

Panasonic BT-4LH310 CalMAN Setup Guide

CalMAN Display Calibration Software can automatically create an optimized 3D calibration LUT for the Panasonic 4LH310 monitor. Follow the procedure below to automatically create and load an optimized 3D LUT monitor calibration file into one of the Panasonic monitor's three User operating modes.

Required CalMAN Software Version:

- Version 5.4.0 or newer

Required CalMAN Workflow:

- Color Cube (3D LUT)

Panasonic Monitor Software Version:

- All versions work

Panasonic Monitor Control Connection:

- Null modem 9-pin female to female serial cable
- If a USB to serial adapter is required, the FTDI adapter (available from SpectraCal and online) is recommended, as it includes a data buffer for superior data integrity at high communication rates.

<http://commercial.spectracal.com/store/accessories/calman-certified-usb-to-serial-adapter.html>

Panasonic Initial Setup

To calibrate the Panasonic monitor with a 3D LUT, you must manually configure desired settings in the monitor before you switch the monitor to Remote mode in order to connect to the monitor within CalMAN:

1. In the Panasonic Main Menu / System Config / Range menu:
 - a. Select "Full" for 0-1023 [10-bit] full range.
 - b. Select "Limited" for 64-940 [10-bit] SMPTE legal range.
2. In the Panasonic Main Menu / Control menu, select "Remote" to enable RS-232 remote control.

Color Cube (3D LUT) Workflow

The Color Cube workflow in CalMAN is used to create 3D display calibration LUTs. In the CalMAN main menu, select *Open Workflow Template / Color Cube (3D LUT)*. Proceed through the instructions on each step of the Color Cube workflow, using the following notes for Panasonic monitor specifics.

1. Initial Setup section

In the *Initial Setup* section of the Color Cube workflow, step through the following pages:

a. Session Setup - Meter Connect

- Connect your color meter to the CalMAN computer.
- On the *Session Setup* page, click the *Find Meter* button.
- On the *Find Meters* dialog, select your meter if it is listed, then click *Search*. If your meter is not listed on the dialog, just click *Search*.
- Under the Target Display Type drop down, select "LCD (LED Blue Green DCI/P3 Gamut)."

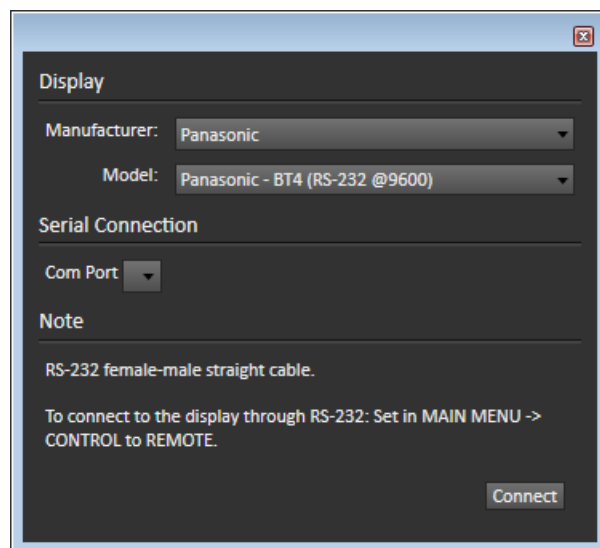
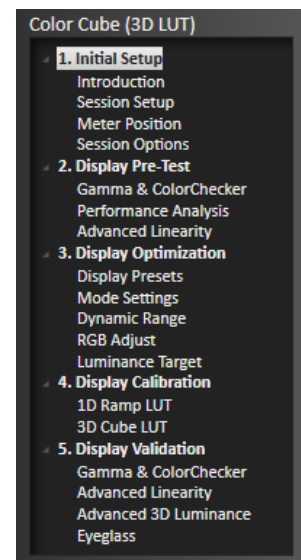
b. Session Setup - Source Connect

- On the *Session Setup* page, click the Find Source button.
- On the *Source* dialog, select your intended test pattern source.

See the Test Pattern Source note, in Appendix A.

c. Session Setup - LUT Device Setup

- On the *Session Setup* page, click the *Find 3D LUT Device* button.
- On the *Display* dialog, under *Manufacturer*, select 'Panasonic.'
- Under *Model*, select 'Panasonic - BT4 (RS-232 @9600).'
- On the *Session Setup* page, under the *3D LUT Memory* drop down, select the desired monitor mode to calibrate.



d. Session Options page

- On the *Session Options* page, under *Input Signal Levels*, select either 'Video (16-235)' (to support the Panasonic Limited range) or 'PC (0-255)' (to support the Panasonic Full range).

2. Display Pre-Test section

In the 'Display Pre-Test' section of the Color Cube workflow, you can measure the performance of a display before you calibrate it, on the *Gamma & ColorChecker* page and on the *Advanced Linearity* page. Because there are no Brightness, Contrast or Luminance controls available in the Panasonic User 1 through User 3 operating modes, however, you will not optimize any monitor picture controls before performing the 3D LUT calibration.

3. Display Optimization section

Because there are no picture controls available in the Panasonic User 1 through User 3 operating modes, skip the *Display Optimization* section of the workflow. Skip directly to the *3D Cube LUT* page.

4. Display Calibration section

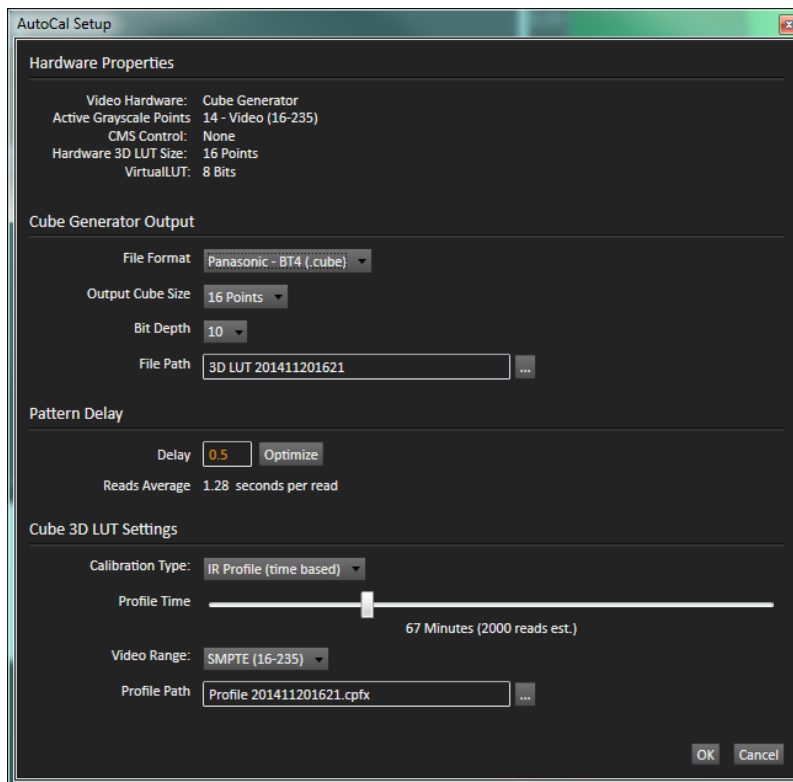
In the *Display Calibration* section of the Color Cube workflow, there are provisions for calibrating both a 1D RGB LUT (*1D Ramp LUT* page) and a 3D cube LUT (*3D Cube LUT* page). When we are calibrating a Panasonic monitor with a 3D LUT, we will skip the *1D Ramp LUT* page (1D RGB LUT) and use only the *3D Cube LUT* page.

a. 1D Ramp LUT page

Skip over this page when creating a 3D LUT file for a Panasonic monitor, since we do not need to create a 1D LUT.

b. 3D Cube LUT page

1. On the 3D Cube LUT page, click the *AutoCal* (rotating arrows) button at the right end of the meter action buttons. The *AutoCal Setup* dialog then appears (see below).



2. Under *File Path*, select the desired directory path and provide a name for the LUT file that CalMAN will create (e.g. monitor ID and date).
3. Under *Calibration Type*, select the desired type of 3D LUT calibration process.
 - **IR Profile (time based)**: Creates the best quality display calibration 3D LUT possible in the selected period of time. You select how much display quality you have time for, from 30 minutes to maximum display quality (6,000 points max). Uses Intelligent Resolution Profiling to search out the most nonlinear color space areas and correct those first.
 - **IR Profile (point based)**: Creates the best quality display calibration 3D LUT possible with the selected number of measurement points (1,000 - 10,000 points). Uses Intelligent Resolution Profiling to search out the most nonlinear color space areas and correct those first.
 - **Lightning LUT**: Creates a display calibration 3D LUT in five minutes or less. Produces a very high quality result on professional displays with moderate linearity. Displays with significant nonlinearity may produce marginal results.
4. Under *Video Range*, select either:
 - 'SMPTE+ (16-255)' (to support the Panasonic Full range), or
 - 'SMPTE (16-235)' (to support the Panasonic Limited range).
5. Click *OK*.

When the AutoCal 3D LUT calibration completes, CalMAN automatically loads the optimized 16x16x16 LUT calibration data into the Panasonic monitor.

5. Display Validation section

You can test the performance of the monitor in the *Display Validation* section of the Color Cube workflow, to validate the accuracy of the monitor when using the 3D calibration LUT. You can switch back to the *Gamma & ColorChecker Pre-Test* page to compare to the pre-calibration performance.

DONE – You are done with the 3D LUT monitor calibration for the Panasonic monitor.

Appendix A

Test Pattern Source Note

A monitor may normally be connected to its signal source in one of two basic modes. The monitor's normal connection mode determines which test pattern source options are available for 3D LUT calibration. The two monitor connection modes are:

Graphics Adapter Connection Mode – The monitor is normally driven from a computer's standard graphics adapter output. The test pattern source options for a monitor connected in this manner are:

- **CalMAN Client 3.** The Client 3 software utility should be installed on the computer that is normally driving the Panasonic monitor.
- **VideoForge hardware pattern generator.** A VideoForge HDMI or VideoForge 4K reference pattern generator should be connected to the Panasonic monitor input that is normally driven from the output of the standard graphics adapter.

Independent Source Mode - The monitor is normally driven from another signal source (e.g. signal router, video adapter device (AJA or Blackmagic), etc.). The test pattern source options for a monitor connected in this manner are:

- **VirtualForge software pattern generator.** The VirtualForge software will control an AJA or Blackmagic video adapter device, which should be connected to the Panasonic monitor input that is normally driven from the video adapter or some other independent signal source.
- **VideoForge hardware pattern generator.** A VideoForge HDMI or VideoForge 4K reference pattern generator should be connected to the Panasonic monitor input that is normally driven from an independent signal source (not the standard graphics adapter).

NOTE: Computer operating systems do not provide application software with absolute bit-level control of their graphics adapter outputs (i.e. VGA, HDMI, etc.). Without external confirmation, a standard computer output cannot be trusted as a reference source for calibrating a display other than one that is normally driven from that computer output.