The Case for using Commercial Grade Displays in QSR

To the average person, most flat screen displays look similar. They have a wide format aspect ratio (16:9), High Definition (HD) 1080p resolution, black bezel and multiple video inputs. However, there are significant differences between consumer-grade TV screens that are available at big box retail outlets such as Best Buy, Costco and Target, and commercial-grade screens designed for digital signage applications. Consumer-grade LCD TVs are designed for far less demanding use than commercial-grade displays that are designed to perform reliably in a 24/7/365 day environment under harsh conditions -- typical of those found in a Quick Service Restaurant (QSR). This whitepaper addresses the top reasons why a commercial grade display should be the screen of choice when implementing digital signage within a restaurant environment.

Brightness

Commercial displays are designed to operate in a variety of conditions including high levels of ambient brightness, whereas home-use TVs assume a dim or darkened room. Commercial displays feature high brightness levels to ensure enhanced visibility and color fidelity in bright store settings. Consumer-grade LCDs are typically available in brightness levels in the 300-400 nits range. A nit (or Candela/m^2) is a standard measurement of display brightness. Commercial displays however, typically offer a minimum of 450-500 nits for indoor environments such as malls or QSRs. For high ambient light environments where there are lots of windows to let in sunlight, brightness levels of 700 nits are recommended. Consumer-grade LCDs do not offer these high brightness levels – making the display appear washed out and less readable in a QSR applications.

Color and Contrast

Not every display is alike when it comes to grayscale reproduction. The ability to display all 256 different levels of luminance, or brightness, that reside between the brightest whites and the darkest blacks will deliver a more vibrant and true image. Commercial displays will produce a full grayscale with good linear color tracking from black to white showing all 256 different levels of brightness. This is critical to have food images “pop” like they do in a magazine photo. For consumer televisions, grayscale is skewed for more of the bright white end of the scale relative to the narrow broadcast standards that they must meet. Contrast ratio, a figure representing the difference between the luminance of the white to black that a display can produce, is a related measure to consider. In general, the higher the contrast ratio the better the production of crisp, vibrant colors, with whiter whites and blacker blacks along with a greater degree of gray values in between. If a contrast ratio is low, even a bright image will look washed out. Additionally, commercial displays are typically calibrated in the factory to provide a uniform and consistent color gamut which produces the identical colors from screen to screen. This is critical in digital menu board and video wall applications where each display’s color gamut should appear identical to its neighbor. Compare this to the differences in picture reproduction one sees when viewing the wall of TVs at the local big-box retailer.

Viewing Angle

A wide viewing angle is critical in commercial applications where the screen can be viewed from many different locations. While some consumer televisions offer viewing angles comparable to commercial displays, many will not – and none will be optimal for vertical orientation. Professional-quality displays designed around an IPS (in-plane switching) panel deliver 178-degrees of both vertical and horizontal viewing with vivid, accurate colors, consistent brightness levels and no image distortion – whether looking directly at the screen or viewing it from above, below, or the sides.

Display Quality

Consumers and businesses alike want outstanding picture quality to maximize viewing enjoyment, and (for commercial installations) effectiveness. What looks good in a home environment, however, does not always deliver the desired results in an out-of-home setting like a QSR. Commercial displays have far fewer impurities in their LCD panels which offer superior anti-burn-in and image retention technology. This is critical for applications such as digital menu boards where the content, while changing, is often static in nature for long periods of time in contrast to typical consumer uses where the picture is always changing.

Enclosure

Along with the bezel, a display's panel is contained by the casing covering its back side. Commercial-quality display enclosures feature more durable materials and construction than consumer products for greater protection against elements such as heat, grease, chemicals, moisture and dust – typical of even the most pristine QSR installation.

Reliability

Commercial quality displays are designed using heavy-duty hardware capable of withstanding the heat generated by the extended runtimes required by most display signage applications. The internal design of these displays also allows for sufficient cooling in both horizontal and vertical orientations. Commercial displays typically come in two flavors; 16 hour for use for standard business day applications and 24 hour for 24/7 continuous use. Commercial displays often include features such as heat monitoring and screen savers to add reliability and durability while options such as fan-less design can extend lifespan in environments with contaminants like airborne grease, moisture and smoke.

Security

Consumer grade displays have little need for locks or security controls. Commercial grade displays on the other hand are designed for public installation and offer tamper-resistant locks for power, volume, and other controls to help prevent unauthorized access or content disruptions. Additional security features can include mechanisms for locking down the front panel and IR remote.

Remote Monitoring and Control

For commercial installations, it is important to have the ability to remotely monitor display health as well as control certain setup and configuration parameters remotely from time to time. Commercial displays typically support a standardized connectivity and control specification that utilizes RS232 or network connectivity. In a multi-display installation such as a digital menu board or video wall, the RS232 interface can be used to enable control of all daisy-chained displays from one display. This eliminates the need to interact with each screen to power on/off or adjust other settings for efficient and cost-effective management. Commercial displays incorporate the standard RS232 external control/connector with PC and video loop-through connector capability facilitating multiple display configurations from a single player, PC or video source. Consumer displays typically do not offer RS232 external display control/connector, video loop through capability or multiple display configuration capability.

Warranty

A display's warranty provides insight into the manufacturer's confidence in the product's performance in a given environment. Consumer products are designed for a specific in-home usage profile (average worldwide TV viewing time is 3.25 hours per day), and thus tend to carry a standard one-year warranty. This warranty is typically voided or reduced to 90 days if the product is used in a digital signage or other commercial application. Most consumer TV's have a 4-hour programmed turn off feature to prevent display fatigue. Commercial-grade displays, on the other hand, typically carry a 3 year warranty, with on-site service options -- necessary for supporting "mission" critical applications such as digital menu boards in a QSR environment.

Mounting Versatility

Commercial display installations call for the flexibility to mount displays in a horizontal (landscape) or vertical (portrait) orientation, depending on space constraints, content design, and other considerations. Consumer TVs, on the other hand, are strictly designed for horizontal viewing. What may seem like a simple matter of turning consumer television 90-degrees is in fact far more complex, and can lead to overheating or degradation of image quality. Designed to accommodate flexible mounting needs, commercial displays include features designed to deliver optimal cooling and image quality in both orientations, as well as standard (VESA compliant) mounting connections for easier, less costly installation.

Design Aesthetics

Displays designed for commercial applications feature slim, symmetrical bezels, which offer the least distraction from the onscreen content as well as optimize the screens for tiled use in digital menu boards and video walls. The bezels on consumer televisions emphasize the screen's intended horizontal orientation and are rarely symmetrical – yet another reason they are not well suited for video wall or portrait orientation displays.

Display Connectivity

Adaptable, high-quality commercial displays offer a versatile selection of inputs, including HDMI, DVI, DisplayPort, CVBS, YPbPr (YCbCr) and VGA, enabling easy connectivity with the variety of digital equipment typically needed for a networked installation. Consumer TVs, however, generally offer far fewer options as their intended use requires connectivity only with standard home-theater equipment.

Additionally and most importantly, commercial displays typically support auto fail-over capability which allows for redundant video connections to two different content players. In the event of a player failure, the display will automatically switch video inputs to the backup player, ensuring continuous operation in the QSR.

Conclusion

The needs of the digital signage market differ markedly from those of an in-home consumer. The design of displays intended to serve consumers and businesses differ greatly as well, as highlighted in the summary table below:

Feature	Commercial Display	Consumer TV
High Brightness	Yes (400 - 700 nit)	No (< 350 nit)
High Contrast	Yes	No
Wide Horizontal Viewing Angle	Yes	Varies
Wide Vertical Viewing Angle	Yes	No
Portrait Mode Operation	Yes	No
24 x 7 Operation	Yes	No (typically 4-5 hours per day)
Durable Bezel	Yes	No
Digital Signage Player Inputs	Yes	No
Remote Control via Player (RS232)	Yes	No
Automatic Content Fail Over	Yes	No
3 Year Warranty	Yes	No (typically up to 12 months)
Commercial Use Warranty	Yes	Void if used commercially
On Site Replacement Option	Yes	No

For applications such as digital menu boards in QSRs, the demands are even higher on the equipment to operate reliably for years without interruption. Consumer TVs are less costly for a reason: they lack the many technology and design features that render commercial displays durable, reliable, and efficient in a digital signage environment. Substituting even an outstanding in-home television for a commercial-quality display can be a recipe for increased frustration, downtime, and costs. Despite higher up-front costs, investment in the appropriate commercial-quality display technology for a given installation is more likely to achieve the desired results and deliver greater ROI and lower Total Cost of Ownership over the intended lifecycle.