Flanders Scientific Inc.

Monitor User Manual

Updated 2.26.2025

XMP Series

This manual is based on public beta firmware 3.1.04. 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, 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.

To automatically lessen the potential severity of image retention or burn-in the display has an optional auto-dimming capability that will allow the panel to dim if static content is detected. The display will return to normal operating luminance when the image is refreshed *(see Panel Dimming section of manual for details)*. Panel dimming can be turned off, but additional caution should be exercised if panel dimming is disabled.

A clear panel noise capability is also provided that can help restore panel performance in most scenarios, but when possible care should be taken to avoid prolonged static conditions that may cause premature aging or panel damage

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.

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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.

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- 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.

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Keyboard

- **SDI 1:** Used to select SDI Input 1 as the active Input.
- **SDI 2:** Used to select SDI Input 2 as the active Input.
- **SDI 3:** Used to select SDI Input 3 as the active Input.
- **SDI 4:** Used to select SDI Input 4 as the active Input.
- **DP:** *Used to select DP input as the active input. This input only supports 3840x2160 @ 60P.*
-
- **F1:** Assignable function key. This key's function is selectable from the Function Menu.
- **F2:** Assignable function key. This key's function is selectable from the Function Menu.
- **F3:** Assignable function key. This key's function is selectable from the Function Menu.
- **F4:** Assignable function key. This key's function is selectable from the Function Menu.
- **F5:** Assignable function key. This key's function is selectable from the Function Menu.

- **MENU / LEFT:** Used to toggle and navigate On Screen Menu.
- **UP:** Used to navigate On Screen Menu.
- **DOWN:** Used to navigate On Screen Menu.
- **RIGHT / ENTER:** Used to navigate On Screen Menu and to confirm selections within the On Screen Menu.

- **PHASE:** Used to adjust hue. Pressing down on the center of this button will return the hue setting to its default position.
- **CHROMA:** Used to adjust chroma higher or lower. Pressing down on the center of this button will return the chroma setting to its default position.
- **BRIGHT:** Used to adjust brightness higher or lower. Pressing down on the center of this button will return the brightness setting to its default position. The brightness knob should NOT be used increase the overall peak luminance of the unit, use the Luminance setting to adjust overall luminance.
- **CONTRAST:** Used to adjust contrast higher or lower. Pressing down on the center of this button will return the contrast setting to its default position.
- **VOLUME:** Used to adjust volume. Press down on this knob to instantly mute or unmute the volume.
- **POWER:** Used to turn power ON / OFF.

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Back Panel

- **SDI In:** 4 Multi-Format 12G/6G/3G/HD-SDI Inputs.
- **SDI Out:** 4 Looped 12G/6G/3G/HD-SDI Outputs.
- **MON Out:** 4 processed MON outputs. If UHD Downscaling is enabled on the Video menu each output will provide a quarter sample resolution downscaled output of any 4K / UHD input. Additionally, if the Look DIT LUT function button is enabled each processed MON output will reflect the Look DIT LUT assigned to the corresponding input.
- **DP In Port:** For GUI monitor use. Only supports 3840x2160 @ 60P.
- **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.
- **RS-485:** RS-485 Ports (In/Out) for looping remote control interface.

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Navigating the Menu
Pressing the MENU button on the monitor's keypad will call up the on screen menu. To navigate use the UP and DOWN buttons and press the ENTER button to select the highlighted sub menu. Navigate the sub menu in the same way by using the UP and DOWN buttons to highlight a particular function and press ENTER to change that function's setting. To exit the menu or back out of a sub menu press the MENU button.

Menus longer than the Main Menu may not fully display. These menus will scroll. Use the Up and Down keys to scroll up and down within longer menus.

Function Menu

Function
Scope
Video
Color
System
OSD

F1	Luminance Scope
F2	Vector Scope
F3	Pixel Mapping
F4	LUM Coloring
F5	Area Marker
	Safety Marker
	Center Marker
	Custom Marker
	3G/HD_INx4
	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

The Function Menu allows you to assign user selectable functions to any of the 5 function buttons (F1, F2, F3, F4, and F5) on the monitor keypad. To assign a function to a function key, highlight one of the 5 functions and press ENTER. A list of assignable functions will appear. Select the desired function with the UP and DOWN buttons and press ENTER.

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.

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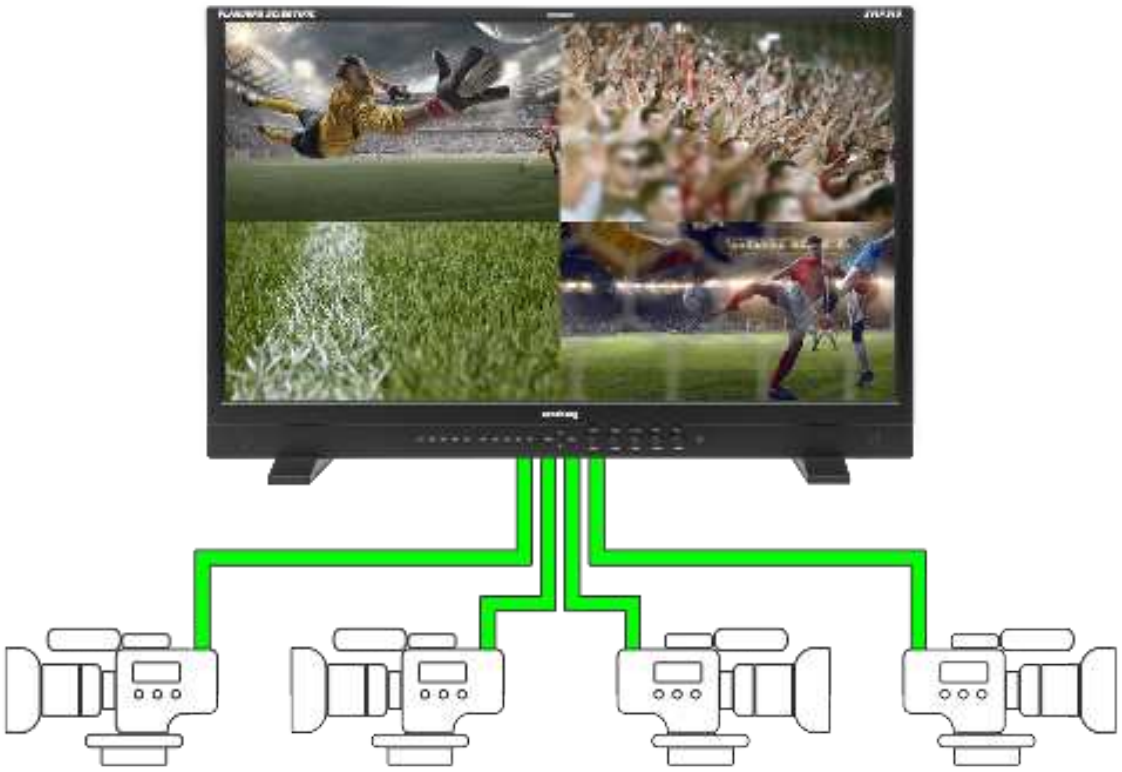
Custom Marker
Use the Custom Marker function to toggle the configured Custom Marker feature on or off. See the OSD section of this manual for details on configuring the preferred Custom Marker as well instructions on uploading Custom Markers to the monitor.

3G/HD_INx4
Enables quad view mode of 4 x 3G or 4 x 1.5G signals. Please note that while gen-lock / synchronization is not required (as of fw 3.1.02) your sources must all be the same format and frame rate in order to use this quad view mode.



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).

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Look DIT LUT
Use this function to turn saved Look DIT LUTs on or off. A unique Look DIT LUT can be assigned to each input using the IP Remote Utility (version 1.9.12 or later). Look DIT LUTs should be formatted as 17x17x17. cube using only the header LUT_3D_SIZE 17. The LUT saved to ID1 will apply to SDI1, ID2 to SDI 2, ID3 to SDI 3, and ID4 to SDI 4.

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 button will toggle your 4 Look LUTs on/off with a single button press. When in quad view mode the Look DIT LUT assigned to each input will apply accordingly to its respective quadrant. Additionally, each processed MON output will mirror that corresponding input's assigned Look DIT LUT if enabled, effectively turning your XMP series monitor into a 4 channel LUT box not just for your onscreen image, but for your downstream MON outputs as well.

Load Profile
Saved profile configurations can be loaded via a function button. This acts as a "load" button only as opposed to a toggle, so pressing a corresponding Load Profile Function button twice does not revert to previous pre-load state.

The most common use for saving profiles and assigning them to a function button is to allow for single button 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 button 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 press a function button to 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 button activated change.

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

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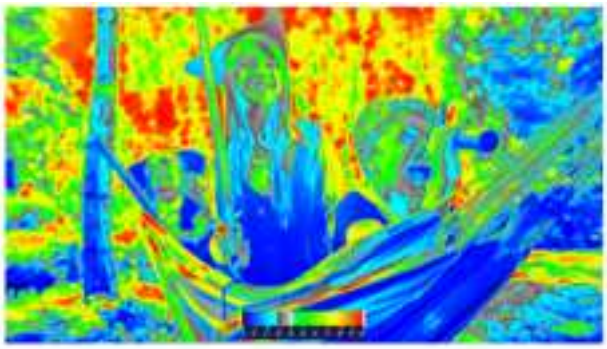
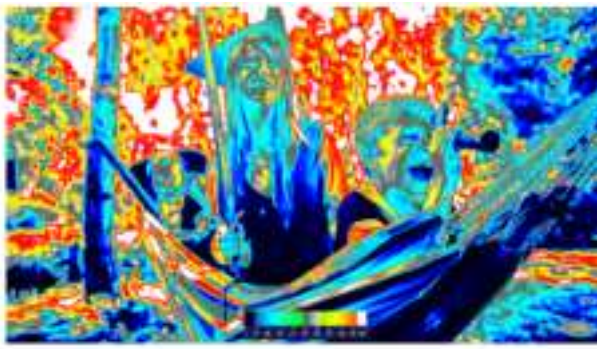
Lum Coloring (Customizable Exposure Check)
Enabling this function generates an artificial luminance map of the incoming source that can be particularly useful in identifying overexposed areas in any given shot. An onscreen scale helps indicate what artificial color corresponds to what luminance from 0 to 100 percent. You can change the range of these color coded regions to any preferred setting by using the monitor's rotary knobs, leaving the range outside of the color coded region as a greyscale representation of the signal. This can be useful in targeting a specific luminance threshold to be shown in color and/or isolated in greyscale. The H POS rotary knob will adjust the lower limit of the lower color coded region. The V POS rotary knob will adjust the upper limit of the lower color coded region. The Ref POS rotary knob will adjust the lower limit of the upper color coded region. The F Stop Rotary knob will adjust the upper limit of the upper color coded region. These color coded ranges are retained in memory so you can exit and reenter Lum Coloring Mode without having to reset your desired threshold levels. The LUM Coloring feature can also be activated via the monitor's Video Menu -> Color Mode -> LUM Coloring.





Blue Only
Enable this function to quickly turn on the standard Blue Only monitoring mode. Blue Only mode can also be activated from the monitor's Video Menu -> Color Mode. On the Video Menu you will also see additional modes including Blue Only as Mono, Red Only, Red Only as Mono, Green Only, Green Only as Mono, and Monochrome. See the Video Menu section of this manual for more details.

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Scope Menu

Function	Lum Style	IRE
Scope	Lum Position	Bottom Right
Video	Luminance	Off
Color	Vec Position	Bottom Right
System	Vector	Off
OSD		

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 IRE or HDR. When set to IRE the waveform will show a percentage based graticule. When set to HDR the waveform will show a PQ nits based graticule.

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.

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Video Menu

Function	Input	SDI 1
Scope	UHD Downscaling	On
Video	SDI Format	AUTO
Color	Pixel Mapping	OFF
System	Deinterlace Mode	INTERFIELD
OSD	Color Mode	Normal

Input
Inputs can be directly selected using the dedicated input buttons on the monitor's keypad, but the active input can also be selected through the Video Menu.

UHD Downscaling
The monitor's 4 clean loop through outputs will always output the same signal received with no modification aside from simply re-clocking the signal. However, the monitor's dedicated MON outputs can optionally downscale any incoming 4K or UHD signals to 2K or HD and this menu item toggles that downscaling On or Off. This is a global toggle that turns UHD downscaling on or off across all 4 MON outputs. When set to On any 4K signal will be downscaled to 2K and any UHD signal will be downscaled to HD. Note, to facilitate low latency, near real-time operation the downscaling feature is a simple quarter sample resolution downscale.

SDI Format
Can be manually set to select the type of incoming signal format. 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.

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.

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 button 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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Video Menu

Function	Input	SDI 1
Scope	UHD Downscaling	On
Video	SDI Format	AUTO
Color	Pixel Mapping	OFF
System	Deinterlace Mode	INTERFIELD
OSD	Color Mode	Normal

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 button allowing you to quickly toggle in and out of 1:1 mode. The default behavior of the Pixel Mapping function button 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 button will toggle between Off and this last selected pixel mapping mode.

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Color Menu

Function	ColorSystem	GaiaColor
Scope	Range	Video 64-940
Video	Gamut	709
Color	EOTF	Gamma 2.4
System	Temperature	6500K
OSD	Luminance Mode	1000
	Luminance Custom	100
	3rdParty LUTMemory	User1

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.

Within the GaiaColor Color System you will find all the available Gamut, EOTF, Correlated Color Temperature, and Luminance options supported by the monitor. 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 from compatible 3rd party calibration software. An additional option 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 will remain similarly adjustable to GaiaColor mode. Gamut, EOTF, and Temperature will all be deactivated and will not be selectable in 3rd Party mode as these parameters are all instead governed by the 3rd Party USER LUTs directly when using 3rd Party mode.

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.

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Color Menu

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OSD	Luminance Mode	1000
	Luminance Custom	100
	3rdParty LUTMemory	User1

Gamut (*GaiaColor Color System Only*)
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 - (*GaiaColor Color System Only*)
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 an XMP550 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 XMP310 LUM Mode 1800 will not be selectable as the monitor is limited to 1000nits peak luminance.

Luminance Custom (GaiaColor Color System Only)
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 XMP310 the LUM Custom slider should not be set higher than 1000 as the XMP310 is limited to 1000nits peak luminance.

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

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

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Color Menu

Function	ColorSystem	GaiaColor
Scope	Range	Video 64-940
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Color	EOTF	Gamma 2.4
System	Temperature	6500K
OSD	Luminance Mode	1000
	Luminance Custom	100
	3rdParty LUTMemory	User1

3rd Party LUT Memory
Does not apply to GaiaColor Color System. This additional selection only applies within the 3rd Party Color System. Select your desired User 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.

The DIT LUT positions should be used for technical transforms or look LUTs, calibration LUTs should normally only be stored in the Calibration LUT positions.

LUTs can be saved to the display using the IP Remote Utility or directly from select 3rd party applications.
Application Note: Incoming signals are mapped to the selected LUTs using the range defined on the monitor's color menu.

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.

AutoCal Data Backup / AutoCal Backup Load
Allows an AutoCal data set to be backed up for later recall. Note, when running a new GaiaColor AutoCal the new AutoCal data set is automatically applied to nonvolatile memory on reboot so you do not need to use the AutoCal Backup or Load menu options to activate the new AutoCal data. However, if you utilize the AutoCal Backup Load menu option this will now become the active data set used. For this reason it is advisable to backup the AutoCal data set you are currently using before loading any older AutoCal backup to ensure you have the ability to recall your current data set should you need it. ***Please think carefully before using the AutoCal Backup Load option to ensure you don't inadvertently override the current AutoCal data set.***

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 approximatley 10 minutes.

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Color Menu

Function	ColorSystem	GaiaColor
Scope	Range	Video 64-940
Video	Gamut	709
Color	EOTF	Gamma 2.4
System	Temperature	6500K
OSD	Luminance Mode	1000
	Luminance Custom	100
	3rdParty LUTMemory	User1

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 accomodate various applications and needs, but we are often asked for recommended settings for the most common workflows. To that end you'll find four 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

Example Configuration C: Typical Reference PQ 2020 HDR Configuration
Color System: GaiaColor
Range: Full 0-1023
Gamut: 2020
EOTF: PQ
Luminance Mode: 1000
Temperature: 6500K

Example Configuration D: Typical Reference PQ P3 D65 Configuration
Color System: GaiaColor
Range: Full 0-1023
Gamut: P3
EOTF: PQ
Luminance Mode: 1000
Temperature: 6500K

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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 XMP550 and XMP650 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 XMP310 is 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 XMP550 or XMP650 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.

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Color Menu

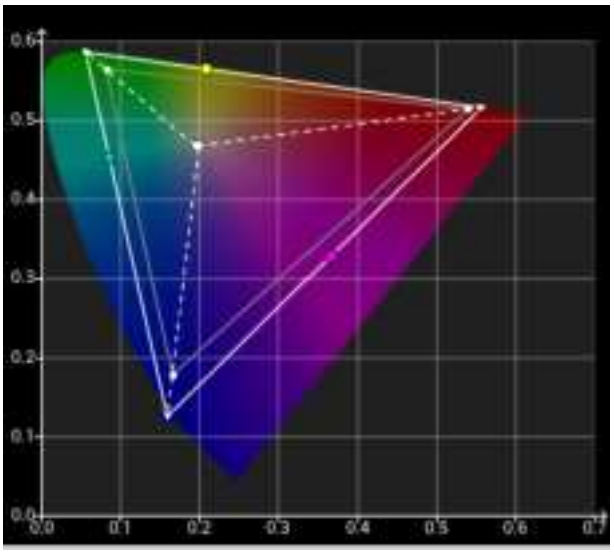
Function	ColorSystem	GaiaColor
Scope	Range	Video 64-940
Video	Gamut	709
Color	EOTF	Gamma 2.4
System	Temperature	6500K
OSD	Luminance Mode	1000
	Luminance Custom	100
	3rdParty LUTMemory	User1

Note on Hue Preservation

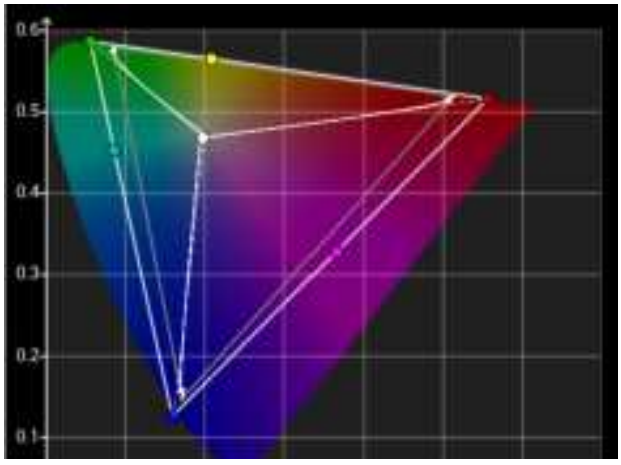
When set to a color space selection larger than the monitor can achieve the display will preserve proper hue tracking towards the selected gamut to the extent possible and will not shift hue at gamut clip. Some other displays may collapse to native gamut instead of preserving hue tracking once their achievable gamut will no longer allow for tracking towards the reference gamut, but we avoid this as it can lead to a sudden and undesirable hue shift at clip.

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).

Hue preservation on XMP



Observed collapse to display native at clip on display that fails to preserve hue tracking



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System Menu

Function	Update Firmware	Allow	
Scope	Current IP	192.168.1.5	
Video	Version	2.4.3	
Color	Serial Number	P550A00001	
System	Payload ID	0.0.0.0	
OSD	Profile Load		
	Profile Save		
	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
	Panel Dimming	On	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 function buttons 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: Full Range 0-1023
Gamut: 2020
EOTF: PQ
Gain/Bias Adjustments: 0 (neutral)
Panel Dimming: On

Profile Save
Select a configuration position to save current monitor settings to that configuration slot. All settings except for function button assignments will be saved to your selected configuration. Profiles do not save function button assignments because profiles can be assigned to and loaded via function buttons, which could cause somewhat of a circular logic problem if included in profile configurations.

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System Menu

Function	Update Firmware	Allow	
Scope	Current IP	192.168.1.5	
Video	Version	2.4.3	
Color	Serial Number	P550A00001	
System	Payload ID	0.0.0.0	
OSD	Profile Load		
	Profile Save		
	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
	Panel Dimming	On	Apply Settings

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 Up, Down, Menu, and Enter keys to navigate the keyboard, and press down on the H POS rotary knob to confirm any highlighted selection. You can also turn the H POS and V POS rotary knobs to navigate the on screen keyboard, again pressing down on the H POS or V POS rotary knobs to confirm a 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 power LED will stay turned on for the duration of the Clear Panel Noise process. Once the process is complete the monitor will shut down automatically and the Power button LED will turn off to let you know the process is complete, this typically takes about 9 minutes. Once the power LED is off 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.

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System Menu

Function	Update Firmware	Allow	
Scope	Current IP	192.168.1.5	
Video	Version	2.4.3	
Color	Serial Number	P550A00001	
System	Payload ID	0.0.0.0	
OSD	Profile Load		
	Profile Save		
	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
	Panel Dimming	On	Apply Settings

Panel Dimming

When panel dimming is set to On the panel will automatically begin to dim after 45 seconds of static content to help automatically protect the panel from image retention. Panel dimming can also be set to Off to disable this behavior and this may be particularly useful during calibration routines, grading sessions, and other scenarios where static images may routinely need to be critically evaluated for more than 45 seconds at a time. When set to Off extra care should be taken not to leave static images on screen longer than actually required. Static display of content for many minutes at a time is unlikely to cause any permanent damage, but don't be the person that leaves their 1000nit high contrast company logo displayed on screen before heading out on an extended holiday...your panel and your wallet may not be happy upon your return.

Button LED

This toggle allows you to turn all keypad LED lights off while using the display. Please note that to avoid confusion during the monitor boot up process this setting will automatically default back to ON whenever you power cycle the monitor.

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OSD Menu

Function	Status Position	Top Left
Scope	Status Set	5s
Video	Menu Position	Top Left
Color	Menu Set	5s
System	Menu Brightness	100
OSD	Area Marker	Off
	Safety Marker	Off
	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 button is pressed 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 Video Menu's SDI format selection, but this line will continue to reflect signal type as indicated by VPID.

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OSD Menu

Function	Status Position	Top Left
Scope	Status Set	5s
Video	Menu Position	Top Left
Color	Menu Set	5s
System	Menu Brightness	100
OSD	Area Marker	Off
	Safety Marker	Off
	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 prefered selection. Press enter to confirm your selection.

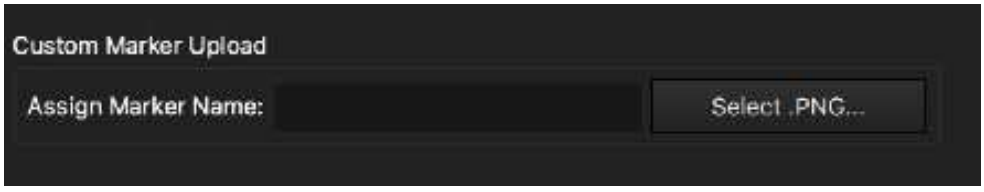
Area Marker
Allows you to define a common Area Marker for display on screen. Once configured with your preferred Area Marker selection this feature can be toggled on or off by assigning Area Marker to a function button.

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 button.

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

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 button to toggle your configured Custom Marker on or off quickly with a single function button press.

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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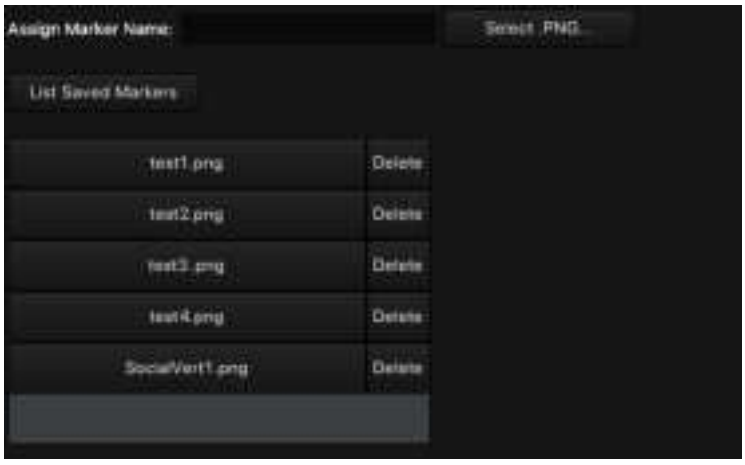
Custom Marker File requirements:
PNG Format
1920x1080 resolution

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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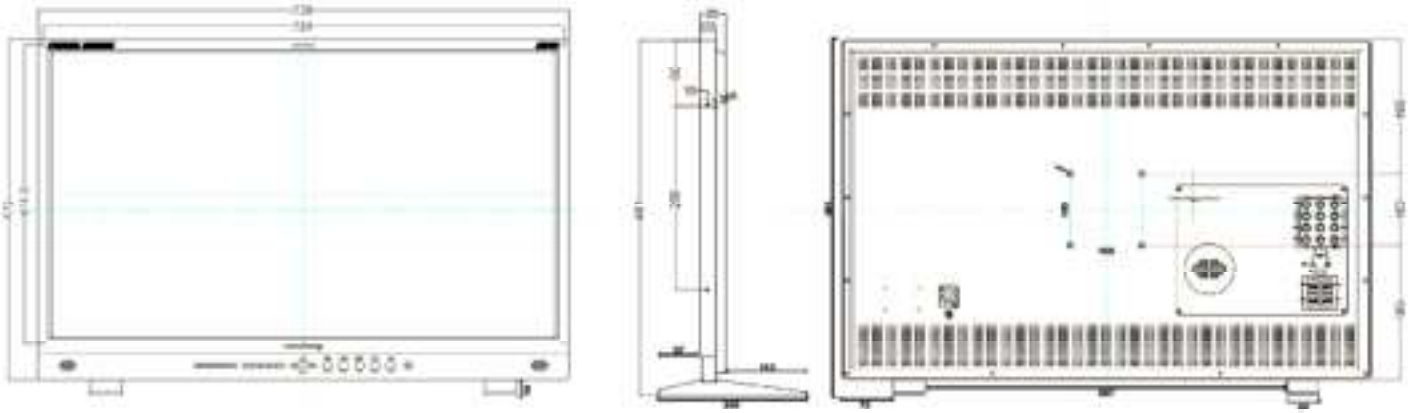
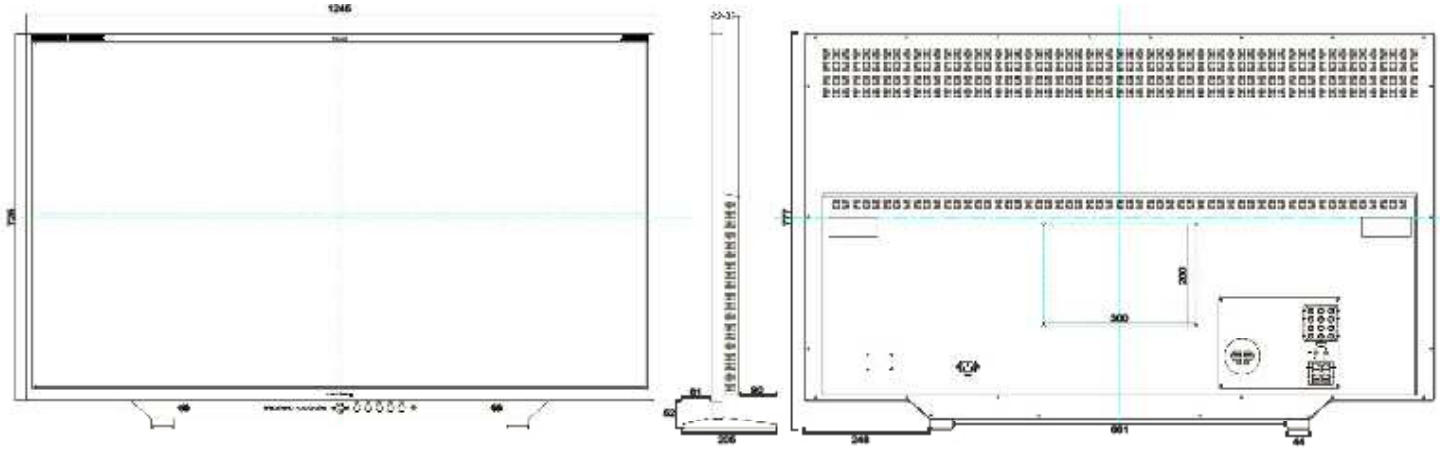
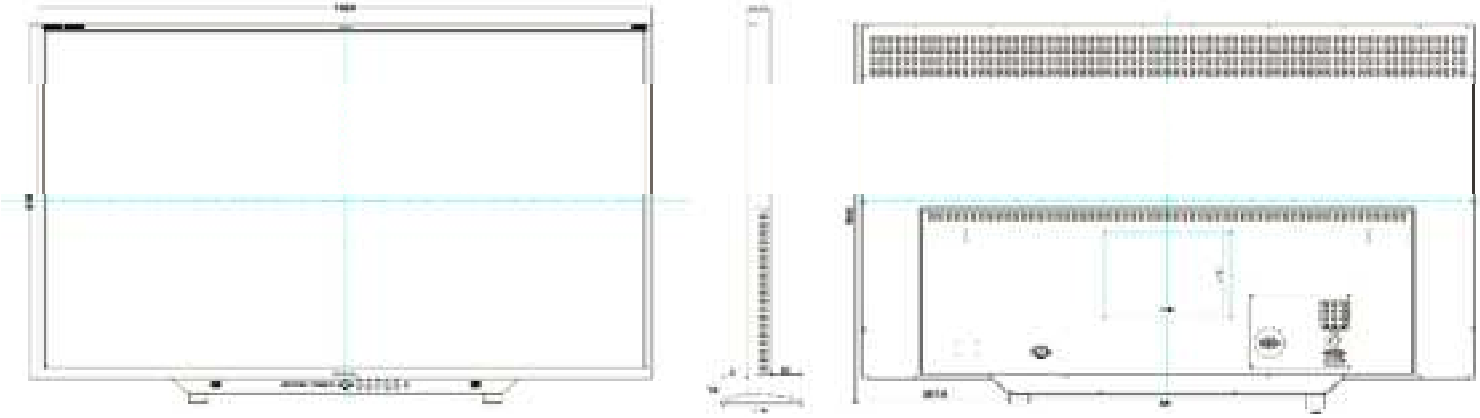


All dimensions in mm. XMP310 weight approximately 17.8 lbs (8.0 Kg)



All dimensions in mm. XMP550 weight approximately 43lbs (19.5Kg)



All dimensions in mm. XMP650 weight approximately 56lbs (25.5kg)

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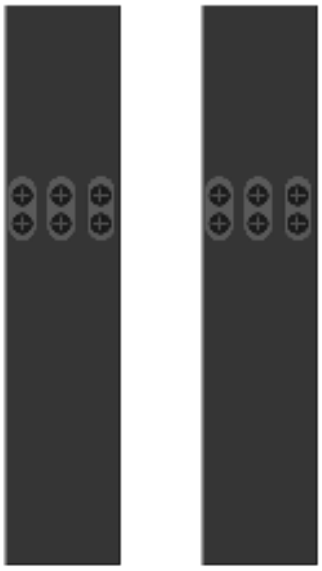
XMP Removable Feet and Mounting Info



XMP 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 XMP550 and XMP650 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 XMP310 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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Appendix - Direct Connect AutoCal

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

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 2.4.41 or later.

2. Ensure that your colorimeter has the correct matrix stored on it for the XMP310, XMP550 or XMP650. The name of the colorimeter matrix must match the model you are calibrating: **XMP310, XMP550,** or **XMP650**.

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.

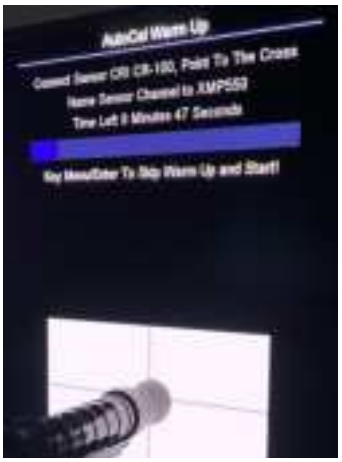
Step 4: During the warmup process use the on-screen guides to position your probe correctly in the center of the screen. This can be done at any time during the warmup process, simply ensure that your probe is centered on the onscreen crosshair before the warmup countdown timer reaches 0 seconds remaining.

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.

**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 series monitors.*



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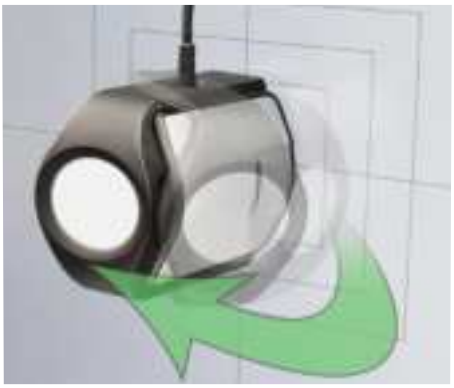
Approximate AutoCal Time by Probe Model
CR100 ~35minutes
K10A / K80 ~45 minutes
CA210 / CA310 / CA410 ~25 minutes
i1D3DS OEM ~90 minutes

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
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 an XMP550 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.
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. 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. 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. We also suggest validating with an L20 or 4% window size on XMP550 or XMP650, or L17 (~3% window) on XMP310, to validate to the monitor's peak luminance capability. As with AutoCal itself, validation is best performed after at least a 10 minute warm-up at 100nits after boot up.

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Question	Answer
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. 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. 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.

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Appendix B - IP Remote Control

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 button selection, and rotary knob 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. Once connected you will be able to use the IPRU to make menu, input, function, and rotary knob selections remotely. 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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Question	Answer
Is a 13 second boot time normal?	XMP 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.
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 XMP310, 68” (1.7m) for the XMP550, and 80” (2m) for the XMP650. 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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