Color matching a video wall

LCD display panel are calibrated at the factory to a factory standard for color matching. This process reduces the time it takes to calibrate the color and brightness (luminance) matching of the video wall once on-site.

In some cases, additional color matching adjustments are necessary to compensate for production tolerances and application requirements. This document outlines the process installers can follow to reach an optimal color and brightness matching.

Affected products

The following products are affected.

- FHD493-XE (P/N: 135-009100-XX)
- FHD554-XZ-H (P/N: 135-033107-XX)
- FHD554-XZ-HR (P/N: 135-032106-XX)
- FHD554-X (P/N: 135-046101-XX)
- UHD654-X-HR (P/N: 135-029102-XX)
- FHD553-XE (P/N: 135-007108-XX)
- FHD553-XE-H (P/N: 135-012104-XX)
- FHD553-XE-R (P/N: 135-008109-XX)
- FHD553-XE-HR (P/N: 135-013105-XX)
- FHD553-X (P/N: 135-023106-XX)

Related documentation

Additional information on this product is available in the following documents.

- For installation, setup, and user information, see the product documentation available on the Christie website.
- *Using the Video Wall Toolbox (P/N: 020-001662-XX)*

Matching color and brightness

To match color and brightness of panels in a video wall, the following steps are required.

1. To make sure panels are prepared for panel matching, *perform a pre-adjustment setup* (on page 2).
2. *Select the 100% white pattern* (on page 2).
3. *Match panels for luminance* (on page 3) using the backlight settings.

   Once you start the panel matching process, do not change the color temperature of the displays. Doing so erases any adjustments you have made so far and you will have to start the process from the beginning.
4. *Adjust the R, G and B gains with the 100% white pattern displayed* (on page 4).

Only adjust gains downward, not upward. Limit the adjustments. Do not exceed gains of 256 on panels.

5. Be sure to evaluate luminance (brightness) levels again after you have matched color temperatures.
6. To compensate if G or B gains are reduced significantly, *repeat the luminance matching process* (on page 3).
7. *To adjust R, G and B offsets, display a 25% gray pattern* (on page 4).
8. Match the R, G, B offsets for the panels.
9. Repeat all three matching processes (*luminance matching* (on page 3), *R, G, B gain adjustments at 100% white* (on page 4), and *R, G, B offset adjustments at 25% gray* (on page 5)) until you achieve required results.

   You may need to iterate all three adjustments several times to create the most evenly matched video wall.

Preparing for panel color matching

Before beginning the panel color matching process, confirm all panels in the video wall are set to the values below.

For instructions on how adjust these settings, refer to *Using the Video Wall Toolbox (P/N: 020-001662-XX)*.

1. Make sure the fine calibration process (FCP) is enabled so the panels are closely matched to each other out of the box.

   Select **Image Settings** > **Color Temperature & Gamma** > **Calibration** > **Multi-Display**.
2. Set your preferred color temperature, such as 7500.

   The available settings are 3200, 5000, 6500, 7500 and 9300.

   Do not change the color temperature of the displays after starting the panel matching process as any adjustments made so far are erased, and the process must be restarted. When panel matching is done for one of the color temperatures, all the other inputs will be color matched when using the same color temperature.
3. If necessary, perform a factory reset on your panel to make sure R,G,B gains and offsets are the factory default values.

   R,G,B gains and R,G,B offsets are adjusted in the factory using the fine calibration process (FCP). Default gains may not be exactly 256 and default offsets may not be exactly 0.
4. Set your preferred backlight value, for example 80%.
5. Select **Menu** > **Advanced Settings** > **Smart Light Control** and select **OFF**.

   Make sure the backlight is set to 90% or less.

   Smart Light Control is only available on FHD553-XE, FHD553-XE-R, FHD553-XE-H, FHD553-XE-HR, and UHD654-X-HR.

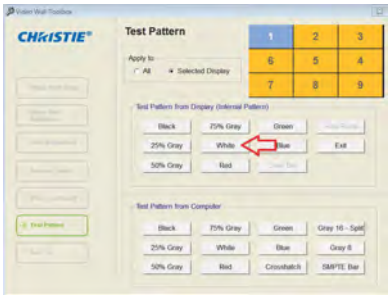
Displaying a 100% white test pattern

Generate a 100% white test pattern on all screens.

For instructions on how adjust these settings, refer to *Using the Video Wall Toolbox (P/N: 020-001662-XX)*.

1. To open the Video Wall toolbox, from the Start menu, select **Christie Display Tool** > **Video Wall Toolbox**.

2. From the Video Wall toolbox, select the **Test Pattern**.
3. In the Apply to section, select **All**.
4. In the Test Pattern from Display (Internal Pattern) section, select **White**.



Matching the luminance (brightness) of panels

Follow these steps to match the luminance (brightness) of panels.

Do not adjust the Brightness, Contrast, Hue, or Saturation settings during this process.

Throughout adjustments to the Video Wall Toolbox, to avoid accidentally pushing incorrect adjustments from previous panel into the new one being worked on, each time you switch between panels select **Refresh**. Refresh polls the panel you selected and updates current values for that panel. Even if the display panel has an auto-refresh feature, as a best practice manually refresh as well.

1. In the VideoWall Toolbox, set the wall to peak white.

   The FHD554 and UHD654 display panels have RGB gain adjustment in the on-screen display that will raise or lower the Gain for all 3 colors at the same time.

   The calibrated drives may not be near the typical max of 256. If all three are reduced, this reduces the brightness. It is advisable to raise all three equally, using the drive closest to 256 as the reference until that one is at 256. Raise the other two an equal amount that it took to raise the first to 256. This maximizes the color dynamic range without reducing overall brightness.

   For example, if the R Gain is 250, G Gain is 249, and B Gain is 245, then raise R Gain to 256, G Gain to 255 and B Gain to 251. Each value has been raised by 6.

Before

After

2. Select a panel from the wall to use as a reference target for luminance matching.

Select the dimmest panel after all panels have been set for maximum dynamic range while maintaining original factory color calibration. This panel is the basis to match other panels using small Backlight adjustments. This can be done in the Color Adjustment menu of the Video Wall Toobox.

3. Working outward from the reference panel, adjust the Backlight setting of adjacent panels so the perceived luminance of the panels matches the reference panel.

   Significant reductions of green or blue in the color matching process will also reduce brightness, so consider this as you adjust backlights on panels that may have excessive amounts of blue or green tint. This may require several iterations to achieve matched luminance.

Matching R, G, B gains at 100% white

Follow these steps to match the R, G, B gains at 100% white.

1. Make sure the 100% white test pattern is selected.
2. Starting with one or two panels that have the highest mismatch with the rest of the wall, in the VideoWall Toolbox reduce the R, G or B Gain slightly to match adjacent panels.

   Do not adjust R, G or B offset.
3. If required, slightly increase the backlight level to compensate for loss of light output due to changes in G or B gain downward.
4. Select a panel from the wall to use as a reference target for color matching, with average color temperature, or average redness (warmth) and blueness (cool).
5. Working across the wall, adjust the color by eye of the neighboring panels to match the reference panel.

   Reduce the R, G or B gain slightly to match adjacent panels. Do not adjust R, G or B offsets.

   Avoid adjusting the R, G or B gain above 256, where possible; instead, lower one or two of the other colors gain values. Increasing any color beyond 256 may cause the color to reach its maximum level prematurely (crush), causing a nonlinear calibration and lowering performance.
6. Pay close attention to the center of the panels and do not try to match the edges of the panels with each other.
7. Once the centers of the panels are properly matched, start to match the edges of the panels by repeating step 5, as a slight shift in overall color temperature can help with panel non-uniformity.

   Be aware that edges and centers of the panels may not match perfectly at the same time; therefore, you need a compromise that provides the best overall effect.

Displaying a 25% gray test pattern

Generate a 25% gray test pattern on all screens.

1. From the Video Wall toolbox, select the **Test Pattern**.
2. In the Apply to section, select **All**.
3. In the Test Pattern from Display (Internal Pattern) area, select **25% Gray**.

Matching R, G, B offsets at 25% gray

Follow these steps to match the R, G, B offsets at 25% gray.

1. Make sure the 25% gray test pattern is selected.
2. Choose the panel with the best looking grey as the reference panel.

   It may be necessary to measure from a meter and adjust the settings accordingly. Do not adjust R, G or B gain at this stage of the process.
3. For the majority of panels nearly matching each other, increase or decrease offsets (the numbers can have negative values) to fine tune matching low level greys.

   Save the noticeably bright or dim panels for last.
4. Working across the wall, adjust the color by eye of neighboring panels to match the reference panel.

   Adjust R, G or B offsets incrementally (up or down) to match adjacent monitors. Do not adjust R, G or B gains.
5. Pay closest attention to the center of the panels and do not try to match the edges of the panels with each other.

   Be aware that edges and centers of panels may not match perfectly at the same time; therefore, you will need a compromise that provides the best overall effect.
6. Adjust panels that are too bright or too dim until they are same amplitude as the rest of the array. Adjust colors as needed to match as well.

Technical support

Technical support for Christie Enterprise products is available at:

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