SpectraCal

CalMAN Setup Guide

Meter Profiling

Rev. 1.2

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CalMAN Meter Profiling

Meter profiling is a process for improving the accuracy of a filter-based colorimeter, for a specific display. Profiling creates a calibration profile for the colorimeter, for the display currently being measured, based on display measurement data from a reference spectrophotometer.

When you profile a colorimeter, you measure the unique spectral characteristics of a display with a spectrophotometer (spectro). CalMAN then corrects the measurement results from your colorimeter to be more accurate, based on the spectro measurements. You basically transfer the accuracy of the spectrophotometer to your colorimeter, for that display.

Meter profiling is so quick and easy in CalMAN that, if you also have access to a reference spectro, we recommend profiling your colorimeter as the first step in every measurement or calibration process.

Why not just calibrate with the reference spectro?

Reference spectrophotometers are very accurate when measuring light from different sources, even those with vastly different spectral power distributions (SPDs). However, spectrophotometers have poor light sensitivity and measure very slowly at low light levels. The slow spectro measurements make them inconvenient for performing multiple display measurements or calibrations.

Filter-based colorimeters, although not inherently as accurate on all displays as spectrophotometers, have better light sensitivity, are more accurate at display black levels, and measure fairly quickly at all light levels. Their fast measurements make colorimeters very convenient for performing multiple display measurements and calibrations.

Why should I profile my colorimeter?

New display technologies have been and continue to be developed with very different SPDs from each other (LEDs, plasma, OLED, quantum dots, etc.). Even though your colorimeter has been precisely calibrated at the factory or at Portrait Displays, the SPD of the display it was calibrated on will not precisely match that of the display you are currently measuring.

Colorimeters require a calibration table for each different type of light source, to correct them for the different SPDs. Meter profiling allows you to update your colorimeter for new display lighting technologies (OLED,

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quantum dot, etc.), even if the colorimeter doesn't include built-in meter modes for those technologies. Profiling a colorimeter calibrates it to the accuracy of the reference spectro, on the targeted display.

How do I profile my colorimeter?

On the CalMAN Meter Settings tab, the Meter Profile New/Edit button opens the Meter Profile dialog (Figure 1). If you haven't already connected to your reference spectrophotometer and target colorimeter, you can do that on this screen.
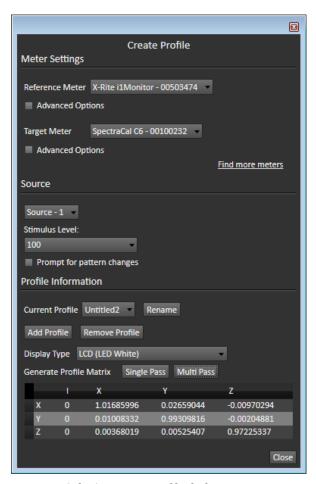

Figure 1. CalMAN Meter Profile dialog.

Reference Meter – This should be a spectroradiometer (X-Rite i1Pro, X-Rite ColorMunki, CRI CR-250, JETI Specbos, etc.)

Target Meter – Typically a filter-based tristimulus colorimeter (SpectraCal C6, X-Rite i1Display, etc.)

You can then click on the "Add Profile" button to initiate a new profile. You can select "Single Pass" to position the two meters side-by-side at the center of the screen and CalMAN will automatically make measurements without moving the meters, though this is dependent on the display being very uniform across the screen.

You can also select "Multi Pass" to position first one meter then the other at a selected position on the display screen. The CalMAN Meter Profile process then prompts you to measure the display with both your spectrophotometer and your colorimeter. Each meter measures four colors in just seconds; white, red, green, and blue.

What happens under the hood?

CalMAN creates a Four-Color Correction Matrix for your colorimeter, based on the differences between the spectrophotometer measurement data and the colorimeter measurement data. The Four-Color Correction Matrix is an industry-standard technology developed by the National Institute of Standards and Technology (NIST).

This is the same process used by the manufacturer or SpectraCal to calibrate your colorimeter. It is not a simple x,y subtraction/offset, which would result in unpredictable and invalid results. The Four-Color Correction Matrix is the internationally recognized standard for calibrating colorimeter accuracy.

What if my colorimeter has a meter mode for the target display technology?

The SPD of one display can be significantly different from another, even with the same lighting/pixel technology. Manufacturers occasionally change the characteristics of a display in the middle of a manufacturing run, without changing the model number.

Even though your colorimeter has been precisely calibrated at the factory or at SpectraCal, the SPD of the display it was calibrated on may not precisely match that of the display you are currently measuring.

A colorimeter with a matching factory mode will be more accurate than a colorimeter with just a generic meter mode. But, profiling the meter to the target display will give you even more accuracy.

How often should I profile my meter?

We recommend profiling your meter on every new display that you calibrate.

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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