

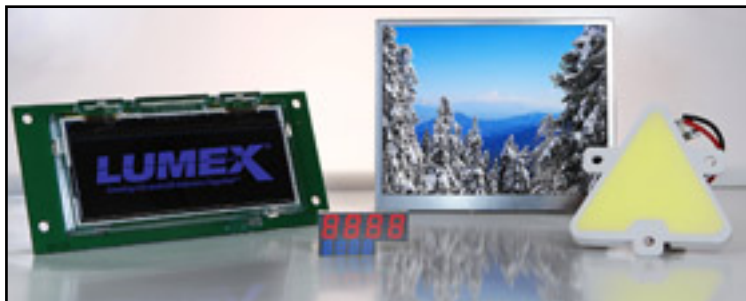
Benefits of Custom LED & LCD Technology

Jeff Oliveros, Director OEM Products, Lumex



One of the most significant developments in the global optoelectronics and display markets over the past few years has been a complete revolution in the value proposition offered by custom technologies. Recent technological advancements have radically redefined industry notions about the inherent benefits and drawbacks of custom versus standard technologies.

Understanding how custom technology has evolved, the unique benefits it provides end users, and the process through which quality providers create custom solutions can help brands speed time to market, identify cost savings, improve product performance and enhance brand differentiation.



Over the past five years, there has been a radical improvement in the quality, cost and speed of custom LED and LCD product creation.

The Evolution of Custom LED & LCD Technology - Updating Outdated Assumptions

For much of the past 20 years, custom LED and LCD technologies were commonly associated with enhanced application-specific performance but also with higher costs, long lead times and reduced reliability. Over the past five years- technological advancements have completely redefined how custom technology performs on each of these fronts.

Cost

In the past, custom technologies were often more expensive than their “off-the-shelf” counterparts due to the need to create custom tooling and pay for design

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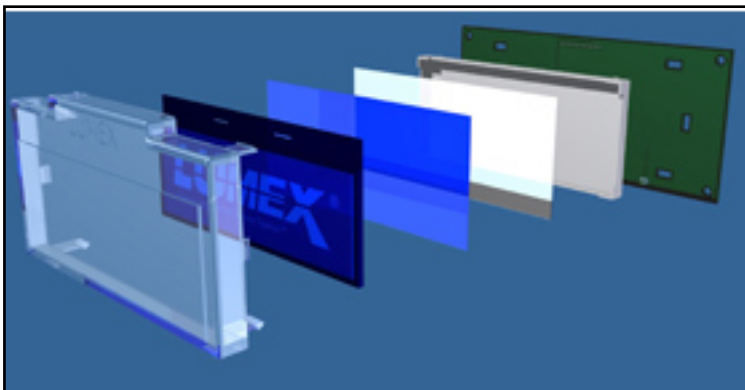
engineering expertise for product design. Happily, this is no longer the case. Over the past few years, technological advancements have significantly brought down the cost of tooling materials. At the same time, many quality LED and LCD suppliers have started offering complimentary design engineering support to customers looking to create custom solutions. These two developments combined with the many process simplifying and performance enhancing benefits of custom technology (outlined below) mean that oftentimes custom technologies are less expensive than standard technologies over a product lifetime.

Lead Times

The time it takes to deliver a custom solution – from product design through delivery and production -- has also been dramatically reduced in recent years. As custom tooling has been simplified and quality suppliers have developed expertise in the specific challenges of custom technology development, processes have been streamlined resulting in shorter lead times. Whereas previously a custom technology could have a lead time of three to four months, today custom technologies can have lead times as short as two to four weeks for LEDs and four to six weeks for LCDs.

Product Reliability

It is also no longer appropriate to view custom technologies as less reliable than standard products. Over the past several years, quality suppliers have developed significant expertise in developing consistently high-quality custom LEDs and LCDs. A good supplier can deliver products with less than 50 to 100 parts per million (PPM) failure rates.



A quality LCD provider has the technical expertise to create a custom LCD specifically tailored to an applications performance and cost needs and can integrate this optimized technology into a comprehensive solution.

Benefits of Custom LED & LCD

Technology

There are several key cost and performance benefits that custom LED and LCD user interface technology provides when compared to standard off-the-shelf technologies.

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Cost

The ability of a quality supplier to identify the most effective technology for a particular application and create a streamlined production process that integrates various components (like light pipes, switches, connectors, PCBs, etc.) in the most efficient way possible generates cost savings in a number of different ways.

- As a single custom LED or LCD supplier can provide a comprehensive custom solution, the number of suppliers needed is reduced, reducing procurement costs.
- Acquiring various components through a single supplier allows for a single bill of materials, simplifying accounting processes and reducing transaction costs.
- As quality LED and LCD providers today offer complimentary product integration support for custom technologies, expense on design engineering is saved as design engineers no longer need to spend time and money researching individual components and integrating them in a way that ensures maximum efficiency. In addition to saving expense on design engineering, this also saves time on product development and speeds time to market.
- Cost savings can also be achieved through more efficient technologies. Because the product is custom-tailored to specific application requirements, cost savings are achieved by identifying the components that most exactly fit specific product demands. For example, energy savings can be generated if a high output / low power consumption technology can meet and fulfill all performance expectations (rather than over spending on high power that is not needed).

Performance

Due to their expertise in custom product design and integration a quality LED or LCD supplier can provide technology that meets and exceeds performance expectations in a number of ways.

- Enhanced reliability and reduced infant mortality is achieved by having experts identify and integrate the most efficient and effective components in the most streamlined manner into a total solution.
- Because the technology is custom designed for a particular application – it can be created with custom wavelengths or optics to match application needs in a way that off-the-shelf technologies cannot match.
- The ability to acquire a custom technology with unique performance abilities enhances brand differentiation and allows products to stand out in crowded markets.

The Custom LED & LCD Product Development Process

One good way to identify a quality LED or LCD technology provider is to study their custom product development process. The following three steps should be offered by a quality provider.

1. Focus On Application Needs

The first step of a custom design process should always be to ask questions in order to understand exactly what the customer's needs are for a particular application. Rather than pushing a customer towards a particular product solution already in their portfolio, a quality supplier will instead put their focus on customer needs and identify a solution that is custom-tailored to an application's specific performance

and cost requirements.

2. Provide Expert Design Support

A quality supplier will provide expert and complimentary product design support. Further, a quality supplier is flexible enough to provide this support in the way that best matches the application needs. For example, a quality supplier is ready to design a solution from scratch or help tweak an existing product design. Several design options should be presented that meet and exceed expectations. Also a quality supplier provides complementary custom product design support for small, medium and large volume products.

3. Streamline Entire Production Process

Custom product development is not completed until the product has passed through the entire production process – from in-bound inspection, to production, to in-field performance. A quality supplier not only provides tips on how to streamline the entire production process for maximum efficiency, they also have experts available worldwide to provide assistance in each step of the process. This helps ensure that the custom product designed for maximum efficiency and performance can in fact provide superior performance as the product moves out of design and into production and distribution. Quality LED and LCD suppliers have representatives worldwide to guide products out of the development process and through production in tangent with any contract manufacturers or other production partners.

In today's unique marketplace where design engineers must meet the growing demand LED and LCD technologies with reduced resources due to global economic conditions, it is key to stay up to date with the very latest being offered in the way of custom technologies. Identifying a quality custom LED or LCD supplier can have a significant impact in obtaining the best possible technology for your specific performance needs.

Author's Biography

Jeff Oliveros is Director of OEM Products at Lumex. He has over 15 years expertise in the design and creation of custom LED and LCD technologies.

About Lumex

For 30 years Lumex has been a global leader in the optoelectronics industry, with the broadest range of high efficiency, high performance LEDs and LCDs in the industry. With thousands of standard products and a focus on semi-custom and custom designs, Lumex is a valuable resource for quality and innovation. Lumex's optical range encompasses a wide spectrum including UV, visible and infrared wavelengths. Lumex's team of Technical Design Specialists are experts in collaboratively developing effective, smart solutions from the most complex design dilemmas.

Lumex has a global footprint with the worldwide headquarters outside Chicago and the Asian headquarters in Taiwan. With manufacturing capabilities in the United States, China, Taiwan and Thailand, Lumex is able to support over 23 end markets with more than 80,000 customers both directly and through our distribution channel

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partners. Over the last 30 years, the name Lumex has become synonymous with quality and performance around the world.

About ITW Photonics Group

The ITW Photonics Group was created to bring together and build on the technical expertise of individual companies that specialize in photonics technology and span the full spectrum of wavelengths. The group consists of:

- * Lumex - LED and LCD technology
- * Cal Sensors - IR Detector and Emitter technology
- * Opto Diode Corp - LED, Silicon Photodiodes and Electro-Optical Assembly technology

The synergy of these three industry front-runners provides an unsurpassed range of photonic capabilities within a broad spectrum of markets, including medical, military and industrial controls. The ITW Photonics Group provides integrated solutions that encompass the technology and experience from all three business units, offering design engineers higher performance with greater feature enhancements.

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