



# CaIMAN

# Setup Guide

Samsung 2016 SUHD TVs

Rev. 1.3

## Introduction

CalMAN supports 2016 Samsung SUHD TVs that are equipped with an ExLink 3.5mm serial port (like an audio headphone cable). CalMAN can automatically calibrate the SUHD TV's two-point white balance controls, 10-point grayscale controls, and CMS color gamut controls, in HDTV SDR modes. This assures the most accurate rendering of SDR picture content.

*Note: For the 2016 Samsung SUHD TVs, CalMAN supports only SDR calibration, not HDR calibration.*

### CalMAN Required Version

- Version 5.8.1.31 or later

### CalMAN Recommended Workflow

- SI Advanced Calibration workflow
- Home Enthusiast workflow (for Home Enthusiast licensees)

To optimize picture controls and calibrate two point and 20-point grayscale RGB balance controls and CMS color gamut controls for HDTV SDR picture content.

### Samsung Control Port

- ExLink serial connection – 3.5mm phone plug to female DB9 cable  
(tip of the phone plug to pin 2 of DB9, ring of the phone plug to pin 3 of DB9, sleeve of the phone plug to pin 5 of DB9)

## Samsung Computer Connection

To connect the CalMAN calibration computer to a Samsung SUHD TV:

1. Connect an ExLink adapter (3.5mm headphone jack to DB9 serial cable) between the 3.5mm jack on the side of the Samsung OneConnect box labeled “External Sync” and an RS232 port on your PC or to a USB to serial converter.
2. If you are using a USB to serial converter, in Windows Device Manager, under “Ports (COM & LPT),” look for a “USB Serial Port (COMx)” listing.
3. Note the listed COM port (COMx) of the serial converter.

### 3.5mm Headphone Jack to DB9 Female Serial Cable

[https://www.amazon.com/dp/B004T9BBJC/ref=cm\\_sw\\_r\\_cp\\_api\\_1rB5ybQ1Y6AP0](https://www.amazon.com/dp/B004T9BBJC/ref=cm_sw_r_cp_api_1rB5ybQ1Y6AP0)

### USB to RS232 Serial Converter

For connecting to a Samsung TV with a computer that does not have an RS232 port, we recommend the FTDI USB to RS232 converter. Extensive testing has determined that this FTDI converter, which includes a data buffer, is the most reliable adapter to use for CalMAN device control.



#### Sources

<https://shop.clickandbuild.com/cnb/shop/ftdichip?op=catalogue-productsnull&prodCategoryID=293&title=RS232+Cables>

<http://www.alliedelec.com/ftdi-us232r-10-bulk/70069416/>

[https://www.amazon.com/s/ref=nb\\_sb\\_noss\\_1?url=searchalias%3Daps&field-keywords=us232r-10](https://www.amazon.com/s/ref=nb_sb_noss_1?url=searchalias%3Daps&field-keywords=us232r-10)

***USB Driver download for FTDI converter***

<http://www.ftdichip.com/Products/Cables/USBRS232.htm>

***Or, CalMAN Device Driver Pack***

<http://www.spectracal.com/download.php?id=3>

## CalMAN Device Connections

On the CalMAN device control tabs (upper right), connect CalMAN to your color meter, test pattern source, and the Samsung SUHD 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. Under the *Target Display Type* drop down, select “LCD (LED Quantum Dot – Samsung 2016)” 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 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.

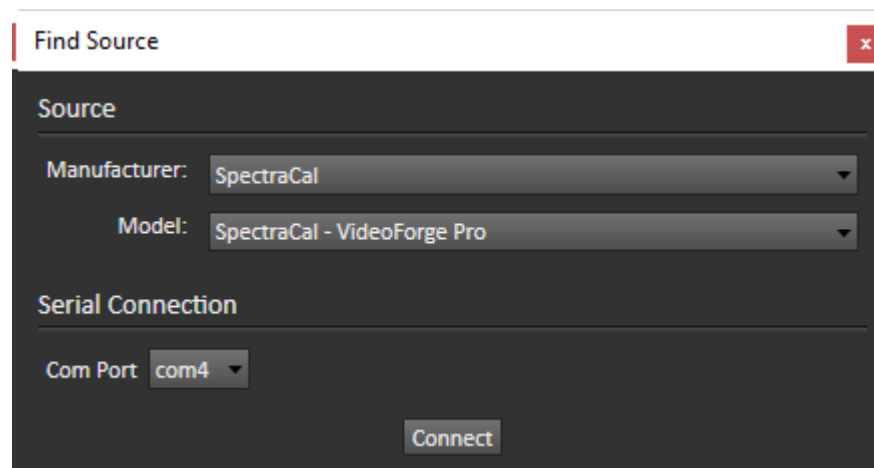


Figure 1. CalMAN Find Source dialog.

## Display Connect

1. Connect the CalMAN computer to the Samsung SUHD TV, as outlined in the Samsung Control Setup section, above.
2. In CalMAN, on the *Display Control* tab, click the *Find Display* button.
3. On the *Find Display* dialog (Figure 2), for Manufacturer, select “Samsung.” For Model, select “Samsung - 2016 SUHD.”
4. Under *Serial Connection*, enter the com port for the TV serial connection, which you noted in the Samsung Control Setup section, above.
5. Click Connect.

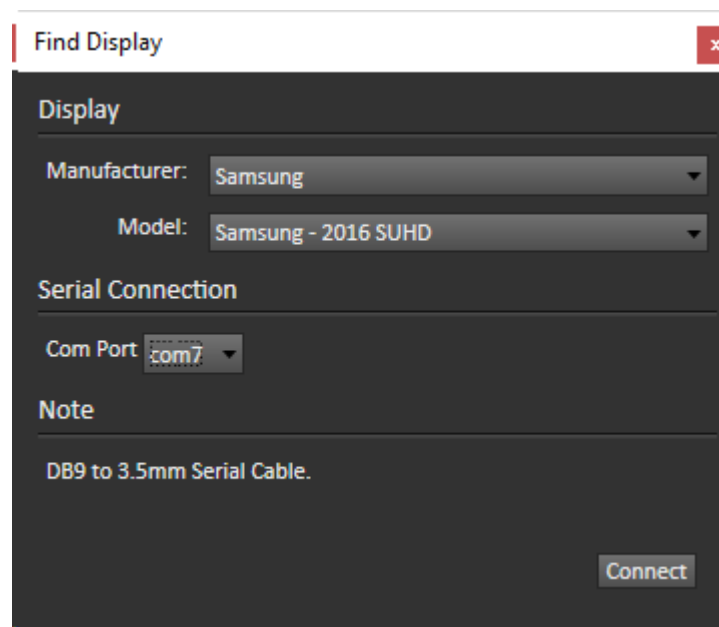


Figure 2. CalMAN Find Display dialog for Samsung 2016 SUHD.

***Important:*** After CalMAN is connected to the Samsung TV for display control, click the “Full DDC Reset” button on the CalMAN Display Control tab. This will sync the CalMAN DDC controls with the Samsung TV.

## HDTV SDR Calibration

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

The CalMAN SI Advanced (or *Home Advanced*) workflow is used to automatically calibrate a Samsung SUHD TV's two-point white balance controls, 20-point gamma/grayscale controls, and CMS color gamut controls for HDTV SDR content. Proceed through each page of the workflow, using the following notes for Samsung TV specifics.

### Source Settings Tab

On the CalMAN *Source Settings* tab (Figure 3), select the following *Settings*:

- Window Size: User Defined
- Delay: 2 (seconds)
- Pattern Size: 18
- Pattern APL: 18
- BT.2020: Disabled
- HDR: Disabled

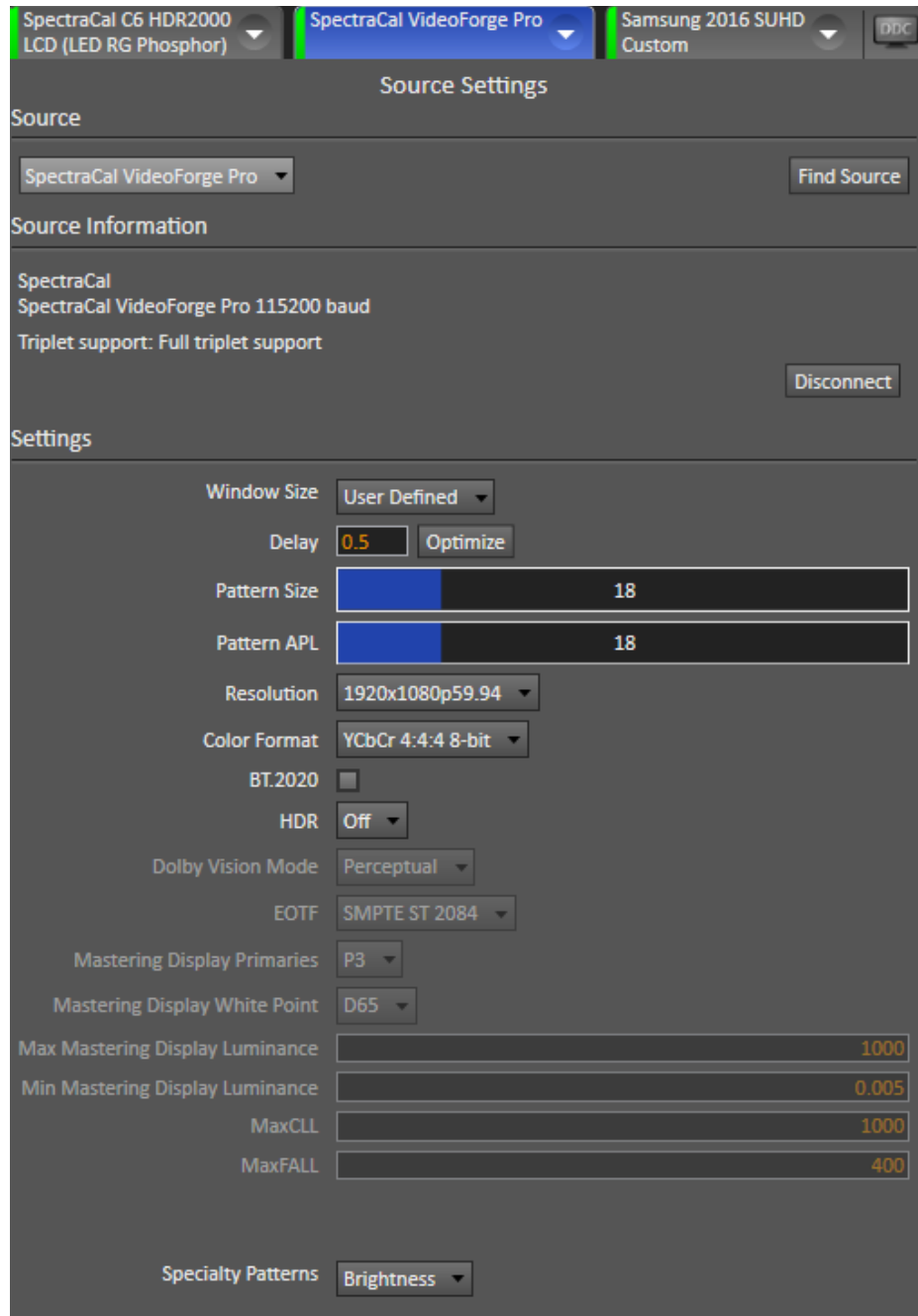


Figure 3. Source Settings tab for Samsung 2016 SUHD SDR.

## Display Control Tab

On the CalMAN *Display Control* tab (Figure 4), select the following *Settings*:

1. For *Display Mode Selection*, select “Custom.”
2. For the *Active Grayscale Points* option, select “SDR.”



3. Click the *Full DDC Reset* button and click *Yes* to reset all TV controls to their factory default settings. This is required for accurate Samsung calibration.

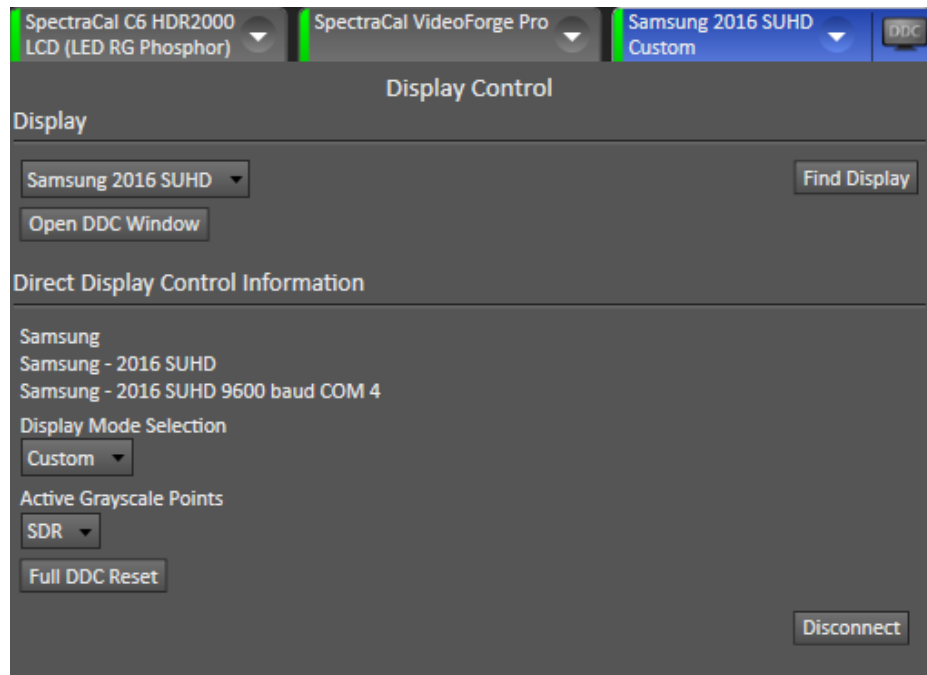


Figure 4. Display Control tab for Samsung 2016 SUHD SDR.

## Samsung DDC Picture Controls:

Samsung picture controls are available within the CalMAN software, allowing you to make TV adjustments in the software, rather than using the TV remote control. On the top-right CalMAN Display Control tab, click the *DDC* icon.



With the DDC panel open, use the top left/right scroll buttons to switch to the *Display Controls* screen.

1. Set the *Brightness* control to "45" (default).
2. Set the *Contrast* control to "95" (default).

*Note:* You can change the *Contrast* setting after calibration is complete.

3. Leave the remaining TV controls also at their default settings (Figure 5).

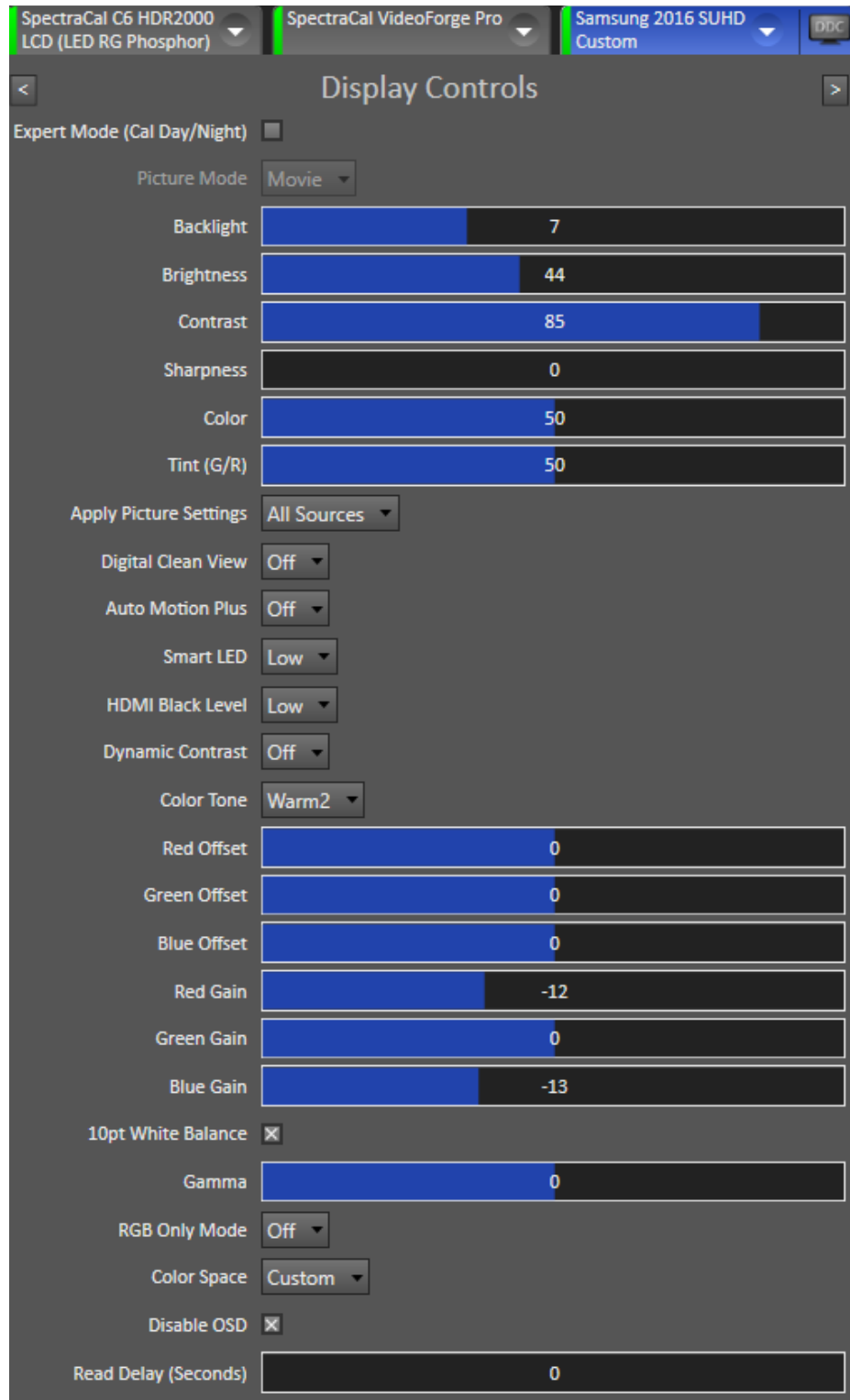


Figure 5. Samsung 2016 SUHD SDR Display Controls.

***IMPORTANT:*** Depending upon the Samsung TV's firmware version, the TV can get into a state where the SDR grayscale and CMS will not calibrate. Perform the following steps to work around this issue:

1. On the DDC *Display Controls* screen (Figure 5), if “Expert Mode” is checked, un-check it.
2. Then, check Expert Mode

(Perform the following steps without disconnecting the TV source signal or power cycling the TV.)

3. On the DDC *Display Controls* screen, under “Picture Mode,” select “Cal Day” or “Cal Night.”
4. Perform the TV calibration

## Calibration Options

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On the *Calibration Options* workflow page, leave all the options at their following default settings.

- Colorspace: rec.709/sRGB
- Whitepoint: D65
- Gamma Formula: ITU BT.1886
- Display Type: LCD (LED Quantum Dot – Samsung 2016)
- Pattern Size: User Defined
- Display Memory: Custom

## Pre-Calibration View

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On the *Pre-Calibration View* workflow page, you can make an automated series of TV measurements to show you how the Samsung TV is performing prior to calibration.

This measures the TV’s gamma/grayscale response and its color gamut response, as compared to standard SDR performance targets (i.e. Rec.709, D65, BT.1886).

## Dynamic Range

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On the *Dynamic Range* workflow page, you can set the Samsung TV’s peak luminance to be suitable for the viewing environment, by adjusting its *Backlight* control.

Select the *100 (255)* level tab at the bottom of the *Dynamic Range* workflow page and click the *Read Continuous* button to set the TV’s peak luminance to

your desired value. Typical peak luminance values that you might start with are:

- Dark Room: 100-130 cd/m<sup>2</sup>
- Dim Room: 130-170 cd/m<sup>2</sup>
- Bright Room: 170-200+ cd/m<sup>2</sup>

***CAUTION:** A TV's Brightness and Contrast controls are both normally adjusted on the CalMAN Dynamic Range page.*

*However, the Brightness and Contrast controls on the Samsung 2016 SUHD TV need to be left at their previous settings of 44 and 85, as specified for the DDC picture control settings above, to allow CalMAN AutoCal to accurately calibrate the TV's luminance levels.*

## CalMAN AutoCal

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In the *Metered Calibration* section of the *SI Advanced* or *Home Advanced* workflow, there are three display calibration pages, Grayscale – 2pt, Grayscale/Gamma, and CMS Calibration.

To most accurately calibrate the Samsung 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

On the *Grayscale Two Point Adjust* page, CalMAN will automatically calibrate the TV's two point white balance controls (i.e. RGB-Gain, RGB-Offset)

1. Click the *AutoCal* button (rotating arrows) at the right end of the meter action buttons. The *AutoCal Setup* dialog for the *Grayscale Two Point Settings* then appears (Figure 6).
2. On the *AutoCal Setup* dialog, under *Active Grayscale Points*, select "2 Point 20%, 80%."
3. Click *OK*.
4. When the AutoCal process completes the white balance calibration, click *Next*.

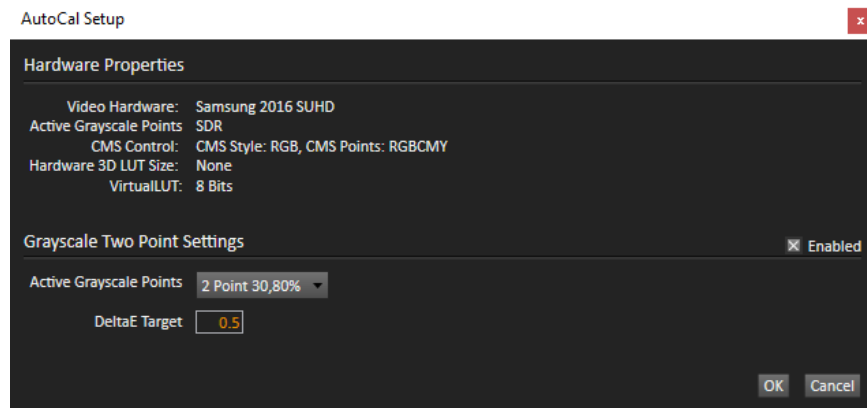


Figure 6. AutoCal Setup for Samsung 2016 SUHD SDR Grayscale – 2pt.

## Grayscale/Gamma

On the *Grayscale/Gamma* calibration page, CalMAN will automatically calibrate the TV's 20-point grayscale/gamma.

1. Click the *AutoCal* button. The AutoCal Setup dialog for the *Grayscale Multipoint Settings* then appears (Figure 7).
2. Click *OK*.
3. When the AutoCal process completes the grayscale/gamma calibration, click *Next*.

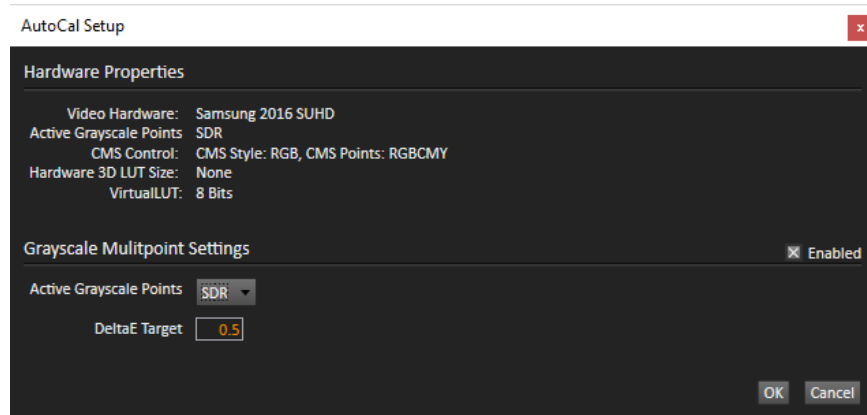


Figure 7. AutoCal Setup for Samsung 2016 SUHD SDR Grayscale - Multi.

## CMS Calibration

On the *CMS Calibration* page, CalMAN will automatically calibrate the TV's RGBCMY colorspace.

1. Click the *AutoCal* button. The *AutoCal Setup* dialog for the *Gamut CMS Settings* then appears (Figure 8).
2. Click *OK*.

- When the AutoCal process completes the colorspace calibration, click *Next*.

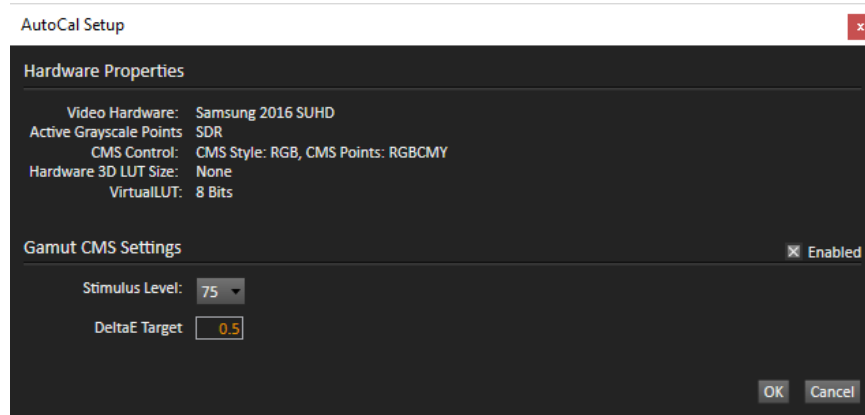


Figure 8. AutoCal Setup for Samsung 2016 SUHD SDR Colorspace.

## Post-Calibration View

On the *Post-Calibration View* page, you can compare the display's performance with what you measured on the *Pre-Calibration Data* page.

**DONE – Calibration of the Samsung 2016 SUHD TV for SDR picture content is complete.**

## About / Contact

### 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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