SHARP / NEC

Laser Projectors in Digital Signage

Projection has long been part of the digital signage toolbox, and the advent of laser projectors make it an even more viable solution.

Summary

Projection offers a unique opportunity in digital signage. They can be used to create signage much larger than traditional digital displays and deploy that signage in areas that simply aren't suitable for a digital screen.

Still, the price of projector lamps and the inevitable decline in brightness of those projectors has hampered the widespread adoption of projection-based signage.

The development of laser projectors, though, is opening the door to the increased use of projection-based signage. Projectors make up about 25 percent of the overall digital signage market, with laser projectors making up an increasing share of that segment. Laser projectors are expected to make up 68 percent of the overall projector market by 2019, according to London-based research firm Futuresource Consulting.

Why projection?

The new technology of flat panel screens (vs. deep CRT's) fueled growth in the digital signage market, similarly laser projector technology is expanding solutions for the industry.

And those situations come up more often than one might think. While projection is not likely to overtake flat panel displays as the preferred method of delivering digital content, projection is the perfect way to fill out the digital signage toolbox.

So why would someone choose projection over a digital display in a deployment? There are several scenarios where projection would be the better choice.

"The main reason to choose projection is for its flexibility in producing larger images from a single projector and ability to create unique shapes," said Richard McPherson, senior product manager at Chicago-based digital display and projector maker Sharp NEC Display Solutions. "Flat panels that are readily available top out at 98 inches for LCD and there may be situationswhere a deployer wants a larger, more creative canvas."

Of course, a video wall consisting of multiple screens may be the answer, but the setting might not lend itself to such a display. In some situations the location may not be designed to support the weight of several displays or it may not have access to the power supply and wiring needs to support those displays. Also, despite decreasing bezel sizes, deployers may prefer a seamless image rather than one spread across multiple screens.

And of course, along with size comes cost concerns.

"In simple terms, up to a 60-inch to 70-inch display, all things being equal the flat panel gets the nod in cost," said Alan Brawn, principal of Vista, California-based audio visual consulting, training, educational development and market intelligence company Brawn Consulting. "But when you go over the 'magic' 80-inch to 90-inch sizes, then the cost advantage can tilt toward projection."

Areas with high ambient light can also lend themselves to projection because the projectors can deliver content at a much higher brightness than traditional displays. Combining a projector with a camera can add interactivity, allowing viewers to manipulate the image shown.

But probably one of the most innovative uses of projection technology is involving odd sizes or surfaces.

“In order to capture people’s attention, you have to hijack imaginations by doing something that people have not seen before,” said Obscura’s Travis Threlkel in the TED article, Sharing Ideas at Massive Scale.

For a more modest application, consider a situation where a retailer plans to open a new location in a mall or on a well-traveled street. Although a printed “Coming Soon” sign might serve to alert potential customers, imagine the buzz that could be created by using rear projection to display an image on the store window.

“We’re seeing a lot of people do temporary deployments in scenarios where they don’t want to put something up permanent,” said Rich Ventura, vice president of business development and solutions with NEC. “When the new store opens or the product rollout is in place, that projector and related equipment could simply be packed up and moved to the next location.”

The shift to laser

Of course, one of the drawbacks to the use of projectors in digital signage has been the relatively short lifespan of projector lamps and the high cost of replacing those lamps. The expected life of a lamp varies based on the projector and the type of lamp, but most lamps provide about 3,000 hours of use, and new lamps can cost as much as $750 or more.

In addition, most projector lamps dim as they age, resulting in a washed-out image that can end up detracting from the message the deployer is trying to convey.

Solid state light source projectors, on the other hand, use either LED devices or laser diodes as a light source, eliminating many of the issues associated with lamp-based systems. Laser projectors offer a lifespan of 20,000 hours or more.

Laser projectors also produce a much higher brightness than lamp-based systems – up to 70,000 lumen with (RGB laser projectors) compared with 2,000-12,000 lumens for a typical lamp-based system – with that brightness decreasing at a much slower pace over time. Those projectors also offer a greater degree of color uniformity, higher contrast and a wider color gamut than a lamp-based system.

Anyone who has used a lamp-based projector knows that it can take anywhere from 30 seconds to several minutes for the system to warm up. Laser projectors, though, offer an instant-on capability. For someone using a projector to deliver a presentation, that capability can help avoid an awkward period of killing time while they wait for the projector to reach full brightness.

And the absence of bulbs as well as a lower operating temperature means laser projectors are generally maintenance-free, even in 24/7 operation, and the lower energy consumption means an accompanying reduction in operating cost.

“There are numerous benefits to these laser projectors, but the bottom line is that they ad dress the needs of the market and will be adopted in growing numbers,” McPherson said. “Their qualitative brightness superiority and potential for energy savings combined with the significant reduction of maintenance cost makes it likely that they eventually replace lamp-based projection systems as the primary projection light source in the future.”

Laser technology comparison

There are three important laser projector technologies available, consisting of:

LED light source

This was the first solid state projector type, commercialized in the late 2000s. It is limited in the light output and mainly used in specialty markets. LED systems include only red, green and blue LEDs to produce images that adhere to the SMPTE color space.

Benefits

- Small form factor.
- Color Rendition.
- 20,000 hour life time.
- Higher resolution (up to native 4K).

Considerations

- Limited brightness capability.
- Limited screen sizes.

Laser Phosphor Light Source

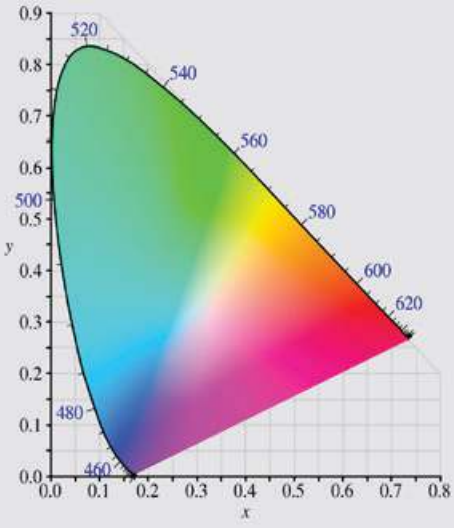
Laser-illuminated projectors use arrays of laser sources illuminating a micro mirror display engine. In the most common laser phosphor approach, blue laser is used for creating the blue color in the final image, the blue laser is also used to illuminate a yellow phosphor wheel, which emits yellow light. This yellow light is then split by a prism or color wheel into green and red light. Maximum color space is limited to the SMPTE standard.

Laser/phosphor systems consist of a solid state light source combined with phosphor to produce images that adhere to the SMPTE color space.

RGB Laser Light Source

RGB laser projectors use “pure laser” technology, with red, green and blue lasers delivering the light directly. The product of this technique is an absolutely pure colored light that is split into the three channels. The light is emitted in a very narrow band in discrete frequencies. This makes it possible to realize a color space that reaches BT2020, exceeding even that of AdobeRGB.

RGB laser is the only true “pure laser,” producing the BT2020 color space using only lasers without the need for additional components such as LED or phosphor.



SMPTE color space

Benefits

- High brightness.
- True colors.
- > 20,000 hour life time.
- Large screen sizes.
- Installation flexibility

Considerations

- Mirrors SMPTE color space.

Benefits

- Highest color space available.
- Scalable.
- > 20,000-hour life time.
- Higher resolution (native 4K).
- Installation flexibility

Considerations

- Higher Cost.

Digital

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Sharp NEC Display Solutions of America

www.sharpnecdisplays.us