

CalMAN Setup Guide

Murideo SIX-G

Digital Video Generator

Rev. 1.6

Introduction

The Murideo SIX-G digital video generator can be automatically controlled by the CalMAN Display Calibration Software to produce measurement and calibration test patterns for SDR and HDR displays at resolutions from 640x480 up to 4096x2160.

CalMAN Required version

- 5.7.0 or later (v 5.8.1 or later for full HDR support)

CalMAN Recommended Workflows

- All available measurement and calibration workflows

Murideo SIX-G Supported Firmware

- Version 1.87 or later for full HDR support
- Version 2.42 or later for full HDR support

Murideo SIX-G Control Ports

- USB
- RS-232 serial

Murideo SIX-G Computer Connection

Connect with a USB cable:

- Install the Murideo SIX-G USB FTDI driver and connect the Murideo SIX-G to the CalMAN computer with a USB cable. (Seen by the computer as a com port.)

Note: The FTDI USB driver is available as part of the CalMAN Device Driver Pack (<http://www.spectracal.com/download.php?id=3>) or from the FTDI web site (<http://www.ftdichip.com/FTDrivers.htm>).

- When the driver is properly installed, the Murideo will be listed in Device Manager under Ports (COM & LPT) as "USB Serial Port (COMx)." If it is not listed that way, the driver is not yet properly installed.

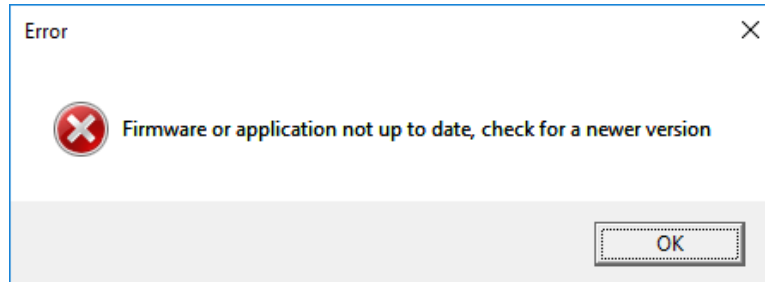
OR, connect with an RS-232 null-modem serial cable:

- If the CalMAN computer has an RS-232 serial port, you can connect the Murideo SIX-G directly to the CalMAN computer with a null-modem female DB9 to 3.5mm phone plug cable (this is a slower control connection).

(tip of the phone plug to pin 2 of the DB9, ring of the phone plug to pin 3 of the DB9, sleeve of the phone plug to pin 5 of the DB9)

CalMAN connection to Murideo SIX-G

***Important:** Murideo SIX-G units with version 2.xx firmware are able to select 3840x2160 resolutions in a “4K Geometry” mode. If the unit is in its 4K Geometry mode while attempting to connect to CalMAN, the following error message will be produced.*



To avoid this error and connect normally, switch the Murideo SIX-G out of its 4K Geometry mode before connecting to CalMAN.

1. On the CalMAN *Source Settings* tab, click the “Find Source” button.
2. On the CalMAN *Find Source* dialog (Figure 1), select “Murideo - SIX-G.”

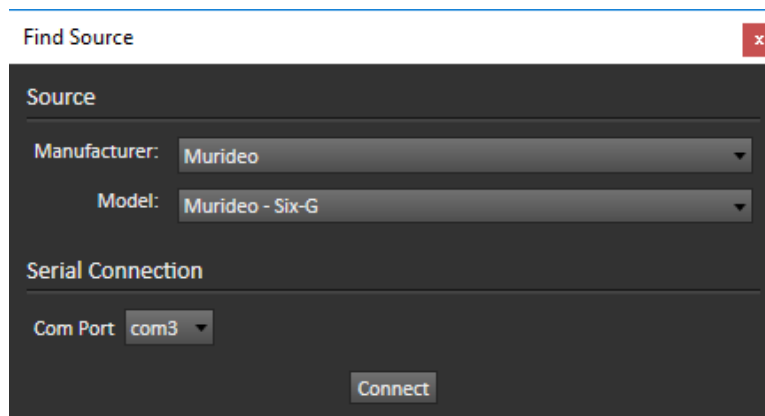


Figure 1. CalMAN Find Source dialog.

3. Select the appropriate *Com Port* (check Device Manager for the assigned com port).
4. Click *Connect* on the *Find Source* dialog.

CalMAN Source Settings Options

When the Murideo SIX-G is connected as a CalMAN test pattern source, the following five *Settings* options on the CalMAN *Source Settings* tab (Figure 2), should be set according to the type of display being measured or calibrated. Refer to specific model information for the display under test to guide these settings.

- Window Size
- *Delay* (Optimize for specific display characteristics)
- Pattern Size
- Pattern APL
- Resolution (match display's normal drive signal)

The remaining options on the *Source Settings* tab, which are listed below the *Resolution* option, should be set to configure the Murideo SIX-G properly for the type of content for which the display is being calibrated.

The *Source Settings* options are detailed below for each of the following types of content:

- [VESA sRGB SDR content](#) (RGB computer monitors)
- [HDTV SDR content](#)
- [HDR10 HDR content](#)
- [HLG HDR content](#)
- [Dolby Vision HDR content](#)

Note: The Murideo SIX-G output mode does not change until the first pattern is selected to be displayed.

VESA sRGB SDR Content Calibration (RGB computer monitors)

Murideo SIX-G *Source Settings* options for VESA sRGB SDR content (Figure 2):

- *Color Format:* RGB Full
- *Bit Depth:* 8-bit
- *BT.2020:* Disabled
- *HDR:* Off

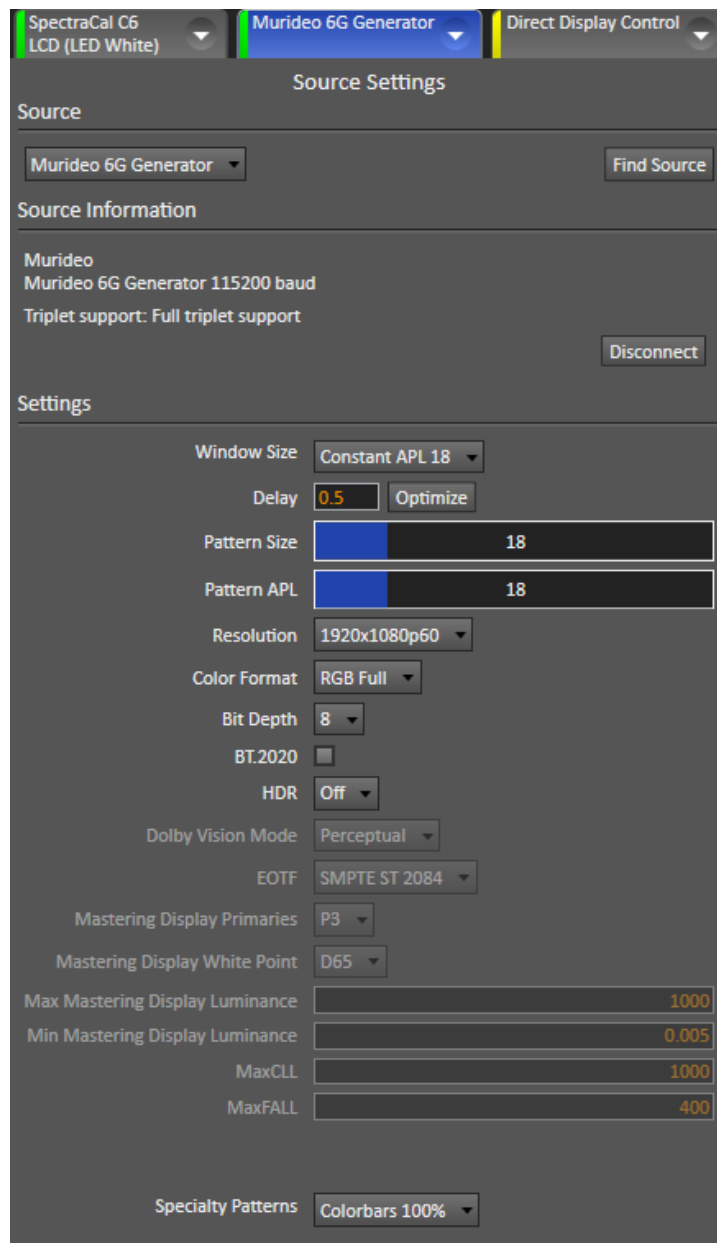


Figure 2. CalMAN Source Settings tab, with HDR mode disabled.

HDTV SDR Content Calibration

Murideo SIX-G *Source Settings* options for HDTV SDR content (Figure 2):

- *Color Format:* YCbCr 4:2:2
- *Bit Depth:* 10-bit
- *BT.2020:* Disabled
- *HDR:* Off

Note: When enabling BT.2020 color space for SDR, the Color Format should be set to "RGB Limited," as the Murideo SIX-G does not support correct BT.2020 triplets for YCbCr output.

HDR10 HDR Content Calibration

Murideo SIX-G *Source Settings* options for HDR10 HDR content (Figure 3):

Note: When enabling HDR10, the Color Format should be set to “RGB Limited,” as the Murideo SIX-G does not support correct triplets for YCbCr output.

- *Color Format:* RGB Limited
- *Bit Depth:* 10-bit
- *HDR:* HDR10
- *EOTF:* SMPTE ST 2084
- *Mastering Display Primaries:* P3
- *Mastering Display White Point:* D65
- *Mastering Display Max Luminance:* 1000
- *Mastering Display Min Luminance:* 0.005
- *MaxCLL:* 1000
- *MaxFall:* 400

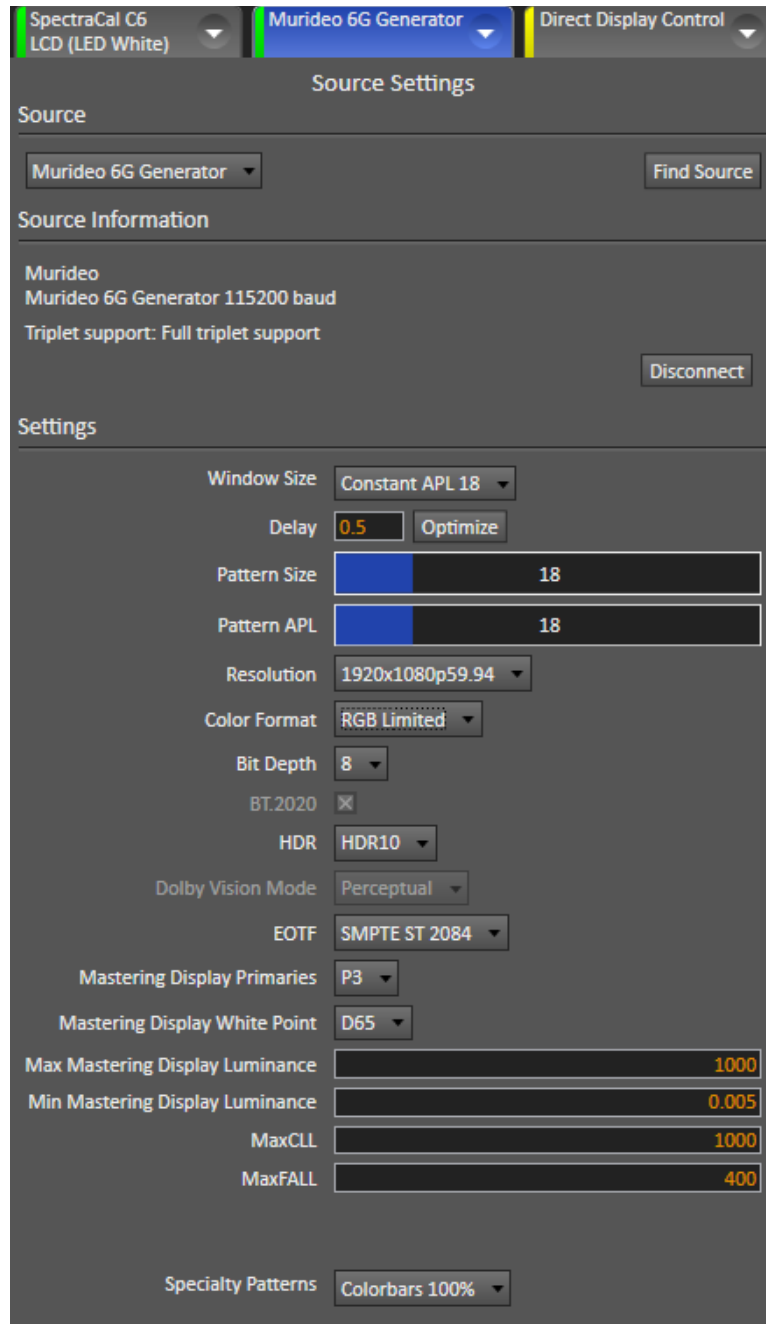


Figure 3. CalMAN Source Settings tab, with HDR10 HDR mode enabled.

HLG HDR Content Calibration

Murideo SIX-G *Source Settings* options for HLG HDR content:

Note: When enabling HLG, the Color Format should be set to “RGB Limited,” as the Murideo SIX-G does not support correct triplets for YCbCr output.

- *Color Format:* RGB Limited
- *Bit Depth:* 10-bit
- *HDR:* HDR10
- *EOTF:* HLG

Dolby Vision HDR Content Calibration

Murideo SIX-G *Source Settings* options for Dolby Vision HDR content (Figure 4):

Note: For Dolby Vision HDR mode, the Murideo resolution must be manually set to 1080p.

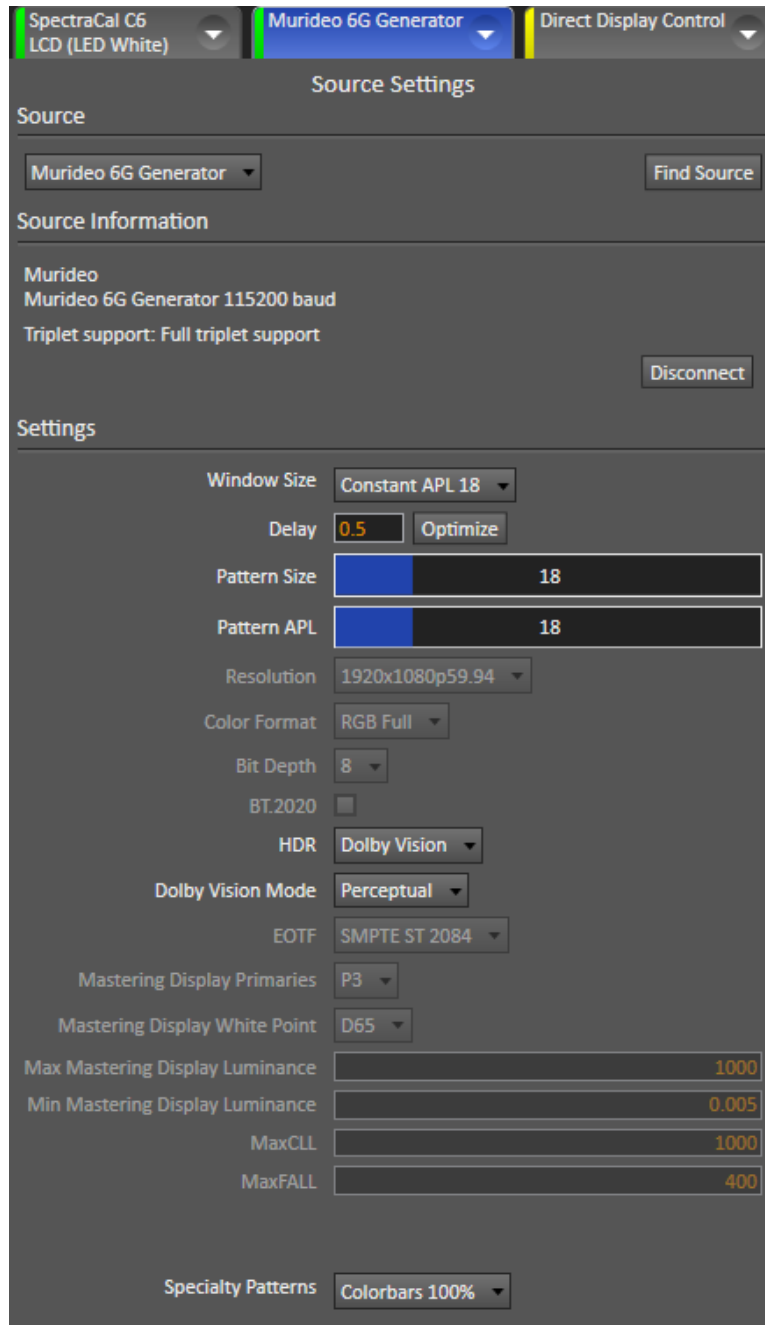


Figure 4. CalMAN Source Settings tab, with Dolby Vision HDR mode enabled.

- *Color Format:* RGB Full 8-bit
(The patterns are actually 4:2:2 YCbCr 12-bit. Dolby Vision tunnels the YCbCr 12-bit patterns through the RGB 8-bit signal path.)
- *HDR:* Dolby Vision
- *Dolby Vision Mode:*
 - *Perceptual* - To be selected when using the *Dolby Vision* workflow (not to be used with the *Dolby Vision Custom* workflow).
 - *Relative* - To be used with the *Dolby Vision Custom* workflow, to perform the *Metered Calibration* steps.
 - *Absolute* – To be used with the *Dolby Vision Custom* workflow, to perform the *Post Calibration* steps.
- *Specialty Patterns:*

In the Dolby Vision mode, the VideoForge PRO specialty patterns display to the TV screen, but they are SDR, not Dolby Vision HDR.

Murideo SIX-G Test Patterns

Specialty Patterns

Specialty patterns are used for visual performance evaluation of a display or for control adjustments (brightness, contrast, sharpness, etc.). These Murideo SIX-G specialty patterns can be selected either from the Specialty Patterns selector on the Source Settings tab or from the Specialty Patterns icon on the CalMAN bottom selector bar.

Colorbars 100%	Ramp Y
Colorbars 75%	Ramp RGB
Colorbars SMPTE	Ramp Red
ISF Brightness	Ramp Green
ISF Contrast	Ramp Blue
ISF Geometry	Horizontal Line
ISF Geometry 2.40	Vertical Line
ISF Gradient	Window
ISF Skintone	Multiburst
Gray Steps 8	Checkerboard
Grey Steps 16	Dolby Vision Check

Custom Patterns

The Murideo SIX-G can upload custom images/patterns in 1920x1080 format. The uploader stores the pattern in one of the ten available "slots" for recall. It supports .jpeg, .png, .bin and .bmp. See the following Murideo support page for more information.

<http://www.murideo.com/generators.html>

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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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