

Advanced Color Adjustment

The SpectraView Engine (SVE) is a custom color processor engine integrated in the monitor. It combines individual characterization and calibration of the monitor during production together with temperature and time monitoring, to provide an unparalleled level of color control, accuracy and stability.

Adjustable color uniformity correction is available, utilizing detailed individual factory screen measurements together with the SVE to produce the best possible matching displays.

The SVE provides the utmost in versatility; from faster and more advanced color calibration, to the ability to accurately emulate colorspace such as Adobe®RGB and sRGB, to performing printer output emulations using ICC Profiles and internal 3D Look Up Tables.

The SVE can operate in one of two modes: On or Off

To enable or disable the SpectraView Engine using the remote control:

1. Press the MENU button.
2. Navigate to the [PICTURE] menu then to [SPECTRAVIEW ENGINE].
Use the ▲▼ + – buttons to navigate the OSD menu.
3. Highlight [ON] or [OFF] and press SET/POINT ZOOM to enable or disable the SpectraView Engine.
4. Press EXIT button to return to the main [PICTURE] menu.

Using the SpectraView Engine

When the SVE is on, the monitor's internal processor will handle many of the color management features and the user color controls allow a unique level of precision to be achieved. The white point is adjusted using a CIE x, y control and the grayscale response of the display is calculated and managed by the monitor itself.

The SVE includes Uniformity Correction, where different levels of compensation can be selected to enable a trade-off between the most uniform brightness and color vs. maximum brightness.

The SVE has five Picture Mode memories that can be individually configured and selected. Each individual Picture Mode can store fully customized color settings. This allows you to quickly switch between different settings by just changing between picture modes.

Using the SVE will also give access to other advanced functionality, such as the ability to emulate several modes of human color vision deficiency as well as the ability to select the monitor's output color gamut.

To change the settings in each SVE picture mode:

Presets have been configured with settings for general use as described in the "Preset Types" table next page. When choosing a preset for the SVE picture mode, all of the settings are immediately adjusted to match the preset. Each setting can be individually adjusted to customize as needed.

1. Press the MENU button.
2. Navigate to the [PICTURE] menu then to [PICTURE MODE].
Use the ▲▼ + – buttons to navigate the OSD menu.
3. Press the + button to navigate to the [PICTURE MODE] field.
4. Select a setting from 1 through 5 at [PICTURE MODE].

- 1 → 2 → 3 → 4 → 5
↑

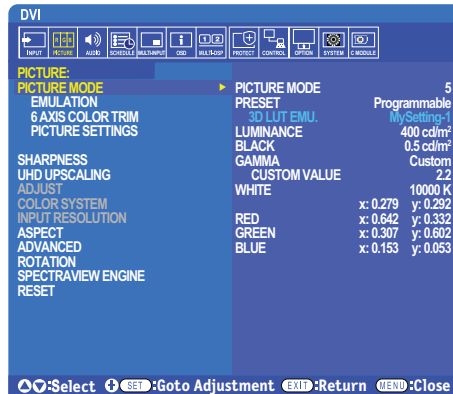
5. Select a preset item at [PRESET].

Choose the [PRESET] that is most suitable for the type of content that is shown or application usage.

Each [PICTURE MODE] includes [LUMINANCE], [BLACK] (Black level), [GAMMA], [WHITE (K)](color temperature), [WHITE (x, y)](White point CIE x, y), [RED] (Red Primary CIE x, y), [GREEN] (Green Primary CIE x, y), and [BLUE] (Blue Primary CIE x, y), settings. You can change these settings in the “Picture Mode” menu.

If any settings need to be changed, press the ▼ button to navigate through the settings and make any adjustments needed using the + – buttons.

6. Press EXIT button to return to the main [PICTURE] menu.



NOTE:

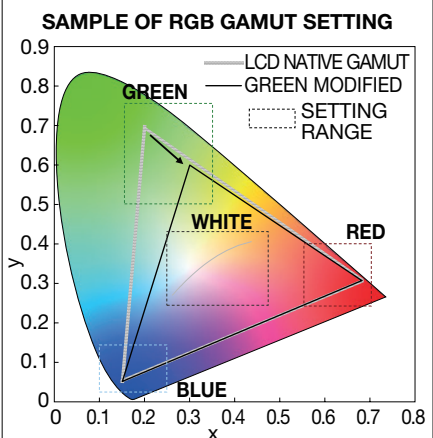
- Changing the settings in the [PICTURE MODE] menu does not change the default settings for the [PRESET].
- “*” mark is shown if the Picture Mode settings have been changed from the default preset settings.

Preset Types

PRESET	PURPOSE
sRGB	The standard color setting of the Internet, Windows® operating systems, and many smart-phone and other digital cameras. Recommended setting for general color management.
AdobeRGB	Wider color gamut setting used in high-end graphics applications such as professional digital still cameras and printing.
eciRGB_v2	Color setting recommended by Europe printing group, ECI (The European Color Initiative).
DCI-P3	Color setting for digital cinema.
Rec.709	Color setting for High-definition television.
Rec.2100 (HLG)	Color setting for HDR (High Dynamic Range) broadcasting.
Rec.2100 (PQ)	Color setting for HDR (High Dynamic Range) digital cinema on disc and internet streaming.
Low Blue	Reduces blue light emitted from the monitor. Paper-like color setting. (The Low Blue function substantially reduces blue light and helps to alleviate eye-strain.)
Signage	Color setting for use in digital signage applications with high ambient lighting conditions where a bright and high color temperature white point may be desirable.
TV Studio	Color setting for use with “on set shooting” where the monitor’s screen will be captured by the camera and should match the studio set’s incandescent lighting.
Full	Native LCD panel color gamut. Suitable for use with color managed applications.
DICOM sim.	Color setting for medical imaging that conforms to DICOM GSDF (Grayscale Standard Display Function).
Programmable	Programmable preset for MultiProfiler and other supported software. The preset name can be changed by software.

SpectraView Settings

SVE SETTINGS	PURPOSE
LUMINANCE	Adjusts the overall image and screen background luminance. When the setting is too high to display, the OSD characters are changed to green.
BLACK	Adjusts the black luminance. When the setting is too low to display, the OSD characters are changed to green.
GAMMA	Allows you to manually select the brightness level of grayscale.
	sRGB: Gamma setting for sRGB.
	L Star: Gamma setting for the CIELAB color space Lab.
	Rec.1886: Gamma setting for HDTV broadcasting.
	HDR-Hybrid Log: Gamma setting for HDR, typically for UHD broadcasting. System gamma can be adjusted.
	SYSTEM GAMMA: System gamma is adjustable in 0.5-2.0 range. When "Auto" is selected, the system gamma is automatically selected according to the "Luminance" setting.
	HDR-ST2084 (PQ): Gamma setting for HDR, typically for UHD disk media and streaming videos. Peak luminance value is adjustable.
	PEAK LUMI.: Sets the peak luminance value to display HDR-ST2084 (PQ) luminance range. A larger value will improve white saturation but the picture become darker. When "Auto" is selected, "Luminance" is used as the peak luminance setting.
	DICOM: DICOM GSDF (Grayscale Standard Display Function) is typically used for medical imaging.
	Programmable: A programmable gamma curve can be loaded using optional NEC software.
	Custom: Set a custom value for Peak luminance.
	CUSTOM VALUE: The gamma value is selected from a range from 0.5 to 4.0 in 0.1 steps. For general images 2.2 is used. Increasing the value will make the intermediate color darker, and lowering the value will make the intermediate color brighter.
	<p>SAMPLE OF PRESET GAMMA</p>
WHITE (K)	Adjusts the white by color temperature (K) or CIE x, y setting. A lower color temperature will result in a reddish screen and a higher color temperature in a bluish screen. A larger x value will result in a reddish screen, a larger y value changes the screen to greenish, and smaller x,y values will change the screen to bluish white.
WHITE (x, y)	
	<p>WHITE RANGE</p>

SVE SETTINGS	PURPOSE
RED (x,y) GREEN (x,y) BLUE (x,y)	Adjusts the color gamut. Set chromaticity with CIE x, y coordinates. It affects all colors except achromatic like white and gray. 

- NOTE:**
- Settings for [EMULATION], [6 AXIS COLOR TRIM], and [PICTURE SETTING] are also stored to each [PICTURE MODE].
 - If the ICC Profile on your computer doesn't match the monitor's settings then color reproduction may be inaccurate.
 - For detailed color settings and to set the ICC profile on your computer automatically, MultiProfiler software is recommended. Connecting PC and the monitor with a USB cable is recommended.

Using Stand-alone calibration

This feature performs color calibration of the monitor without using an external computer or software. This is useful for color matching a small number of monitors quickly. It also updates the factory color measurement data used by the monitor's internal SpectraView Engine (SVE) color processor.

Updating the factory color data with measurements taken from a color sensor results in color related settings, shown on the OSD, closely matching measurements from the color sensor. In effect, the color sensor's measurements become the new reference for all of the SVE's internal color calculations. All color presets in the monitor automatically update to use the new reference.

Requirements for Stand Alone Calibration:

- NEC MDSVSENSOR3 color sensor. This sensor connects directly to the USB1 (SENSOR) port on the monitor. The monitor automatically takes screen measurements directly from the color sensor.
- Or
- A near-range colorimeter with a measurement readout display in CIE Y/x, y format with Y in units of cd/m². Measurements are taken manually and each reading must be entered into the monitor via the OSD using the remote control. [VALIDATION] and [WHITE COPY] are not available.

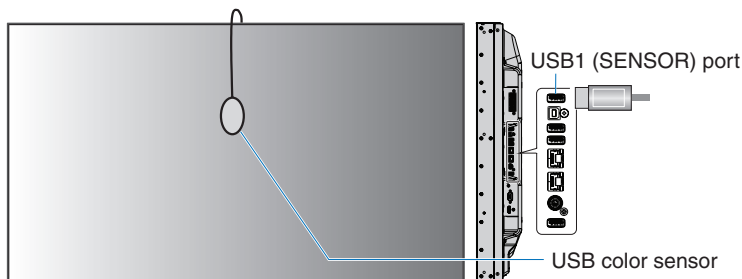
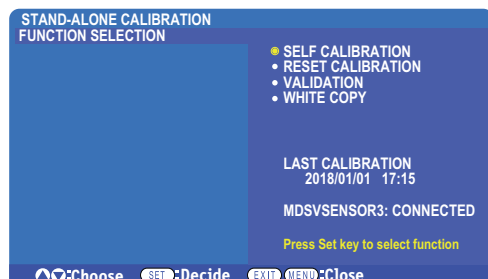
NOTE: Other color sensor models and types are not supported.

- NOTE:**
- For best calibration results, it is recommended the monitor be allowed to warm up for at least 30 minutes before starting the calibration or measurement process.
 - It is not necessary to recalibrate the other Picture Modes in the monitor after performing the Self Calibration. Updating the monitor's internal reference automatically updates all color settings.
 - The original factory measurements can be restored at any time.
 - Access to each monitor's USB1 (SENSOR) port is necessary to use this feature with the NEC MDSVSENSOR3 color sensor. Be sure to provide adequate access when installing the monitors.
 - Differences between the factory color measurements and those taken with a color sensor are to be expected. Differences can be due to many factors, such as variations between color sensor measurement technologies and device calibration and drift, measurement position on the screen, and video signal differences.
 - For color matching and managing a large number of monitors, the NEC Display Wall Calibrator software is recommended.
 - To open Stand Alone Calibration OSD menu, select Calibration on the OSD. Please make sure [SPECTRAVIEW ENGINE] is [ON].

To open the STAND-ALONE CALIBRATION window using the remote control:

1. Press the MENU button.
2. Navigate to the [PICTURE] menu then to [SPECTRAVIEW ENGINE].
Use the ▲▼ + – buttons to navigate the OSD menu.
3. Highlight [ON] and press SET/POINT ZOOM button to enable the SpectraView Engine.
4. Navigate to [CALIBRATION] then press SET/POINT ZOOM button. The STAND-ALONE CALIBRATION window appears.
5. Highlight a menu then press SET/POINT ZOOM button.
6. Press the EXIT button to close the OSD window.

Follow the instructions on the OSD message.



Self calibration

This function updates the monitor's internal SpectraView Engine color processor to use measurements taken using a supported color sensor device. These measurements will become the reference for all color settings in the monitor.

When an NEC MDSVSENSOR3 color sensor is connected to the monitor's USB1(SENSOR) port, the monitor takes measurements and is calibrated automatically. Place the color sensor at the center of the screen and follow the messages displayed.

Otherwise, if using a near-range colorimeter device, measurements must be taken manually with the device and the CIE Y/x/y values individually entered via the OSD using the remote control. Y is in units of cd/m².

Depending on the monitor usage and other factors, performing a Self Calibration at least once per year is recommended.

Reset calibration

This deletes the color measurement data created by the Self Calibration function and returns to the original factory internal reference color measurement data. All Picture Modes will automatically be updated. If you are using NEC display Wall Calibrator, uniformity adjustment data is also deleted.

Validation*

This can be used to determine if the Self Calibration operation should be performed.

It compares measurements taken of various color patches on the screen by the color sensor with the expected values calculated by the SVE, which uses the current internal reference color measurement data. The result of this comparison is indicated as an average color difference (dE) value. Larger values mean there is a larger difference between the measurements and the internal reference. If the dE value is higher than 3.0, Self Calibration is recommended to update the internal reference color data.

*: The Self Calibration function must have been previously performed before this function is available on the OSD menu.

NOTE: • [Self calibration], [Validation] and [WHITE COPY] are not available if the source HDMI signal resolution is 3840 x 2160 (60 Hz).

- The date and time stamped results of the "Self calibration" and "Validation" functions are stored in the monitor and can be read by software on your computer. Setting the [SCHEDULE] → [DATE & TIME] in OSD menu is required for this function.

White copy*

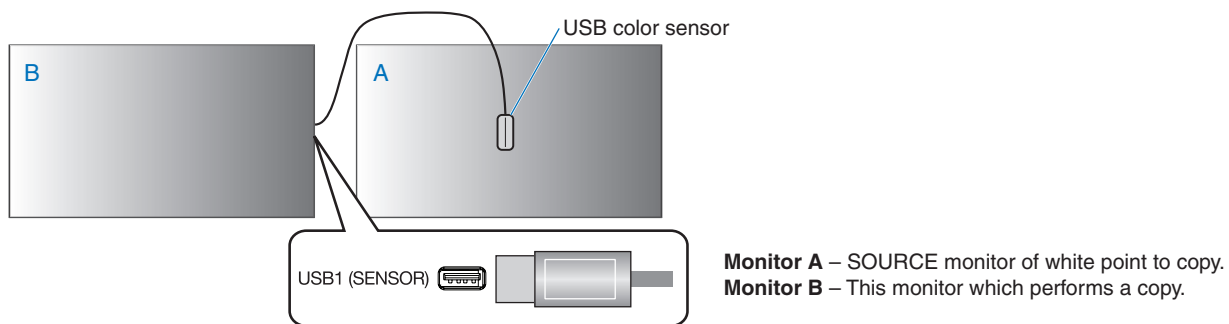
This function can be used to “copy” the luminance and white point from another monitor when used in a multi-monitor installation. This process is done by measuring the color of a monitor and setting those measured values into the monitor being adjusted. This can be useful in situations where it is necessary to match a monitor in color to neighboring monitors without having to recalibrate all monitors.

Before starting, it is necessary to input a full-white video signal to all of the monitors. Select the monitor that will be used as the Target – or source - of the copy operation (A).

This function will measure the luminance and white point of the target monitor (A), and set these values to the current Picture Mode of the destination monitor (B).

You can also fine-tune the measurement result while checking the screen color. If you want to return to the measured value, select re-measurement.

*: The Self Calibration function must have been previously performed before this function is available on the OSD menu.



NOTE: When adjusting the color of multiple displays, we recommend that you perform [SELF CALIBRATION] from [WHITE COPY].