



**Flanders  
Scientific  
Inc.**

## **Monitor User Manual**

Updated 04.27.2026

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**XMP C Series**

This manual is based on firmware version 3.2.08. If you have an older or newer firmware version installed instructions may vary.

Flanders Scientific, Inc.  
6215 Shiloh Crossing  
Suite G  
Alpharetta, GA. 30005  
Phone: +1.678.835.4934  
Fax: +1.678.804.1882  
E-Mail: [Support@FlandersScientific.com](mailto:Support@FlandersScientific.com)  
[www.FlandersScientific.com](http://www.FlandersScientific.com)

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## OLED PANEL IMAGE RETENTION CAUTION

Prolonged display of static content, overlays, OSD menu, or scopes, 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 XMP C 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.

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.

## Connecting and Disconnecting SDI BNC Cables

To prevent damage to components from electrical discharge follow these steps:

- Connect power first on all devices.
- Power on all devices.
- Connect BNC cables.

To disconnect:

- Disconnect BNC cables.
- Power down and disconnect power from devices.

If using a wireless video receiver we strongly suggest using an SDI Video Ground Path Isolator (available at ShopFSI.com, ShopFSI.co.uk, and ShopFSI.eu) and powering the receiver from a separate power source than the monitor. Use of wireless video receivers may cause dangerous ground loop issues in certain scenarios that can damage connected equipment like monitors. Using a ground loop isolator **AND** powering from a separate power source will help keep downstream equipment protected.

## 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.
  - 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.

## Back Panel



- **SDI In:** 4 Multi-Format 12G/6G/3G/HD-SDI Inputs.
- **SDI Out:** 4 Looped 12G/6G/3G/HD-SDI Outputs.
- **DP In Port:** For GUI monitor use. Only supports 3840x2160 @ 60P.
- **Audio In/Out:** Analog Stereo Mini-phonon 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.
- **RS-485:** RS-485 Ports (In/Out) for looping remote control interface.
- **LAN:** LAN port for remote control and firmware update.

## 5-Way Navigation Controller



### Using the Controller and Navigating the Menu

XMP C 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	Look DIT LUTs	On
F2	Luminance Scope	Off
F3	Pixel Mapping	Off
F4	LUM Coloring	Off
F5	Area Marker	Off
Power Down Now		

## Function Menu

Function	F1	Luminance Scope
Scope	F2	Vector Scope
Video	F3	Pixel Mapping
Audio	F4	LUM Coloring
Color-Global	F5	Area Marker
Color-Input		Safety Marker
System		Center Marker
OSD		Custom Marker
		Quad Mode
		Look DIT LUT
		Smooth Gradient
		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

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.

## 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

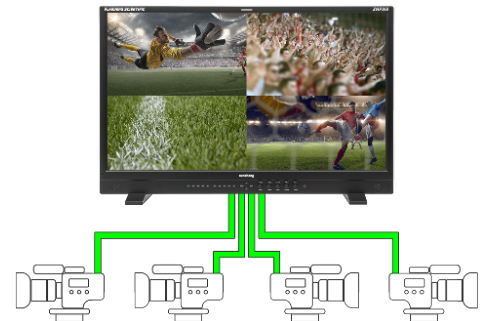
Toggles the center marker (cross-hair) on or off.

## 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.

## Quad Mode

Enables quad view mode of up to 4 signals. Please note that while gen-lock / synchronization is not required your sources must all be the same format and frame rate in order to use this quad view mode. 4 signals are not required to enter this multi-view mode, you can monitor 2, 3, or 4 signals in this mode and empty inputs will simply be displayed as a black quadrant when activating this view. Pressing any input button will allow you to immediately exit Quad Mode and view the selected input full screen. Pressing the Quad Mode function button again will then return you to Quad Mode. Quad Mode can also be used for quad-link monitoring of a single 8K UHD or UHD signal formatted as square division. For two sample interleave (2SI) formatted signals Quad Mode does not need to be activated, simply select the first link (SDI 1) to view the image.

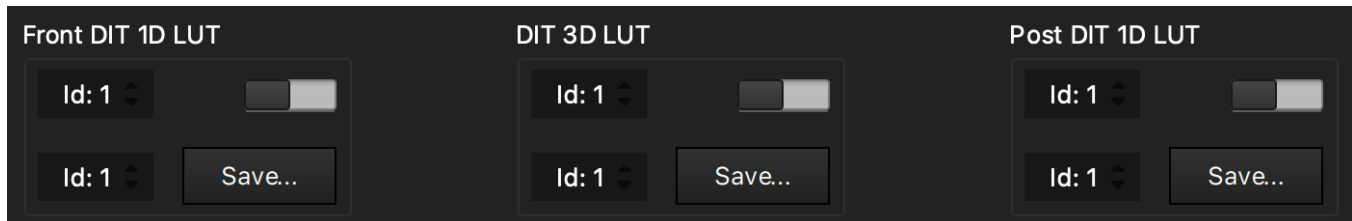


## Smooth Gradient

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 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).

## Look DIT LUT

Use this function to turn saved Look DIT LUTs on or off. While in Input Color Mode - Global any of 16 saved unique Look DIT LUTs can be assigned to each input from the Color-Input menu. Up to 16 Look DIT LUTs can be saved to monitor memory at a time using the IP Remote Utility (IPRU). If using the IPRU (version 1.9.13 or later) for LUT loading the Look DIT LUTs should be formatted as your choice of 17x17x17.cube or 33x33x33.cube using only the header LUT\_3D\_SIZE 17 or LUT\_3D\_SIZE 33 respectively.



After saving your selected LUTs to the monitor's memory from the IPRU you must power cycle the monitor for the LUTs to become accessible. Once successfully saved the Look DIT LUT function will toggle any assigned Look LUTs on/off with a single function toggle.

## 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.

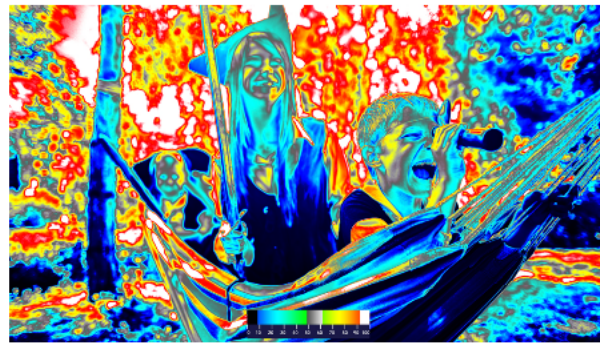
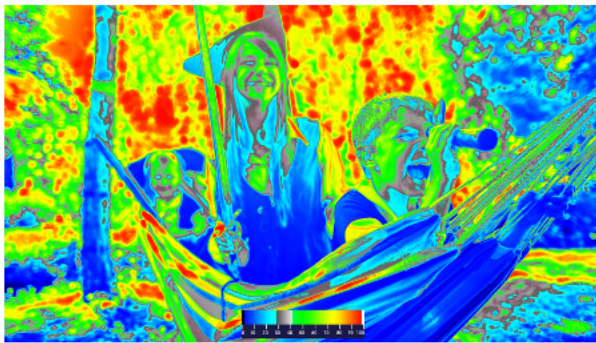
Profiles 1 - 5 are user adjustable via the Profile Save command found on the System Menu. Simply set all monitor settings to your liking, then from the System Menu select Profile Save, pick the Configuration memory slot where your settings will be saved, and Enter to confirm. Profile 0 is the Factory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

**Please note: loading profile configurations does NOT change function assignments. The functions are independent of the profile configurations. See Save Profile and Load Profile sections in the System Menu portion of this manual for more details.**

### 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.



### 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.

## Scope Menu

Function	Background	Black
Scope	Lum Position	Bottom Right
Video	Luminance	Off
Audio	Vec Position	Bottom Right
Color-Global	Vector	Off
Color-Input	Lum Style	Percent
System	Color1	Blue
OSD	Divide1	20
	Color2	Green
	Divide2	30
	Color3	Cyan
	Divide3	40
	Color4	Red
	Divide4	50
	Color5	Magenta
	Divide5	60
	Color6	Black

### Background

Choose the background style for scopes. Select Black, Translucent, or Transparent.

### Color & Divide

These toggles allow you to customize the appearance of the on screen waveform scope by setting different colors for up to 6 different luminance ranges.

Color1 sets the color of levels under the Divide1 threshold.

Color2 sets the color of levels between the Divide1 and Divide2 thresholds.

Color3 sets the color of levels between the Divide2 and Divide3 thresholds and so on.

Finally, Color6 sets the color of any levels over the Divide5 threshold.

Divide thresholds are defined by percentage when Scope Lum Style is set to Percent and defined by nits when Scope Lum Style is set to PQ Nits.

### Lum Position & Vec Position

Use Lum & Vec Position to select in what area of the screen you would like your Scopes to be displayed.

### Lum Style

Select Percent of PQ Nits. When set to Percent the waveform will show a percentage based graticule. When set to PQ nits the waveform will show a PQ nits based graticule. Both modes will scale the graticules accordingly based on operating signal range.

## Scope Menu

Function	Background	Black
Scope	Lum Position	Bottom Right
Video	Luminance	Off
Audio	Vec Position	Bottom Right
Color-Global	Vector	Off
Color-Input	Lum Style	Percent
System	Color1	Blue
OSD	Divide1	20
	Color2	Green
	Divide2	30
	Color3	Cyan
	Divide3	40
	Color4	Red
	Divide4	50
	Color5	Magenta
	Divide5	60
	Color6	Black

### Luminance / Vector

Luminance WFM and Vector Scope can be activated via dedicated function buttons, but may also be manually toggled on/off from the Scopes Menu.

## Video Menu

Function	Input	SDI 1
Scope	Pixel Mapping	OFF
Video	Deinterlace Mode	Interfield
Audio		
Color-Global		
Color-Input		
System		
OSD		

### Input

The active inputs can be selected using the Video Menu.

### 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

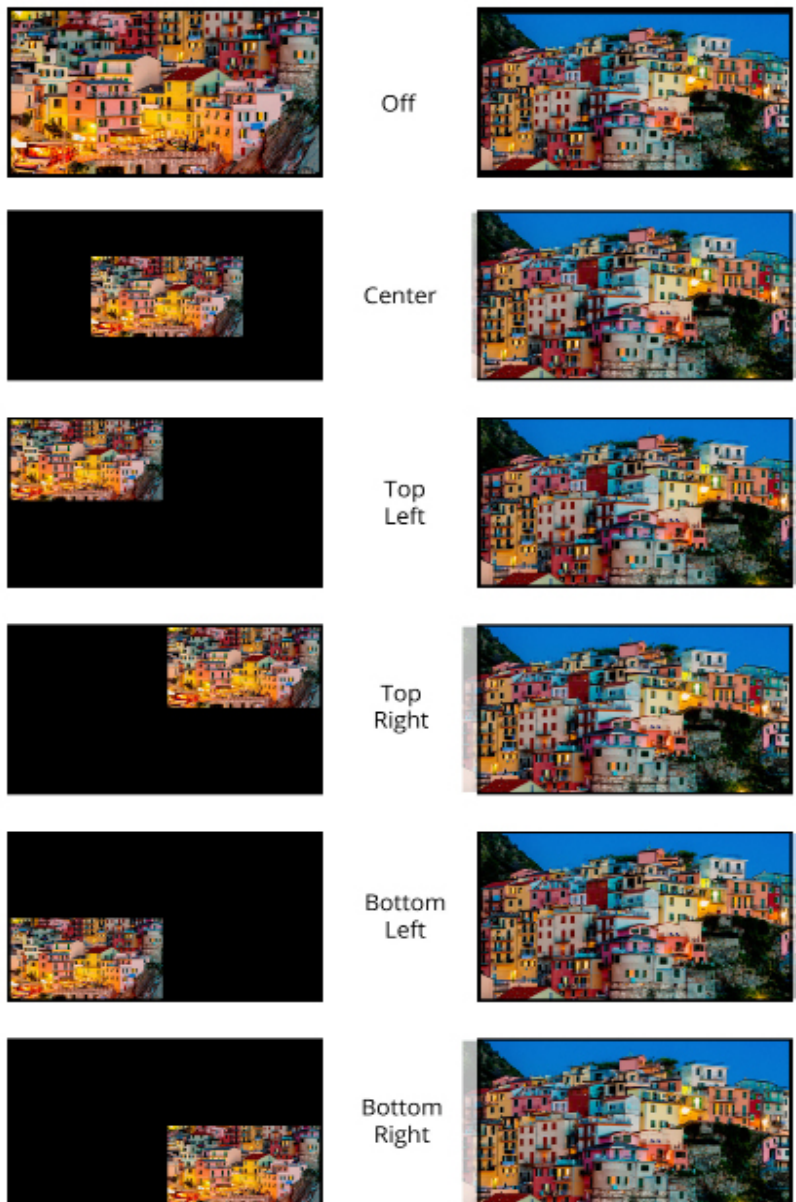
Maps the signal 1:1 with the bottom right of incoming video in the bottom right of the screen.

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.

## HD Signal

## 4K Signal



## Video Menu

Function	Input	SDI 1
Scope	Pixel Mapping	OFF
Video	Deinterlace Mode	Interfield
Audio		
Color-Global		
Color-Input		
System		
OSD		

### 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.

## Video Menu

Function	SDI-1 Audio	Digital CH1&2
Scope	SDI-2 Audio	No Sound
Video	SDI-3 Audio	Digital CH1
Audio	SDI-4 Audio	Digital CH3
Color-Global	DP Audio	Analog
Color-Input		
System		
OSD		

### SDI 1, SDI 2, SDI 3, and SDI 4 Audio

Use these toggles to select what audio source is active (via audio output connection) when viewing SDI 1, 2, 3, and 4 respectively. You may select any single channel or stereo pair of embedded audio, Analog (from minijack input), or No Sound.

### 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.

## 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
Scope	Gamut Toggle	Hue
Video	3rd Party cLUT	User1
Audio	Red Gain	0
Color-Global	Green Gain	0
Color-Input	Blue Gain	0
System	Red Bias	0
OSD	Green Bias	0
	Blue Bias	0
	GaiaColor AutoCal	
	AutoCal Data Backup	
	AutoCal Backup Load	
	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.

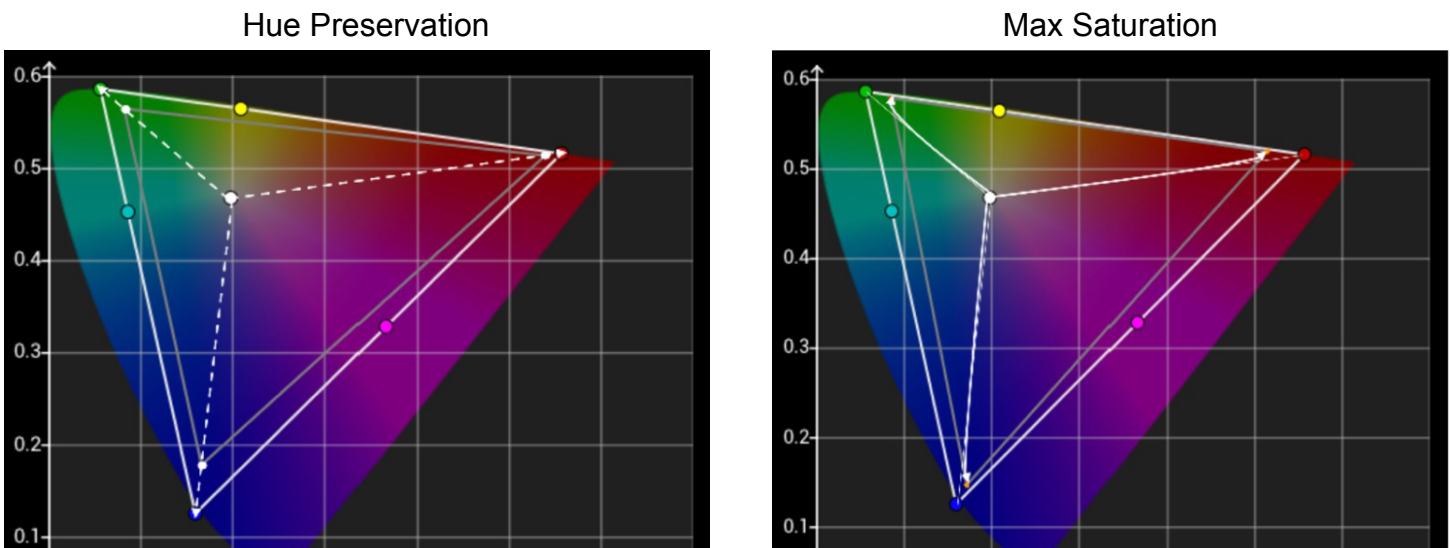
Please leave the ColorSystem set to GaiaColor unless you have specifically saved your own user generated calibration LUTs to one of the 3rd Party Color System's memory slots (3rd Party cLUT memories) from compatible 3rd party calibration software. An additional ColorSystem selection labeled NONE is also 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.



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 6 LUT positions that are accessible at a time as follows:

Front DIT 1D LUT -> DIT 3D LUT -> Post DIT 1D LUT-> 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.*

## 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	Input Color Mode	Global
Scope	SDI-1 DIT LUT	System-Off
Video	SDI-2 DIT LUT	System-Off
Audio	SDI-3 DIT LUT	System-Off
Color-Global	SDI-4 DIT LUT	System-Off
<b>Color-Input</b>	<b>Input Color Config</b>	<b>Global</b>
System	Range	Full 0-1023
OSD	Gamut	2020
	Temperature	6500K
	EOTF	PQ
	Luminance Mode	203
	Luminance Custom	40
	Color Format	Auto
	Color Mode	Normal

## Input Color Mode

Select from Global or Individual-Input.

When set to Global the same calibration related color management settings will be applied to all inputs as governed by the Input Color Config memory named Global.

When set to Individual-Input each input will have uniquely configurable color management selections as governed by the corresponding Input Color Config memories (SDI-1, SDI-2, SDI-3, SDI-4, DP). By setting Input Color Mode to Individual-Input you can easily configure a unique calibrated state per input and moreover these unique calibrated states can operate on screen simultaneously while in Quad Mode. This Individual-Input operating mode enables a wide variety of useful monitoring scenarios. For example, some users like having dedicated HDR and SDR inputs on the monitor or want the ability to monitor SDR and HDR sources on screen at the same time. It is important to note that when in the Individual-Input Color Mode, Look DIT LUT functionality will be disabled. Look DIT LUT(s) are only compatible with the Global Input Color Mode. However, while only one Global calibrated state will be active in Global Input Color Mode you can still apply a unique DIT Look LUT to each input or Quad Mode quadrant. For users that want to both apply a unique DIT Look LUT per input/quadrant in combination with a unique calibrated state per quadrant you can achieve this manually by concatenating your desired Look DIT LUT with a transform from the Global calibrated configuration to your target individual display spaces. Put another way, Individual-Input Color Mode allows for the direct selection of 4 different calibrated states on screen at the same time, but no DIT Look LUTs whereas the Global Input Color Mode allows for one global calibrated state, but supports up to 4 simultaneous Look LUTs on screen at the same time.

## **SDI-1 through SDI-4 DIT LUT (only available in Input Color Mode - Global)**

When operating in Input Color Mode – Global these 4 menu items will allow you to apply any of 16 saved DIT Look LUTs to the corresponding inputs listed. By default these selections will be set to System-Off. To apply a DIT Look LUT to an input select the desired saved LUT (1 through 16) to the input. New Look DIT LUTs can be saved to the monitor's non-volatile memory using the IP Remote Utility where the ID number you are saving to will correspond to the same number on these menus. Once your desired Look DIT LUTs are assigned you can quickly toggle them on/off using the DIT LUT function.

When Input Color Mode is set to Individual-Input these DIT LUT menu selections will become greyed out and inaccessible.

## **Input Color Config**

Select from Global, SDI 1, SDI 2, SDI 3, SDI 4, 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 for the individual SDI 1, SDI 2, SDI 3, SDI 4, or DP configuration to be active the Input Color Mode must be set to Individual-Input. If Input Color Mode is instead set to Global then all inputs will 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. The XMP C series of monitors meet Dolby's [Tier 1 Requirements for Dolby Vision HDR mastering](#).

**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 an XMP C 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 XMP C 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 DP In Port in combination with a system that reads EDID the monitor should be configured as follows:**

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 only applies to DP In Port use. EDID is not used via SDI connections.

### **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.

On the XMP550C 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 XMP270C and XMP310C 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 XMP550C 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 SDI 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). XMP 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/m<sup>2</sup> (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 an XMP550C 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 an XMP310C LUM Mode 1800 will not be selectable as the monitor is 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 an XMP310C the LUM Custom slider should not be set higher than 1000 as the XMP310C is 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.

### **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.

## System Menu

Function	Update Firmware	Allow	
Scope	Current IP	192.168.1.5	
Video	Version	2.4.3	
Audio	Serial Number	P550A00001	
Color-Global	Payload ID	0.0.0.0	
Color-Input	Profile Load		
System	Profile Save		
OSD	Set Static IP	192.168.1.5	192.168.1.5
	IP Reset	DHCP	255.255.255.0
	Clear Panel Noise	Off	192.168.1.1
			Apply Settings

### 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 except for function assignments will be saved to your selected configuration. Profiles do not save function assignments because profiles can be assigned to and loaded via functions, which could cause somewhat of a circular logic problem if included in profile configurations.

### **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.

### **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.

## OSD Menu

Function	Status Position	Top Left
Scope	Status Set	5s
Video	Menu Position	Top Left
Audio	Menu Set	5s
Color-Global	Menu Brightness	100
Color-Input	Area Marker	Off
System	Safety Marker	Off
OSD	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.

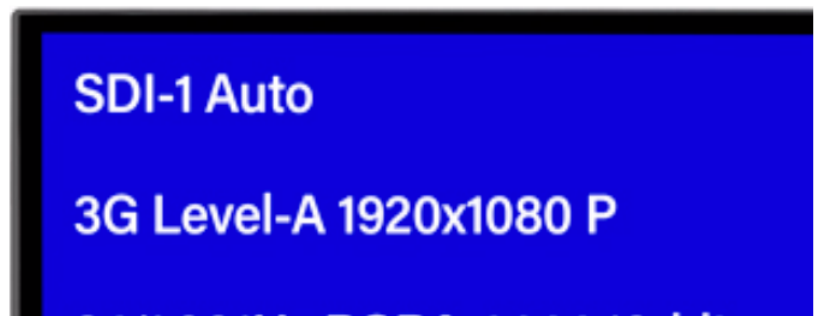
### Status Set - Signal Status ID window

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 primary input's detected bandwidth (e.g. 12G), resolution (e.g. 3840x2160), and scan type (e.g. PsF). Please note that if your video mode is set to something besides a single wire format (e.g. Quad Link SDI) this second line will only show the detected bandwidth and resolution of the primary (selected) input. A quad link SDI UHD signal will therefore only indicate the resolution of the primary quadrant (HD) whereas a single 12G-SDI UHD signal will show 3840x2160 resolution.

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



## OSD Menu

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

### 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 preferred 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.

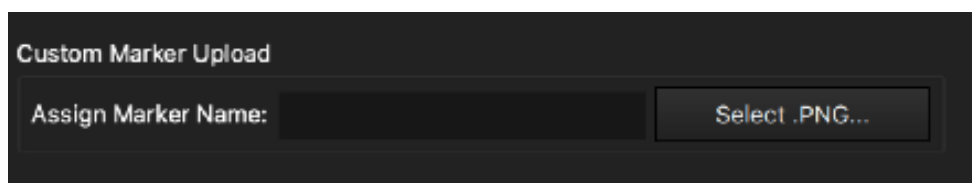
### Center Marker

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.

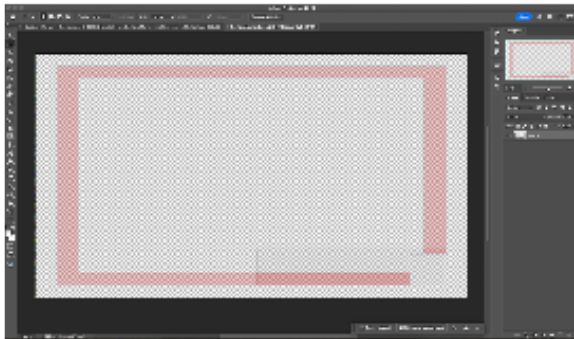


## Custom Marker File requirements:

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:

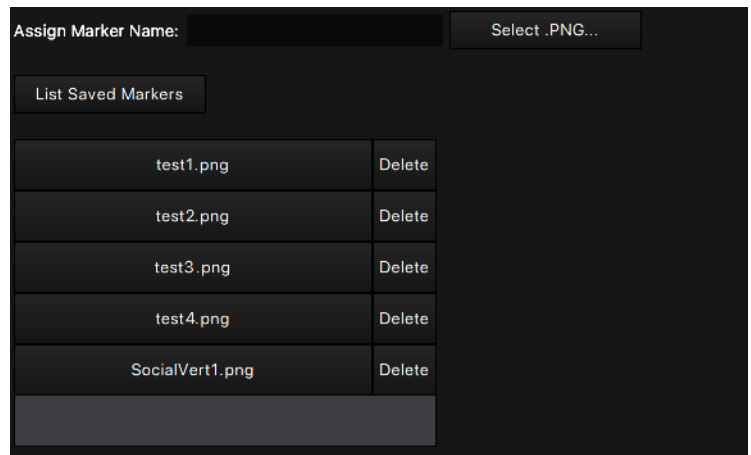


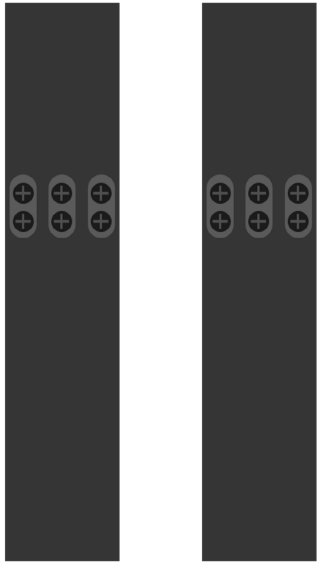
Here is how it would appear when loaded on the monitor:



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 instead 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.





XMP C 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 XMP550C 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 XMP270 and XMP310C can be mounted with M4 screws using the 100Cmm x 100mm VESA mounting points. Please ensure mounting screws do not extend more than 15mm into the threaded mounting holes.

GaiaColor Direct Connect Volumetric AutoCal provides a simple and accurate way to calibrate your FSI monitor. On XMP C 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 XMP C series monitors.*

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

1. Verify your monitor is running firmware version 3.1.10 or later.
2. 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: **XMP270, XMP310, XMP550, XMP551, XMP650, or XMP651. NOTE: for simplicity, XMP C series units use the same matrix name as their XMP counterparts since these use the same panels with the same spectral power distribution. This means that the XMP270C, XMP310C, and XMP550C are compatible with matrices named XMP270, XMP310, and XMP550 respectively.**
3. 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.



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

**Approximate AutoCal Time by Probe  
CR100**

~ 27 minutes

**K10A / K80**

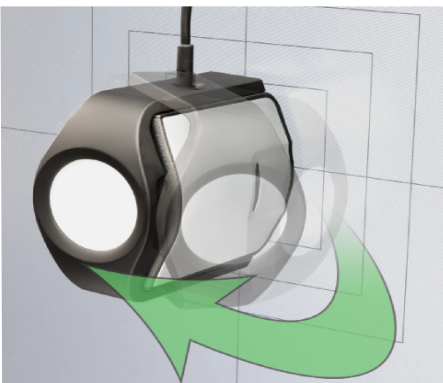
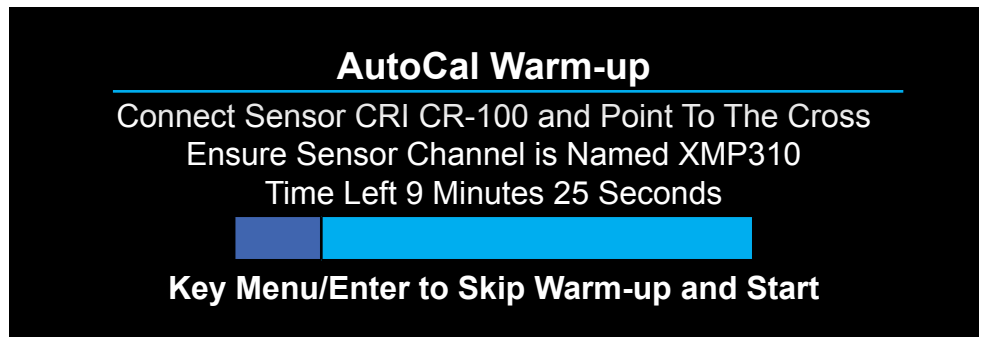
~ 35 minutes

**CA210 / CA310 / CA410**

~ 25 minutes

**i1D3DS OEM**

~ 60 minutes



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

Issue / Topic	Solution / Tip
<p>Monitor displays error message advising you to check probe connection and/or channel name</p>	<p>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 an XMP550C a matrix named XMP550 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.</p>
<p>Is disconnecting all signal cables before starting automatic calibration actually required?</p>	<p><b>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.</b> 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.</p>
<p>The monitor or probe was unplugged before calibration completed</p>	<p>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.</p>
<p>Can I start my calibration right away or is warm-up necessary?</p>	<p>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.</p>

### Tips and Troubleshooting

Issue / Topic	Solution / Tip
<p>Poor results or calibration failure when using CR100</p>	<p>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.</p> <p>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.</p>
<p>Calibration Validation Considerations</p>	<p>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.</p> <p>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.</p> <p>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.</p>
<p>K10A measurement spot size consideration</p>	<p>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 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.</p>

### Tips and Troubleshooting

Question	Answer
<p>Do customizable manual calibration settings need to be reset before starting AutoCal?</p>	<p>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.</p> <p>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.</p> <p>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.</p>

GaiaColor Analyzer is a fast, powerful calibration QC tool built into every XMP and XMP C 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.

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.



## 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 should be ASCII characters, begin with '!' and end with a carry return.

!00BINA

|| || +--Parameter

|| |+----Command

|| +-----Separator

|+-----Monitor Address

+-----Start Flag

### Command Description

Start Flag: Every command should begin with '!'.

Monitor Address: 00~99, 00 for broadcast.

Separator: Must be 'B'

### 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 ~ E	A: SDI1, B, C, D...
F	Function Key	0 ~ 5	0: F1, 1,2,3...
KNOBP	Knob Push	0 ~ 5	0: Knob1, 1,2,3...
KNOBCW	Turn Knob Clockwise	0 ~ 5	0: Knob1, 1,2,3...
KNOBCCW	Turn Knob Counter Clockwise	0 ~ 5	0: Knob1, 1,2,3...
MENU	Menu Key		
UP	Up Key		
DOWN	Down Key		
ENTER	Enter Key		

Question	Answer
<p>Is a 13 second boot time normal?</p>	<p>XMP C 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. 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.</p>
<p>What is the recommended viewing distance?</p>	<p>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 XMP310C, 68" (1.7m) for the XMP550C. 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.</p>
<p>Is it okay to install an adhesive screen protection film on the panel?</p>	<p>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.</p>