



CalMAN Setup Guide

Flanders Scientific Monitors

3D LUTs

Rev. 1.2

Introduction

CalMAN Display Calibration Software can automatically create optimized calibration 3D LUTs for Flanders Scientific monitors equipped with the FSI Color Fidelity Engine (CFE or CFE2). CalMAN creates a custom LUT file, optimized to calibrate the FSI monitor to the selected performance standard.

The custom LUT file can then be loaded into the FSI monitor and accessed in the monitor's User1, User2, or User3 Color Space selections.

Required CalMAN Workflow:

- Color Cube (3D LUT)

Required FSI Monitor Firmware:

- Version 9.53-1907 or newer
- Firmware updates:
<http://www.flandersscientific.com/index/firmware.php>

FSI Monitor Control Connection:

- FSI-supplied USB to RJ45 update cable connected to FSI monitor GPI port
- Update cable available from ShopFSI.com

FSI Monitors with Calibration LUTs:

FSI models equipped with the Color Fidelity Engine are capable of loading custom calibration 3D LUTs.

- First generation FSI CFE monitors utilize a .dat LUT format for calibration 3D LUTs.

First generation CFE monitors include:

- CM-170W
- CM171
- CM172
- CM240

-CM250
-CM320TD
-CM500TD
-LM-2461W
-LM-2460W
-LM-2461W
-LM-2450W w/CFE

- Second generation FSI CFE2 monitors, running firmware version 9.53-1935 or later, utilize a .cfe LUT format for calibration 3D LUTs.

Second generation CFE2 monitors include:

-AM210
-AM250
-AM420
-AM550
-CM171
-CM172
-CM240
-CM250
-CM320TD
-CM420TD
-CM500TD
-BM090
-BM210
-BM230
-BM240
-DM250

Note: CFE2 monitors include both a Calibration LUT (.cfe) and a DIT LUT (.dat).

The CalMAN Color Cube workflow creates 3D LUT files in either .dat or .cfe format, for compatibility with the above FSI CFE and CFE2 monitors.

Create Software LUT File

CalMAN 3D LUT Monitor Calibration

Follow this procedure to create an optimized software 3D LUT calibration file, ready to be manually loaded into an FSI CFE monitor:

1. In CalMAN, load the "Color Cube (3D LUT)" workflow.
2. Proceed through each step of the workflow in the normal fashion, using the following notes for FSI-specific actions on the indicated workflow pages.
3. On the CalMAN *Session Setup* page, click the *Find 3D LUT Device* button, then select "SpectraCal - Cube Generator (3D LUT)."
4. While on the CalMAN *Display Presets* page (under *Display Optimization*),
 - a. In the FSI monitor's *Display Alignment/Color Management* menu, set LUT Bypass to 3D LUT, placing the monitor to *Wide Gamut*, bypassing the factory LUTs.
 - b. For an OLED monitor:
 - In the FSI *Color Management* menu, set *Color Matching Function (CMF)* to *CIE 1931*. When calibration is complete, you can switch to *Judd Modified*, if you prefer to operate with a Judd modified CMF-based calibration.
 - In the CalMAN *Settings* menu, if you select *ITU BT.1886* as the *Gamma Formula*, set a *Black Level Target* of 0.005 fL or 0.017 cd/m² (under *Workflow Advanced Options*).

If you select the CalMAN *Gamma Formula* as *Power*, with an exponent of 2.2 to 2.4, set a *Black Level Target* of 0.0.
5. Skip the CalMAN *RGB Adjust* page (The FSI Gain and Bias controls should be left at their default settings at 50).
6. Skip the CalMAN *1D Ramp LUT* page (a 1D LUT does not need to be created for the FSI).
7. On the CalMAN *3D Cube LUT* page, click the *AutoCal* action button in the lower right.
8. On the *AutoCal Setup* popup dialog (shown below), under *File Format*:
 - a. For CFE monitors, select "Flanders Scientific (.dat)" (creates an FSI 64x64x64 10-bit 3D LUT format file).
 - b. For CFE2 monitors, select "Flanders Scientific (.cfe)"

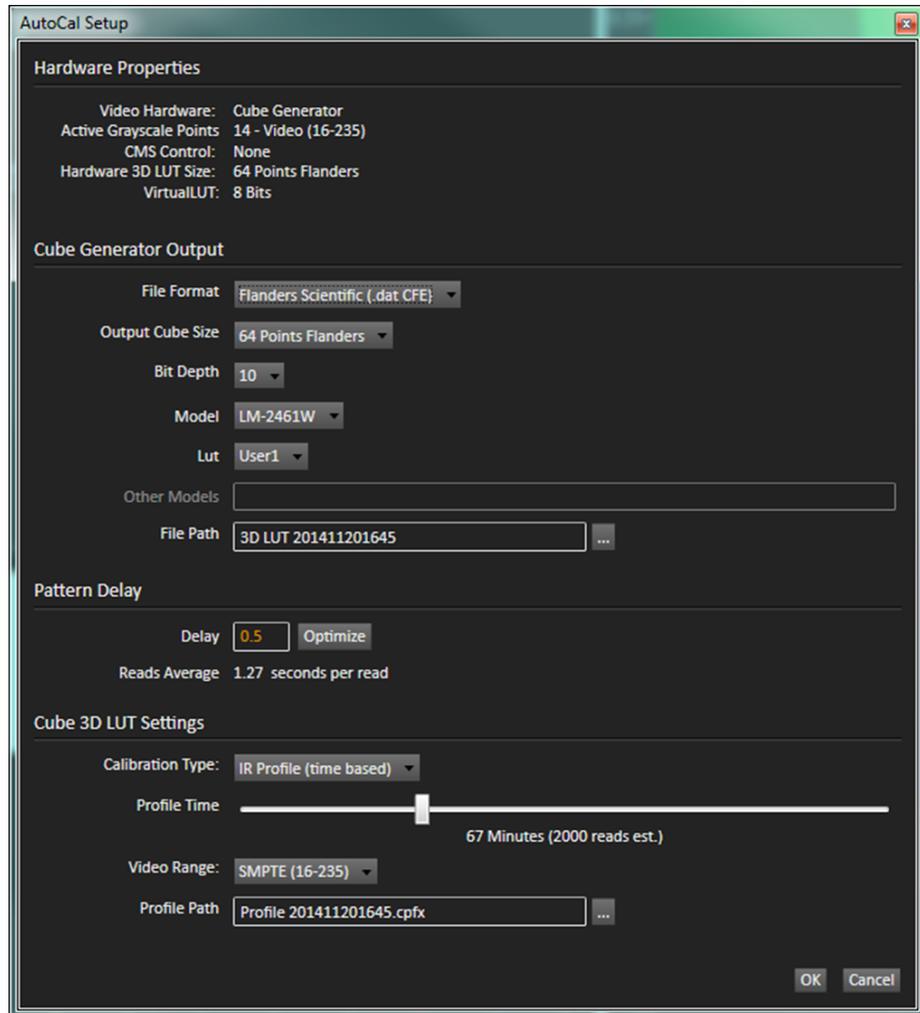


Figure 1. CalMAN AutoCal Setup dialog for 3D LUT creation.

9. Also on the *AutoCal Setup* dialog, under *Model and LUT*, select your monitor model and the FSI monitor's *Color Space LUT* slot that you wish to calibrate.
10. Under *File Path*, select a convenient location for the LUT file that CalMAN will create. Name the .dat or .cfe file either "user1", "user2", or "user3," depending on whether you wish to load the LUT into the FSI monitor's User1, User2, or User3 Color Space slot.

Note: the default location for storing LUT files is:
(Documents\SpectraCal\CalMAN xxx\LUTs

11. 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.

Upon completion of the AutoCal 3D software LUT calibration process, CalMAN automatically writes the optimized LUT calibration data to an FSI .dat or .cfe format 64x64x64 LUT file in the selected drive location.

You are now ready to load the 3D calibration LUT into the FSI CFE monitor.

Load 3D LUT into FSI Monitor

When CalMAN completes its automatic 3D LUT calibration, the created LUT file is ready to be manually loaded into the FSI monitor. To load a software 3D LUT calibration file into an FSI CFE monitor:

1. From the monitor's on-screen menu, load the default profile (*Menu \ System \ Load Profile \ Default*). Press *Enter* to start the process, and confirm with *Yes* when prompted.
2. Verify that the monitor is in update mode (*Menu \ System \ UDisk Mode \ On*).
3. Connect the FSI-supplied USB to RJ45 update cable to the monitor GPI port and to a USB port on your computer. After a short time, the computer will recognize the FSI monitor as a mass storage device (disc drive), viewable in Mac's *Finder* or PC's *My Computer*.
4. On your computer, drag and drop the userx.dat or userx.cfe LUT file to the monitor storage device. You may load up to three custom LUT files at a time ("user1.dat", "user2.dat", and "user3.dat" or "user1.cfe", "user2.cfe", and "user3.cfe").
5. When the file is finished transferring, on the monitor go to: *Menu \ Display Alignment/Color Management \ Update CFE*. Press *Enter* to start the update process, and confirm with *Yes* when prompted. The update process will take approximately 6 minutes per LUT for CFE monitors and approximately 15 seconds per LUT for CFE2 monitors.
6. When the LUT update is complete, power cycle the monitor.
7. In the FSI monitor's *Display Alignment/Color Management* menu, set LUT Bypass to Off.
8. Exit the FSI monitor's menu.
9. Reenter the menu and access the new custom calibration LUT from the monitor's *Display Alignment/Color Management* menu by selecting: *Menu \ Display Alignment/Color Management \ Color Space \ (USER1, USER2, or USER3)*.

DONE – Flanders Scientific 3D LUT calibration and setup 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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