

Debunking "Brightness" Myths

A critical examination of **Contrast:** The other half of the digital display visibility equation

Today, many electronic message center and digital billboard manufacturers blindly subscribe to the theory that brighter is better. They would have you believe that brightness alone is what determines the quality of digital images in terms of ideal viewing characteristics. But in order to accurately evaluate digital performance and the overall viewability of outdoor LED displays in general, you have to factor in how contrast impacts brightness.

With this in mind, let's examine some of the more common myths surrounding digital display brightness.

MYTH 1:

"I need all the brightness I can get, because my display is competing with the sun's brilliance."

The premise certainly sounds logical enough at first. After all, the LEDs that make up an outdoor digital display are affected by ambient light. So the brighter the board, the better – right?

Not necessarily. A digital display's reflectivity is every bit as important to viewing as its brightness. Consider that the sun's brightness (when viewed directly) is measured at approximately 60,000 NITs (a "NIT" is the amount of candela emitted in 1 square meter at the source of the light). If too much light is reflected, the reflected sunlight would completely overwhelm and wash out any LED display if brightness were the only factor involved.



ADAPTIVE: 7,500 Nits/2% Reflected light = CR of 6.25
COMPETITOR: 6,500 Nits/5% Reflected light = CR 2.16

way, the emitted light is much stronger than the reflected light. This ratio is commonly called the Contrast Ratio.

For example, a competitor's board with only 5% reflectivity would need approximately 18,750 NITs of brightness to have the same contrast ratio as an Adaptive board with only 2% reflectivity running at 7,500 NITs.

Therefore, it's important to look beyond brightness alone and isolated NIT specs in determining how a digital display will look to the naked eye. By taking into account the complete picture of brightness and contrast, Adaptive Micro Systems is able to produce digital display images that stand out in all lighting conditions, without having to push the brightness of the display any further than necessary.

As you'll see, this capability also becomes a key consideration in evaluating the long-term value of your investment in a digital display.

That's why all digital display manufacturers make an attempt to reduce reflectivity in order to improve viewing contrast. Adaptive's outdoor LED displays utilize flat black surface coatings and texturing as well as long horizontal louvers to help absorb ambient light. That

MYTH 2:

"Brighter equals better."

Not true. In fact, there is such a thing as being too bright. Over-saturation of light—sometimes referred to as "bloom"—can cause a glow effect that can make images hard to read... to the point that digital displays can overwhelm the eye and even repel it. This is why a display's power delivery is adjusted during evening hours to reduce display brightness in order to achieve comfortable viewing.

Adaptive Micro Systems constantly looks for ways to improve its digital displays' contrast

ratios and achieve optimum viewing characteristics with the least amount of brightness. Adaptive's on-staff Doctor of Optics uses lighting measurements and visual psychology to determine optimum brightness and contrast requirements for different ambient light conditions. Ambient light evaluation curves are then used in conjunction with the on-board light sensor on every Adaptive digital display to ensure that the ideal brightness is achieved for the given ambient light conditions.

MYTH 3:

"The brighter the display is to start with the better, because LED performance diminishes over time."

LED performance does diminish over time. While true, this fact can be misleading. Why? Because LED performance diminishes so minimally that it takes years to see a real fall-off in quality.

However, increasing brightness initially requires driving the LEDs harder. This results in higher power draw, which means greater heat build up. And more heat over time can overstress the semiconductor material that makes up the LEDs, exponentially decreasing LED life. Therefore, manufacturers that tout significantly higher NITs are more likely to significantly shorten the usable lifespan of the board's LEDs. So the odds are that these displays are far more likely to burn out long before you would see a

reduction in brightness from a display consuming considerably less power.

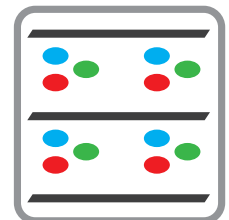
To compensate for heat loads, some manufacturers provide external cooling via air conditioning units. Yet, air conditioners add significantly to overall system weight and operating costs. Others vent their cabinets. But this can allow dirt and moisture contamination of sensitive electrical components and require ongoing routine filter maintenance.

Adaptive achieves a power balance that requires no external cooling units for the digital display while maintaining the integrity of a sealed case, thus helping preserve the life of electrical components and the LEDs.

Conclusion

Brightness is an essential part of the digital visibility equation—but not the only part. Focus solely on NITs and you may miss the bigger picture.

To make sure you wind up with the best digital display investment, you owe it to yourself to see examples of systems from various manufacturers...first hand if possible. While the information on the spec sheet may sound impressive, it's what you see up there on the digital display that ultimately counts.



Adaptive's optimized pixel and lower design enhances contrast.