Section 1: Intro

To be seen: Various shots from the plant

Narrator: In searching for a digital billboard or LED sign, you've probably heard about color calibration. We'd like to take a few minutes to explain why Watchfire's whole-sign calibration is so important.

The whole-sign calibration process adjusts both the color and brightness of each LED, which optimizes the LEDs performance and makes the sign look its absolute best on Day one – and for the life of the sign. When signs are calibrated correctly using this process, problems like uneven coloring and splotchy patches are eliminated.

We've seen digital signs and billboards from other manufacturers that are less than a year old and are already showing significant signs of aging. We've also seen brand new signs that display colors so unnaturally, they're almost cartoonish. Patchy appearances are often due to lack of brightness calibration, while color issues are often due to lack of color calibration. You may also notice digital billboards and signs in which the whites aren't quite white, and that affects the look of all other colors. It's especially obvious in skin tones. This can happen when the digital sign isn't calibrated using a uniform light source.

Section 2: The history of our calibration experience

To be seen: Various shots of signs; video and stills; on-premise and billboard

Narrator: The first Watchfire LED signs built in 1998 relied solely on binning and batching technology. LED suppliers sorted groups of LEDs by common qualities and dropped them into bins. Watchfire would then create batches of each color - red, green and blue - identified by numerical code. Signs were comprised entirely of LEDs from a common batch to minimize color variations across the display. Although that process was the best available at the time, it isn't satisfactory by today's standards to produce the smoothest, most life-like colors with the longest-lasting color balance.

Watchfire Employee on camera: Batching and binning was better than doing nothing at all, but it wasn't good enough for us. Within a few years, Watchfire became a leader in deploying a more thorough module-to-module color calibration process that makes images look far superior to those using the batching approach alone.

We continued to push the capabilities of the equipment available, which led to our whole-sign color calibration approach developed by Radiant Imaging, a world-leading provider of light and color measurement systems. We adopted their whole-sign field calibration process into the production of our signs in the factory. Our sophisticated process enables us to calibrate for both color and brightness at the pixel AND modules levels to end up with the smooth, true-to-life colors you see on Watchfire signs and digital billboards.

According to Radiant Imaging, as of July 2011, Watchfire is the only LED sign manufacturer using this whole-sign calibration process before shipment.

Section 3: Walk through of our whole-sign calibration process

To be seen during narration: shots of LEDs from inventory and BlazeTech, shot of billboard (or large OP sign) in production and/or calibration

Narrator: From start to finish, it takes over three hours to complete the entire sign calibration process on a typical billboard. Watchfire engineers start by carefully selecting single binned LEDs from top-tier suppliers that are already grouped by light intensity and color wavelength. This helps reduce variation among the LEDs and allows for a deeper color palette, which results in superior image quality.

To be seen: calibration camera

Watchfire Employee on camera: Our first step is to calibrate our equipment, making sure it's operating optimally. We begin with a calibration camera that takes very high resolution pictures of the sign for analysis.

To be seen: spectroradiometer

Watchfire Employee on camera: We then use a spectroradiometer to calibrate the camera for color and brightness and to take very accurate measurements of both color and brightness of the individual LEDs.

To be seen: light source device

Watchfire Employee on camera: We use a uniform light source to ensure the calibration camera sees a consistent white for the entire sign. Later, during calibration of the sign, we further dial in the white target to D65 which is the standard for daylight illumination and also used in the television industry.

To be seen during narration: over-shoulder technician at computer, technician securing a module into position, motion graphic representation of process

Narrator: After we properly calibrate the measuring equipment, we analyze the entire sign by allowing the camera to focus on every single LED. This is done to accurately measure its brightness and color. Each pixel is adjusted to produce a consistent red, green, blue, and white, resulting in a nine-value calibration matrix per pixel. We then store these values on the microprocessor within the LED module rather than in the sign's onboard controller. This allows the "smart module" to be moved anywhere on the sign, and still maintain uniform color and brightness in any position. If the values were stored in the controller, a module could be noticeably out of place in another position, which would disrupt the continuity of the sign's images.

To be seen: corrected sign in background with solid colors

Watchfire Employee on camera: Once we've adjusted the individual pixels, we analyze the entire sign as a whole and adjust each module's values so color and brightness are consistent across the sign.

To be seen during narration: Various shots of signs; video and stills; on-premise and billboard

Narrator: Watchfire has been using Radiant technology equipment longer than any other manufacturer in the industry, and we think it shows in the results – Watchfire signs have more accurate color and more uniform brightness than any other product on the market today.

Watchfire Employee on camera: We're very proud of the results. We take comfort in knowing we've done everything possible to provide our customers with the best product available.

Section 4: Closing

To be seen during closing narration: Recap shots of process, start to finish, including final sign product

Narrator: Whole-sign color calibration isn't a process that just anyone with the right equipment can perform well. It carries a steep learning curve, and it requires time, dedication, and skill to perfect. Watchfire's experienced engineers and technicians have been through rigorous training and are constantly working to improve the quality of the calibration process, pushing the technology to new heights. This steadfast commitment to quality is why Watchfire produces the very best LED signs and digital billboards in the industry.