Projecting the Future

Turn any space into an interactive environment with projector technology

By Richard McPherson

Visualizing projectors may conjure images of the "3 … 2 … 1" film reel countdown seen on movie theater screens of yore, or of clunky classroom equipment wheeled around on a chalk dust-covered cart – but today's projectors couldn't be more different from these relics.

Advances in technology provide new levels of brightness, image quality and connectivity options, making projectors ideal for unusual or challenging applications, including areas with high ambient light, uneven surfaces or sharp angles, across a multitude of verticals.

Functional and Flexible

Projectors give designers and installers options not always available with digital screens.

For example, projectors using film or glass technology allow projection in windows to be visible when viewing content from both inside and outside the store. This is not possible with other display technologies.

Projection mapping, in which projectors flash images onto multiple types of surfaces (including stone, ice, metal and more), is an eye-catching way to display content in dynamic environments. For example, the Cleveland Cavaliers make a grand entrance when entering the arena at their home base, Quicken Loans Arena, where 3-D images are projected onto the basketball court.

Some applications even map content around digital displays to give a multidimensional look and feel, like at the Amsterdam RAI Convention Center, where content is projection-mapped around a video wall – giving convention center attendees a double dose of digital display technology.

Projectors also create redundancy. Projection stacking, or using multiple projectors overlapped on a screen, allows an image to be projected at a higher brightness, and also creates a backup in case one projector fails or shuts down.

They also are attractive to customers on a tighter budget, as the cost per square inch is lower for a projector than it is for a display, so customers get more screen space for less money. They are also ideal for spaces that cannot support the weight of a large digital display but need to show large-format content.

Installing Projectors: Best Practices

To maximize projectors' capabilities in digital signage projects, a few important pre-installation considerations include:

Lighting – both natural and artificial: A space with outdoor-facing windows may have a lot of natural light during different seasons and times of day, depending which directions the windows face, and all possibilities should be taken into account.

While projectors are much brighter these days, reducing ambient lighting near the screen still makes for a better viewing experience and better image contrast.

Viewing distance: Consider how far the screen will be from the projector, relative to the size of the screen. Most manufacturers will state the image size range at specific "throw" distances to the screen.
In some cases, it makes sense to use a projector with interchangeable zoom lenses (optional) for proper placement, although this will affect image size from a particular throw distance.

Screen size: Generally, one can calculate optimal screen size using a 4:1 ratio of where the screen is in relation to the furthest possible viewer – so if the furthest viewer is 32 feet away, the space needs an eight-foot screen. For larger text and graphics within the image, the ratio may change.

Brightness: While common knowledge dictates that brightness specifications in the 2,000 to 5,000 lumen range are suitable for many indoor applications, this is not always the case: Some environments may require more than 5,000 lumens of brightness to compensate for certain factors.

For example, with larger screens, brighter ambient light and longer throw distances, a projector with a brightness range of 8,000 to 21,500 lumens and higher is ideal.

Additionally, the screen material may provide the ability to gather the projected light and manipulate it for reflection in a certain direction, creating a brighter image. This ability is called "screen gain" and can be used to increase image brightness with a lower-lumen

projector. The location (viewing angle) of the intended audience needs to be considered, as the higher reflective properties of the screen will affect the offset angle.

<u>Video and data sources</u>: Customers may want to show content from video/data sources, such as Blu-ray players, laptops, tablets and other smart devices, on the projector. Common signal source connections include composite video, s-video, component video, HDBaseT, DisplayPort and HDMI with HDCP.

An established practice today is to transfer data from a source to a projector using a network. Some sources, such as HD video, are better sent via cable, because wireless network bandwidth may not be fast enough to ensure good video quality. If an integrator plans to set up cables to run to the projector, consider the optimal location for the cable connectors to be available to users.

After planning for traditional analog/digital input connections from local multimedia devices, the next thing to consider is network connectivity for accessing network content and remote administration.

Not all projectors need to be connected to a network, but it can be helpful from an asset management standpoint. An administrator can remotely monitor and manage projectors and even turn them on and off, extending the lamp life.

Exploring Laser Projector Options

While traditional projectors use lamps as a light source, integrators can offer customers a new option in laser projectors, which use solid-state light sources in lieu of lamps.

Solid-state light sources come in different forms. LED (light-emitting diode) projectors are on the low end of the brightness scale, but are effective for smaller screen sizes. Laser phosphor projectors come in different forms, from the simple blue laser and phosphor, to blue laser with phosphor and red or green LED, to blue and red laser with phosphor. At the high end of the brightness scale, RGB laser is available and provides users with an expanded color space up to and including Rec. 2020.

Lasers have a lifespan exceeding 20,000 hours – up to 10 times as long as traditional installation projectors using lamps. That means the laser projector, in most applications, will last more than six years (depending on the usage model), compared with projection lamps, which may need to be replaced within a year or two.

While the initial investment for laser phosphor is greater, its longevity adds up to big savings for budget-conscious customers. Going lampless also saves on time and maintenance. As an added bonus, some laser projectors do not require filters that would need changing every few months, making the savings even greater.

Moreover, the multiple lasers comprising a solid state projector create a bright and brilliant image, but also help minimize the chances of a dark screen and loss of content. The system's electronics work together to compensate for the brightness and color levels, in the event that multiple laser diodes stop working.

In addition to the overall lifespan of the laser projector, its brightness decays very slowly, so the image stays uniformly vibrant for longer. Colors stay vivid and images remain sharp. Newer laser phosphor projectors even offer 4K capabilities.

Ensuring the Right Solution

The key to a successful project is always finding the right solution for the right application. Projectors create a memorable experience by amplifying interactivity and engagement, allowing integrators to turn any space into a dynamic environment – and boost their own business by ensuring customer satisfaction.

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