel Letter Module units are energized by our field-proven high performance power supply, which converts 110-240V AC into low-voltage current.

## **No Bio-hazardous Material**

LED is solid-state lighting technology, and therefore the Channel Letter Module does not contain bio-hazardous materials as those found in neon and fluorescent lights. Together with its energy-saving feature, Channel Letter Module is simply a better environmental-friendly choice.

**LED CHANNEL LETTER MODULES ARE THE CHOICE OF THE FUTURE.**