Outside the Digital Signage Box

Workbook
Empowering the Connected Enterprise

Today’s enterprise is a fast-moving environment with a distributed workforce and a wealth of constantly changing information. The X2O platform empowers all employees with tools to create visual communication channels linked to real-time information sources and push them to the right person, on the right screen, at the right time. It integrates with existing corporate tools like SharePoint®, Lync®, SAP®, and many others. Cutting through the clutter and noise, the dynamic, connected channels significantly improve communications and decision-making.

Applications:
- **Connected Desktop** - Create and watch dynamic channels right on your desktop
- **Connected Workplace** - Allow multiple users to collaborate in a shared visual workspace
- **Connected Workplace** - Engage and communicate with your employees through a network of connected screens and devices
- **Connected Workforce** - Share real-time content with remote workers, building a global community of connected users

For more information on the X2O platform, contact us today:

@x2omedia | youtube.com/x2omedia | sales@x2omedia.com | www.x2omedia.com

NewBay Media’s AV Technology Magazine “Out of the Box Award,” was created to recognize original thinking, creativity, and design in a digital signage installation. But make no mistake, this is about way more than hardware or software—it’s about pushing the imaginative terrain.

In 2015, the inaugural winner is the Viacom headquarters in New York City’s iconic Times Square, at 1515 Broadway. With dynamic and immersive elements, interactivity, sleek design, dazzling visuals, a smart infrastructure, and a live content management strategy would make any media company jealous, this AV project sets a new standard. The AV Technology team congratulates everyone involved in this project, and hopes it serves as a stellar example of innovation for the AV industry.
When so much thought is devoted to designing and crafting every architectural detail, digital signage should reflect that effort. LG offers the most elegant, versatile solutions, like the new VH7B (shown) with the industry’s thinnest bezel, along with simple installation and endless customization. And with IPS display technology in every LG Commercial Display model, it looks good from almost every angle, just like the professionals who choose LG.

LG Digital Signage solutions provide:

- Cutting-edge, industry-leading design
- Versatile installation options
- IPS screen technology for a dependably beautiful picture

LG’s VH7B is not only beautiful but also highly functional, making it a great choice for those looking to enhance their digital signage. Find out more about LG’s incredible VH7B and beyond at amazingdisplays.com/hospitality.
Christie® Velvet™ LED tiles are simply brilliant. Combining stunning image quality, efficient operation and long life with a modular design that’s flexible enough to build spectacular display walls of any size or shape, they are sure to make a lasting impression.

cristiedigital.com/led
For more than 100 years, Times Square has been known for its bright lights and iconic New Year’s Eve Ball. Shining even brighter today, LED displays cover nearly every available façade used to advertise products, promote Broadway productions, and engage the more than 300,000 pedestrians and another 115,000 people traveling through by car or bus, every day.

In 2012, Viacom, the entertainment company that owns, among others, the brands MTV, VH1, BET, Nickelodeon, Comedy Central, TV Land, Spike, and Paramount Pictures, renewed the lease at their New York City headquarters located at 1515 Broadway, between 44th and 45th Streets.

WAY Outside the Digital Signage Box

by Cindy Davis

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While blazing in LED glory on the outside, the main lobby of the media giant responsible for creating some of the most distinctive brands in the media business lacked the branding, and “wow factor” that the company was seeking.

ENVISIONING EXPERIENTIAL BRANDING

“The goal of the Viacom project team was to provide eyecatching technology that would create a unique media experience for employees and visitors alike, combining channel branding with the artistic talents of Viacom’s industry-leading creative teams,” said Mike Bivona, vice president of Broadcast and Production Engineering for Viacom Media Networks. To drive the architectural vision, Viacom’s Core Services team engaged with Studios Architecture to design the second-floor lobby entrance and architectural design firm, Gensler, to transform a space once used as a tape library into a much needed event space. This became known as the “White Box.”

In keeping with that of a media company, the architectural vision called for displays throughout the spaces, but with content that needed to transcend far beyond basic digital signage. “To fulfill this vision the project required a blend of technical expertise, ranging from traditional AV to television production,” said Bivona. At the end of 2013, while still at the conceptual phase, Viacom tapped Bivona to lead the technology portion of the project. “Without a doubt, expectations around the creative and visual impact were sky high,” Bivona explained. “Our challenge was to balance those expectations with technology that fit within the architectural vision.
Case Study: Viacom Headquarters

Vision, and McCann had the expertise to bring that vision to reality," said Viacom senior director of Production Technologies, Bill Anchelowitz. Now Viacom had the team to execute.

CONTENT VISION, PLANNING AND COLLABORATION
"At the end of the day technology provides the canvas, and creative makes it come to life, so it’s a partnership. We worked hard to provide the best possible technical environment without limiting creativity," said Bivona. The content strategy and plan for the lobby and White Box digital environment are under the domain of Catalyst, Viacom’s internal branding, marketing and creative agency.

Cheryl Family, Viacom’s senior vice president, Brand Strategy and Creative, and the head of Catalyst, worked closely with senior management to develop a clear vision for the screens. “They were to serve as a canvas that celebrates Viacom’s content, creativity and talent,” said Viacom Executive Producer and Vice President of Video and could be sustainable on a day-to-day basis.”

1515 Broadway is not only Viacom’s corporate headquarters it is also the creative and technical hub for many of its brand activities. This location is home to some of Viacom’s live production studios, as well as many content creation workgroups that would be contributing content to this new experimental environment, all supported by Viacom’s Media & Technologies Services (MTS) group. “It took multiple technologies teams working together, lead by MTS’s Production Technologies group, to make this project a success. Going into the process we also understood the need for external expertise to help deliver this cutting edge experience, so we decided to bring in a media design firm and AV system integrator,” said Bivona.

This led to introductions to audiovisual design firm McCann Systems, and architecture, planning, and design firm, Rockwell Group, both instrumental in creating innovative digital installations. “The LAB at Rockwell provided the creative, architectural vision, and McCann had the expertise to bring that vision to reality,” said Viacom senior director of Production Technologies, Bill Anchelowitz. Now Viacom had the team to execute.

GRAND ENTRANCE
At the end of the hallway, just past the elevators, are two side-by-side, 4-foot-wide by 15.61-foot tall, motorized, 480 pixels wide x 1680 pixels high video panel doors. When these remarkable video doors, called LED Blades, are opened, they reveal Viacom’s event space called The White Box. The LED Blades were designed, engineered, sourced, and assembled by McCann Systems. Christie Digital, 2.5mm pixel pitch, LED panels were chosen for the LED Blades, and help set the stage for the experience awaiting.

VIACOM ENTRANCE; THE VIDEO WALLS
1515 Broadway comprises two mirror-image entrances: one on 44th Street, and one on 45th Street and Broadway that lead up to the second-floor lobby of Viacom. Passing through the turnstile, and after the security desk, employees and guests are greeted by two massive video walls on the outside of elevator bank walls, made up of 16, 55-inch, LG Super Narrow Bezel Video Wall panels set up in a 4 x 4, landscape configuration, creating a combined 16:9 aspect ratio.

Outside the Digital Signage Box | AVTechnology Manager’s Workbook
Case Study: Viacom Headquarters

Avnetwork.com

Outside the Digital Signage Box

Tips for Managing Dynamic Content

Viacom’s Executive Producer and Vice President of Video and Motion Graphics for Catalyst, Matt Herron, and Director of Screen Content, Matt Hanson share some valuable insight that can be applied to any organization managing the digital signage content experience.

Herron: We try to keep at least a two-month lead on events, which gives us enough flexibility to stay topical in the moment, while also being agile enough to handle the demands we receive on a daily basis. The cool thing is the more we create, the larger our library gets, the more the ever-expanding content itself becomes our safety net.

Hanson: We definitely took a very formulaic approach when designing the system. Instead of spending a significant amount of manpower up-front, we designed a really dynamic content network. Because impression times in the lobby vary greatly from person to person, we needed to make sure that it never looked like they were watching the same thing over and over.

Herron: Lead with strategy and play to your strengths. Establish a solid foundation; define your workflow, roles, and responsibilities. Once you have that system in place, and it’s functioning properly, then you’ll have some space to start getting ambitious and go outside your comfort zone. You never know who is going to come through that lobby, so make sure you’re always putting your best foot forward, and the identity that you are conveying on the screen is on point.

Case Study: Viacom Headquarters
different,” said Rivona. Viacom and McCann Systems developed the details of what the lobby and the White Box digital environment network would look like. “The design had to allow for internal IP conductivity while having hooks needed to integrate into a larger IT backbone,” Rivona emphasized.

With design in hand, the Viacom and McCann teams went to work. We work closely with our networking team on a daily basis,” Anchelowitz said. “It’s just the nature of technology today allowing us to easily collaborate on systems integration projects of this nature.”

Ongoing support of the entire environment goes directly through McCana Systems. They provide break fix services along with remote monitoring. EventViz.Forti.ink Pro was put in place to monitor critical services via SNMP traps for signal integrity and overall system status. As part of the overall system monitoring, email notifications are used so that issues can be resolved as quickly as possible.

**MEASURE OF SUCCESS**

The Viacom lobby digital environment was launched in November 2014, and the White Box launched in January 2015. “Everyone wants to be a part of it and everyone can be a part of it. That’s the beauty of it,” Viacom’s, Herron said. “Moreover, we are working with a ton of brilliant artists that have pitched, and delivered insanely beautiful work. All in all, we deal with over a dozen different groups, a multitude of artists, and that number keeps climbing.” The lobby and the White Box experimental environments have been such a huge success, that the Catalyst team has used them for everything from a background for a VH1’s, Top 20 Countdown, to a way for Viacom to welcome guests to a way to drive traffic to Viacom initiatives.

Cindy Davis is a contributing editor of AV Technology magazine.

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**CASE STUDY: VIACOM HEADQUARTERS**

**THE WHITE BOX**

Two, 12-foot-high by 24-foot-wide, LED curtains are on the opposite 140-foot wall flanking the main entrance inside the White Box. These are intended to display graphic elements as “digital wallpaper,” and not detract from the content displayed on LED Blades.

**STAND BACK!**

Using a combination of Evertz Microsystems equipment such as switchers, converters, receivers, and monitoring system designed for a critical 24/7 environment like broadcast television, and McCann Systems’ custom designed PCs with four, NVidia Quad cards and sync board with the ability to send up to 16 direct simultaneous HD signals over fiber to the video wall, there are two PCs running each lobby video wall, and a similar build with fewer outputs, for the other displays.

“This allows the X2O Media platform, which runs across all of these machines to move content organically between them,” Fusaro said, explaining. “They don’t have to worry about interpolating in between servers. On the video playback side, it’s a computer with a computer with a computer with a computer,” Anchelowitz explained, “They don’t have to worry about interpolating in these machines to move content organically between them,” Fusaro emphasized.

**THE WHITE BOX**

When a space calls for a non-standard LED panel, and a way out side-the-box creative solution, that’s when McCann Systems designs, engineers, sources, and assembles the perfect fit. McCann Systems’ Joseph Fusaro, provided his account:

**MEASURE OF SUCCESS**

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Five key considerations to buying a video wall

You've seen the rapid growth in the installation of large, dazzling video walls in spaces public and private—from airports to corporate offices to sports arenas to universities. And even retail stores are taking advantage of the benefit of video walls to place branding and marketing where people shop. But with the proliferation of video walls, it’s important to learn which technology is engineered to out-perform the lesser brands and models, so you can choose a solution that is designed to not just dazzle but to impart your important messaging effectively, and is built to succeed in every environment. Here are the five key technology and feature considerations to keep in mind.

1. Pushing video wall technology to the edge—literally
   It’s only in recent years that technology improvements and engineering breakthroughs have allowed thinner millennials, or “bezels” in video walls. The term bezel refers to the black line, or thin border between each screen that makes up a video wall. While video walls made up of just stacked video monitors have been available for years, those old design, chunky video walls were really just stacked TVs or monitors that presented the familiar “grid” of images. In those old designs, clunky video walls were really just stacked video monitors having a depth of 32 inches or 3.42 inches to allow for easier installation and maintenance of the displays after installation, you’re using yesterday’s technology not today’s. Video walls are not available at depths of more than 4 inches, and if you have one that size and it is at foot-traffic level, not in compliance with strict ADA (Americans with Disability Act) regulations. And remember that weight considerations affect many aspects of a video wall installation: shipping costs to get the product to the site; the amount and cost of mounting gear needed; and maintenance costs after the installation is complete. Choose a video wall/display supplier that is at the forefront in light-weight, thin displays and integrated mounting systems.

2. Getting content to the video wall
   While the old days of needing highly expensive and specialized video processing hardware to tile content to a video wall are gone, there is much confusion in the industry about the kind of media player is needed for digital signage deployments, or to get content to a video wall in different AV applications. Can an embedded PC be a good choice for a media player, or is it generally better to utilize a separate appliance type of media player to get content to a video wall? How should the systems integrator, or end user, start to separate what is needed to get content to the screen in the most effective way? The key answer to that question is to choose a video wall solution that gives you the option to: A) use sophisticated third-party video processing platforms to feed content to your video wall and provide for advanced features such as interactivity (touch screen, gesture control, facial recognition, etc.) if needed; or B) use a display’s built-in SoC (System on a Chip) to eliminate the need for a third-party media player and so simply the system design and save on hardware costs.

3. Elegant design and weight/depth advancements
   The best video wall systems are made up of flat panels that are light in weight, and less deep in profile than what was common a few years ago. If your video wall flat panel supplier is not offering options that are light weight (20KG or 44lbs), and slim depth (87mm or 3.4 inches) to allow for easier installation and maintenance of the displays after installation, you’re using yesterday’s technology not today’s. Video walls are not available at depths of more than 4 inches, and if you have one that size and it is at foot-traffic level, it’s not in compliance with strict ADA (Americans with Disability Act) regulations. And remember that weight considerations affect many aspects of a video wall installation: shipping costs to get the product to the site; the amount and cost of mounting gear needed; and maintenance costs after the installation is complete. Choose a video wall/display supplier that is at the forefront in light-weight, thin displays and integrated mounting systems.

4. Beneath the glass: at the heart
   To ensure you’re getting the best possible canvas (so to speak) for your video wall, choose products that are made up of LCD panels with optically bonded glass. That ensures added ruggedness and durability. But for the best quality you need to look beneath the bonded glass. Be sure your chosen flat panel displays feature the high-end panel technology called IPS (in-plane switching). The best IPS technology allows for an image with 8 million pixels, to ensure optimal color saturation and contrast for off-angle viewing (both horizontal and vertical). IPS technology also provides a screen surface temperature tolerance of up to 230 degrees Fahrenheit (110 degrees Celsius), which helps alleviate a common problem with screens overheating and, as a result, suffering from permanent picture quality damage. And best of all for the viewer: IPS technology only provides reliable factory calibration (each display in a video wall is by definition a configuration of individual images. So the different displays that make up a video wall must be calibrated to show a consistent, uniform image across the wall. This means not only maintaining the brightness uniformity across the screens, but also keeping the edges of each display as bright as the center of each display. There is nothing as ugly as a video wall that includes a scene of a nice blue sky but has one off-color greenish display right in the middle that spoils the effect. There is only one solution to this problem: you must choose a video wall/display provider that not only provides reliable factory calibration (each display in a video wall design is set up at the factory to be calibrated with its sister displays in that video wall design). But due to environmental factors, third-party content software anomalies, and user error, there often needs to be some calibration on-site at a video wall installation, so the video wall/display provider must provide a fast, easy-to-use on-site calibration system. Ideally this will include an Automatic ID setting for easy installation, so that if you install 100 screens, you do not need to waste time and set up the unique ID of each monitor respectively—the Automatic ID eliminates the frustration.

5. Set-up & calibration
   Calibration may sound daunting to the end-user and even to systems integrators who are constantly frustrated with identical displays from the same manufacturer that look different while showing exactly the same content. It’s all about one simple factor: a video wall is by definition a configuration of individual images. So the different displays that make up a video wall must be calibrated to show a consistent, uniform image across the wall. This means not only maintaining the brightness uniformity across the screens, but also keeping the edges of each display as bright as the center of each display. There is nothing as ugly as a video wall that includes a scene of a nice blue sky but has one off-color greenish display right in the middle that spoils the effect. There is only one solution to this problem: you must choose a video wall/display provider that not only provides reliable factory calibration (each display in a video wall design is set up at the factory to be calibrated with its sister displays in that video wall design). But due to environmental factors, third-party content software anomalies, and user error, there often needs to be some calibration on-site at a video wall installation, so the video wall/display provider must provide a fast, easy-to-use on-site calibration system. Ideally this will include an Automatic ID setting for easy installation, so that if you install 100 screens, you do not need to waste time and set up the unique ID of each monitor respectively—the Automatic ID eliminates the frustration.

What You Need to Know: Buying a Video Wall

FIVE

Key Considerations to Buying a Video Wall

Here are key technology must-haves to consider when evaluating the latest round of video wall solutions coming to market.

Outside the Digital Signage Box

—LITERALLY

What You Need to Know: Buying a Video Wall

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What You Need to Know: Buying a Video Wall
7.5 x 53 Feet
Sports Book Brings People In

A Christie Velvet LED display envelops a wall at Silverton Casino Hotel providing a rich and dynamic platform for the casino's sports book.

Photography Courtesy of Christie Digital
Case Study: Silverton Casino Hotel, Sports Book

Located minutes from the Las Vegas Strip, Silverton Casino Hotel is a high-end resort that caters to those seeking an authentic Vegas experience without the noise, traffic and crowds of the main strip. Featuring a variety of restaurants, events and gambling opportunities, Silverton Casino Hotel provides endless options for guests visiting Las Vegas. Central to this offering is an impressive 7.5 feet by 53 feet sports book made up of Christie Velvet LED tiles designed and integrated by McCann Systems and operated by CG Technology.

“The sports book is one of the premier features at Silverton,” remarked Parikshat Khanna, VP of Business Development at CG Technology. “It brings people in.” Enveloping the back wall of the 2,000 sq. ft. sports book, the Christie Velvet LED wall provides an engaging and dynamic display that not only keeps Silverton Casino Hotel clients informed with up-to-the-minute sports statistics and betting information, but the clear and crisp visuals make it an excellent place to view various sporting events. The modular format of Christie Velvet also allows the display to be windowed, providing multiple, simultaneous feeds across the entire wall.

When specifying the installation, LED tiles were chosen because of the high quality picture and low maintenance. Upon the advice of McCann Systems, CG Technology chose the 4mm pixel pitch version of Christie Velvet for integration. “We used 6mm before,” explains Khanna, “but as far as the picture quality is concerned, when McCann showed us examples, the 4mm had the crispest visuals.”

Featuring true 24/7 operation, Christie Velvet LED provides a brilliant digital canvas that is easy to install, operate and maintain. Based on efficient LED illumination, Christie Velvet is a low-energy, long-life platform for display walls in any indoor setting. Producing 281 trillion colors, a full-field contrast ratio of 3,000:1 and brightness levels up to 1,000 nits, content displayed on Christie Velvet enables a fantastic viewing experience.

The feedback from Silverton Casino has been excellent, shares Khanna, noting that they are looking at integrating additional displays. “It was immaculately done. It’s hard to take a fault. There is nothing called a ‘worst seat’ in Silverton. Every seat gives the customer a spectacular viewing experience.”

When CG Technology and Silverton Casino Hotel launched a new sports book, they chose a Christie Velvet LED display wall. Integrated by McCann Systems and operated by CG Technology, the sports book complements Silverton’s other high-end offerings.

Photography Courtesy of Christie Digital

SNAPSHOT
When CG Technology and Silverton Casino Hotel launched a new sports book, they chose a Christie Velvet LED display wall. Integrated by McCann Systems and operated by CG Technology, the sports book complements Silverton’s other high-end offerings.
Cutting through the clutter to fully engage employees—be they on the shop floor, in the field, or in the executive suite—has always been a challenge. Now it is more important than ever to ensure that the right information reaches the right person at the right time. The ability to take vital business content, parse it, share it, and collaborate on it is paramount to business success.

Savvy enterprises are looking to take advantage of the new visual vocabulary of business, using visualized data, video, and imagery to become effective and influential corporate storytellers. Communicating visually provides an unrivaled sense of clarity and understanding no matter what is being conveyed, from supply chain data to sales trends to new product reveals.

Visual communication is the foundation of the connected enterprise; it results in the ability to create a cohesive, aligned workforce that can view and interact with important business content no matter where they are or what device they are using.

THREE FUNDAMENTAL SHIFTS IN THE WORKPLACE

Three dramatic technological and societal shifts are impacting the workplace: First, companies are embracing a new way to work that includes anytime access to a vast array of business applications, telecommuting options, and bring-your-own-device (BYOD) opportunities. Second, big data and the opportunities that lie within its analysis are driving business decisions. The power of real-time data is especially influential as more and more managers require instant snapshots of processes. Third, the workplace is undergoing dramatic changes as millions of tech-savvy millennials—a constituency that is already comfortable with digital applications and understands the communication value of visual content—enter the workforce.

These three factors and others are forging a new “digital workplace” environment, and driving the need for a new approach toward communications in the enterprise.

THE VISUAL COMMUNICATIONS CONCEPT

Employees and other stakeholders are demanding communications solutions that share functionality, look and feel, and the convenience of the apps they use at home. They are also looking for exciting new ways to work together and share information.

At the core of the visual communications concept is the channel. A channel can look and feel like a cable news network pulling video and data from multiple live sources. It can also be a

67 percent of people use personal devices at work — Microsoft

More than 2.5 exabytes (2.5 billion gigabytes) of data is generated every single day. — Adeptia

By 2015 millennials will make up the majority of the U.S. workforce — U.S. Bureau of Labor Statistics

Embracing Visual Communications in the Enterprise

A fully connected workforce provides unprecedented opportunities to collaborate, mentor, share knowledge, and focus resources.

by Vern Freedlander
The Digital Workplace

dashboard with “live” charts, graphs, and statistics. Or it can be as simple as images ticking in sync alongside a PowerPoint presentation. These editationally focused, easily consumed, data-driven visuals display targeted content directed at a specific audience. What makes a channel powerful is that it serves a very specific business or communications purpose and—by taking advantage of automated processes and existing content—can be built, modified, and distributed quickly. A channel can be designed for and distributed to any screen, helping to ensure that important information reaches stakeholders anywhere on any device.

What sets channels apart from other means of communication is their highly visual, concise, and editorially focused nature. Channels are effective because they are designed to command attention by placing the most important, timely information at the forefront and getting the viewer’s attention when events warrant.

Enterprises can use visual communications to convey complex ideas powerfully and effectively, especially when it comes to the analysis of big data. Data comes to life in easy-to-read graphs, meters, and charts that use animation and design to signal important fluctuations. Moving far beyond Excel-type graphs, visual communications takes its cue from the broadcast world, where dramatic, bold design instantly captures attention.

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A NEW TYPE OF INFORMATION DELIVERY

Using visual communications to help support digital workplaces also involves rethinking information delivery. Within the connected enterprise there are now multiple ways of disseminating information. A centralized, multidevice distribution approach allows corporate communications professionals to fully control messaging. Rather than relying on traditional delivery methods, such as word of mouth or e-mails, digital workplaces are better positioned to accommodate the rapid pace of today’s corporate environment and ensure that messaging remains consistent. This rapid-fire communication can include the facilitation of new product announcements, the eradication of rumors, and the implementation of change management initiatives.

For instance, during times of dramatic change, organizations can tap their visual communications network to effectively deliver vital communications and create content to ease uncertainty within the workplace. In one such scenario, a CEO could use live video to address an entire organization across multiple locations or create a virtual town hall meeting that appears on desktops, tablets, or place-based screens.

As a result, a company’s workforce can hear important information in real-time, directly from leadership, as opposed to messages that trickle down through multiple layers of management. Staff can also augment these communications with social media from colleagues. Later in the process, staff can create channels that provide background videos, employee interviews, training materials, or other support collateral to help manage change while retaining the collaborative advantages of the digital workplace culture.

Alternately, enterprises can fully democratize information delivery, allowing anyone to aggregate content, create channels, and distribute it to team members or to specific departments. A team tasked with a specific project can collect relevant content, including data, documents, presentations, and videos, lay it out as a channel, and ensure that the entire group is fully aligned. An interactive collaboration layer within the channel allows the team to annotate, share documents, send instant messages, and communicate via videoconference. In this way, the channel is not simply a one-way messaging system; it introduces a new way of working, utilizing real-time information within a shared virtual workplace. For telecommuters or employees in the field, the channel concept provides a vital live link to the team and the company.

THE POWER OF CONNECTION

As companies seek to realign themselves and keep up with an ever-accelerating business landscape, both dissemination of and access to instant information become key elements for obtaining a competitive advantage within the marketplace. Corporate environments are quickly transforming into digital workplaces. When done properly, visual communication in the enterprise evokes a stronger sense of trust among staff members, reinforces commitments to organizational objectives, and makes organizations more flexible to adjust to emerging trends. It is the sheer power of connection between stakeholders that drives engagement, collaboration, and productivity. Better communication translates into better business.
The Phenomena of Electroluminescence

LED display walls have proven to be a highly effective delivery of communication to large numbers of people.

But how do they work?

What are the key strengths and advantages of LED technology?

What kind of features do they offer?

Here are the answers.

LEDs are based on the phenomena of electroluminescence. Electrons moving across a semiconductor change to a lower quantum-energy state, in the process emitting photons of a specific wavelength. The construction of an LED usually includes a lens that allows the resulting light to be emitted in an efficient manner in a given direction.

A LED display wall uses individual LEDs in three colors for each pixel: red, green, and blue. The LEDs can be discrete devices or combined into a surface-mount device (SMD). Each color of LED, which is called a sub-pixel, receives its own drive signal based on video content, which allows in total, millions of colors to be generated.

Typically, each tile is actually composed of a series of identical LED modules. The circuit boards of the modules are electrically connected such that each pixel receives its intended and unique RGB drive signals and so that all pixels receive power from the tile’s power supply. This modularity is an advantage during servicing because if an LED fails, only the module containing that LED needs to be replaced.

All of the modules in a tile are typically housed in a cabinet, which also contains a power supply for the tile as well as electronics to control each module and allow connection of a video signal. Some tile designs place the power supply and control electronics in a separate enclosure that attaches to a frame that also holds the LED modules.

The tile’s structure allows it to be hung from an external frame that enables larger arrays containing many tiles to be created. One or more separate control units, each connected to a given number of tiles, accept video signals from a variety of possible sources, typically over DVI or HDMI, and direct the correct portions of images to each tile.

The mechanical design of the tiles ensures that each aligns very accurately to its nearest neighbors, resulting in a seamless composite image that can contain anywhere from several thousand pixels to millions of pixels, depending on how many tiles are used and how many pixels each contains.

**KEY STRENGTHS AND ADVANTAGES**

As a light source, LEDs have a number of exemplary properties.

First is brightness. Indoor LED display walls today can achieve peak brightness of up to 12,000 nits (cd/m²), although levels for indoor models are typically less than 2,000 nits. While high-brightness is crucial for an outdoor display that needs to compete with direct sunlight, it is also a boon to an indoor display that needs to be noticed in a busy environment.

Other methods of creating large images either can’t achieve image brightness levels comparable to LED display walls or can do so only with a considerable increase in system complexity. LCD panels, for example, are typically less than 1,500 nits, with most below 700 nits. In the case of projection displays, where image brightness is almost arbitrary but scales with image size for a given lamp or other light source, achieving brightness levels rivaling LED display walls for a specific combination of lamp and image size may require multiple projectors.

The ability of LED display walls to handle high levels of ambient illumination is another strength. This is a consequence not only of the high-brightness typical of LED tiles but of high contrast ratios. The result is an outstanding perceived level of black, resulting in a high contrast image even in elevated levels of indoor ambient light.

Another strength of LED display walls is the perceptually seamless nature in the way the red, green and blue LEDs used in LED display walls emit a much narrower range of wavelengths than a broad-spectrum, white-light source like a lamp. This allows more deeply saturated colors to be reproduced as well as increasing the range of reproducible colors.

A further strength of LED display walls is the long life of the LED pixels themselves. The useful lifetime of a display’s light source is often defined as the number of hours to reach half of the initial brightness. By this measure, LEDs, whether used only as a light source or employed directly as pixels in an LED display wall, typically last much longer than lamps.

All displays consume power and require cooling but not all display technologies are the same in this regard. LED display walls consume energy more efficiently than most other display technologies. The improvement in efficiency can be as high 400% or more, depending on which displays are being compared.

This translates into less heat as well as less audible noise resulting from the cooling required to dissipate that heat. In fact, some LED tiles run cool enough to not require fans, provided there is adequate space behind them and appropriate HVAC.

An important image parameter for any display is the pitch or distance between its pixels. The lower the number the closer that observers will be able to get to an image before discerning its individual pixels. A lower number also means that a given number of pixels can be packed into a smaller area, or conversely that more pixels can be achieved within a given area. However, small pixel pitches aren’t right for every application. For very large displays in particular, an overly small pitch may result in many more pixels than are needed for a given application. Fortunately, LED tiles are available in a broad range of pixel pitches from as large as 20mm to as small as 1mm, with the smaller pitches primarily for indoor use.

Also very important is the fill factor of individual pixels. This is the ratio of the area of the light producing element within a pixel (in this case the LEDs themselves) to the total area of the pixel. The higher the fill factor, the smoother the image and the closer observers will be able to get to an image before discerning its individual pixels. The useful lifetime of a display’s light source is often defined as the number of hours to reach half of the initial brightness, although levels for indoor models are typically less than 2,000 nits. While high-brightness is crucial for an outdoor display that needs to compete with direct sunlight, it is also a boon to an indoor display that needs to be noticed in a busy environment.

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Table 1: Suggested optimal viewing distances

<table>
<thead>
<tr>
<th>LED Display Pixel Pitch</th>
<th>Optimal viewing distance: Pixel pitch x 8</th>
<th>Optimal Viewing dDistance from LED Display: (approx.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.9mm</td>
<td>1.9 x 8</td>
<td>15 feet</td>
</tr>
<tr>
<td>2.5mm</td>
<td>2.5 x 8</td>
<td>20 feet</td>
</tr>
<tr>
<td>3mm</td>
<td>3 x 8</td>
<td>24 feet</td>
</tr>
<tr>
<td>4mm</td>
<td>4 x 8</td>
<td>32 feet</td>
</tr>
</tbody>
</table>

* To calculate optimal viewing distance in meters instead of feet, the formula is pixel pitch x 2.5. (Estimate to be used as a guideline only)

With respect to the optimal viewing distances for different pixel pitches there are no hard and fast rules. Nevertheless, Table 1 lists some recommendations. The best pixel pitch for a given application is one for which the pixels are not obtrusively obvious at the typical viewing distance but still allows the display at its intended resolution to subtend a significant portion of the viewer’s field of vision for maximum impact.

EDDING ITS BADGES

Compared to other image-display technologies LED display walls enjoy a number of advantages with respect to brightness, color gamut, service life, power consumption and form factor. They are also uniquely adaptable to a wide variety of applications with differing requirements for size, shape, viewing distance and environment.

As an image-display technology, the LED display wall may be one of the new kids on the block but it is already distinguishing itself. The future for LED display walls looks bright.
Christie Velvet LED displays

Featuring true 24/7 operation, Christie® Velvet™ LED displays create high-impact, seamless visuals which are perfect for corporate settings, hospitality venues and retail stores. Their modular design can be configured into any size or shape for unmatched creative freedom. Benefit from the low energy consumption and the long service life of LED technology and create brilliant display walls that last.

When you choose Christie, we work with you every step of the way to map out a solution that will bring your vision to reality. Through our expert advice and working alongside our extensive network of partners, determining the Christie Velvet solution that best meets your needs is easy.

Superior technology, superior visuals

Christie Velvet LED displays are extensively tested and comply with industry standard certifications. This ensures that Christie Velvet is safe and emission free, giving you the confidence to deploy in any environment.

85 years of industry-leading experience

Christie has been helping customers create the best shared experiences through a full range of leading-edge products, services and technologies that can be seamlessly integrated together to create the most advanced display walls.

Choosing Christie gives you access to 85 years of industry-leading expertise in creating and sharing the most impressive visual installations and applications. Working alongside an extensive network of partners and dealers, Christie can custom-tailor a custom LED display wall solution to meet your needs.

Christie - the complete solution provider

With our extensive range of display technologies, audio, processing and content management systems, we help customers create the world’s most memorable shared experiences. Discover how Christie can tailor a solution for you.

Media server options

Christie Spyder® X20

Unmatched 20 megapixel video processing matrix switching and integrated source monitoring.

Christie Phoenix

Network-distributed open content management system for simultaneous encode, decode and display of audio-visual data.

Christie JumperStart

Easy-to-use, powerful content management solution.

3rd Party media server

DVI / HDMI

ECU

Cat 5 fiber extenders

Display wall solution components – just add great content

85.0 pixel pitch (mm)

1 pixel = 3.0mm

3.0 pitch (mm)

3rd Party media server
**SPONSOR PRODUCT DATA SHEET | LG 55VH7B**

**LG**

**55VH7B**

Extraordinary Premium Video Wall Panel

With its borderless design, the 55VH7B series offers maximum immersion for video walls. Engineered with efficient management tools such as quad-core System on Chip (SoC) which plays various types of content without the need for an external media player. The 55VH7B is perfect to effectively raise a customer’s awareness, particularly in areas with heavy foot traffic such as museums, galleries, and large retail stores.

**KEY FEATURES**

**Borderless Design**

- **NARROWEST BEZEL**: Borderless design with its 9.9mm even panel bezel™ enables immersive and seamless viewing experiences on assembled video wall screens.

  * Panel Bezel: The black matrix section where an image is not displayed against the front panel.

**Smart Platform**

- **BEST IN SC AND Synchronized Playback**: The optimized built-in quad-core SoC in the 55VH7B can play various content formats and eliminates the need for an external media player. Using its built-in SCX, each display plays its video file without lag for synchronized content playback.

**webOS 2.0**

The webOS 2.0 platform provides easy and convenient tools to create contents. LG’s Software Development Kit (SDK) and technical supports make content development and management easier.

**SOFTWARE**

- **ADVANCED COLOR ADJUSTMENT**
  - Intuitive GUI in SuperSign C software allows measurement, color adjustment and brightness instantly on display.
  - Automatic white balancing of a video wall display when using a sensor.

- **REMOTE MONITORING AND CONTROL**
  - Intuitive GUI-based Remote Monitoring & Control via the network and RS232 connection feature in SuperSign C software.

**Superior Picture Quality**

**CLEAR VIEWING ANGLE**

Even T/B/L/R angle of 45 degrees*

Even T/B/L/R angle of 45 degrees*

*N is the angle from the center of the screen to have 50% of the initial luminance.

**UNIFORM BRIGHTNESS**

LG’s LED backlight technology guarantees high uniformity in brightness to ensure a clear picture. On other screens, certain pixels may appear darker than others, but the new 55VH7B generates high visibility and a consistent brightness across the whole screen.

**IMAGE GAP REDUCTION**

The 55VH7B includes an image improvement algorithm that can adjust to objects located in the boundary of beam for a seamless viewing experience.

**SHINE OUT**

The 55VH7B is the perfect fit for window displays because it reflects sunlight for better visibility and a clearer image than conventional panels.

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**AVTechnology Manager’s Workbook | Outside the Digital Signage Box**

http://developers.lg.com/wssignage

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AVTechnology Manager’s Workbook | Outside the Digital Signage Box
### 55VH7B

#### Extraordinary Premium Video Wall Panel

- **Screen Size:** 55" (139.7 cm) diagonal
- **Aspect Ratio:** 16:9
- **Brightness:** 300 nit (typical)
- **Viewing Angle (H x V):** 178° x 178°
- **Response Time:** 7 ms (typical)
- **Audio**: Built-in speakers, 20W RMS (10W x 2)

<table>
<thead>
<tr>
<th>Dimension</th>
<th>55VH7B</th>
</tr>
</thead>
<tbody>
<tr>
<td>Width</td>
<td>28.5&quot; (72.4 cm)</td>
</tr>
<tr>
<td>Height</td>
<td>19.0&quot; (48.2 cm)</td>
</tr>
<tr>
<td>Depth</td>
<td>6.1&quot; (15.5 cm)</td>
</tr>
</tbody>
</table>

#### Technical Specifications

<table>
<thead>
<tr>
<th>Feature</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Make</td>
<td>LG</td>
</tr>
<tr>
<td>Type</td>
<td>LCD</td>
</tr>
<tr>
<td>Panel Size</td>
<td>55&quot;</td>
</tr>
<tr>
<td>Resolution</td>
<td>1920 x 1080</td>
</tr>
<tr>
<td>Refresh Rate</td>
<td>60 Hz</td>
</tr>
<tr>
<td>Input</td>
<td>HDMI, DVI, DisplayPort, RJ-45 (Ethernet)</td>
</tr>
<tr>
<td>Output</td>
<td>HDMI, DVI, DisplayPort</td>
</tr>
</tbody>
</table>

#### Features

- **Enhanced Content Management**
  - LAN Daisy Chain Performance
  - 4K Scaling

- **Convenient Options**
  - Guide Bracket / Classifed Input / Output: Style

- **Control Buttons**
  - 8 Guide Brackets Options can be used to operate various functions of the VHT, such as controlling the OSD (On-Screen Display) and changing the input source.
**SPONSOR PRODUCT DATA SHEET | X2O**

**X2O**: The Digital Workplace is Here.

Empowering the Connected Enterprise

The way employees work and their office environments are changing dramatically. Today’s workforce is highly mobile and more in tune with emerging technologies than ever. As a result, employees expect to be able to communicate and collaborate anytime, anywhere.

The X2O platform empowers all employees with tools to create visual communication channels linked to real-time information sources and push them to the right person, on the right screen, at the right time. It easily integrates with existing applications like SharePoint®, Lync®, SAP® and many others. Cutting through the clutter and noise, dynamic X2O channels significantly improve communications at all levels, on multiple devices. Are you ready for the new way to work?

**Any Content. Any Screen. Anywhere.**

With the HTML-based X2O platform, users can drag-and-drop smart objects that include videos, graphics, images, social media content, as well as links to virtually any data source, and create stunning visual channels. These dynamic channels are then pushed to the most appropriate screen, empowering the connected employee in any department or function throughout the enterprise.

**X2O media**
The X2O Digital Workplace: Connect, Communicate, Collaborate

Communications in the enterprise is poised to undergo dramatic change in the coming years and getting the right message to the right employees quickly and efficiently is more important than ever. With the X2O software platform, users can create and push dynamic content to anyone, anywhere, in real time, and target that information based on location or department—all with no programming skills required.

Connected Desktop
Users view and interact with live X2O channels and widgets directly on their desktop PC or laptop with X2O.Jive
- On-demand channels
- Desktop widgets
- Screen saver channels
- Targeted notifications
- Real-time alerts
- Enterprise social networking
- Business intelligence dashboards

Connected Workspace
Multiple users collaborate in a shared virtual workspace, in-person or remotely
- Interactive touchscreens, tablets, cell phones, laptops, desktops
- Document sharing, desktop sharing, IM, video chat, polling
- Facilitator role/participant role
- Users all in same room or on the web

Connected Workplace
Communicate real-time information and engage with users through connected screens and devices throughout a facility
- Digital signage
- Interactive touchscreens
- Video walls
- IP phones
- Wearable devices
- “Internet of Things”

Connected Workforce
Share real-time content with remote workers, building a global community of connected users
- World wide digital signage network
- Online collaboration
- Document sharing, desktop sharing, IM, video chat
- Tablets and smartphones

X2O Server
- Central content management server
- Real-time data management
- Automatically distributes content and monitors play out
- Cloud or on premise options

Browser-Based Authoring Tools
- Create channels using smart objects
- Customize objects to your branding
- Link objects to multi-data sources
- Accessible from web browser or mobile phones

Content Management Portal
- Centrally manage digital assets
- View playlists and schedule content play out
- Send content to any screen or group of screens
- Restrict access to content based on role and permissions

Network Management Tools
- Monitor network status from anywhere
- View detailed Player stats and update configuration settings
- Remotely control any Player or group of Players
- Take corrective action immediately

Channel Players
- Real-time broadcast-style graphics and video
- Support for a wide range of devices
- Support for multi-touch and gesture input
- 3D animations and transitions (platform dependent)