

# Taking Digital Signage Outdoors

Conquering the Elements without Enclosures, Glare or Electronics Damage

*By: Todd Mares*

Digital signage has been exploding in indoor environments ranging from airports and conference centers to banks, restaurants and retail stores, but it has failed to gain critical mass in outdoor settings. Open-air deployments in locations such as stadiums, public transit stops, amusement parks, restaurant patios, cruise ships and residential backyards have been stalled by a simple but frustrating market reality: traditional display technology is not built for outdoor applications.

Harsh weather, dirt and dust, insects, extreme temperatures, bright sunlight and other indignities of outdoor and extreme indoor exposure adversely affect both the operation and the picture quality of indoor displays. Enclosure cabinets designed to protect display systems from the elements add cost, bulk and other problems. Initial efforts to weatherproof displays fell short, suffering from maintenance and brightness issues.

Today, however, **a new generation of waterproof / weatherproof / dustproof display technology** is ready for prime time and already successfully deployed in a variety of venues. These new outdoor TVs and displays have been specially engineered and patented to provide features such as:



- Fully sealed housings with no external vents, exhaust fans or filters
- An internal thermal control system to avoid component freezing and overheating
- The ability to operate from -40° to +140°
- A crystal-clear picture in bright sunlight.
- They also meet the criteria for the industry's highest environment a protection ratings, confirming their ability to stay outside year-round without damage

Early installations range from Chicago's Soldier Field, where a 16-screen outdoor video wall operating at Chicago

Bears games and other events shows ads, game information and entertainment, to commuter train stations in Washington, D.C., where more than 120 outdoor displays at 88 stations alert riders to track work, weekend closures and other transit issues affecting their travel plans – with all units impervious to weather, grime and other environmental onslaughts.

## Outdoor Obstacles

At the dawn of the digital signage movement, the initial barrier to outdoor and extreme indoor deployments was the inability to use a conventional flat panel anywhere other than within a climate-controlled environment.

Standard TVs and displays are unable to withstand rain, humidity, snow, dirt, insects or other assaults from Mother Nature. They also lack the ability to survive extreme temperatures. High heat shortens component lifespans. Cold can impact how an LCD works as well as expand and distort TV frames. Fluctuating temperatures – like a cool night warmed by the morning sun – create condensation that can easily short out the electronics. And the glare of sunlight affects the ability to deliver a crisp, clear picture.

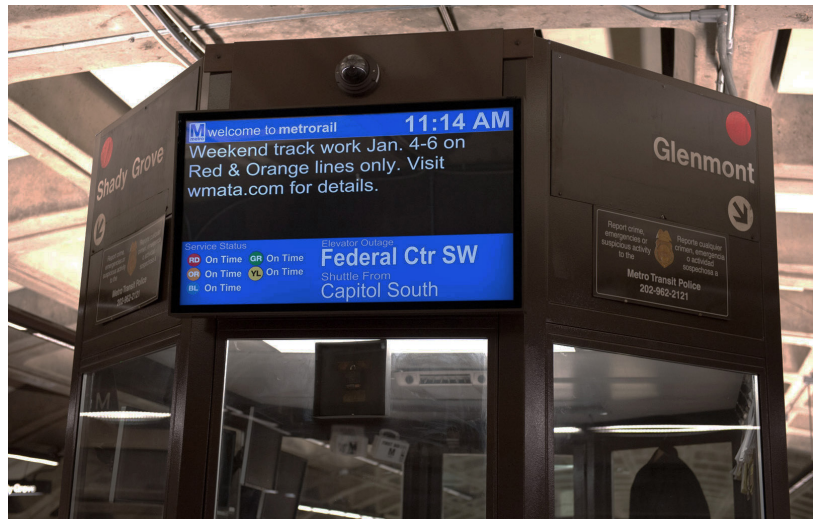
These issues led to the use of protective enclosures that cocoon the TV or display in a sealed metal cabinet. These enclosures, however, are **bulky, expensive**, in need of add-on heaters and air conditioners, difficult to maintain, and again subject to unsightly and damaging condensation. Placing a TV or display behind enclosure glass further degrades picture quality, enabling clear viewing only when standing directly in front of the screen.

Enclosure installation, aesthetics and size are also problematic. Enclosure cabinets add 150 to 300 pounds to the display device, requiring special mounts and in some cases reinforcement of the mounting surface to carry the extra weight. The cabinet size is an additional drawback, both because it is visually unappealing in today's "thin is in" flat panel world and because it is too large for many locations where signage is needed. All of these factors have traditionally inhibited the development of outdoor and extreme indoor digital signage projects.

## Peerless-AV® TVs & Displays: Changing the Picture

Now – with Peerless-AV®'s family of fully sealed, full 1080p HD Peerless-AV TVs and displays – these limitations are a thing of the past.

With Peerless-AV technology, **digital signage can go anywhere** from a stadium, zoo,



“With Peerless-AV technology, digital signage can go anywhere from a stadium, zoo, amusement park, golf course, marina or restaurant patio to a grimy train station or factory floor - all without the expense and functional disadvantages of enclosures.”

amusement park, golf course, marina or restaurant patio to a grimy train station (as shown in the photo) or factory floor – all without the expense and functional disadvantages of enclosures. Digital TVs can now stand up to the elements on a home pool deck, in an outdoor kitchen, or in the middle of a dusty home workshop. Extreme heat, bitter cold, blizzards, thunderstorms, ants, spiders, dirt or pressure washing will have no effect on system operation. And even the sunniest day will not interfere with screen readability.

Available in models from 32" to 55" that also provide the industry's sleekest outdoor video wall capabilities, Peerless-AV's flatscreens are able to deliver these capabilities thanks to a series of engineering innovations specifically designed to address the outdoor/extreme indoor market. Here is a look at some of these innovations and their significance for AV dealers, distributors, integrators, installation professionals and their customers.

### 1. Patented Dynamic Thermal Transfer™ System – No Vents Needed

The #1 priority in designing Peerless-AV display devices was to provide a completely sealed housing that would protect both the LCD and internal components from environmental damage. In order to achieve that objective, the Peerless-AV engineering team needed to develop a means of dissipating heat that would replace the standard air transfer method used by other outdoor displays.



That's because air transfer – involving releasing excess heat into the environment as well as bringing in outside air to keep air flowing for temperature control – requires openings in the housing for external vents and exhaust fans. It also requires the use of filters to keep dust, dirt, insects and other contaminants from damaging the electronics. Like furnace and air conditioning filters, display filters must be removed from inside the housing to be cleaned – again preventing units from being completely sealed. Filters also add maintenance overhead, associated costs, and the risk that clogged filters will affect display operation.

To solve the problem, Peerless-AV engineers devised a **industry-exclusive, Patented Dynamic Thermal Transfer™ system to dissipate heat through a heat sink** on the back of the display. The system includes a

combination of internal fans and heaters, a built-in thermostat that turns these heating and cooling mechanisms on and off at pre-set thresholds, and cooling tubes that connect the LCD panel to the heat sink. In this way, internal components can be safely warmed in extreme cold and properly cooled in extreme heat without external vents, exhaust fans or filters.



## 2. 100% Sealed – Waterproof, Weatherproof, Dustproof

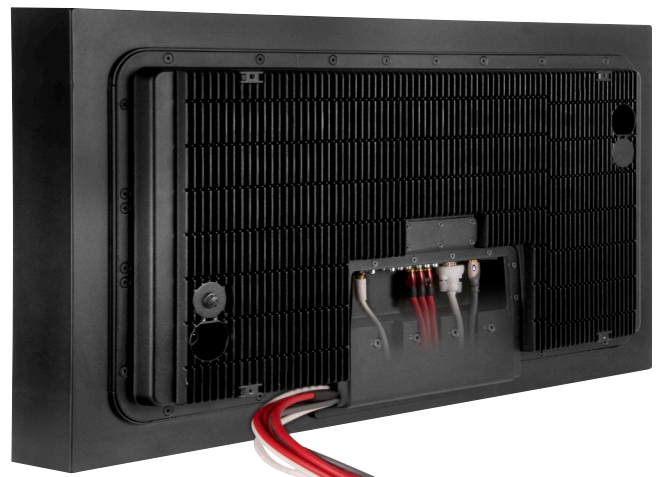
Thanks to this unique internal heat dissipation strategy, the Peerless-AV housing can be fabricated as a continuous surface with no openings for venting, exhaust fans or filter access – and therefore no path for moisture or other atmospheric insults to enter the unit. The resulting **industry-first 100% sealed housing** hardens Peerless-AV TVs and displays against the elements, creating the first waterproof, weatherproof and dustproof display products. With this exclusive sealed, ventless design:



Nothing gets in and nothing gets out – including rain, sleet, snow, water, ice, smoke, dust, chemical clouds, fuel exhaust, dirt, dust, micro-particles, acid base and insects.

- Internal components are shielded from externally caused damage.
- Units can be pressure-washed or even temporarily submerged in water with no harm to the LCD, other components or display operation.
- Frames are protected from water penetration or freezing that can cause expansion or distortion of the perimeter.
- There is no need for enclosures and associated complications because Peerless-AV's flat panel is tough enough to withstand even the harshest external conditions without the protection of an additional cabinet.

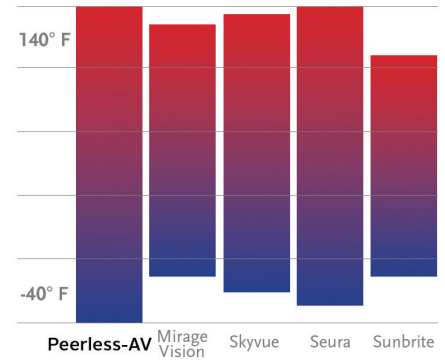
All joints are sealed internally to avoid vulnerability at the seams. The cable entry is also sealed, ensuring that the signal connections are unaffected by weather conditions and again preventing water, dust, ice or air from entering the display.



### 3. 180° Temperature Range – Leading the Industry

Also courtesy of Peerless-AV’s innovative internal thermal control system, Peerless-AV displays are able to **operate at temperatures from -40° to +140°** – the widest range of any outdoor display.

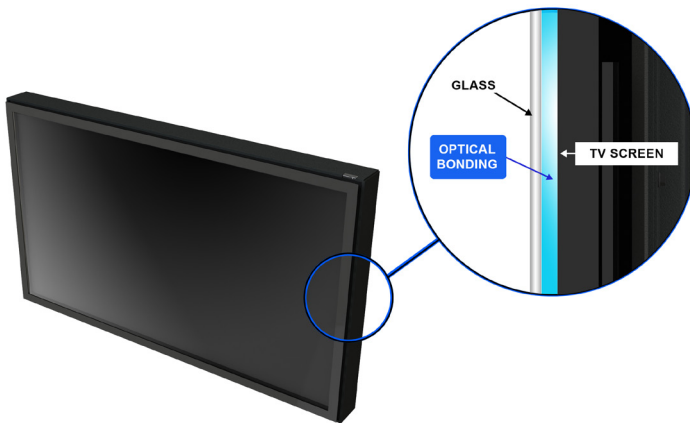
As a result, Peerless-AV displays can function on the hottest day on the Las Vegas strip or the coldest day on the Aspen slopes as reliably as a conventional unit operating in an air-conditioned or heated building. Digital signage can therefore be placed in never-before-possible locations, opening new opportunities for the AV community and their end customers.



### 4. Optical Bonding – Full Readability in Direct Sunlight

Peerless-AV flat panels also deliver better picture quality than competing outdoor displays through the use of optical bonding – a technique that eliminates the air gap between the LCD and the impact-resistant safety glass that is used to protect the screen from both breakage and outside exposure.

Used in many military aircraft to ensure the visibility of cockpit instrumentation, this technique utilizes adhesive to fuse the LCD to the glass. It **improves screen readability in three ways.**



First, it eliminates the visual distortion caused by the air gap. Second, it cuts down on glare related both to reflection (from sunlight) and refraction (from light coming out of the display). Third, it enhances the contrast ratio by reducing the amount of reflected

ambient light, delivering a sharper and therefore more readable image by increasing the contrast between black and white.

Through optical bonding strategy, Peerless-AV TVs and displays are able to use a 700 nit LCD (two-thirds brighter than a standard in-home TV) to achieve a level of brightness and sharpness that otherwise would require a 1500 nit high-bright panel – an option that would both increase unit costs and generate too much heat to control in an outside environment.

These capabilities are complemented by an ambient light sensor that automatically adjusts the image brightness to best match any lighting conditions. The clarity of the image itself is driven by full 1080p HD technology, providing outstanding color depth, resolution and fast refresh rates for a rich viewing experience.

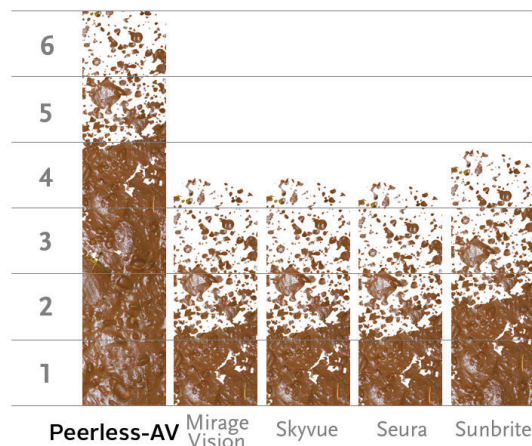
One additional benefit of optical bonding is that closing the air gap between the LCD and the safety glass also eliminates space where moisture can penetrate between two surfaces. This in turn thwarts the formation of condensation that can fog the display and ruin a digital signage installation.

## 5. IP 68 and NEMA 6 – Highest Protection Ratings

With their fully sealed housings providing an impermeable barrier against the outside, Peerless-AV’s products meet the requirements for top-of-the-line IP 68 (Ingress Protection) and NEMA 6 (National Electrical Manufacturers Association) ratings signifying their ability to take the toughest of beatings from the external environment. **No other display on the market can claim these protection rankings – both the highest available.**

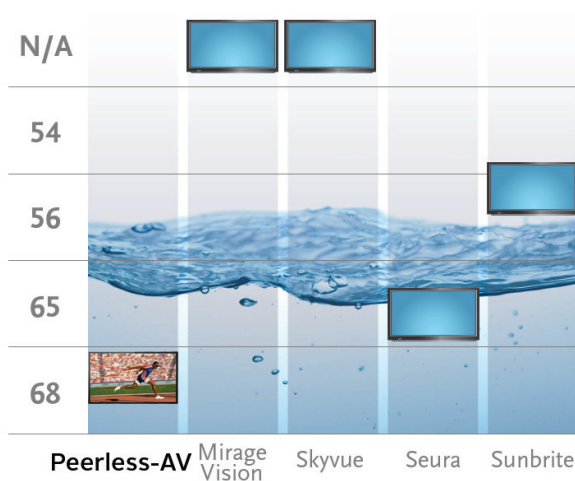
The IP 68 (for Peerless-AV Xtreme™ displays) rating validates the ability of Peerless-AV hardware to completely block the entry of dust and water, even under the force of powerful pressure washing-type jet sprays or during temporary underwater immersion. The IP 68 designation denotes that Xtreme devices can stay watertight when submerged in 2 meters of water for 60 minutes.

IP Ratings Comparison



The NEMA 6 (National Electrical Manufacturers Association) rating applicable to both Peerless-AV models signifies that they are protected against dirt, dust, temporary submersion, damage from ice formation, and hose-directed water.

NEMA Ratings Comparison



These ratings demonstrate that Peerless-AV TVs and displays deliver what they promise: an airtight seal that cannot be breached even in the most challenging outdoor or indoor environments. This paves the way for fresh digital signage and residential applications with no enclosures, no location limitations and no weather worries.

## Xtreme™ Outdoor Daylight Readable Displays

Peerless-AV's family of fully sealed outdoor video devices includes TVs and displays for different applications. The models include:

**Peerless-AV Xtreme™ Outdoor Daylight Readable displays** for professional applications. Available in 42", 49", and 55" sizes, the Xtreme features an ultra-thin bezel that delivers a streamlined look for one-unit installations while also enabling the industry's first outdoor digital signage video walls. An optional all-aluminum outdoor soundbar easily attaches to the display. Operating temperatures range from -40°F to +140°F.

## About Peerless-AV

For over 75 years, passion and innovation continues to drive Peerless-AV forward. We proudly design and manufacture the highest quality products, ranging from outdoor displays to complete kiosk solutions, digital signage mounts to wireless systems. Whether a full-scale global deployment or custom project, Peerless-AV develops meaningful relationships and delivers world class service. In partnership with Peerless-AV, you are trusting an award-winning team of experts who will support your business every step of the way. For more information, visit [peerless-av.com](http://peerless-av.com).



Todd Mares is the Director of Emerging Technologies Division of Peerless-AV, a provider of Professional Audio and Video Mounting Solutions, High Definition Wireless Delivery Solutions, and Professional Outdoor Display Solutions for Residential and Commercial Applications.