



## Marketplace

### Turbulence in the LED World

What it Means to You and Your Designs

As you well know Lumex has been in the Opto Component business for over 25 years and has kept the promise of superior service and support from early design assistance all the way to volume production. As we say, same name and the same people in the past and in the future.

As you may be aware, all the parts of the Agilent/HP LED business have been sold and or taken over by the consortium partner. The Agilent portion was sold to private equity and their LumiLeds share was taken over by the mighty Phillips. Many parts have been discontinued and many designers are left hanging at their mercy. Many of your favorite distributors were also cut off from these parts.

You know that when parts are discontinued then service will suffer if not compromised. Changes like this are always disruptive and they are taking their toll among the many Agilent/HP LED customers. Lumex can help now or in the future. If you need to cross Agilent parts our Lumex technical sales group will be able to assist you and provide you a solid alternative.

We also know that a Taiwanese company bought the old Monsanto/General Instrument/Quality Technologies/Fairchild business unit. We know that they will be looking for "volume" business only. They now actively abandon many low to medium volume requirements. Lumex can support most of these orphans and falling angels.

Yet, another reason why Lumex/ITW should be your choice for LEDs and LCDs. We plan to be around for a long time and will support you to overcome problems with discontinued parts and naturally all your present and future needs.

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## Selecting the Right Display for White Goods Applications

by Steve Sievers and Yasoob Ahmed, Lumex, Inc.

The days when all washers and dryers were finished in white enamel and had a couple of large electromechanical dial/controllers, are fading into the past. Today's consumers are looking for increased variety, sophistication and added features, in the major appliances they buy for their homes. As a result, there is a greater need, as well as opportunity, for the incorporation of displays which enhance the 'human-machine interface,' allowing for more user control, more feedback of information and many more features.

### History and Trends in White Goods Applications

Historically, the term 'white goods' has been applied to large household appliance finished in white enamel. This includes washers, dryers, stoves, refrigerators, freezers, ovens, dishwashers, and so on. Today, these products are available in virtually any color and material, such as brushed stainless steel.

While the number and types of appliances have grown over the years, there have been a number of general marketplace trends underlying this growth. Many consumers are interested in appliances which are more energy efficient, and which use less water. The leading edge of this movement may be in Europe and Asia, but today, many American consumers are looking for appliances with higher energy efficiency as well.

Another trend in the white goods marketplace is the development of more high-end models. Affluent consumers are looking for the highest performance, the most features, and an up-scale appearance. White enamel simply won't 'cut it' in the kitchens and laundry rooms of today's homeowners.

To facilitate the incorporation of these features, consumers need a more sophisticated human-machine interface. The classic rotary electro-mechanical dial does not provide enough information, and is not a practical way for users to choose among the numerous set-up options on today's high-end appliances. A more comprehensive interface is needed, and a variety of display technologies are available for providing such an interface.

### Choosing the Right Display for the Application

How does a designer choose which type of display to incorporate into a stove, oven or dishwasher? As general guidelines, the following characterizations can be helpful:

- **LEDs** - high brightness and saturated color are good for safety warnings and/or display of basic information. They are very rugged and have virtually unlimited lifetime.
- **LCDs** - display more complex information. Backlight often needed. Full color graphic displays are excellent for high-end models, but they are pricey.
- **VFDs** - provide the display capabilities of LCDs with brightness levels approaching that of LEDs. Generally, these are the most expensive. Complex power supply-drive issues can be avoided by using today's integrated VFD modules.

### Generally, the choice of which display to use comes down to 3 basic criteria:

#### 1. Type of Information to be Displayed

When graphics or intricate characters must be displayed, LEDs are ruled out, and LCDs or VFDs become the display of choice. If warning messages, such as 'hot surface' must grab the user(s) attention, LEDs offer the intensity and saturated color which is ideal for that purpose.

#### 2. Budget Available for the Display

In an apples-to-apples comparison of the most basic display types, simple LCD panels are the least expensive, followed by LEDs, VFDs and monochrome or color LCD modules. This rank ordering may change if the appliance already includes a microcontroller and can provide serial or parallel data in a form the display can use directly. This might allow the use of a controller-less display, reducing the cost. However, the designer must look at the offsetting cost of providing the required power supply, if display modules are not used. When a budget is extremely tight, displays are generally not used at all. Instead, simple on-off indicators, such as individual LEDs, neon glow indicators or indicating mechanical switches, are employed.

#### 3. Marketing/Appearance Considerations

Because an LED, LCD or VFD could technically be used in virtually any white goods appliance, the choice often comes down to a marketing decision on product features or desired price points. Which display type will provide the appearance that the stylist is hoping to convey? Which display type will offer features or benefits to the end user, which will translate into a competitive advantage? Which display type will allow the quickest integration into the appliance, allowing the quickest time to market? In consumer goods, these types of decisions are often more important than the specific technical details behind each display type.

### Typical Selections

Although today's display technologies offer a wide degree of flexibility and offer designers almost unlimited choices, Lumex does see some general trends among the appliance manufacturers:

- **Ovens** - VFDs or LEDs most common
- **Washers & Dryers** (high-end) - LCDs, particularly graphic devices
- **Microwaves** - Could be LEDs, LCDs or VFDs, all are applicable
- **Dishwashers** - LCDs most common

As white goods continue to grow in sophistication, there will be an increased push toward the use of displays. This is likely to result ultimately in the use of full graphic displays for the highest-end models, with character displays in most others. The choice of specific type will be made by the marketing positioning of the appliance. The continuing growth in the use of modules will reduce the burden on appliance designers to 'start from scratch' when designing displays into their products, and more so if microcontrollers are present to manage the functions and features of the appliance at hand.

# ROHS

## Lumex Parts are RoHS Compliant!

The RoHS Directive stands for "the restriction of the use of certain hazardous substances in electrical and electronic equipment". Effective July 1, 2006, this Directive will ban the placing on the EU market of new electrical and electronic equipment containing more than agreed levels of lead, cadmium, mercury, hexavalent chromium, polybrominated biphenyl (PBB) and polybrominated diphenyl ether (PBDE) flame retardants.

Majority of Lumex parts are now RoHS compliant. Lumex Part numbers starting with the prefix listed below is in compliance with Directive 2002/95/EC on the restriction of the use of certain hazardous substances in electrical and electronic equipment (RoHS Directives).

### RoHS Compliant Series List

CCL	SML-LX0805	SFF-LXH	SSL-LX3059
GT-BC	SML-LX1106	SFF-LXH4RA	SSL-LX305C4
GT-BG	SML-LX1206	SSH-LX	SSL-LX305D8
GT-CM	SML-LX1210	SFL-LXH	SSL-LX305F4
GT-NE	SML-LX15	SFL-LXR5010	SSL-LX3064
GT-NY	SML-LX23	SFL-LXR5020	SSL-LX306F4
LCD-	SML-LX2832	SFL-LXN730	SSL-LX308F4
LCM-	SML-LXF0805	SFL-LXMP	SSL-LX3353
LDC-	SML-LXF1206	SFL-LX4673	SSL-LX3ARG4
LDD-	SML-LXFM0603	SFL-LX3	SSL-LX3T453
LDF-	SML-LXFT0603	SFL-LX5	SSL-LX4064
LDG-	SML-LXFT0805	SFL-LX8	SSL-LX4073
LDM-	SML-LXFT1206	SFL-RM	SSL-LX40FT3
LDP-	SML-LXL1206	SSL-LX100133	SSL-LX433
LDQ-	SML-LXL1209	SSL-LX15	SSL-LX4673
LDS-	SML-LXL1210	SSL-LX15583	SSL-LX50133
LDT-	SML-LXL1307	SSL-LX1847D4	SSL-LX50493
LPA-	SML-LXL238	SSL-LX203C	SSL-LX5063
LPB-	SML-LXR1206	SSL-LX20333	SSL-LX507DT3
LPI-	SML-LXR44	SSL-LX20465	SSL-LX5093
LPI-	SML-LXR85	SSL-LX20483	SSL-LX5097
OCP-	SML-LXR851	SSL-LX20R6	SSL-LX5098
OED-CL3054	SML-LXR856	SSL-LX22R13	SSL-LX5099
OED-CL5093	SML-LXT0402	SSL-LX2344	SSL-LX50FT3
OED-CL-8L/R	SML-LXT0805	SSL-LX2473	SSL-LX5573
OED-ELRD	SNW-	SSL-LX25493	SSL-LX80113
OED-EL-1L2	SSA-LXB	SSL-LX25583	SSL-LX88123
OED-SP	SSA-LXH	SSL-LX25593	SSL-LXA1725
OED-SR	SFB-CEL	SSL-LX2559D3	SSL-LXA227
OED-ST-392T-TL	SFB-CER	SSL-LX2573	SSL-LXA228
OED-ST-44F	SFB-COB	SSL-LX2577	SSL-LX3052
SLX-	SFB-LX	SSL-LX25783	SSL-LXA3025
SFX-	SFF-EX2573	SSL-LX2579	SSN
SMF-	SFF-H	SSL-LX2583	SFP-LX6144
SML-DSP	SFF-LX3P74	SSL-LX3034	SSS
SML-LX0402	SFF-LX453	SSL-LX3044	STF
SML-LX0603	SSL-LX0603	SSL-LX304F4	
SML-LX0606	SSL-LX30FT4	SSL-LX3054	

This list is also available on our website, [www.lumex.com](http://www.lumex.com), and click the ROHS symbol or go directly to the link, [http://www.lumex.com/tech\\_notes/RoHS.pdf](http://www.lumex.com/tech_notes/RoHS.pdf).

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# Smart Solutions

## Bi-color, Water Resistant, Daylight Visible Indicator

**Customer's Problem:**  
**Our Opportunity to Show Our Skilled Focus:**

The customer needed a bi-color red and green indicator light for the foot pedal of a trolling motor they manufacture. The design called for a daylight visible and water resistant indicator. However, customer had no luck in locating an LED that could meet both requirements so they were resigned to redesign the foot pedal without indication.



Part Number:  
SSH-LXH9ZIC31574  
SSL-LXH9UPGCD31574

## Lumex Saves the Day:

Lumex modified our existing SSH-LXH9 one-piece, rubber molded holder to accommodate our customer's water resistant specification and used our brightest four element AllinGaP and InGaN technology LEDs to meet their red and green color with daylight visible requirements.

## Benefit to customer:

We provided the customer with a design solution through a slight modification to one of our existing toolings, which allowed the customer to use their original design at a minimal cost. It did require multiple cavity casting mold modifications but we rushed it through.

## Oval Shaped Backlight

### Customer's Problem: Our Opportunity

The customer wanted to backlight an oval shaped brand emblem for one of their motorcycles. The design could not allow for the backlight board to exceed the perimeter of the emblem and thus the overall size of the backlight had to match the shape of the branding emblem.

### Lumex's Permanent Solution:

Lumex designed an edge-lit, oval, white LED, backlight using staircase methodology.

### Benefit to Customer:

The designed solution was tailor made to the unique specifications of their emblem. We provided an even brightness across the surface of the backlight eliminating detracting hot spots. This resulted in an ornamentally attractive accent to their motorcycle without any obvious evidence of the unique underlying technology.



Part Number:  
SSB-CER7247UWW-OVL

## Lightpipe For Board With Limited Space

### Customer's Problem: Our Opportunity to Solve a Problem.

Our customer needed a multiple color indicator light, which would be positioned above an existing board edge connector they were designing. The board had space limitations, which only allowed for limited space behind the connector to install the lighting required.

### Lumex's Permanent Solution:

We designed a special lightpipe to transport the light from behind and above the connector to the edge of the board it was designed with a snap feature, which, latched onto the top of the connector and held it in place. In addition, we used an RGB LED source to allow the lightpipe to transport multiple colors of indication.

### Benefit to customer:

The customer was required to make only minimal changes to their existing PCB and the RGB LED source used allowed them to create any color variation they need for their status indication. An affordable and full spectrum solution in one! Only from Lumex!



Part Number:  
LPP-C0113065