Flanders Scientific Inc.

# Monitor User Manual

**Updated 11.13.2026**

**V Series**
**V270**
**V310**
**V550**

This manual is based on firmware version 0.1.4. If you have an older or newer firmware version installed instructions may vary.

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## OLED PANEL IMAGE RETENTION CAUTION

Prolonged display of static content, overlays, or OSD menu, may cause image retention or burn-in.

When possible you should avoid displaying static content, especially in HDR mode, for longer than necessary.

A clear panel noise (CPN) capability is provided that can help maintain, and in many scenarios even restore, panel performance. CPN should be run regularly (when prompted) to help mitigate image retention. In order to benefit from the ameliorating capabilities of the CPN process please ensure that you allow the procedure to complete after activating. See the Clear Panel Noise section of the manual for more details.

If using the CPN process regularly and monitoring most typical content, especially at SDR levels, the potential for permanent image retention or burn-in is quite low. The risk of image retention or burn-in is most prevalent when dealing with static, high-contrast, HDR elements for prolonged periods of time. Camera surround information and frame lines displayed at 1000nits on screen for prolonged periods of time are one of the biggest potential burn-in risk factors. Many high-end camera systems provide options for displaying camera surround information and frame lines at more muted levels when monitoring in HDR. Displaying such information at 100nits or lower is ideal whenever possible. For cameras that do not support camera surround or frame line intensity customization you can use the V series Custom Marker capabilities to generate a translucent overlay to mute these elements to more reasonable levels. See the Custom Marker section of this manual for more details.

In addition to the steps above, the Pixel Shift option can also be used to help mitigate image retention when static, high-contrast image elements must be displayed for extended periods. See Pixel Shift in the Video Menu section of this manual for details.

Image Retention and Burn-In are not warrantable issues so care should be taken as outlined above to avoid these issues.

**FCC (Federal Communications Commission)**
This equipment has been tested and found to comply with the limits for a class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interface when the equipment is operated in a commercial environment.

This equipment generates, uses, and can radiate radio frequency energy, and if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications.

**Warning:** Changes or modifications not expressly approved by the manufacturer responsible for compliance void the user's authority to operate the equipment.

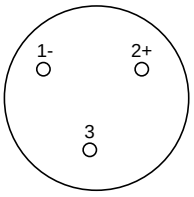
**Safety Precautions**

- All operating instructions must be read and understood before the product is operated.
- All warnings on the product and in the instructions must be observed closely.
- All operating instructions must be followed.
- Do not use attachments or accessories not recommended by the manufacturer. Use of inadequate attachments may result in serious accidents.
- Do not place heavy objects on the power or signal cable cords. Route cords to prevent people from stepping on or resting objects on the cords. Check to ensure that both outlet and product connection points are properly seated and secured.
- This product must be operated on a power source as specified on the specification label or product screening. Always operate the product within the voltage range specified.
- Do not overload AC outlets or extension cords. Overloading can cause fire or serious electric shock.
- Never insert an object into the product through vents or openings as this can cause serious electric shock or damage.
- Do not expose product to water or other liquids as this can lead to electrical shock or permanent damage.
- Do not attempt to service the product yourself. Removing covers can expose you to high voltage and other unsafe conditions. Please seek the assistance of a qualified service professional for all service needs.
- If any of the following occur, unplug the power cord from the AC outlet and consult a qualified service professional to perform repairs:
  - Power cord or plug becomes damaged.

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  - When any liquid is spilled on or in the product.
  - When the product has been exposed to rain or water.
  - When the product does not operate properly as described in the instruction manual.
  - When the product has been dropped or damaged.
- Keep this product away from heat generating sources such as radiators, heaters, stoves, or other heat generating products.
- If the product requires replacement parts, make sure that the service person uses replacement parts specified by the manufacturer, or those equivalent parts having the same characteristics and performance specifications as the original parts. Use of unauthorized parts can result in fire, electric shock, and/or other damage.
- Upon completion of any service or repair work, request that the service technician perform safety checks to ensure that the product is in proper working order.
- When mounting the product to a wall, ceiling, or within an enclosure, be sure to install the product according to the instructions of both the mount and monitor manufacturer.
- Unplug the power cord from the AC outlet before cleaning the product.
- For proper screen maintenance please follow the guidelines below to prevent scratches, discoloration, or other damage to the panel:
  - Avoid striking the screen with any object.
  - Do not wipe screen hard. Apply only gentle pressure if cleaning.
  - Do not wipe the screen with solvents such as alcohol, paint thinner, or benzene as this can cause permanent damage to the panel.
  - Do not spray detergent or other cleaners directly on the monitor or panel.
  - Do not write on the panel with any substance or object.
  - Do not paste or stick anything to the screen as any adhesive can cause damage to the panel.
  - Screen may be cleaned by gently wiping with lint free cloth to remove dust. For more thorough cleaning use a lint free cloth that has been very lightly dampened with distilled water. Please dry any excess moisture from the monitor or panel immediately to prevent damage.
- Take care in moving this product as serious injury or death can result from the sudden shifting or falling of this object.
- The vents and openings in the product's chassis are designed for ventilation. Do not cover, block, or otherwise obstruct these vents and openings as insufficient ventilation can cause overheating and/or shorten the life of the product. Do not place the object on a bed, sofa, rug, or other similar surface as this can result in serious obstruction of ventilation areas. If using in enclosed space make sure to provide proper ventilation to maintain a reasonable operating temperature range.
- The panel used in this product contains glass and can cause serious injury if broken. If the unit is dropped or otherwise damaged take care to avoid possible injury by glass shards.
- Avoid prolonged exposure to direct sunlight as this can cause damage to the panel.
- For proper chassis maintenance please follow the guidelines below to avoid any potential damage:
  - Do not wipe the chassis with solvents such as alcohol, paint thinner, or benzene.
  - Do not expose the cabinet to any volatile substances.
  - Do not allow prolonged contact with rubber or plastic.
  - Apply only gentle pressure to chassis when cleaning.
  - To clean use a soft, lint free cloth to remove dust. A lightly dampened cloth, as described in the screen maintenance section, may also be used to clean the chassis.

If using a third party power adaptor on the V270 or V310, please ensure the proper voltage and pinout are being used.




**3 pin XLR pinout**

Pin 1: Negative
Pin 2: Positive
Pin 3: Not Used

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**Back Panel**




- **HDMI In:** HDMI 2.1 Input.
- **DP In:** DisplayPort 1.4 Input.
- **Audio In/Out:** Analog Stereo Mini-phono Audio Input & Output. Unbalanced Audio Out.
- **USB Type A:** Connect compatible AutoCal probes here when using AutoCal. Can also be used for USB power, for example to power MediaLight Bias Lights.
- **SPDIF:** Optical Digital Audio Output.
- **RS-485:** RS-485 Ports (In/Out) for looping remote control interface.
- **LAN:** LAN port for remote control and firmware update.
- **GPI:** GPI contact closure port. See the GPI Menu section of this manual.


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**5-Way Navigation Controller**




**Using the Controller and Navigating the Menu**

V Series displays are equipped with a 5-way navigation controller on the back of the monitor allowing for selections of left, right, up, down, or enter (depress controller button for enter). To turn the monitor on depress the controller button once. Boot up time is approximately 13 seconds. Once on, press left on the controller to call up the main menu. You can then navigate through the menu by pressing up, down, left, right, or enter as desired. You can exit the main menu by pressing left again on the controller. In addition to the main menu there is also a shortcut menu that can be accessed by depressing the controller button. Note, to access the shortcut menu the main menu must not be on screen. From the shortcut menu you can toggle assigned Functions On/Off quickly. The shortcut menu is also where you will find the monitor's power down option to turn the monitor off. Function button assignments can be changed from the main menu.

**Menus longer than the Main Menu may not fully display. These menus will scroll.**

**Use the Up and Down controls to scroll up and down within longer menus.**

| Shortcut Menu | |
|---|---|
| F1 Smooth Gradient | On |
| F2 Custom Marker | Off |
| F3 Pixel Mapping | Off |
| F4 LUM Coloring | Off |
| F5 Area Marker | Off |
| Power Down Now | |
| Menu | |

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**Function Menu**

| Function | F1 | Pixel Mapping |
|---|---|---|
| Video | F2 | LUM Coloring |
| Audio | F3 | Area Marker |
| Color-Global | F4 | Safety Marker |
| Color-Input | F5 | Center Marker |
| System | | Custom Marker |
| OSD | | Smooth Gradient |
| GPI | | Load Profile 0 |
| | | Load Profile 1 |
| | | Load Profile 2 |
| | | Load Profile 3 |
| | | Load Profile 4 |
| | | Load Profile 5 |
| | | Blue Only |
| | | Blue As Mono |
| | | Red Only |
| | | Red As Mono |
| | | Green Only |
| | | Green As Mono |
| | | GaiaColor ABL Mode |

The Function Menu allows you to assign user selectable functions to any of the 5 shortcut function selections (F1, F2, F3, F4, and F5). To assign a function to a function shortcut position, highlight one of the 5 functions and select ENTER. A list of assignable functions will appear. Select the desired function with the UP and DOWN controls and press ENTER to confirm. Once assigned functions can be activated from the shortcut menu.

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**Area Marker**
Use the Area Marker function to toggle the configured Area Marker feature on or off. See the OSD section of this manual for details on setting up the preferred Area Marker.

**Safety Marker**
Use the Safety Marker function to toggle the configured Safety Marker feature on or off. See the OSD section of this manual for details on setting up the preferred Safety Marker.

**Center Marker**
Toggles the center marker (cross-hair) on or off.

**Custom Marker**
Use the Custom Marker function to toggle the configured Custom Marker feature on or off. See the OSD section of this manual for details on configuring the preferred Custom Marker as well instructions on uploading Custom Markers to the monitor.

**Smooth Gradient**
This function can be enabled to reduce quantization and improve the perceived smoothness of gradients, especially when dealing with high bit depth PQ EOTF signals. It is important to note that with the Smooth Gradient feature enabled viewers may perceive more flicker in some images, which is why this feature is made available as an optional toggle. Some viewers will be more sensitive to this flicker than others, but for all viewers the effect tends to be most pronounced if sitting closer than recommended to the display. Smooth Gradient mode is best utilized if the viewer can ensure a viewing distance of at least 2.5 times the picture height. As Smooth Gradient mode is controlled by a function key it is also easy to toggle it on just as needed as most content will look identical with respect to quantization unless dealing with particularly challenging high bit depth gradients. For PQ applications specifically the Smooth Gradient mode can also be coupled with a lower Luminance Mode selection for not just perceived, but also actual, increased bit depth allocation in the darkest regions of an image (see Luminance Mode section for details).

**GaiaColor ABL Mode**
Toggles the monitor's ABL (Automatic Brightness Limiting) behavior between Global and Highlights. See GaiaColor ABL Mode in the Color-Global Menu section of this manual for a full explanation of the two modes.

**Load Profile**
Saved profile configurations can be loaded via a function.

The most common use for saving profiles and assigning them to a function is to allow for quick access to different configurations for various HDR and SDR workflows. For example, you could set one profile to load a 2020, PQ, Full Range, 6500K configuration, another to load a Rec709, Gamma 2.4, Video Range, 6500K configuration, and yet another to load a P3, Gamma 2.6, Full Range, 6300K-DCI configuration. Profiles can be a great convenience and a huge time saver if you frequently switch between different types of monitoring configurations.

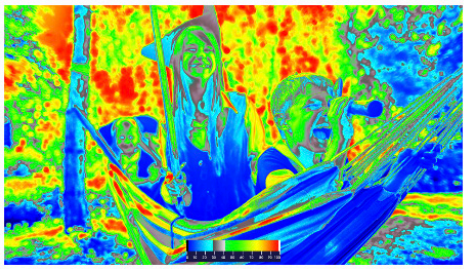
Profiles 1 - 5 are user adjustable via the Profile Save command found on the System Menu. Simply set all monitor settings to your liking, then from the System Menu select Profile Save, pick the Configuration memory slot where your settings will be saved, and Enter to confirm. Profile 0 is the Factory Default Configuration.

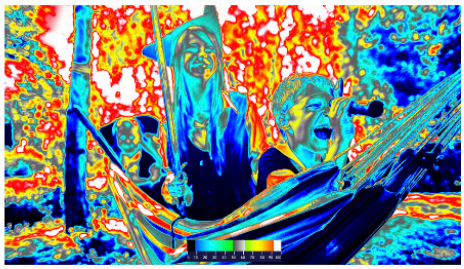
If loading profiles via a function assignment be aware that any menu / sub-menu you are actively viewing will not reflect its new settings until you exit and reenter that menu. For example, if you are viewing the Color Menu and have the monitor set to Rec709 gamut, then load a profile you have assigned with a P3 gamut, the Color menu will not reflect that gamut change until you exit and reenter the Color menu. The actual settings do take effect immediately, but menus must be refreshed by exiting / reentering the menu before reflecting any function activated change.

**Profiles save function assignments. For this reason if you want to dynamically switch between profiles with just shortcut function selections please ensure that each corresponding profile has the desired Load Profile functions configured on the function menu.**

**Lum Coloring**
Enabling this function generates an artificial luminance map of the incoming source that can be particularly useful in identifying overexposed areas in any given shot. An onscreen scale helps indicate what artificial color corresponds to what luminance from 0 to 100 percent. The LUM Coloring feature can also be activated via the monitor's Color-Input Menu -> Color Mode -> LUM Coloring.

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**Blue Only / Red Only / Green Only / Mono**
These modes can also be activated from the monitor's Color-Input Menu -> Color Mode, but assigning to a function provides for faster access to these modes. Blue Only, Red Only, and Green Only will show just the blue, red, or green channel for an incoming signal respectively. There are additional Blue as Mono, Red as Mono, and Green as Mono selections available as well that will show you these respective signal channels as monochrome on screen. A standard Mono mode is also available that show the complete incoming signal as monochrome. See the Color-Input Menu section of this manual for more details.

**Pixel Mapping**
Pixel Mapping can be assigned to a function allowing you to quickly toggle in and out of 1:1 mode. It can also be selected from the Video Menu. The default behavior of the Pixel Mapping function after a power cycle is to toggle to CENTER pixel mapped when activated, but if set to any other selection from the Video Menu (e.g. Top Left) the pixel mapping function will toggle between Off and this last selected pixel mapping mode.

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**Video Menu**

| Function | Input | HDMI |
|---|---|---|
| Video | Pixel Mapping | OFF |
| Audio | Deinterlace Mode | Interfield |
| Color-Global | Pixel Shift | OFF |
| Color-Input | | |
| System | | |
| OSD | | |
| GPI | | |

**Input**
The active input can be selected using the Video Menu. Select from HDMI or DP.

**Pixel Mapping**
Pixel Mapping toggles between various available pixel mapping options including:

**OFF**
With Pixel Mapping set to OFF the incoming source is scaled to fill as much of the screen as possible while preserving aspect ratio. If the incoming source and panel share the same resolution then there will be no difference between OFF and the other pixel mapping modes.

**Center**
Maps the signal 1:1 with the center of incoming video in the middle of the screen.

**Top Left**
Maps the signal 1:1 with the top left of incoming video in the top left of the screen.

**Top Right**
Maps the signal 1:1 with the top right of incoming video in the top right of the screen.

**Bottom Left**
Maps the signal 1:1 with the bottom left of incoming video in the bottom left of the screen.

**Bottom Right**
Maps the signal 1:1 with the bottom right of incoming video in the bottom right of the screen.

**Pixel Mapping on 4K sources**
Note: Using pixel mapping with a 4K source on a native 3840x2160 screen will cause a portion of video to not be displayed, but these modes can be used to display 4K signals 1:1 and view the Left, Right, or Center of the video signal.

Pixel Mapping can also be assigned to a function allowing you to quickly toggle in and out of 1:1 mode. The default behavior of the Pixel Mapping function after a power cycle is to toggle to CENTER pixel mapped when activated, but if set to any other selection from the Video Menu (e.g. Top Left) the pixel mapping function will toggle between Off and this last selected pixel mapping mode.

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**Deinterlace Mode (only applies to interlaced and PsF sources)**
When monitoring interlaced or PsF (progressive segmented frame) signals there are three modes to choose from:

**Interfield:** fields are combined and shown as progressive.

**Intrafield:** fields are shown as interlaced on screen with proper temporal field order. This is the mode suggested for QC monitoring of interlaced sources as it will allow you to spot issues like field reversals.

**PsF:** for use with progressive segmented frame (PsF) signals. PsF signals are sent to the monitor similarly to interlaced video sources, setting this selection to PsF allows the monitor to display such PsF sources as progressive on screen.

**Pixel Shift:** When set to ON, the image shifts slightly every minute. This mode is designed to help reduce the risk of image retention and burn-in when displaying static, high-contrast image elements for extended periods of time.

The panel's native resolution is slightly larger than the active 3840 × 2160 video raster, allowing the image to shift position without cropping or losing any portion of the active image.

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**Audio Menu**

| Function | HDMI Audio | Digital CH1&2 |
|---|---|---|
| Video | DP Audio | Analog |
| Audio | | |
| Color-Global | | |
| Color-Input | | |
| System | | |
| OSD | | |
| GPI | | |

**HDMI Audio**
Use this toggle to select what audio source is active (via audio output connection) when viewing the HDMI input. You may select No Sound, Analog (from minijack input), or Channel 1&2.

**DP Audio**
Use this toggle to select what audio source is active (via audio output connection) when viewing the DP input. You may select No Sound, Analog (from minijack input), or Channel 1&2.

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**Color-Global Menu**
The Color-Global menu contains color management related settings and features that always apply to the monitor across all inputs.

| Function | ColorSystem | GaiaColor |
|---|---|---|
| Video | Gamut Toggle | Hue |
| Audio | 3rd Party cLUT | User1 |
| Color-Global | Red Gain | 0 |
| Color-Input | Green Gain | 0 |
| System | Blue Gain | 0 |
| OSD | Red Bias | 0 |
| GPI | Green Bias | 0 |
| | Blue Bias | 0 |
| | GaiaColor AutoCal | |
| | AutoCal Data Backup | |
| | AutoCal Backup Load | |
| | GaiaColor ABL Mode | Global |
| | Hue | 0 |
| | Chroma | 0 |
| | Bright | 0 |
| | Contrast | 0 |

**ColorSystem**
The monitor features 2 Color System selections: GaiaColor and 3rd Party. GaiaColor is the default selection and what you should use unless you are specifically utilizing 3rd Party calibration software to build 3rd Party calibration LUTs.

While in the GaiaColor Color System you will be able to select all available Gamut, EOTF, Correlated Color Temperature, and Luminance options supported by the monitor from the Color-Input menu. Any selection made within the GaiaColor mode activates a calibrated monitor state instantaneously, without having to reprofile the display, based on the last volumetric profile data saved to the monitor's non-volatile memory state during the AutoCal process.

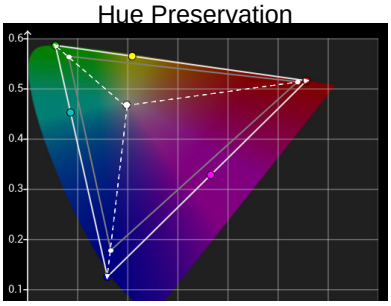
Please leave the ColorSystem set to GaiaColor unless you have specifically saved your own user generated calibration LUTs to one of the 3rd Party Color System's memory slots (3rd Party cLUT memories) from compatible 3rd party calibration software. An additional ColorSystem selection labeled NONE is also listed, but generally should not be used as this simply turns off all calibrations.

Note: when in 3rd Party mode only the Range & LUM selections from the Color-Input menu will remain similarly adjustable to GaiaColor mode. Gamut, EOTF, and Temperature will all be deactivated and will not be selectable in 3rd Party ColorSystem mode as these parameters are all instead governed by the 3rd Party USER LUTs directly when using 3rd Party mode.

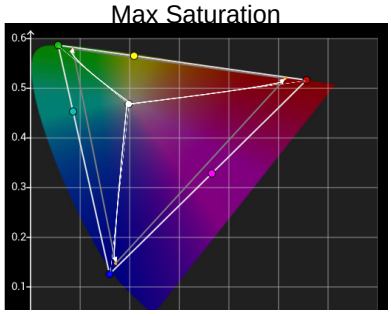
**Gamut Toggle (GaiaColor Color System Only)**
This setting allows you to define gamut mapping behavior when the monitor is set to a color space selection larger than the display can achieve (e.g. Rec2020). The suggested setting is Hue Preservation which will maintain proper hue tracking towards the selected gamut to the extent possible and will not shift hue at gamut clip. The other selection is Max Saturation and this will track proper hue angles for all target values achievable by the display until gamut clip is reached at which point hue preservation will be sacrificed in favor of maximum saturation preservation.

The difference in behavior is illustrated in the diagrams below.

Hue Preservation




Max Saturation




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Closely related to this topic, when using a Rec2020 container as output from a grading system it is a common best practice to limit the output gamut to P3 within that container as most modern grading monitors can achieve all or most of P3. If doing so make sure your monitor's gamut is set to match the primary container (e.g. Rec2020) as your over the wire code values are all relative to this container. For example, if outputting Rec2020 (P3 limited) from a grading system you will leave the monitor set to Rec2020. You will only set the monitor to P3 if your over the wire code values are relative to P3 (e.g. your grading system is set to just P3 output).

**3rd Party cLUT**
Does not apply to GaiaColor Color System. This additional selection only applies within the 3rd Party ColorSystem. Select your desired User cLUT (calibration LUT) Memory position to activate the custom LUTs you have saved to the corresponding memory position (see 3rd Party LUT calibration documents for further instructions).

3rd Party LUT Mode provides 3 LUT positions that are accessible at a time as follows: **Front Calibration 1D LUT -> Calibration 3D LUT -> Post Calibration 1D LUT**

All 1D LUTs are 4096 entry point using 12bit values in the Flanders.lut format and all 3D LUTs are 17x17x17.cube format using only the header LUT_3D_SIZE 17.

**Red / Green / Blue Gain and Bias settings**
White balance may be manually adjusted / customized / fine-tuned using these toggles. When in PQ mode do not attempt to adjust gain using a 100%white test patch or any other test patch whose code values exceed the monitor's native luminance output capabilities as this will not work well. A 100nit white test patch is suggested for use during manual gain adjustment whether adjusting in SDR or HDR. Note that RGB Gain / Bias adjustments apply globally to all inputs and any color space selections made on the monitor.

**GaiaColor AutoCal**
Select Start to begin a new Direct Connect Volumetric AutoCal. See AutoCal instructions for details.

**AutoCal Data Backup**
This option allows the currently active AutoCal dataset to be saved to one of five selectable non-volatile memory slots for later recall.

**AutoCal Backup Load**
This option allows a previously saved AutoCal dataset to be loaded.

**Note:** When running a new GaiaColor AutoCal, the new AutoCal dataset is automatically written to non-volatile memory and applied on reboot. As a result, you do not need to use the AutoCal Data Backup or AutoCal Backup Load options to activate a newly completed AutoCal.

In addition to the five numbered memory slots (Data 1–Data 5), AutoCal Backup Load includes an extra option labeled LAST. This selection automatically stores and recalls the data from the most recent AutoCal performed on the monitor.

**Common Use Cases**
AutoCal Data Backup and Load can be useful in several scenarios, including:
1. Comparing calibration results when using multiple AutoCal-compatible probes.
2. Preserving an existing calibration before running a new AutoCal, allowing you to safely restore the previous state if needed.

*Tip: Be sure to back up the current calibration before starting a new AutoCal if this is your intent.*

***Display Warm Up Recommendation***
*If starting from a cold boot it is a best practice to allow the display to warmup before performing calibration or making color-critical decisions. If using GaiaColor AutoCal the warm up and stabilization routine will automatically be performed before any measurements are taken. An easy manual warm up method is to display a ~100nit patch for approximately 10 minutes.*

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**GaiaColor ABL Mode**
Choose between Global and Highlights.

Loading behavior is a characteristic common to most HDR display technologies. Loading behavior occurs when an image's APL (Average Picture Level) exceeds the panel's available power budget. FSI QD-OLED monitors provide two ABL (Automatic Brightness Limiting) modes, allowing users to select the behavior best suited to their application.

For the majority of typical content, loading behavior is unlikely to occur. These settings affect display behavior only when viewing higher-APL scenes that exceed the panel's available power budget. These ABL modes are intended for use with PQ signals specifically.

**Global ABL Mode (default)**

When ABL is required, luminance is reduced evenly (globally) across the entire image. While highlights may get dimmer in this mode, they retain their separation all the way up to the selected peak luminance's matching code value.

Global mode is particularly useful when seeing distinct highlight details is the priority, allowing operators to clearly assess the highlight information present in a scene even when ABL is active.

**Highlights ABL Mode**

Driven by an Adaptive APL algorithm, when the image APL would otherwise trigger global ABL, luminance reduction is instead concentrated in the highlights to the extent necessary to prevent the rest of the image from dimming. This preserves luminance accuracy in the critical lowlight and mid-tone regions of the image.

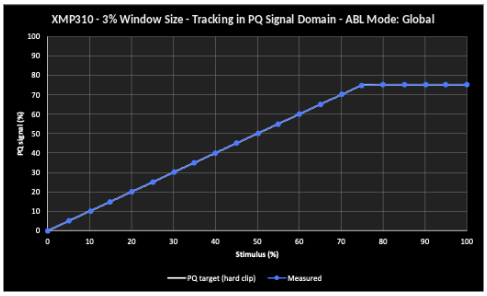
The GaiaColor Highlight ABL algorithm continuously analyzes the signal in real time and limits highlights only to the extent required by the current image content. As a result, many typical HDR scenes are displayed with little or no highlight clipping. Highlight limiting progressively increases only as necessary when scene APL exceeds the panel's available power budget.

The algorithm is informed by a dedicated Adaptive APL calibration procedure that runs automatically as part of the standard GaiaColor AutoCal process: a set of additional measurements, unique to each monitor, that characterize how the panel's luminance responds across a range of APL conditions.

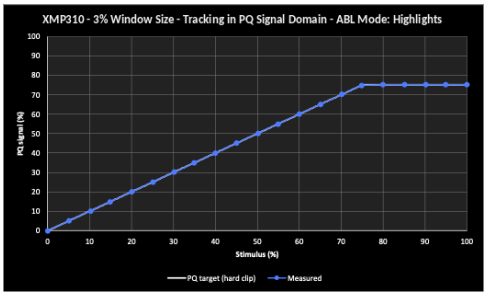
Highlights mode is particularly useful when consistent tonal and color accuracy across the bulk of the image is the priority. By holding the shadows and mid-tones stable regardless of scene APL, it ensures that grading decisions aren't influenced by image-wide luminance shifts.

The GaiaColor Highlights ABL Mode can be activated from the monitor's Color-Global menu or assigned to a function allowing for instantaneous switching between Global and Highlights mode.

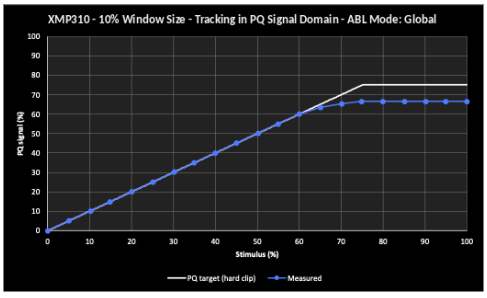
The following charts illustrate the difference in these modes. Please note that these charts represent loading behavior on an XMP310 set to 1000 nit peak luminance mode. Larger units like the V550, VP551, VP651, XMP550, XMP551, and XMP651 can get much brighter and exhibit significantly less loading behavior so the difference between Global and Highlights tends to be much more subtle on those brighter units.



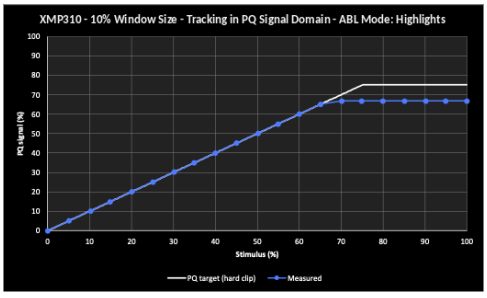
3% window – Global ABL Mode



3% window – Highlights ABL Mode

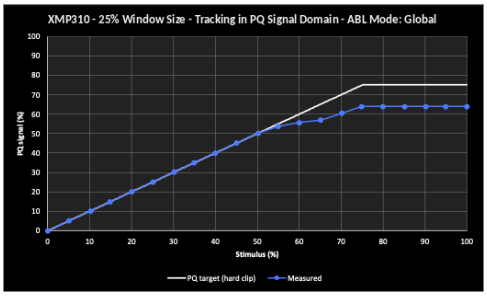


10% window – Global ABL Mode

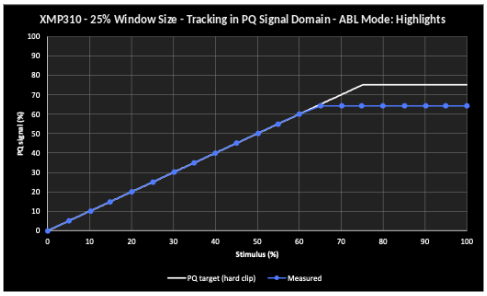


10% window – Highlights ABL Mode

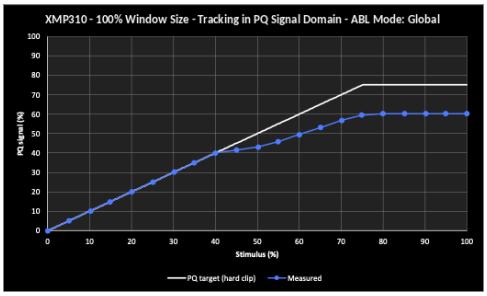
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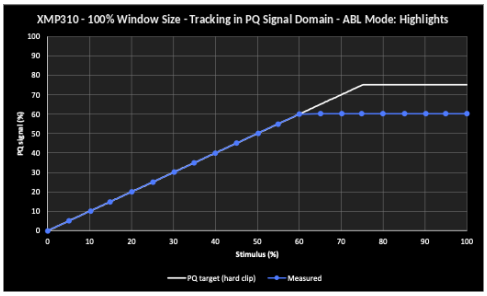

25% window – Global ABL Mode




25% window – Highlights ABL Mode




100% window – Global ABL Mode




100% window – Highlights ABL Mode



Global GaiaColor ABL Mode Example*



Highlights GaiaColor ABL Mode Example*

**Simulated images for illustrative purposes only*

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**Color-Input Menu**
The Color-Input menu contains color management related settings that can optionally be applied individually on a per-input basis or can be applied globally across all inputs.

| Function | | |
|---|---|---|
| Video | Input Color Mode | Global |
| Audio | Input Color Config | Global |
| Color-Global | Range | Full 0-1023 |
| Color-Input | Gamut | 2020 |
| System | Temperature | 6500K |
| OSD | EOTF | PQ |
| GPI | Luminance Mode | 203 |
| | Luminance Custom | 40 |
| | Color Format | Auto |
| | Color Mode | Normal |

**Input Color Mode**
On V series monitors this selection is locked to Global. The same calibration related color management settings are applied to both inputs as governed by the Input Color Config memory named Global.

**Input Color Config**
Select from Global, HDMI, or DP to define the color management parameters for each of these unique memory positions. **When an Input Color Config is selected all menu items listed below that configuration name will reflect that memory's current settings and these can then be updated as desired.** Range,Gamut, Temperature, EOTF, Luminance Mode, Color Format, and Color Mode can all be individually defined per Input Color Config memory. Please keep in mind that on V series monitors Input Color Mode is locked to Global, so all inputs use the parameters defined by the Input Color Config Global memory slot.

**Common Color System Configurations**
Thousands of possible color system configurations combining different gamuts, white balances, EOTFs, and signal ranges are possible on the monitor to accommodate various applications and needs, but we are often asked for recommended settings for the most common workflows. To that end you'll find five very common configurations outlined below, but when delivering to third parties we strongly suggest double checking with them on their exact delivery specifications and requirements:
**Example Configuration A:**
**Typical Reference SDR Configuration**
Color System: GaiaColor
Range: Extended 64-1019
Gamut: Rec709
EOTF: Gamma 2.4
Luminance Mode: 100
Temperature: 6500K

**Example Configuration B:**
**Typical Reference HLG HDR Configuration**
Color System: GaiaColor
Range: Video 64-940
Gamut: 2020
EOTF: HLG
Luminance Mode: 1000
Temperature: 6500K

Dolby Vision is a popular HDR mastering format that is commonly used in professional content creation workflows that utilizes dynamic metadata to streamline deliverables and best preserve creative intent across the billions of Dolby Vision enabled playback devices.

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**Example Configuration C:**
**Typical Reference PQ 2020 HDR Setup**
**Commonly used for Dolby Vision PQ 2020 Mastering***
Color System: GaiaColor
Range: Full 0-1023
Gamut: 2020
EOTF: PQ
Luminance Mode: 1000
Temperature: 6500K

**Example Configuration D:**
**Typical Reference PQ P3 D65 Setup**
**Commonly used for Dolby Vision PQ P3 D65 Mastering***
Color System: GaiaColor
Range: Full 0-1023
Gamut: P3
EOTF: PQ
Luminance Mode: 1000
Temperature: 6500K

**Example Configuration E:**
**Suggested Dolby Vision SDR Trim Pass Setup****
Color System: GaiaColor
Range: Full 0-1023
Gamut: Rec709
EOTF: Gamma 2.4
Luminance Mode: 100
Temperature: 6500K

**Note: To learn more about Dolby Vision mastering, refer to Dolby's Dolby Vision Content Creation Best Practices Guide or the Dolby Vision Essentials & Advanced training courses on Dolby's Learning Website.*

***Note: For ease of use, Configuration E is suggested if using a V series monitor to review Dolby Vision analysis metadata and make any trim passes for the SDR **100 nit, BT.709, BT.1886, Full (Home) Target Display Output** iCMU emulation. To learn more about Dolby Vision Trim Controls refer to Dolby's dedicated article: The Dolby Vision Trim Controls. Please also be aware that you do not have to work in full range when mastering in Dolby Vision. Legal range is also acceptable. Regardless of which range you choose, always ensure that the signal range output from the color corrector matches the V display input signal range setting. To learn more about working in legal range for Dolby Vision refer to Dolby's Best Practices: Legal Range Workflows for Dolby Vision Home Distribution.*

*+Informative: Dolby does not recommend using dual display setups for simultaneous SDR & HDR content review as no current standards for surround illumination exist for dual stimulus setups. Viewing SDR & HDR side by side can lead to unwanted artifacts downstream or making sacrifices to your HDR master. Dolby recommends using a single Tier 1 display to create the HDR master grade, then swapping the monitor into an appropriate SDR configuration to do any SDR trim passes / review.*

**When using the monitor as a GUI display via the HDMI or DP In Port in combination with a system that reads EDID, the following configuration is suggested when the system is set to SDR output:**
Color System: GaiaColor
Gamut: P3
EOTF: 2.2
Temperature: 6500K

Using this configuration allows the monitor to be configured to match what its EDID will report back to the connected computer. This applies to both the HDMI and DP In Ports.

**For HDR output on a Mac the monitor should instead be set as follows:**
Color System: GaiaColor
Gamut: 2020
EOTF: PQ
Temperature: 6500K
Luminance: 1000

**Note on HLG, LUM, and Range Selection**
The LUM selection on the monitor will set the nominal peak white, at code value 940, for HLG system gamma calculation.

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On the V550 the monitor's signal range can be set to either 64-940 or 64-1019 when used with HLG selections and a nominal peak LUM selection of 1000. In both range selections the LUM selection defines the nominal peak configuration of the display at code value 940. The only difference between the 64-940 and 64-1019 selection on these monitors in such a use case is that the 64-940 selection will clip values over nominal peak whereas the 64-1019 selection will display values over nominal peak (e.g. super whites will be visible). As the V270 and V310 are limited to 1000nits there is no practical benefit to setting the range to 64-1019 compared to 64-940.

Though not in common use, if a user wanted to set nominal white (LUM selection) for HLG on the V550 to a setting of 1800 then only the Video Range (64-940) selection on the monitor should be used as values over 940 will then exceed what the display can reproduce.

**Range**
Sets the desired signal range configuration for the monitor. Choose from:

Video Range 64-940
Extended Video Range 64-1019 (suggested for typical SDR workflows)
SMPTE Full Range 4-1019
Full Range 0-1023

*About Signal Ranges:* For PQ signals the listed lower and upper values (10bit) represent the min/max code values used to calculate the PQ EOTF. The difference between SMPTE Full and Full Range in this use case is very subtle and provided simply to offer the most accurate match between the output system's expected behavior and the monitor. Calculating PQ between 0-1023 code values is the most commonly used approach for PQ even though this means some target values (0-3, 1020-1023) may be reserved over the wire on some connections.

For typical video range SDR workflows we suggest setting the monitor to Extended Video Range 64- 1019 whether your signal is configured to pass super-white levels (64-1019) or not (64-940). V series monitors are optimized to offer the best SDR video range performance in Extended Video Range 64-1019 mode and this one setting is compatible with both signals that contain super-white levels and those that do not. The monitor's Video Range selection (64- 940) is provided primarily for those wanting to bound certain HDR EOTFs (e.g. PQ, HLG) within that specific code value range.

**Gamut**
Select from 709, P3, or 2020 to set your operating display color gamut.

Note: if the signal format is YCbCr the gamut selection will also automatically apply the matching matrix coefficients.

**EOTF**
This setting defines the display's EOTF configuration. Select between PQ, HLG, and various gamma options. HLG selections work in both Video and Extended ranges using monitor LUM Mode as nominal white and 5 nit surround to determine system gamma. Further EOTF customization is possible via 3rd Party color system use.

**Luminance Mode**
Select from CUSTOM or the 100, 203, 400, 600, 800, 1000, or 1800 quick access selections. The luminance value shown represents the target luminance in cd/m2 (nits). When set to CUSTOM the Luminance Custom menu item below Luminance Mode will allow you to specify your preferred custom peak luminance setting.

When used in combination with a PQ EOTF selection the Luminance Mode setting will define the hard clip point of the PQ response. Additionally, when used with a PQ EOTF the monitor's entire available bit depth will also be applied just within the range you select. For this reason, even though PQ is an absolute and not relative EOTF standard, it can still be advantageous to set the Luminance Mode just to the peak luminance threshold you need. For example, if doing a 1000nit master on a V550 you retain more bit depth in the 0 to 1000nit range if you set luminance to 1000 instead of a higher value like 1800. Similarly, if you are working on an extremely dark scene or footage in PQ you could even set Luminance Mode to a lower value like 100 to gain considerable bit depth just within the 0 to 100nit range. Note, on a V270 or V310 LUM Mode 1800 will not be selectable as these monitors are limited to 1000nits peak luminance.

**Luminance Custom**
Allows for custom peak luminance selection in 10nit increments when Luminance Mode is set to CUSTOM. If Luminance mode is not set to CUSTOM this menu item does not apply. Note, on a V270 or V310 the LUM Custom slider should not be set higher than 1000 as these monitors are limited to 1000nits peak luminance.

**Temperature**
Sets the white balance of the display. Select from 3200K, 5000K, 6000K (P3-D60), 6300K (P3-DCI), 6500K, or 9300K. 6500K is the default.

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**Color Format**
Can be manually set to select the type of incoming signal format (e.g. 422 YCbCr, 444 RGB, etc.). When set to AUTO the monitor will attempt to read the signal's Payload ID, but if Payload ID is missing or incorrect this manual toggle can be used to set the monitor to a configuration that matches the signal formatting.

**Color Mode**
The Color Mode selection allows you to enable optional viewing modes that may be useful for various exposure, QC, and engineering tasks. The first selection is LUM Coloring, which is an adjustable false color mode. LUM Coloring may also be set directly to a function for faster access. Please see the LUM Coloring description in the Function Menu section of this manual for more details on using LUM Coloring. Additional color mode selections include MONO, Blue Only, Blue as Mono, Red Only, Red as Mono, Green Only, and Green as Mono. The Blue, Red, and Green as Mono modes display just the selected color channel as a monochrome image on screen, which can be useful and easier to view in many engineering / QC applications compared to viewing those channels in their respective colors.

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**System Menu**

| Function | | | |
|---|---|---|---|
| Video | Update Firmware | Allow | |
| Audio | Current IP | 192.168.1.5 | |
| Color-Global | Version | 0.1.4 | |
| Color-Input | Serial Number | P550A00001 | |
| System | Payload ID | 0.0.0.0 | |
| OSD | Profile Load | | |
| GPI | Profile Save | | |
| | Set Static IP | 192.168.1.5 | 192.168.1.5 |
| | IP Reset | DHCP | 255.255.255.0 |
| | MCU Version | | 192.168.1.1 |
| | RS422 Address | | Apply Settings |
| | Baud Rate | | |
| | Parity | | |
| | Clear Panel Noise | Off | |

**Update Firmware**
When left to Allow (default) allows firmware to be remotely updated using the FSI IP Remote Utility. When set to Block prevents firmware from being remotely updated.

**Current IP**
Shows monitor's current IP address.

**Version**
Displays the current firmware version.

**Serial Number**
Displays the unit's serial number.

**Profile Load**
Load a saved configuration by selecting it from the list. Profiles can also be assigned to functions for even faster access. Configurations 1 through 5 are user adjustable using the Profile Save menu item. The Default Configuration returns settings to factory default of:

Color System: GaiaColor
Range: Video 64-940
Gamut: Rec709
EOTF: gamma 2.4
Gain/Bias Adjustments: 0 (neutral)

**Profile Save**
Select a configuration position to save current monitor settings to that configuration slot. All settings, including function assignments, will be saved to your selected configuration. Profiles save function assignments, so if you want to switch between profiles with shortcut function selections make sure each profile you save has the desired Load Profile functions assigned on the Function Menu before saving it.

**Set Static IP**
Allows you to set a static IP address, subnet mask, and gateway address. Please note you must fill all fields and then select Apply Settings for the settings to become active.

While setting an IP using the on-screen keyboard, use the monitor's 5-way controller to navigate the keyboard and depress the button to confirm any highlighted selection.

The first field listed is where you will enter in the desired static IP address. The second field listed is for the subnet mask. The third field listed is for the gateway address. The configured IP settings will not become active until you select Apply Settings so make sure not to skip this step. All fields must be filled out, failure to fill out all 3 fields will cause the Apply Settings step to fail.

**IP Reset**
Disable Static IP and Re-enable DHCP after a static IP address has been used.

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**Clear Panel Noise (CPN)**
The CPN feature may help to alleviate various panel noise conditions, particularly image retention conditions caused by displaying static, high contrast, content for extended periods of time. To start the process highlight Clear Panel Noise -> On, then press Enter to confirm. The panel will go to full black and the tally light will flash green for the duration of the Clear Panel Noise process. Once the process is complete the monitor will shut down automatically and the flashing tally light will turn off to let you know the process is complete, this typically takes about 9 minutes. Once the tally light stops flashing you may reboot the monitor at any time. Additionally, if shutting down the monitor after 4 or more hours of cumulative use you will be automatically prompted to run CPN as running CPN regularly will help maintain the performance of your display over time.

If you do not select Yes or No when prompted the monitor will automatically select Yes and start CPN 2 minutes after the prompt is first displayed.

**MCU Version**
Displays the MCU version currently installed on the monitor.

**RS422 Address**
Assigns an address from 0 to 127 to the monitor for individual serial remote control in multi-monitor environments. See Appendix C for details on RS485 Remote Control.

**Baud Rate**
Selects the baud rate used for RS485 remote control communication.

**Parity**
Select None or Even for RS485 remote control communication.

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**OSD Menu**

| Function | Status Position | Top Left |
|---|---|---|
| Video | Status Set | 5s |
| Audio | Menu Position | Top Left |
| Color-Global | Menu Set | 5s |
| Color-Input | Menu Brightness | 100 |
| System | Area Marker | Off |
| OSD | Safety Marker | Off |
| GPI | Center Marker | Off |
| | Custom Marker | Off |

**Menu & Status Position**
Changes position of on-screen menu and signal status display.

**Menu Set**
Set menu to automatically disappear after 5s, 10s, or to stay On until manually cleared.

**Status Set - Signal Status ID window**
Select from On, Off, or 5 second display. When set to 5 second display the monitor will display signal status ID window for 5 seconds whenever an input is selected or signal format is changed.

The first line of the signal status ID window shows the user selected primary input and video mode (default is Auto).

The second line shows the detected resolution (e.g. 3840x2160) and scan type (e.g. P).

The third line indicates the frame rate, whether the signal is RGB or YCbCr, the chroma sampling, and the signal bit depth. Please note that this information is based on the signal format reported by the connected source. If it is incorrect you may manually override using the Color Format selection on the Color-Input menu, but this line will continue to reflect the signal type as reported by the source.




**Menu Brightness**
Allows you to specify how bright the on screen menu will be displayed. Select any value between 5 and 100 to set the menu to your prefered selection. Press enter to confirm your selection.

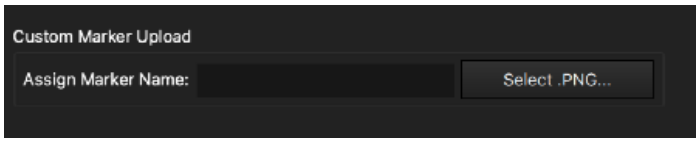
**Area Marker**
Allows you to define a common Area Marker for display on screen. Once configured with your preferred Area Marker selection this feature can be toggled on or off by assigning Area Marker to a function.

**Safety Marker**
Allows you to define a common Safety Marker for display on screen. Once configured with your preferred Safety Marker selection this feature can be toggled on or off by assigning Safety Marker to a function.

**Center Marker**
Turns the center cross-hair marker on or off. This can also be assigned to and controlled by a function.

**Custom Marker**
Allows you to activate any Custom Marker that has been saved to the display. Once your preferred Custom Marker is selected you may also set Custom Marker to a function to toggle your configured Custom Marker on or off quickly.

Custom Markers can be saved to the monitor from the IP Remote Utility (IPRU version 1.9.6 or later). See Appendix B for instructions on connecting to your monitor via the IPRU.

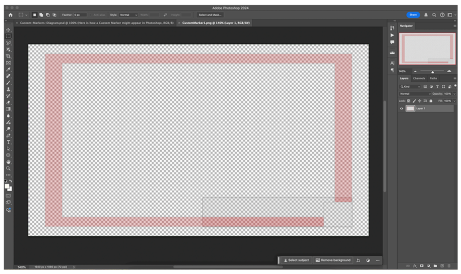



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**Custom Marker File requirements:**
PNG Format
1920x1080 resolution

Custom markers can be any 1920x1080 resolution PNG. Make sure to set any areas you wish to be visible as transparent in your PNG file. You may also define marker areas with different opacity levels by simply setting their opacity level within your PNG. Before selecting your desired PNG file make sure to enter the desired marker name in the IP Remote Utility's Assign Marker Name Field. This assigned name, not the PNG file name, is what will populate on the Monitor's Custom Marker Menu. Marker Names are limited to 32 characters. After typing in the desired name press the Select .PNG… button and then choose your desired PNG file. A prompt will then appear asking you to reboot the monitor. Once your monitor is rebooted the new marker will be selectable from the Custom Marker menu.

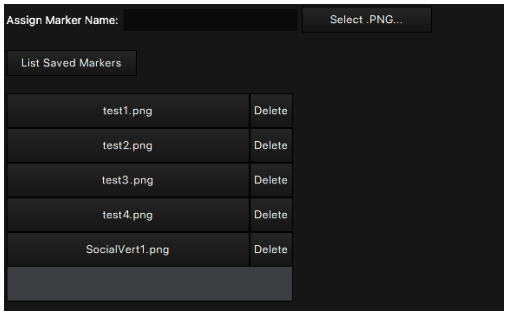
Here is how a Custom Marker might appear in Photoshop:



Here is how it would appear when loaded on the monitor:



Markers may be temporarily displayed instead of being saved to the monitor's non-volatile memory. This can be particularly useful for quickly testing markers without needing to reboot the monitor. To temporarily display a marker insead of saving it to memory select the Display .PNG button from the IPRU and select your desired marker file. Upon reboot the marker will be cleared from memory.




Custom markers can be deleted from the monitor's memory from the IPRU. Select List Saved Markers from the IPRU to see a list of custom markers you have saved to the display. Press the Delete button next to the name(s) of any marker(s) you wish to delete. You will then need to reboot the monitor for the changes to be reflected on the monitor's Custom Marker menu.

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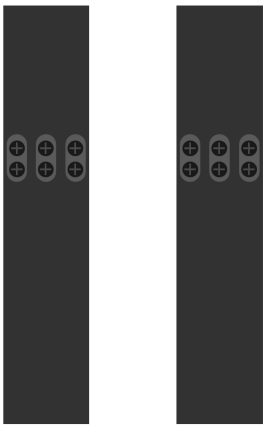
**GPI Menu**

| Function | GPI1 | Pixel Mapping |
|---|---|---|
| Video | GPI2 | LUM Coloring |
| Audio | GPI3 | Area Marker |
| Color-Global | GPI4 | Safety Marker |
| Color-Input | GPI5 | Center Marker |
| System | GPI6 | Custom Marker |
| OSD | GPI7 | Power On |
| GPI | | |

The GPI port on the monitor allows you to control features / toggles via simple GPI contact closure. Pin 8 is a ground and pins 1 through 7 have assignable controls including various functions, power on/off, input selection, and tally light control.

**GPI1~7**
Use the GPI menu to set the desired command assignment to a GPI pin.


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V series monitors have pedestal style feet that can be removed when monitor is wall mounted.

The feet are held on by six screws per foot on the bottom.

The V550 can be mounted with M6 screws using the 300mm x 200mm VESA mounting points. Please ensure mounting screws do not extend more than 40mm into the threaded mounting holes.

The V270 and V310 can be mounted with M4 screws using the 100mm x 100mm VESA mounting points. Please ensure mounting screws do not extend more than 15mm into the threaded mounting holes.


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GaiaColor Direct Connect Volumetric AutoCal provides a simple and accurate way to calibrate your FSI monitor. On V series monitors this automatic calibration routine is currently compatible with the Colorimetry Research CR100, Klein K10A / K80, Minolta CA210* / CA310* / CA410, and the xRite i1D3DS OEM.

**Minolta CA210 & CA310 integration is limited to the 10mm measurement spot size versions of these probes (rated to 3,000nits) as the 27mm measurement spot size versions are not rated to handle the maximum luminance output of V series monitors.*

Before plugging your probe into your monitor you will want to ensure that the following prerequisites are met:

1. Ensure that your colorimeter has the correct matrix stored on it for the monitor model you are calibrating. The name of the colorimeter matrix must match the model you are calibrating: **V270, V310, or V550.**
2. Disconnect all signal cables from the monitor.

**Automatic Calibration Steps**

**Step 1:** With the monitor powered on plug the probe into the monitor's USB Type A Port.

**Step 2:** From the Monitor's Color Menu select GaiaColor AutoCal, then select Start. Confirm you want to Start Display Alignment by selecting Yes.

**Step 3:** Select your probe type from the list of probes provided on screen and press Enter to confirm. After selecting Enter an automatic 10 minute warmup process will begin.

**Step 4:** During the warmup process use the on-screen guides to position your probe correctly in the center of the screen. This can be done at any time during the warmup process, simply ensure that your probe is centered on the onscreen crosshair before the warmup countdown timer reaches 0 seconds remaining.

**Step 5:** Once the warmup is complete the calibration will take between 25 and 95 additional minutes to complete depending probe model in use. Once the alignment data is saved you will be prompted to reboot the monitor to complete the process.

**Step 6:** Once AutoCal is complete any Gamut, EOTF, Correlated Color Temperature, and Luminance Mode selections you make will be applied instantaneously as you select them.

The principle behind AutoCal is that the native, uncalibrated state of your display is profiled and saved to the monitor's non-volatile memory. Then as any color management selections on the monitor are made calibrated states are calculated from that native profile and instantly applied on demand. Because all selections are calculated from this one primary profile capture you can make any selection without having to rerun AutoCal.




**Approximate AutoCal Time by Probe**

**CR100**
~ 27 minutes

**K10A / K80**
~ 35 minutes

**CA210 / CA310 / CA410**
~ 25 minutes

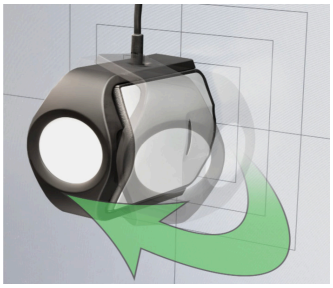
**i1D3DS OEM**
~ 60 minutes

| Function | ColorSystem | GaiaColor |
|---|---|---|
| Video | Gamut Toggle | Hue |
| Audio | 3rd Party cLUT | User1 |
| Color-Global | Red Gain | 0 |
| Color-Input | Green Gain | 0 |
| System | Blue Gain | 0 |
| OSD | Red Bias | 0 |
| GPI | Green Bias | 0 |
| | Blue Bias | 0 |
| | GaiaColor Analyzer | |
| | Analyzer Data Show | Off |
| | GaiaColor AutoCal | Start |
| | AutoCal Data Backup | |
| | AutoCal Backup Load | |

**AutoCal Warm-up**
Connect Sensor CRI CR-100 and Point To The Cross
Ensure Sensor Channel is Named V310
Time Left 9 Minutes 25 Seconds

**Key Menu/Enter to Skip Warm-up and Start**

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Times are approximate and may vary slightly with your specific probe / monitor combination. Times are exclusive of optional 10 minute warmup routine at start of AutoCal process.

*If using an i1D3DS OEM please make sure to open the diffuser covering the probe's lens before starting calibration.*

*The lens should be pointing towards the screen and the white diffuser disk should be pointing away from the screen.*

## Tips and Troubleshooting

| Question / Issue / Topic | Solution / Tip / Answer |
|---|---|
| Monitor displays error message advising you to check probe connection and/or channel name | This error can occur if the probe you are connecting does not match the probe model you selected from the monitor's menu when starting Automatic Calibration. This message can also appear if you do not have a correctly named matrix loaded to the probe. For example, if connecting to a V550 a matrix named V550 must be stored on the probe. Please ensure a valid and correctly named matrix is stored on the colorimeter and that the probe is properly connected to the display's USB Type A port. |
| Is disconnecting all signal cables before starting automatic calibration actually required? | **No, but it is critically important that if a signal is left connected that the signal does not drop out, disconnect, or change format for the duration of the AutoCal process.** Change of format or loss of signal during AutoCal may interrupt the process and could potentially render the monitor inoperable so it is a best practice to disconnect signal cables if possible. |
| The monitor or probe was unplugged before calibration completed | Previous calibration data is not deleted until the new calibration completes successfully so a mid-calibration power interruption to monitor or probe is not generally a problem. Simply unplug the probe from the monitor, power cycle the display, then reconnect the probe and start again. |
| Can I start my calibration right away or is warm-up necessary? | Best results will be obtained when calibrating a monitor that has had time to warm-up and stabilize to approximately the typical operating temperature it will run at in day to day operation. For most users this is most easily achieved by allowing the monitor to perform its automatic 10 minute warm-up as part of the standard AutoCal process. However, if your display was already manually warmed up before beginning calibration (for example if you were already displaying an L20 100nit window for 10 or more minutes on screen) you can press Enter to skip the automatic warm-up procedure during AutoCal. However, do not attempt to warm-up your display using an extremely bright static test patch for an extended period of time as this will cause additional heat buildup that will not be representative of the typical operating temperature of the display in normal day to day operation. |
| Poor results or calibration failure when using CR100 | When using the CR100 please ensure that Exposure Multiplier is set to 1, Sync is set to Auto, Max Exposure is set to 500ms, and Max Flicker Frequency Search is set to 150Hz.<br>These settings are typically the factory default on CR100 probes, but they can all be checked and updated as needed from the CRI Utility. Incorrect probe settings can cause problems during AutoCal. |
| Calibration Validation Considerations | If you'd like to validate your AutoCal results with 3rd party software we suggest using the same or similar equipment and settings used during AutoCal.<br>If validating with a colorimeter, using the same probe with the same or similar matrix will provide the most consistent readings between calibration and validation.<br>We also suggest validating HDR with an L18 (~3% window) in order to validate the monitor's true peak luminance capability. For SDR, using a common test patch size like a 10% window (~L32) should also work well for validation. As with AutoCal itself, validation is best performed after at least a 10 minute warm-up at 100nits after boot up. A 10 second stabilization for both monitor and probe on 100% white is also advisable before beginning validation readings. |
| K10A measurement spot size consideration | The K10A has a larger measurement spot size than most colorimeters, especially when using the available extension tube. For smaller monitors this can cause the measurement spot size to |

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| Question / Issue / Topic | Solution / Tip / Answer |
|---|---|
| | exceed some of the test patch sizes used during AutoCal, which will negatively impact readings. For this reason when using the K10A with 31.5” and smaller monitors it is advisable to omit the extension tube and use just the provided rubber hood and main probe body as this will reduce your measurement spot size from 60mm to 43mm. A 43mm measurement spot size should fit well within all generated patches provided that your probe is precisely centered on screen. |
| Do customizable manual calibration settings need to be reset before starting AutoCal? | No, customized settings do not necessarily need to be reset before starting AutoCal, but importantly any custom settings will continue to impact your post calibration result if not returned to neutral. As explained earlier in this document GaiaColor AutoCal works by profiling the native, uncalibrated state of your panel and saving that to non-volatile memory, with any color menu selections made then being calculated from that native profile data. Since the profiling process is measuring only the native panel response any custom manual settings have no bearing on this profiling process. However, if you have custom non-neutral Gain, Bias, Hue, Chroma, Bright, or Contrast selections applied these will be applied on top of the neutral calibrated state of any given selection.<br><br>This has a few practical implications. First, and most importantly, if you had some unwanted custom, non-neutral, settings accidentally applied before starting GaiaColor AutoCal you can simply reset these to default/neutral at any time. You should not have to run a new AutoCal simply because you forgot to reset unwanted custom settings to default before starting AutoCal. Second, if you have a custom setting you have spent some time dialing in shortly after a previous GaiaColor AutoCal you should not have to redo those custom settings. A new GaiaColor AutoCal run should return you to essentially the same neutral baseline achieved during any previous GaiaColor AutoCal run so any customized user preference tweaks you have made should still apply quite well. This is particularly useful if for example if you have a custom white point you like to use. You should be able to run AutoCal, apply your custom tweaks to the manual calibration settings, and then simply do new AutoCal runs over time with minimal to no changes to your custom settings needing to be made.<br><br>For users that want to ensure any manual calibration settings are indeed back to default/neutral this is easy as 0 is the default neutral Gain, Bias, Hue, Chroma, Bright, and Contrast setting. Any non-zero value for these manually adjustable settings is a custom, non-default user selection. |
| Should I run Clear Panel Noise (CPN) before calibration, and will running CPN subsequently cause a loss of calibration? | Running CPN (Clear Panel Noise) does not inherently compromise calibration. There are, however, a few best practices to keep in mind for the most consistent results. In particular, running CPN shortly before calibrating the monitor can be beneficial. The idea is that subsequent CPN cycles will return the panel to essentially the same baseline state that existed when the calibration was performed.<br><br>To put this another way, if a display is operated for weeks or months without running CPN and is then calibrated without first performing CPN, some degree of image retention may be present during calibration. If CPN is subsequently run, that retained image influence may be reduced or removed, potentially resulting in a measurable shift relative to the calibration that was performed on top of that retained state.<br><br>Conversely, if CPN is run shortly before calibration and then allowed to run regularly thereafter, as prompted by the display at shutdown, image retention can be minimized while calibration consistency can be maintained well over time. In practice, we find this approach generally provides greater long-term consistency, as accumulated image retention can itself introduce measurable drift if left unchecked. |

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GaiaColor Analyzer is a fast, powerful calibration QC tool built into every XMP, XMP C, and V series monitor. It allows you to use the same probe used for GaiaColor AutoCal to verify the calibration state of any monitor color space configuration in as little as 60 seconds. After analysis reports are shown directly on screen meaning that no standalone software or computer is required.

GaiaColor Analyzer automatically checks calibration against your current monitor configuration, meaning you can run accurate QC reports across thousands of potential configurations without any additional setup steps. GaiaColor Analyzer is the perfect companion to GaiaColor AutoCal allowing you to confirm that your calibration results are on target, track performance over time, and know exactly when it's time to run a new AutoCal.

Running GaiaColor Analyzer is very similar to running GaiaColor AutoCal. You should reference the same prerequisites, best practices, and troubleshooting / tips outlined earlier in this document for GaiaColor AutoCal.

**GaiaColor Analyzer Steps**

**Step 1:** With the monitor powered on plug the probe into the monitor's USB Type A Port.

**Step 2:** From the Monitor's Color-Global Menu select GaiaColor Analyzer, then select Start. Confirm you want to Start Analysis by selecting Yes.

**Step 3:** Select your probe type from the list of probes provided on screen and press Enter to confirm. After selecting Enter a probe positioning guide will be shown on screen, use this guide to position your probe correctly in the center of the screen. Once properly positioned you can press Enter to begin the analysis process.
**note: for optimal QC results it can be beneficial to allow the monitor to sit with the probe positioning guide on screen for a few minutes before pressing enter, especially if you have just booted your monitor from a cold start or have recently switched from HDR to SDR operation. This provides some warm-up / stabilization time for the display.*

**Step 4:** Analyzer speed is somewhat probe and monitor configuration dependent, but should typically take just 1 to 2 minutes. Once complete your QC report will automatically be shown on screen.

**Step 5:** To exit the QC report view go to the Color-Global Menu, Analyzer Data Show, and change the setting from CURRENT to OFF. This will exit the QC report and allow you to continue using the monitor.

GaiaColor Analyzer automatically stores your CURRENT QC report and your LAST QC report to monitor memory. You can quickly recall either report by selecting Analyzer Data Show CURRENT or LAST from the Color-Global Menu.

GaiaColor Analyzer reports can also be exported from the monitor by using the IP Remote Utility (build 1.11.0 or later). Simply connect to the monitor via IPRU and then from the Analyzer Capture section you can select whether you want to pull the CURRENT or LAST Analyzer report. Once pulled into IPRU you can quickly save your report on your computer as a PNG or PDF.

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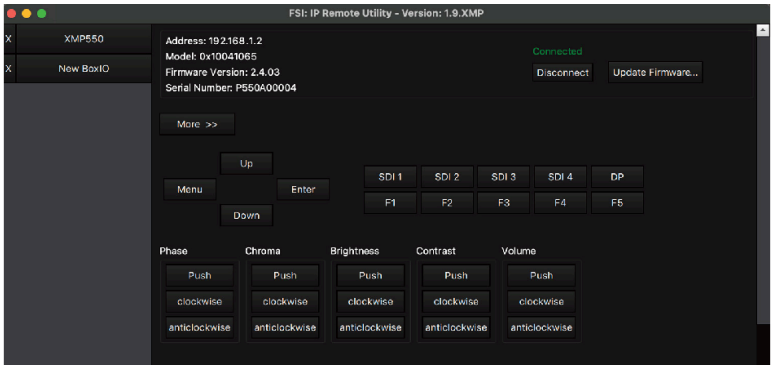
The monitor can be controlled over an ethernet connection using FSI's IP Remote Utility (IPRU) application. The IPRU will allow you to control menu navigation, input selection, function selection, as well as phase, chroma, brightness, contrast, and volume control. The IPRU is also what you will use to load firmware updates. The IPRU can optionally be paired with a Stream Deck and sample Stream Deck profiles and instructions, as well as download links for the IPRU, can all be found at: https://flandersscientific.com/ip-remote/

**Connecting to a Network**
To add the monitor to a network connect an ethernet cable from your router or switch to the monitor's LAN port.

**DHCP / Static IP Settings**
The monitor is DHCP compatible and will obtain an IP address from your network's DHCP server if available. You can view the monitor's IP address in the System Status menu. If no IP address is shown you can select the IP Reset option on the monitor to ensure DHCP is on and force a release / renew. A static IP address can also be assigned to the monitor and for permanent installations relying on regular use of the IPRU setting a static IP address is often the best and most convenient option. See the System Menu -> Set Static IP section of this manual for details.

**Direct Connection**
The monitor can also be connected directly to your PC or Mac via an ethernet connection without a router or switch. To directly connect you must assign static IP addresses to your monitor and to your computer using the same subnet mask. The IP addresses must be different for each device. When connecting directly, you should disable other network connections (including WiFi) on your computer. Direct connection may be useful for temporary use cases, but generally speaking it is advisable to add your monitor to an existing network for more permanent installs.

**Using the IPRU**
Once the monitor is connected to your network launch the IPRU and select Manage -> Add Monitor to add a Monitor Tab if one is not already listed. Next, type in the IP address of the monitor and press connect. For faster navigation of the IPRU take a look at the shortcut keys listed in the menu bar of the IPRU application.




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## Monitor RS422/RS485 Protocol

Electronic Technical Standard: RS422/RS485
Physical Interface: RJ-45
Hardware Peripheral: UART
Baud Rate: 9600, 19200, 38400, 57600
Parity: NONE

### Protocol

All commands are ASCII characters. Each command begins with `!` and ends with a carriage return (0x0D).

```
! 00 B IN A
| |  | |  └─  Parameter
| |  | └────  Command
| |  └──────  Separator
| └─────────  Monitor Address
└───────────  Start Flag
```

### Communication Notes

- Each command is terminated by CR (0x0D). A trailing LF, if sent, is harmless and is ignored.
- Monitor Address `00` is broadcast and corresponds to RS422 Address 0 in the monitor menu (i.e. no specific address). To receive responses, set the monitor to a non-zero address (01–99) and address commands accordingly.
- The Connect command (`CN1`) must be sent before other commands are accepted.
- For addressed (non-broadcast) operation, the monitor returns a response to each command; software should wait for this response before sending the next command. Broadcast commands receive no response.

### Command Description

**Start Flag:** Every command must begin with `!`
**Monitor Address:** 00–99; 00 is used for broadcast
**Separator:** Must be `B`
**Command:** Command identifier, such as `CN`, `PW`, or `IN`
**Parameter:** Parameter associated with the command, when applicable

### Example

```
mode COM1:data=8 parity=n baud=9600

echo !00BCN1 > COM1
echo !00BINA > COM1
echo !00BCN0 > COM1
```

### Pin Description

| Pin No. | Description | Connect To |
|---|---|---|
| 1 | TXD+ | PC RXD+ |
| 2 | TXD- | PC RXD- |
| 3 | RXD+ | PC TXD+ |
| 4 | NC | |
| 5 | NC | |
| 6 | RXD- | PC TXD- |
| 7 | NC | |
| 8 | GND | GND |

### Commands

| Command | Function | Parameter | Description |
|---|---|---|---|
| `CN` | Connect | 0/1 | 1: Connect, 0: Disconnect |
| `PW` | Power On/Off | 0/1 | 1: Power On, 0: Power Off |
| `IN` | Input Select | A–B | A: HDMI, B: DP |
| `F` | Function Key | 0–5 | 0: F1, 1: F2, 2: F3… |
| `KNOBP` | Knob Push | 0–5 | 0: Knob 1, 1: Knob 2, 2: Knob 3… |
| `KNOBCW` | Turn Knob Clockwise | 0–5 | 0: Knob 1, 1: Knob 2, 2: Knob 3… |
| `KNOBCCW` | Turn Knob Counterclockwise | 0–5 | 0: Knob 1, 1: Knob 2, 2: Knob 3… |
| `MENU` | Menu Key | | |
| `UP` | Up Key | | |
| `DOWN` | Down Key | | |
| `ENTER` | Enter Key | | |


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| Question | Answer |
|---|---|
| Is a 13 second boot time normal? | V series monitors take approximately 13 seconds to boot. This is normal and part of a multi-stage boot up process that helps preserve the life of components.<br>Please only press the Power On button once and wait for the monitor to complete boot up sequence before initiating additional controller inputs. Additional key presses during boot sequence may interrupt the process and prevent the monitor from booting up. If this occurs, simply hold down the controller button to force a reset. |
| What is the recommended viewing distance? | The suggested viewing distance for the primary viewer (colorist/editor/DIT) is approximately 2.5 times picture height, for client viewing a distance somewhat farther away is common. ITU-BT.2100 specifies a reference viewing distance somewhere between 1.6 to 3.2 times picture height for UHD resolution displays and in practice FSI has observed distances around 2.5 times picture height used most often. The optimal reference viewing distances are therefore approximately 39” (1m) for the V310 and 68” (1.7m) for the V550. When viewed from closer than the suggested viewing distance you may observe or experience phenomena including, but not limited to, panel noise that is otherwise not visible from a normal viewing distance, a shift in perceived contrast or color once your neutral monitor surround is no longer visible, and greater eye fatigue. |
| Is it okay to install an adhesive screen protection film on the panel? | Adhesive or cling style screen protection films that attach directly to the panel are not recommended and using them will void your warranty. Screen protectors should mount to the chassis and not make contact with the panel itself. For some monitor models FSI offers approved acrylic or gorilla glass screen protectors that can be fitted to the chassis with thumb screws. |


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