



CaIMAN

Setup Guide

Panasonic 2017 OLED EZxxx Models
All Regions

Rev. 1.5

Introduction

For the Panasonic 2017 OLED models, CalMAN can automatically calibrate the TV's two-point white balance controls, the 10-point grayscale controls, and the CMS color gamut controls, in Standard Dynamic Range (SDR) mode and in High Dynamic Range HDR10 and HLG modes. This assures the most accurate rendering of both SDR and HDR picture content.

Also, the TV's two Pro picture modes, Professional1 and Professional2 can each be calibrated with individual picture menu adjustments, grayscale adjustments, and CMS adjustments.

CalMAN Required Version

- Version 5.8.31 or later

CalMAN Recommended Workflows

SDR Calibration

Home Enthusiast workflow to optimize picture controls and calibrate two-point white balance controls, 10-point grayscale controls, and CMS color gamut controls for SDR picture content.

HDR Calibration

HDR10 Calibration workflow to optimize picture controls and calibrate two-point white balance controls, 10-point grayscale controls, and CMS color gamut controls for HDR10 picture content.

HLG Calibration workflow to optimize picture controls and calibrate two-point white balance controls, 10-point grayscale controls, and CMS color gamut controls and CMS color gamut controls for HLG picture content.

Panasonic Control Connection

- Wireless or wired network connection

Panasonic Network Setup

To connect the CalMAN calibration computer to a Panasonic model listed above, through a wireless (Wi-Fi) or wired (Ethernet) network:

1. In the Panasonic *Network* menu, select *Network Status*.
2. If a connection to a network router is indicated, select *Status Details*.
3. Under *Network Status Details*, note the *Network Name* to which the TV is connected and note the TV's *IP Address*.
4. If no network connection is indicated, in the Panasonic *Network* menu, select *Network Connection*.
5. Under *Network Connection*, select *Quick Setup*, and wait for the TV to search for available routers (an internet connection is not required to the router).
6. In the list of available routers, select the router to which you wish to connect the TV (may require a security password).
7. Under *Network Status Details*, note the *Network Name* to which the TV is connected and note the TV's *IP Address*.
8. Exit the TV's network setup.

CalMAN Device Connections

On the CalMAN device control tabs (upper right), connect CalMAN to your color meter, test pattern source, and the Panasonic TV.

Meter Connect

1. Connect your color meter to a port on the CalMAN computer.
2. On the *Meter Settings* tab, click the *Find Meter* button to connect your meter.
3. On the *Find Meters* dialog, select your meter if it is listed, then click *Search*. If your meter is not listed on the *Find Meters* dialog, just click *Search*.
4. On the *Meter Settings* tab, under the *Meter Mode* drop down, select "OLED (White) - LG, Panasonic" for a colorimeter. For a spectrophotometer, no special selection is required.

Source Connect

1. For a hardware test pattern generator, connect the generator to a control port on the CalMAN computer (unless the generator uses a wireless control interface).
2. On the *Source Settings* tab, click the *Find Source* button.
3. On the *Find Source* dialog (Figure 1), select the Manufacturer and Model of your test pattern source device.
4. Select the *Com Port*, if appropriate.
5. Click *Connect*.

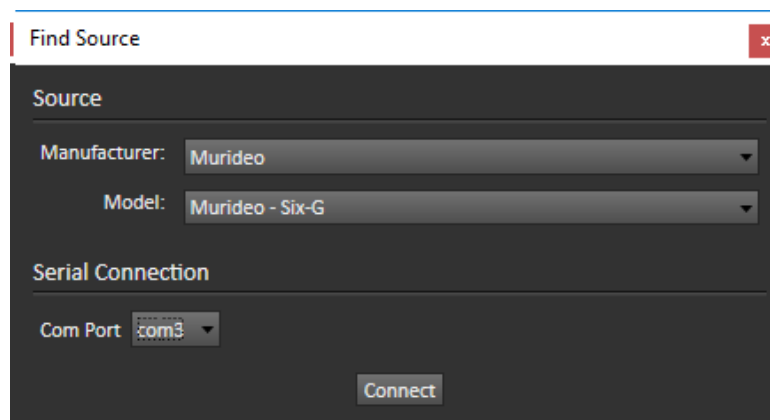


Figure 1. Find Source window.

Display Connect

1. Connect the CalMAN computer to the same wireless network to which the Panasonic TV is connected.
2. On the Panasonic TV, open the *Picture* menu.
 - a. Under *Picture/Viewing Mode*, select *Professional 1* or *Professional 2*.
 - b. Under *Picture/Lock Settings*, select *PIN*.
 - c. Press the “i” button on the remote (just below the Power button, 画面表示 on Japanese models) then press “0,” “8,” “5” on the keypad.
 - d. Under *Adjustment Lock*, select *Off*.
 - e. Under *Menu\Network\Network Status\Status Details*, note the IP address.

- f. Arrow down to *isfcc Network* and press *OK* on the remote.
 - g. At this point, the TV will read “Waiting for Connection.”
3. In CalMAN, on the *Display Control* tab, click the *Find Display* button.
4. On the *Find Display* dialog (Figure 2), select “Panasonic - 2017 EZxxx Series (Ethernet).”
 - a. Under *Socket Connection*, enter the TV’s IP Address that you noted above.
 - b. Click *Connect* on the *Find Display* dialog.

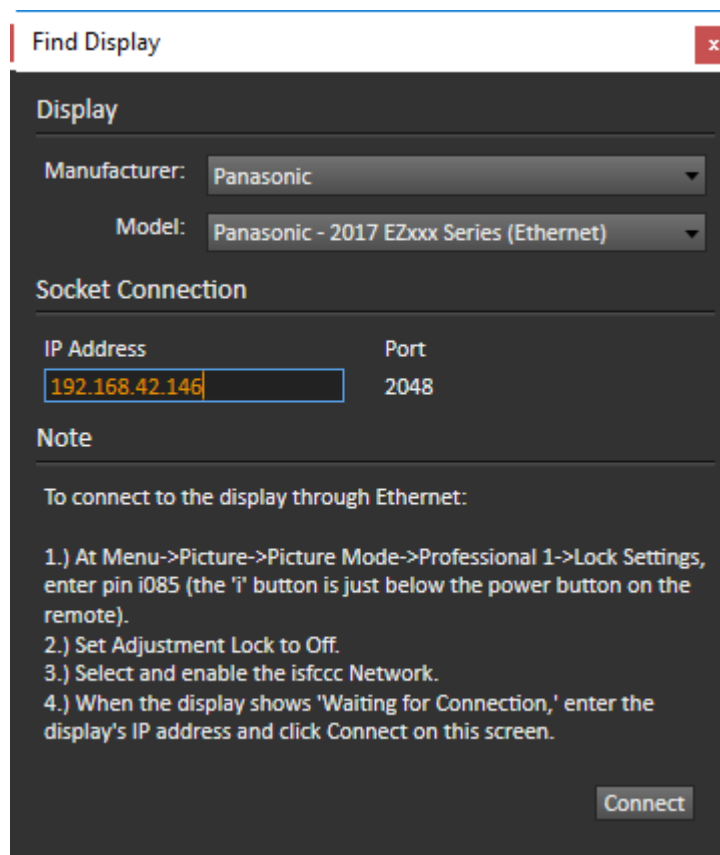


Figure 2. Find Display window.

Jump to Calibration Section

Click one of the following links to jump in this document to the desired SDR or HDR calibration process.

[HDTV SDR Calibration](#)

[HDR10 HDR Calibration](#)

[HLG HDR Calibration](#)

HDTV SDR Calibration

This section outlines the CalMAN process for calibrating the Panasonic TV's controls for accurate rendering of standard dynamic range HDTV picture content.

Jump to [HDR10 HDR Calibration](#)

Jump to [HLG HDR Calibration](#)

Panasonic TV Control Presets

Preset these controls before connecting to the TV with CalMAN

- **Picture/Viewing Mode** - Select *PROFESSIONAL1* or *PROFESSIONAL2*
- **Picture/Color Temperature** - Select *WARM 2*
- **Picture/Vivid Color** - Set to *Off*
- **Picture/Color Remaster** - Set to *Off*
- **Picture/Advanced/Color Gamut** - Set to *Rec. 709*
- **Picture/Advanced/Gamma** - Select *2.4* for dim room lighting, *2.2* for moderate room lighting, or *2.0* for bright room lighting

CalMAN Source Settings Tab

On the CalMAN Source Settings tab (Figure 3):

1. Set the *Window Size* option to “Window 10%.”
2. Set the *Color Format* to “YCbCr 4:2:2 10-bit.”
3. Set the *HDR* option to “Off.”

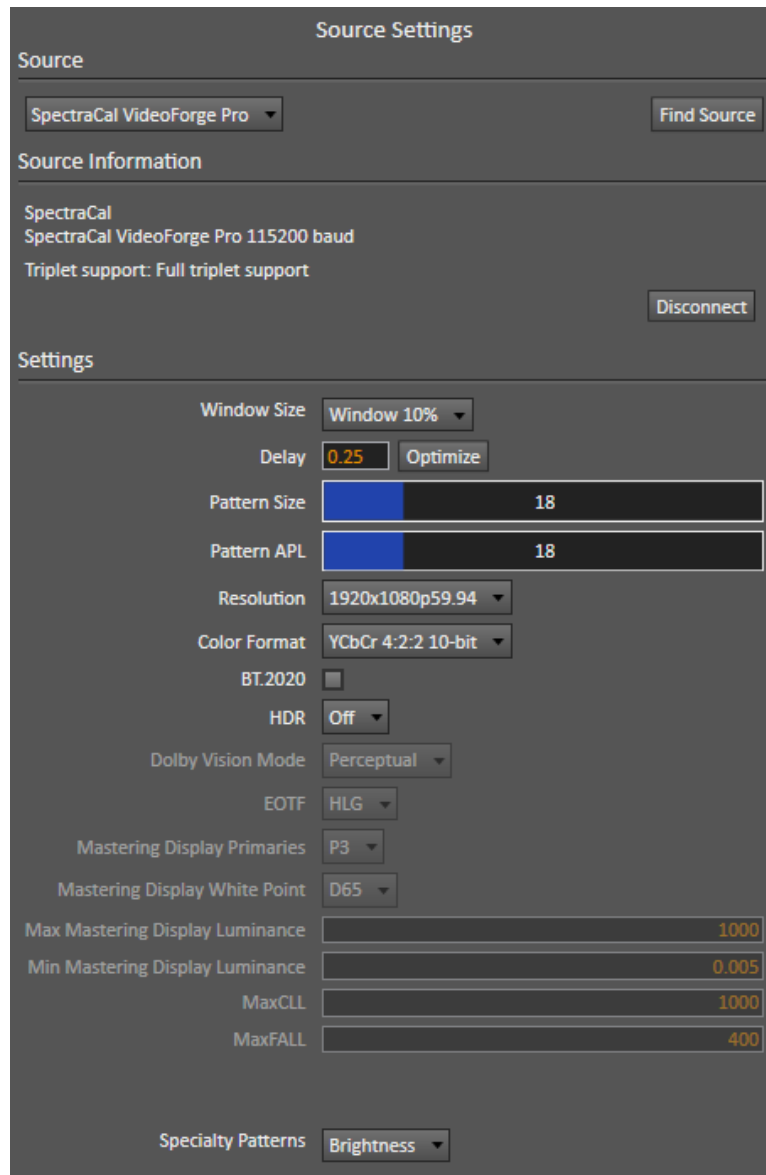


Figure 3. Source Settings tab.

CalMAN Display Control Tab

On the *Display Control* tab (Figure 4):

1. For the *Display Mode Selection* option, select either “Pro 1 - Day” or “Pro 2 - Night.”
2. For the *Active Grayscale Points* option, select “10 SDR.”
3. Click the *Full DDC Reset* button and click *Yes* to reset all TV settings.

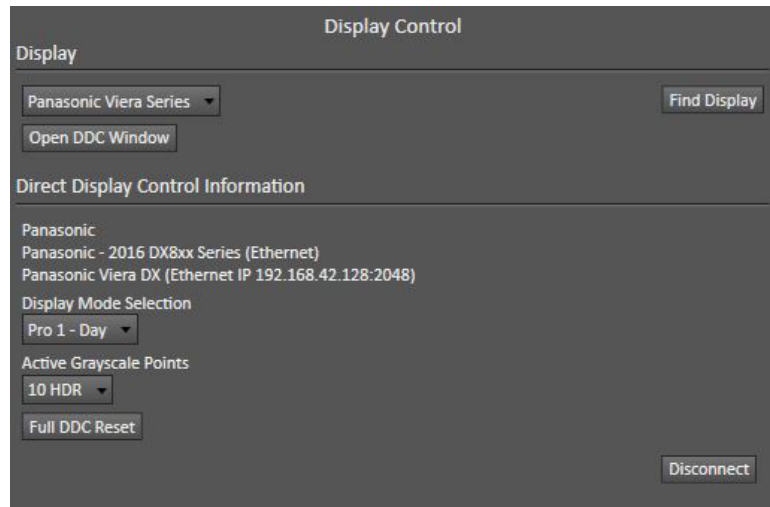


Figure 4. Display Control tab.

Panasonic DDC Display Controls:

Panasonic picture controls are available within the CalMAN software, allowing you to make TV adjustments in the software, rather than using the TV's remote control.

On those calibration workflow steps where you need to make a manual TV adjustment (e.g. Brightness, Contrast, etc.), you can click the *DDC Controls* button on the right end of the CalMAN *Display Control* tab (red arrow below), then scroll to the *Display Controls* screen to make those adjustments from the CalMAN software.



Figure 3. DDC Display Controls screen.

DDC Display Control Settings

On the DDC Display Controls screen (Figure 5):

1. Disable the *On Screen Display* option.

CalMAN AutoCal:

In the *Calibration Options* section of the *Home Enthusiast* workflow, there are three display calibration pages, *Grayscale - 2pt*, *Grayscale - Multi*, and *Colorspace*.

To most accurately calibrate the Panasonic TV, it is best to perform AutoCal on each of these three CalMAN workflow pages, in the order that the pages occur in the workflow.

Grayscale - 2pt

1. On the *Grayscale Two Point* page, click the *AutoCal* button (rotating arrows) at the right end of the meter action buttons. The *AutoCal Setup* dialog then appears (Figure 6).
2. On the *AutoCal Setup* dialog, click *OK*.

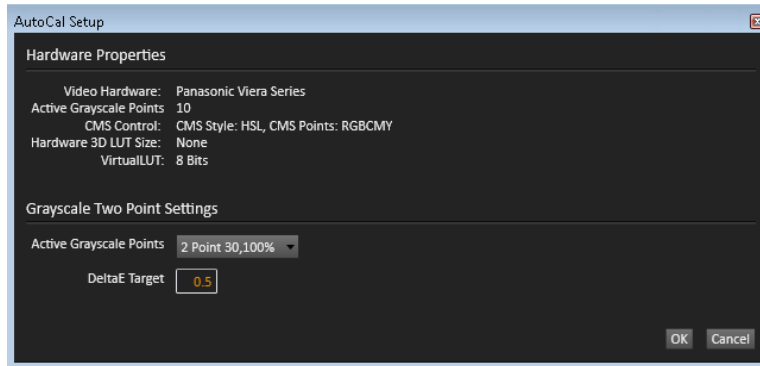


Figure 6. *AutoCal Setup* dialog for *Grayscale Two Point*.

Grayscale - Multi

1. On the *Grayscale Multipoint* page, click the *AutoCal* button. The *AutoCal Setup* dialog then appears (Figure 7).
2. On the *AutoCal Setup* dialog, click *OK*.

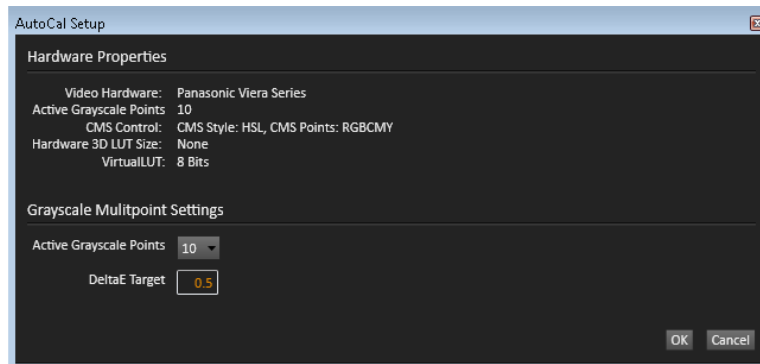


Figure 74. *AutoCal Setup* dialog for *Grayscale Multipoint*.

Colorspace

1. On the *Colorspace* page, click the *AutoCal* button. The *AutoCal Setup* dialog then appears (Figure 8).
2. On the *AutoCal Setup* dialog, click *OK*.

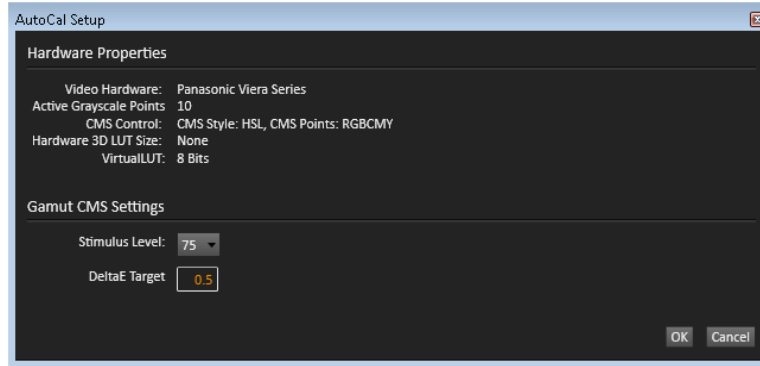


Figure 8. AutoCal Setup dialog for Gamut CMS.

When AutoCal is complete on all pages, optimize the TV's Brightness control for the local viewing conditions.

DONE - Calibration of the Panasonic TV for HDTV SDR picture content is complete.

HDR10 HDR Calibration

This section outlines the CalMAN process for calibrating the Panasonic TV's controls for accurate rendering of high dynamic range HDR10 picture content.

Jump to [HLG HDR Calibration](#)

Jump to [HDTV SDR Calibration](#)

Panasonic TV Control Presets

Preset these controls before connecting to the TV with CalMAN.

- **Picture/Viewing Mode** - Select *PROFESSIONAL1* or *PROFESSIONAL2*.
- **Picture/Contrast** - Set to 100.
- **Picture/Color Temperature** - Select *WARM 2*.
- **Picture/Vivid Color** - Set to *Off*.
- **Picture/Rec.2020 Color Remaster** - Set to *Min*.
- **Picture/Advanced/Color Gamut** - Select *Rec. 2020*.
- **Picture/Advanced/Gamma** - Select 2.2.
- **Picture/Option Settings/HDMI EOTF Type** - Select *Auto*.

CalMAN Full Field Pattern Insertion

On the CalMAN *Settings / Application Measurement Options* panel (Figure 9):

1. Check the *Enable Pattern Insertion* option.
2. Set the *Pattern Insertion Frequency* to 5.
3. Set the *Pattern Insertion Duration* to 5
4. Set the *Pattern Level* option to 0%.

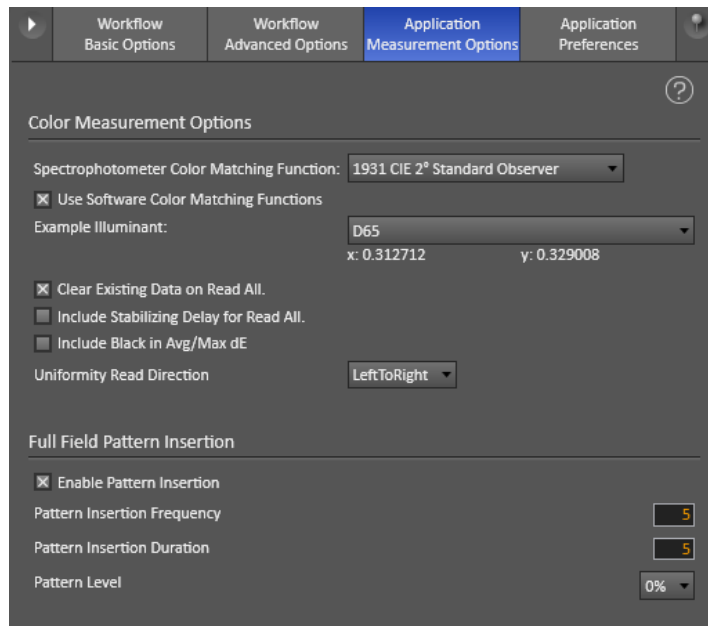


Figure 9. Full Field Pattern Insertion options.

CalMAN Source Settings Tab

On the CalMAN *Source Settings* tab (Figure 10):

1. Set the *Window Size* option to “Window 10%.”
2. Set the *Color Format* to “RGB Limited 10-bit.”
3. Set the *HDR* option to “HDR10.”
4. Set the *EOTF* option to “SMTPE ST 2084.”
5. Set *Max Mastering Display Luminance* to 1000 nits (default).
6. Set *MaxCLL* to 1000 nits (default).

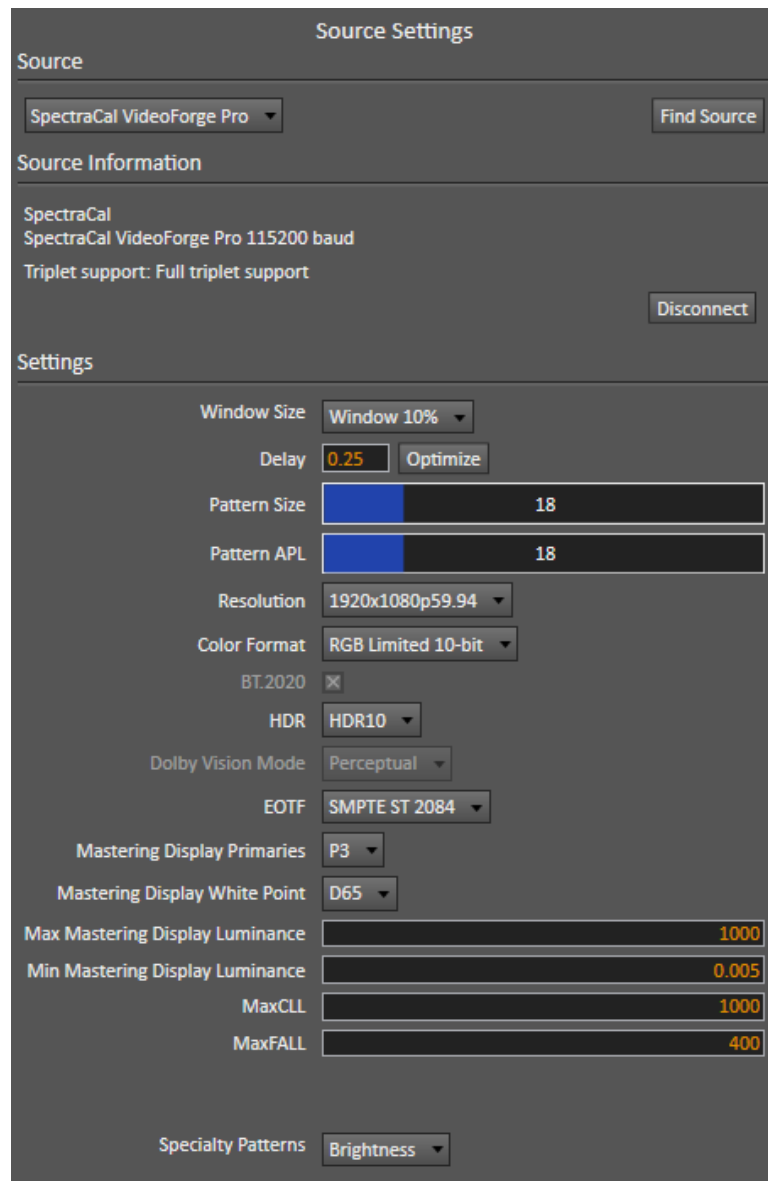


Figure 10. Settings Source tab.

CalMAN Display Control Tab

On the Display Control tab (Figure 11):

1. For the *Display Mode Selection* option, select either “Pro 1 - Day” or “Pro 2 - Night.”
2. For the *Active Grayscale Points* option, select “10 HDR.”
3. Click the *Full DDC* Reset button and click *Yes* to reset all TV settings.



Figure 11. Display Control tab.

Panasonic DDC Display Controls

Panasonic Display Controls are available within the CalMAN software, allowing you to make TV adjustments in the software, rather than using the TV's remote control.

On those calibration workflow steps where you need to make a manual TV adjustment (e.g. Brightness, Contrast, etc.), you can click the *DDC Controls* button on the right end of the CalMAN Display Control tab, then scroll to the *Display Controls* screen to make those adjustments from the CalMAN software.

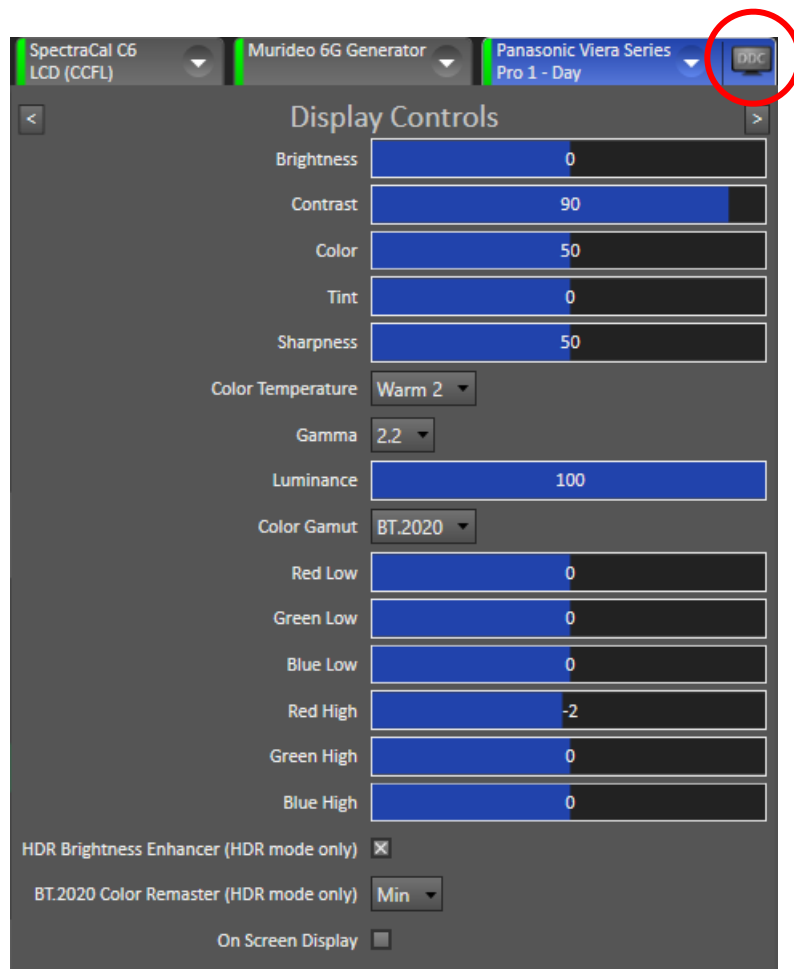


Figure 12. DDC Controls button.

DDC Display Control Settings

On the DDC Display Controls screen (Figure 12):

1. Enable the *HDR Brightness Enhancer* option.
2. Disable the *On Screen Display* option.

CalMAN AutoCal

In the *Metered Calibration* section of the HDR10 Calibration workflow, there are three display calibration pages, *White Balance*, *Grayscale*, and *CMS Calibration*.

To most accurately calibrate the Panasonic TV, it is best to perform AutoCal on each of these three CalMAN workflow pages, in the order that the pages occur in the workflow.

White Balance

1. On the *White Balance* page, click the *AutoCal* button (rotating arrows) at the right end of the meter action buttons. The *AutoCal Setup dialog* then appears (Figure 13).
2. On the *AutoCal Setup dialog*, click OK.

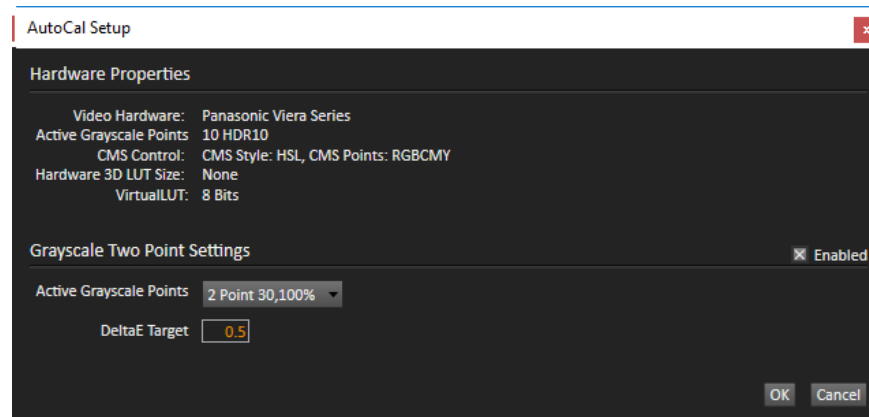


Figure 13. *AutoCal Setup dialog for White Balance.*

Grayscale

1. On the *Grayscale* calibration page, click the *AutoCal* button. The *AutoCal Setup dialog* then appears (Figure 14).
2. For the *Active Grayscale Points* option, select “10 HDR10.”
3. On the *AutoCal Setup dialog*, click OK.

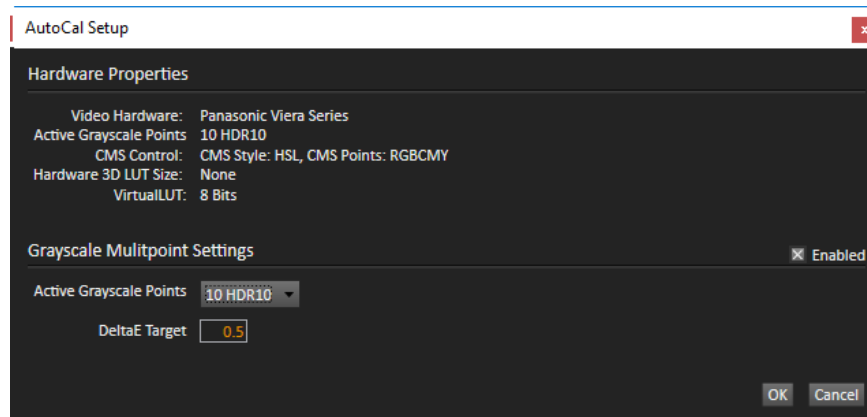


Figure 14. AutoCal Setup dialog for Grayscale.

CMS Calibration

1. On the *CMS Calibration* page, click the AutoCal button. The *AutoCal Setup* dialog then appears (Figure 15).
2. On the *AutoCal Setup* dialog, click OK.

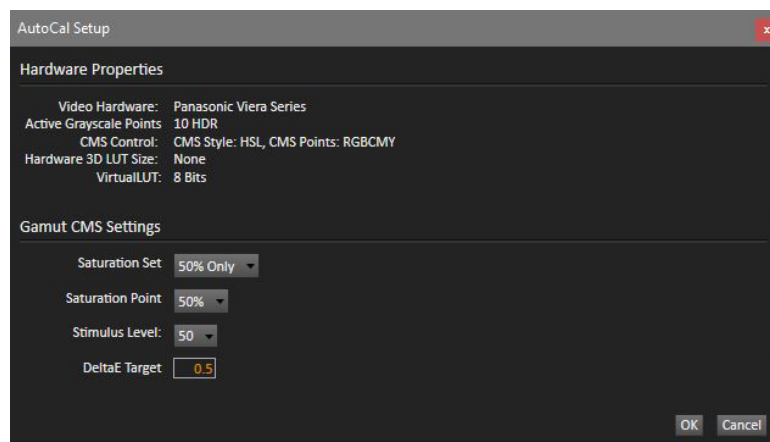


Figure 15. AutoCal Setup dialog for CMS Calibration.

DONE - Calibration of the Panasonic TV for HDR10 picture content is complete.

HLG HDR Calibration

This section outlines the CalMAN process for calibrating the Panasonic TV's controls for accurate rendering of high dynamic range HLG picture content.

Jump to [HDR10 HDR Calibration](#)

Jump to [HDTV SDR Calibration](#)

Panasonic TV Control Presets

Preset these controls before connecting to the TV with CalMAN

- **Picture/Viewing Mode** - Select *PROFESSIONAL1* or *PROFESSIONAL2*.
- **Picture/Contrast** - Set to 90.
- **Picture/Color Temperature** - Select *WARM 2*.
- **Picture/Vivid Color** - Set to *Off*.
- **Picture/Rec.2020 Color Remaster** - Set to *Min*.
- **Picture/Advanced/Color Gamut** - Select *Rec. 2020*.
- **Picture/Advanced/Gamma** - Select *2.2*.
- **Picture/Option Settings/HDMI EOTF Type** - Select *Auto*.

CalMAN Full Field Pattern Insertion

On the *CalMAN Settings / Application Measurement Options* panel (Figure 16):

1. Check the Enable Pattern Insertion option.
2. Set the Pattern Insertion Frequency to 5.
3. Set the Pattern Insertion Duration to 5
4. Set the Pattern Level option to 0%.

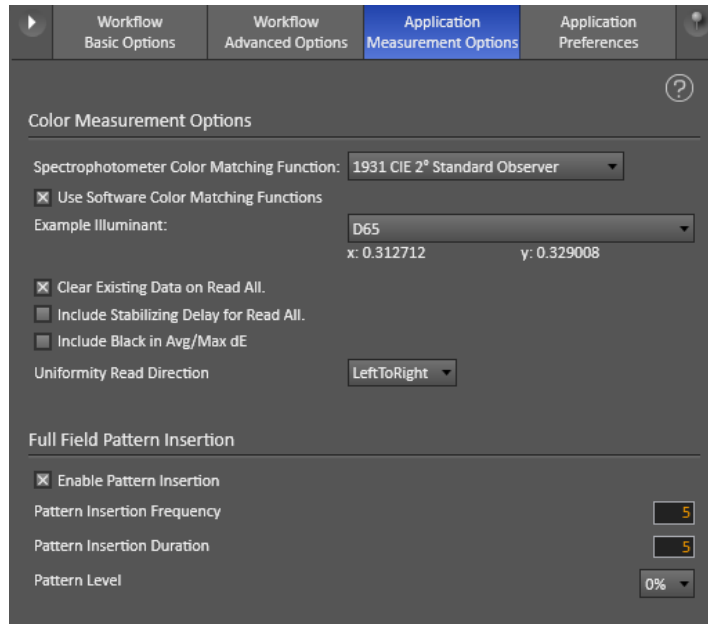


Figure 16. Full Field Pattern Insertion window.

CalMAN Source Settings Tab

On the CalMAN *Source Settings* tab (Figure 17):

Set the *Window Size* option to “Window 10%.”

5. Set the *Color Format* to “RGB Limited 8-bit.”
6. Set the *HDR* option to “HDR10.”
7. Set the *EOTF* option to “HLG.”

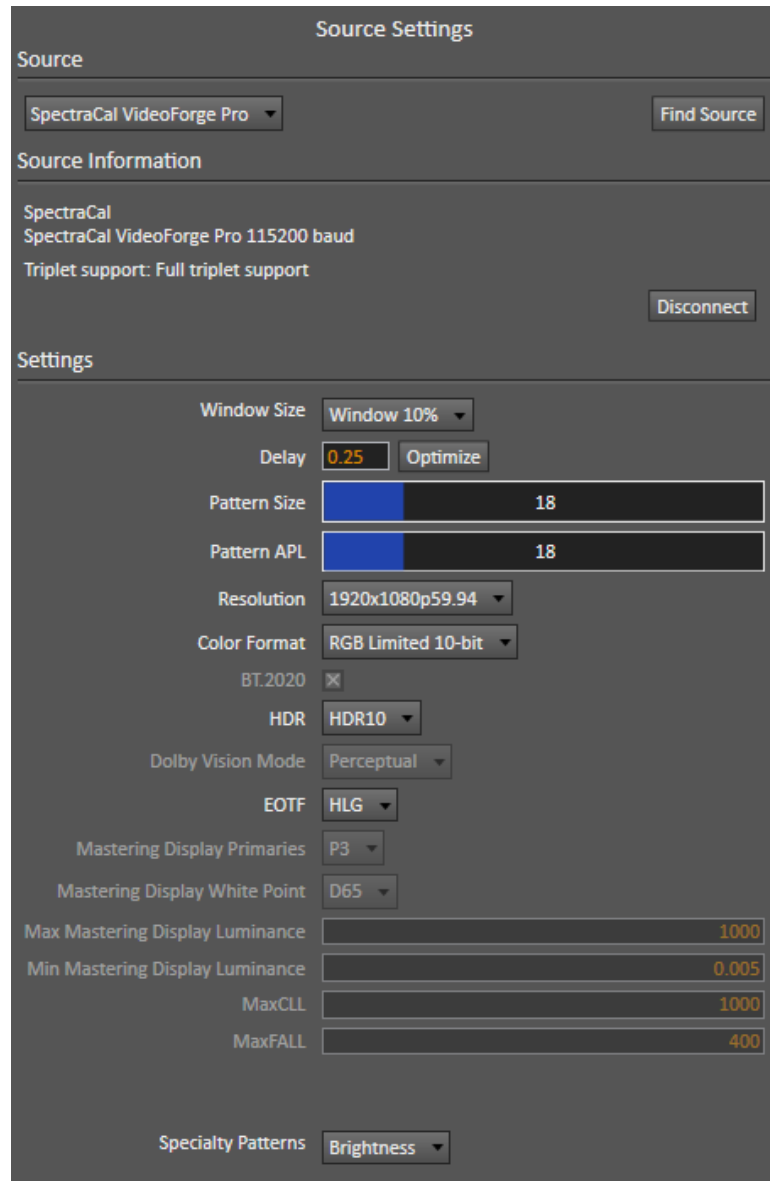


Figure 17. Source Settings tab.

CalMAN Display Control Tab

On the Display Control tab (Figure 18):

1. For the *Display Mode Selection* option, select either “Pro 1 - Day” or “Pro 2 - Night.”
2. For the *Active Grayscale Points* option, select “10 HLG.”
3. Click the *Full DDC Reset* button and click *Yes* to reset all TV settings.



Figure 18. Display Control tab.

Panasonic DDC Display Controls:

Panasonic picture controls are available within the CalMAN software, allowing you to make TV adjustments in the software, rather than using the TV's remote control.

On those calibration workflow steps where you need to make a manual TV adjustment (e.g. Brightness, Contrast, etc.), you can click the *DDC Controls* button on the right end of the CalMAN Display Control tab, then scroll to the *Display Controls* screen to make those adjustments from the CalMAN software.

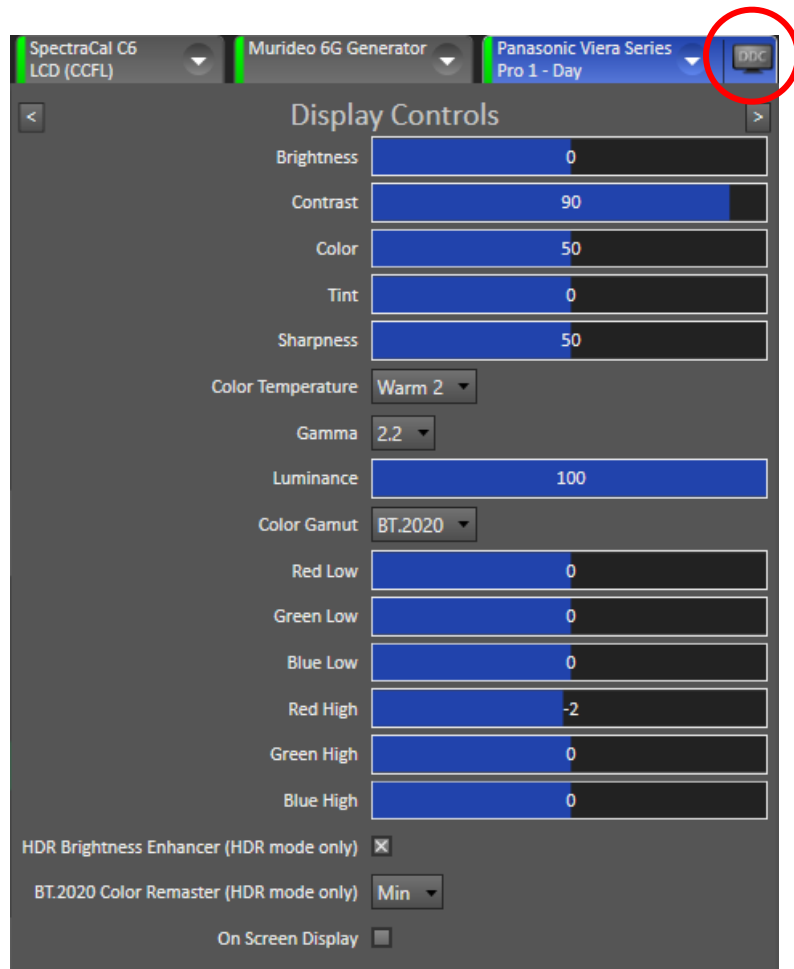


Figure 19. DDC Display Controls screen.

DDC Display Control Settings

On the DDC Display Controls screen (Figure 19):

1. Enable the *HDR Brightness Enhancer* option.
2. For *BT.2020 Color Remaster*, select “Min.”
3. Disable the *On Screen Display* option.

CalMAN AutoCal:

In the *Metered Calibration* section of the HLG Calibration workflow, there are three display calibration pages, *White Balance*, *Grayscale*, and *CMS Calibration*.

To most accurately calibrate the Panasonic TV, it is best to perform AutoCal on each of these three CalMAN workflow pages, in the order that the pages occur in the workflow.

White Balance

1. On the *White Balance* page, click the *AutoCal* button (rotating arrows) at the right end of the meter action buttons. The *AutoCal Setup dialog* then appears (Figure 20).
2. On the *AutoCal Setup dialog*, click OK.

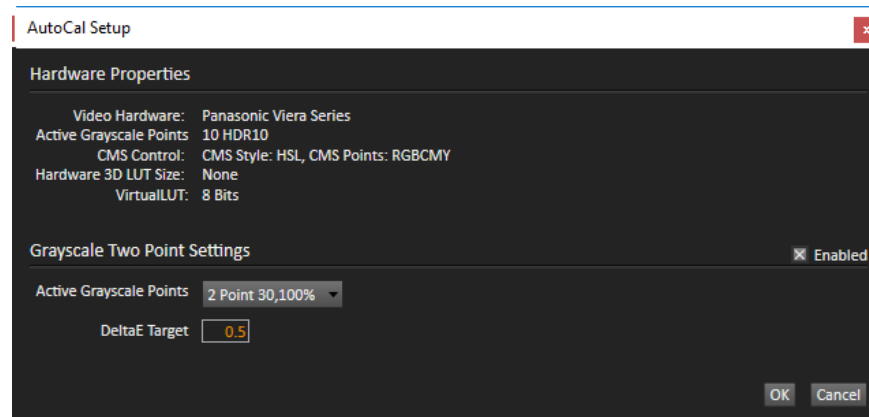


Figure 20. *AutoCal Setup dialog for White Balance.*

Grayscale

1. On the *Grayscale* page, click the *AutoCal* button. The *AutoCal Setup dialog* then appears (Figure 21).
2. For the *Active Grayscale Points* option, select “10 HLG.”
3. On the *AutoCal Setup dialog*, click OK.

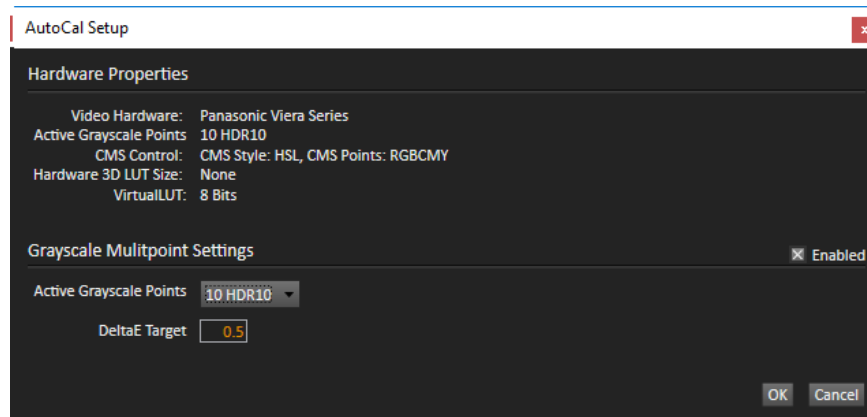


Figure 21. AutoCal Setup dialog for Grayscale.

CMS Calibration

1. On the CMS Calibration page, click the AutoCal button. The *AutoCal Setup dialog* then appears (Figure 22).
2. On the *AutoCal Setup dialog*, click OK.

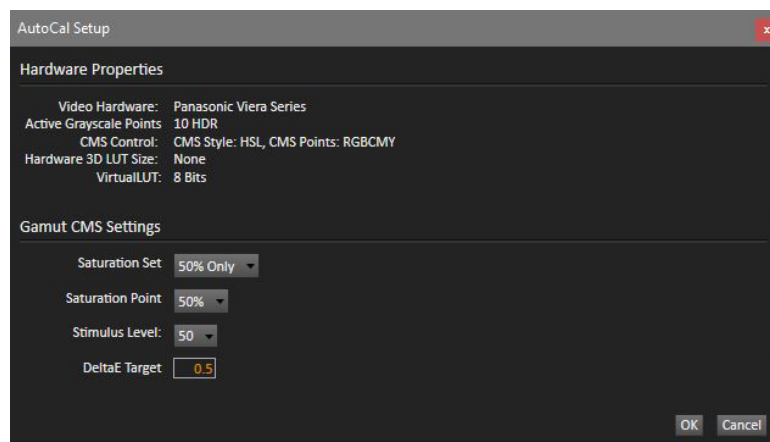


Figure 22. AutoCal Setup dialog for CMS Calibration.

DONE - Calibration of the Panasonic TV for HLG picture content is complete.

About Portrait Displays

Portrait Displays, Inc., since 1993, is a leading application software provider (ASP) for PC, smartphone, and tablet displays. The Portrait Displays team now includes **SpectraCal**, the world's leading provider of video display calibration software. The combined companies offer value-added, feature-rich solutions to both OEM display manufacturers and end users seeking improved accuracy and manageability of their displays.

Portrait Displays, an Intel Capital Portfolio company, is a private corporation with headquarters in Pleasanton, California, USA with representatives in Europe, Taiwan, China, Japan, and Korea.

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**PORTRAIT
DISPLAYS**

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