



CaIMAN

Setup Guide

CaIMAN 3D LUT Files

for Image Editing Software

Rev. 1.1

Introduction

CalMAN Display Calibration Software can create display calibration 3D LUT files that can be imported into many video and image editing software systems. CalMAN creates an optimized 3D LUT file that applies calibration correction to the display to correct its performance to very accurately comply with a desired video standard (e.g. BT.709, sRGB, etc.). CalMAN currently creates the following common LUT file formats: .3dl, .csv, .cube, .m3d, .clt, .itx, .txt, .dat, and .mga formats; plus specific file formats for many common LUT hardware devices.

When display calibration LUT data is imported into an editing software program, the program's output signal is then altered, according to the LUT data, to produce an image on the display that complies with the selected video standard. Programs that are compatible with the LUT file formats that CalMAN currently produces include:

- **Adobe;** After Effects
- **Apple;** Color
- **Assimilate;** Scratch
- **Autodesk;** Lustre, Flame/Inferno, Flint, Smoke, Fire
- **Blackmagic Design;** DaVinci Resolve
- **Chaos Group;** Pdplayer
- **The Foundry;** Nuke
- And, others for which detail is not yet provided

CalMAN Required Software Version

- Version 5.1.0 or later

CalMAN Required Workflow

- Color Cube (3D LUT) workflow

Create CalMAN 3D LUT

Follow this procedure to create a display calibration 3D LUT file with CalMAN and load that file into a number of video and image editing software programs.

CalMAN Color Cube Workflow

The Color Cube workflow in CalMAN version 5.1 or later (Figure 1) is used to create display calibration 3D cube LUTs. In the CalMAN main menu, select *Open Workflow Template / Color Cube (3D LUT)*.

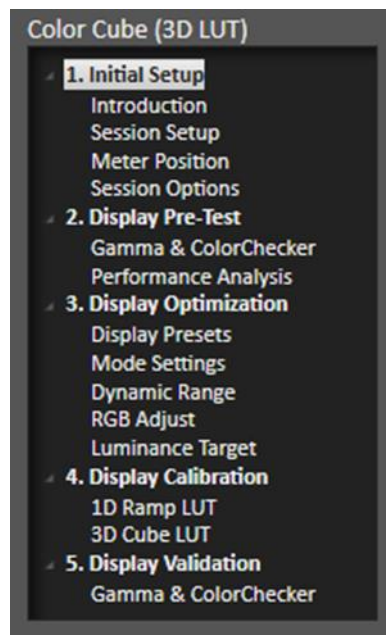


Figure 1. Left-panel outline of CalMAN Color Cube workflow.

Initial Setup section

In the *Initial Setup* section of the Color Cube workflow (Figure 1), step through the following pages:

Session Setup - Meter Connect

Connect your color meter to the CalMAN computer. Then, 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*.

Session Setup - Source Connect

Connect your test pattern generator to the CalMAN computer. Then, on the *Session Setup* page, click the *Find Source* button. On the *Source* dialog, under *Manufacturer*, select the manufacturer of your test pattern source. Under *Model*, select the model of your test pattern source.

Session Setup - LUT Device Setup

On the *Session Setup* page, click the *Find 3D LUT Device* button. Since you want to generate a LUT to a standalone file, rather than within a hardware LUT processor, you will use the *SpectraCal Cube Generator* software 3D LUT generator device. On the *Display* dialog (Figure 2), under *Manufacturer*, select *SpectraCal*. Under *Model*, select *SpectraCal – Cube Generator (3D LUT)*.

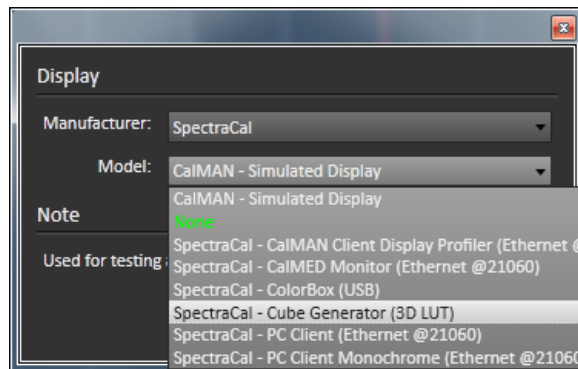


Figure 2. CalMAN Display connect dialog for Cube Generator.

Session Options

On the Session Options page, select your desired calibration targets for the display under test.

For *Input Signal Levels*, select “Video (16-235)” if you are calibrating the display for viewing video content. Select “PC (0-255)” if you are calibrating the display for viewing web or other computer content.

Display Pre-Test section

In the *Display Pre-Test* section of the Color Cube workflow, on the *Test/Document Display* and *Check Linearity* pages, you can measure the performance of a display before you calibrate it. On the Display Performance Test page, the previous display measurements are evaluated in a series of pass/fail performance parameters.

If the display fails in any of these parameters, you should consider using the *Display Optimization* workflow section that follows to optimize adjustments on the display itself.

If the display passes all of these parameters, you can skip the *Display Optimization* section and go immediately to the *Display Calibration* workflow section.

Display Optimization section

In the *Display Optimization* section of the Color Cube workflow, you are guided to optimize display controls for picture mode, color gamut, color temp, gamma, dynamic range, white point balance, and white point luminance.

Display Calibration section

In the *Display Calibration* section of the Color Cube workflow, there are provisions for calibrating both a 1D LUT (1D Ramp LUT page) and a 3D LUT (3D Cube LUT page). When we are using the CalMAN Cube Generator function to produce a 3D LUT file, we will skip the 1D LUT page and use only the 3D Cube LUT page.

1D Ramp LUT

Skip over this page when using the CalMAN Cube Generator function to produce a 3D LUT file.

3D Cube LUT

Use this 3D Cube LUT page to create a 3D LUT display calibration file that will be written to a selected directory location.

1. On this page, click the *AutoCal* (rotating arrows) button at the right end of the meter action buttons. The *AutoCal Setup* dialog then appears (Figure 3).

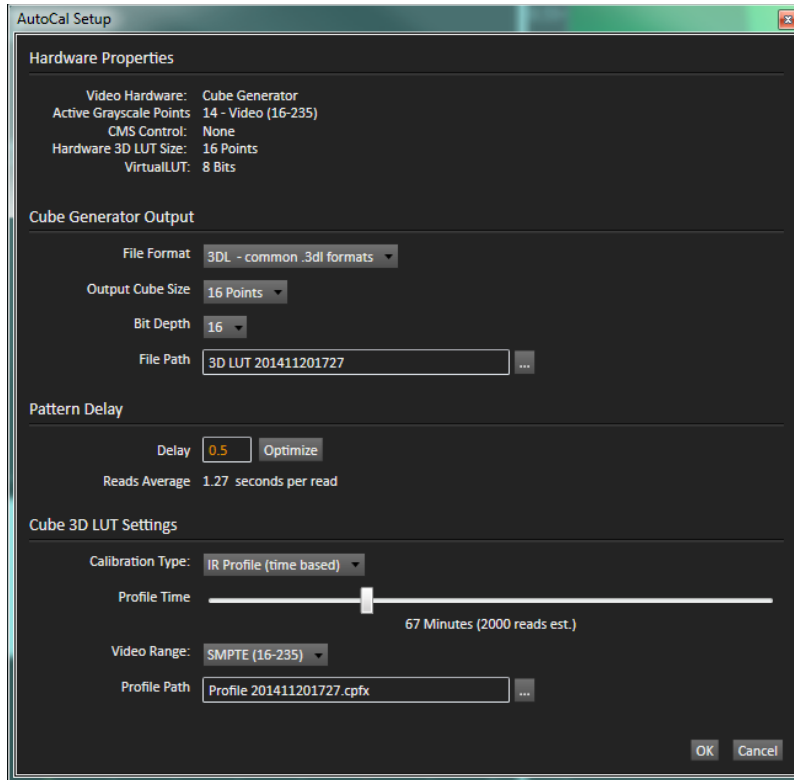


Figure 3. CalMAN 3D LUT AutoCal Setup dialog for Cube Generator function.

2. Select your File Format and Output Cube Size according to the requirements of the video or image editing system you are targeting. LUT file details for a number of software editing systems follows below.
3. 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).
4. 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.

5. Under *Video Range*, select “SMPTE (16-235)” if you are calibrating a video display that clips or compresses signals above reference white, as tested on the *Dynamic Range* page. For other video displays, select “SMPTE+ (16-255).” (The default is “Full Range (0-255)” for RGB computer monitors.)
6. Click *OK*.

Display Validation section

In the *Display Validation* section of the Color Cube workflow, you can test the performance of the display to verify the accuracy of the 3D calibration LUT. You can switch back to the *Display Pre-Test* section to compare to the display’s pre-calibration performance.

Imaging Software LUT File Details

Following are selections for the LUT file size and format that are required for different popular graphics software, plus information on how to import and load the display calibration LUT file within each different software program. However, be careful to not burn the display calibration LUT into the video footage, or the footage will look correct only on that display.

Adobe After Effects:

1. In the CalMAN *AutoCal Setup* dialog, select the *File Format* to be 3DL, select the *Output Cube Size* to be 64 Points, and name your LUT in the *File Path* dialog.
2. When the CalMAN AutoCube calibration process is complete, copy the .3dl LUT file to a folder on your editing computer.
3. In Adobe After Effects, with an image file open, select *Effect > Utility > Apply Color LUT*, then select the LUT file from your drive.

Apple Color:

1. In the CalMAN *AutoCal Setup* dialog, select the *File Format* to be MGA, select the *Output Cube Size* to be 16 Points, and name your LUT in the *File Path* dialog.
2. When the CalMAN AutoCube calibration process is complete, copy the .mga LUT file to a folder on your editing computer.
3. In Apple Color, select *File > Import > Display LUT*, select the .mga LUT file you created, using the *Load LUT* dialog, then click *Load*.

Assimilate Scratch:

1. In the CalMAN *AutoCal Setup* dialog, select the *File Format* to be 3DL, select the *Output Cube Size* to be 32 Points, and name your LUT in the *File Path* dialog.
2. When the CalMAN AutoCube calibration process is complete, copy the .3dl LUT file to a folder on your editing computer.
3. In Assimilate Scratch, with an image file loaded, under *Source Transform*, select *Custom/Load* to select the LUT and apply it to the file.

Autodesk Lustre

1. In the CalMAN *AutoCal Setup* dialog, select the *File Format* to be 3DL, select the *Output Cube Size* to be 17 Points, and name your LUT in the *File Path* dialog.
2. Click OK in the *AutoCal Setup* dialog and wait for the CalMAN AutoCube calibration process to complete.
3. In Autodesk Lustre, with an image file loaded, open the Input LUT menu. In the LUT List, click the Browse button to open the Import file browser. Navigate to the appropriate source folder and select one or more LUT files. Click Import.

Autodesk Fire

1. In the CalMAN *AutoCal Setup* dialog, select the *File Format* to be 3DL, select the *Output Cube Size* to be 17 Points, and name your LUT in the *File Path* dialog.
2. When the CalMAN AutoCube calibration process is complete, copy the .3dl LUT file to the ~/lut folder in the Fire home directory.
3. In the Fire init.cfg file, under the 3DLUT keyword heading, add the following line for the 3D LUT file you added to the ~/lut folder: 3DLUT <filename>.3dl. This makes the 3D LUT available for the Player and the View menu for the reference buffer overlay.

Autodesk Flame, Flint, Inferno, Smoke

1. In the CalMAN *AutoCal Setup* dialog, select the *File Format* to be 3DL, select the *Output Cube Size* to be 17 Points, and name your LUT in the *File Path* dialog.
2. Click OK in the *AutoCal Setup* dialog and wait for the CalMAN AutoCube calibration process to complete.
3. In Autodesk Flame, Flint, Inferno, or Smoke, with an image file loaded, open the LUT Preferences menu and select the 3D LUT tab. Click the Import button to open the Import LUT browser. Navigate to the 3D LUT file you want to use, and select it to load it to the 3D LUT list. Highlight the desired LUT and click the Select button to apply the LUT to the image.

Blackmagic Design DaVinci Resolve:

1. In the CalMAN *AutoCal Setup* dialog, select the *File Format* to be CUBE, select the *Output Cube Size* to be 17 Points, and name your LUT in the *File Path* dialog.

2. When the CalMAN AutoCube calibration process is complete, copy the .cube LUT file to your computer system's /Library/Application Support/Blackmagic Design/DaVinci Resolve/LUT folder.
3. In DaVinci Resolve, with an image file loaded, right-click on the node in the top-right corner, navigate to the folder where you saved the LUT file, and select it to apply the LUT to the file.

Chaos Group Pdplayer:

1. In the CalMAN *AutoCal Setup* dialog, select the *File Format* to be 3DL, select the *Output Cube Size* to be 17 Points, and name your LUT in the *File Path* dialog.
2. When the CalMAN AutoCube calibration process is complete, copy the .3dl LUT file to a folder on your editing computer.
3. In Pdplayer, with an image file loaded, right-click on the Lookup Table chooser, select Import, then select the .3dl LUT file to apply it to the file.

The Foundry Nuke:

1. In the CalMAN *AutoCal Setup* dialog, select the *File Format* to be 3DL, select the *Output Cube Size* to be 32 Points, and name your LUT in the *File Path* dialog.
2. When the CalMAN AutoCube calibration process is complete, copy the .3dl LUT file to a folder on your editing computer.
3. In Nuke, to select the LUT to use when reading or writing an image, double-click to open the Read or Write node's properties panel.
4. From the Colorspace dropdown menu, select the .3dl LUT file you created.

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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