



Contrast is King

A high contrast solution from Prismview

Overview

As it relates to the digital display, utilizing full-color light-emitting diodes (LEDs), the concept of high contrast is essential, yet difficult to measure.

Historically, the concept of high contrast has related to photography, as a measure of "highlights and shadows represented by extreme differences in density" (tpub.com/photography/high_contrast). However, those terms relate to dots on a background, measured in a variety of colors. LED display image contrast represents emitted light images on a black field.



For purposes of this discussion, we will accept the fact that LED illumination on a black background is a challenge, and that the blacker the background surface, the better the image and the lower the requirement of illumination to produce a viable image.

Extenuating Environmental Circumstances

Anything that is placed outdoors for a period of time suffers from the environment. Displays of all types are defaced by the accumulation of dirt over time. In major city environments, it was once common practice to clean displays regularly. Today, economic considerations make such practice a luxury.

For digital displays, the cleanliness of a display is directly proportional to the quality of the image. Even the tiniest dirt particles may impede the optical characteristics of projecting light. Consequently, dirty displays appear to be flawed. It is not unusual for a technician to be dispatched to determine the nature of a distorted image, only to determine that cleaning would bring the image quality back to the expected quality.

Certain environments face extreme challenges. In the desert, as typified by inland southern California, Arizona, and Nevada, there is little rain, coupled with a high occurrence of blowing sand and dirt. Nature does not give these displays a regular bath. The dirt stays affixed to the faces, blanching out the dark background and distorting the light as it emits from the diodes. In a fairly short period of time, the image quality degrades dramatically.

In major urban environments such as New York City's Times Square, the city's grime builds up continually. The situation can be exacerbated by the environment in which the displays reside. Because most displays project over pedestrian areas, there is little or no time in which the displays may be cleaned. In spite of the frequent precipitation, the nature of the urban build-up is stickier than its desert counterpart, making it adhere to the face even in a torrential downpour.

Even in the best of circumstances, the faces of LED displays accumulate dust over time. This reduces the display's innate contrast. Ultimately, environmental airborne particles are the enemy to emitting illuminated light images.



The Prismview's Solution

The Prismview's engineering team has developed a multi-tiered solution to enhance the contrast of its displays. Operating from the premise that the blacker the background, the better the image, Prismview has developed a face background that starts out with the deepest color possible, enhances that background with grooves which further trap the darkness, and then coats it with a material proven to deflect airborne particles. The net result is the truest black background available in the digital display industry.

The Blackest Black

Many people assume that there is but one black, as it relates to face material. In reality, a wide variety of blacks are available for plastics and coatings, each with their own light-trapping characteristics. Prismview engineering has worked extensively with the engineering divisions of a number of different compound manufacturing firms to select the deepest light-robbing material for its background component. The proprietary product, developed for Prismview is durable, long-lasting, and resistant to UV fade over time.

The Grooved Background

The new Prismview face is louvered, as with the previous products, to provide stability and to shade the pixels for maximum darkness in the background. In addition, the background material, between the louvers (vertically and between the pixels, horizontally), is grooved to provide a mini-louver effect to further trap light and to enhance the dark background.

The Anti-Particle Coating

Perhaps the greatest innovation relative to enhanced contrast, as measured over time, is the anti-particle coating. This product was specifically formulated for the Prismview digital display in direct response to the dirt-buildup problems previously noted. It adheres to the face of the display for the life of the product and has been specifically formulated to resist UV damage.

In a rudimentary test, Prismview placed two LED modules under a functioning welding machine. One was coated with the anti-particle material; the other was not. Each module was examined for dirt accumulation at fixed time intervals over a period of three months. At each interval there was a measurable difference in the accumulation of dirt. At the end of the three-month test, the difference was dramatic. The module without the coating looked weathered, with a significant amount of welding particles affixed to the face. The coated module had very little build-up, even in the extreme environment of a welding station. The dirt that had accumulated blew off when the LED module was held vertically.

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