

# CalMAN Setup Guide

HP DreamColor Z27x

Rev. 1.2

## Introduction

CalMAN Display Calibration Software can automatically create an optimized calibration 1D LUT and color matrix for the DreamColor Z27x monitor and automatically load the calibration data into the monitor. Because of the inherent linearity of the DreamColor monitor, very accurate performance is obtained without employing a 3D LUT.

*Note: The DreamColor Z24x, Z31x, and Z32x monitors do not contain the features required to support CalMAN auto calibration.*

### CalMAN Required Software Version:

- Version 5.3.5 or newer

### CalMAN Recommended Workflow:

- Monitor - Direct (EIZO/HP) - RGB monitor mode
- SI Advanced Calibration - video monitor mode

### DreamColor Z27x Control Connection:

- USB 3.0 (USB 3.0 A to B cable required for proper connection and control)

### DreamColor Z27x Initial Setup

To connect a DreamColor Z27x to a host calibration computer with a USB 3.0 cable:

1. Install the [HP DreamColor Z27x SDK/API Development Software](#) to load the USB driver for the DreamColor Z27x (available from the HP web site).

*Note: The DreamColor USB driver does not currently support operation under VMware Fusion.*

2. Connect a USB 3.0 cable (required) between the display and the CalMAN computer.

3. On the DreamColor Z27x, under Open Menu / Management / Manage Internal Processor, select “Enable.”
4. Under Open Menu / Image Adjustment, uncheck the “Use Video Levels (16-235)” selection. After calibration is complete, you can select the Video Levels option, if desired.
5. *Cycle the master power switch on the rear panel of the DreamColor Z27x, and then wait 2 minutes before connecting to the DreamColor within CalMAN.*

## DreamColor Z27x Connection Modes

The monitor's normal signal connection mode determines the optimum calibration method to use in the following sections. The DreamColor monitor will normally be connected to its signal source in one of two basic modes.

The two monitor connection modes are (click to jump to the desired process):

### [Graphics Adapter Connection Mode](#) (RGB monitor mode)

DreamColor monitor is directly connected to the output of a computer's standard graphics display adapter (DVI, HDMI, DisplayPort).

### [Independent Source Mode](#) (video monitor mode)

DreamColor monitor is connected to another signal source (e.g. signal router, AJA or BMD video adapter device, etc.).

## Graphics Adapter Connection Mode Calibration

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Follow this procedure to calibrate an HP DreamColor monitor that is normally connected to the output of a computer's standard graphics display adapter (DVI, HDMI, DisplayPort).

This calibration procedure will:

- Automatically create and load an optimized 1D LUT monitor calibration file into the HP DreamColor Z27x monitor.
- Adjust the color matrix.
- Create an ICC profile.

*Note: See the "[Independent Source Mode Calibration](#)" section below for calibrating DreamColor monitors that are normally driven from a source other than a computer's standard graphics adapter output.*

### Test Pattern Connection

CalMAN Client 3, running on the computer that is driving the HP DreamColor monitor, will be the test pattern source for monitor calibration. However, for accurate calibration, it is important that the computer sends a full range RGB signal to the monitor during CalMAN measurement and calibration, even if the monitor will be used for monitoring video level signals.

If the monitor is connected to a DisplayPort output, the signal will always be full range RGB. If the monitor is connected to an HDMI output, the signal may be full range RGB or it may be video level YCC. If you wish to use the HDMI output, you will need to make sure that the graphics display adapter is set for RGB output.

### Monitor - Direct (EIZO/HP) Workflow

The Monitor - Direct (EIZO/HP) workflow in CalMAN is used to automatically create a 1D display calibration LUT, adjust the color matrix, and create an ICC profile. To open this CalMAN workflow, in the main menu select Open Workflow Template / Monitor - Direct (EIZO/HP). Proceed through each step of the workflow (Figure 1) in a normal fashion, using the following notes for DreamColor monitor specifics.

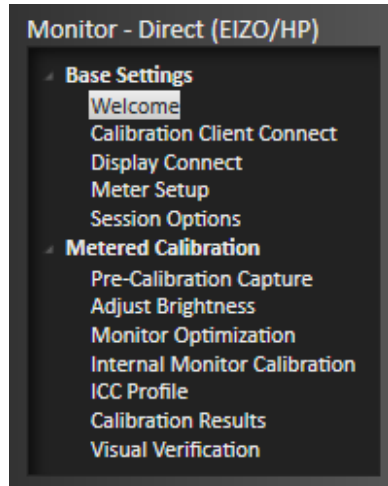


Figure 1. Monitor –Direct workflow outline.

## Base Settings section

In the Base Settings section of the Monitor - Direct (EIZO/HP) workflow, step through the following pages:

### ***Calibration Client Connect page***

To connect to CalMAN Client 3 on the local computer on which CalMAN is running, in order to calibrate an HP monitor on the local computer, click the “Local Client Connect” button. CalMAN will automatically connect to the locally installed CalMAN Client 3 as a Source device and as a Display Control device.

To connect to CalMAN Client 3 on another computer on the local network, in order to calibrate an HP monitor on that computer, click the “Networked Client Connect” button. On the *Source* dialog, under *Manufacturer*, select “SpectraCal.” Under *Model*, select “SpectraCal – CalMAN Client 3 Pattern Source.” In the Socket Connection search box, select the IP address for the desired target computer, and then click Connect.

*Note: The HP internal test patterns are not an advantage in this situation, and cannot be used on an HP monitor that is being used as a workstation’s primary display.*

On the *Select Monitor and Calibration Memory* drop down, select “Native.”

### ***Display Connect page***

On the *Display Connect* page, follow the instructions to make a USB connection from the CalMAN computer to the HP monitor that is to be

calibrated. This connection will be used to load calibration data into the target monitor.

Note: If more than one HP monitor is connected to the computer, disconnect all the HP monitors except for the one that you are currently calibrating.

To connect CalMAN to the HP monitor, click the “HP Connect” button.

During the connection process, the following message is displayed on the DreamColor: “The LUT download is in progress. Do not turn off your display during the download process.”

When the connection is about complete, the following message is displayed on the DreamColor: “The LUT has been successfully downloaded.”

While connecting to the DreamColor monitor, CalMAN automatically resets the DreamColor internal 1D LUT.

*NOTE: If CalMAN fails to connect to the DreamColor Z27x, you may need to reset the monitor. To do this, cycle the master power switch on the rear panel of the DreamColor Z27x, and then wait 2 minutes before connecting to the DreamColor within CalMAN.*

### ***Meter Setup page***

Connect your color meter to the CalMAN computer.

Then, on the *Meter 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 *Find Meters* dialog, just click *Search*.

The DreamColor Z27x has a very wide color gamut. For the Target Display Type for a colorimeter, select “LCD (LED Blue Green DCI/P3 Gamut).” No special selection is required for a spectrophotometer.

The DreamColor pops up message windows in the middle of the screen. Position your meter at least 3 inches to the side of the screen center to avoid those message windows. Alternately, you can move the message window away from the center of the screen (Main Menu > Menus and Message Control > Menu and Message Position).

### ***Session Options page***

On the *Session Options* page, confirm that the listed monitor and display mode are correct. If not, step back to the *Select Monitor and Calibration Memory* drop down, on the *Calibration Client Connect* page, to make the desired selection.

Make any desired changes to the default Color Space, White Point, and Gamma targets.

*Note: This workflow defaults to PC (0-255) for Input Signal Levels. This is required to support 1D LUT calibration.*

## Metered Calibration section

In the Metered Calibration section of the Monitor - Direct (EIZO/HP) workflow (Figure 1), step through the following pages:

### ***Pre-Calibration Capture page***

On the *Pre-Calibration Capture* page, you can measure the monitor's performance before you calibrate it. When you click the *Read Series* button, CalMAN measures the monitor's grayscale balance, the luminance at reference white, and the ColorChecker\* error across the monitor's color gamut.

*\*CalMAN uses the X-Rite/Pantone ColorChecker® target colors to analyze a monitor's color gamut performance.*

### ***Adjust Brightness page***

On the *Adjust Brightness* page, you can change the monitor's luminance output by adjusting its Brightness control. Click the CalMAN *AutoCal* button and input your desired White Level Target to automatically adjust the Brightness control. Or, click the *Read Continuous* button and adjust the software Brightness control in CalMAN to change the white level luminance.

### ***Monitor Optimization page***

Skip the *Monitor Optimization* page for the HP DreamColor monitor. This page would normally be used to calibrate a monitor's RGB Gain and RGB Offset controls. The HP monitor has a full 1D LUT available instead, which will be calibrated on the following page.

### ***Internal Monitor Calibration page***

On the *Monitor Optimization* page, CalMAN automatically adjusts the HP monitor's output 1D LUT to calibrate gamma and adjusts its color matrix to calibrate CMS. Click the CalMAN *AutoCal* button to start the automatic calibration process.



*Note: There are no CMS controls available in the CalMAN DDC controls window for manual color matrix adjustments.*

### ***ICC Profile page***

On the *ICC Profile* page, CalMAN automatically measures the HP monitor's color primaries and its grayscale levels. It then creates an ICC profile that it writes to the computer that is driving the HP monitor. Click the CalMAN *AutoCal* button to start the automatic profile process.

### ***Calibration Results page***

On the *Calibration Results* page, click the *Read Series* button to start the post-calibration measurement. CalMAN displays the monitor measurement data from the previous Pre-Calibration Capture page. It also displays monitor's post-calibration performance for comparison.

### ***Visual Verification page***

On the *Visual Verification* page, CalMAN displays comparison chip charts for the monitor's pre-calibration and post-calibration grayscale performance and ColorChecker performance. It also displays a variety of photo images on the calibrated display, with the option to disable the ICC Profile (although the monitor's internal 1D LUT can't be disabled).

**DONE** – You are done with calibrating the HP DreamColor that is normally connected to a computer's standard graphics adapter output.

## Independent Source Mode Calibration

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Follow this procedure to calibrate an HP DreamColor monitor that is normally connected to an independent signal source, such as a signal router or video adapter device (not directly connected to the output of a computer's standard graphics display adapter).

This procedure will:

- Automatically create and load an optimized 1D LUT monitor calibration file into the HP DreamColor Z27x monitor.
- Adjust the color matrix.
- Create an ICC profile.

Note: See the "[Graphics Adapter Connection Mode Calibration](#)" section above for calibrating DreamColor monitors that are normally connected to the output of a computer's standard graphics display adapter (DVI, HDMI, DisplayPort).

### Test Pattern Connection

When the DreamColor monitor to be calibrated is not normally connected to the output of a computer's standard graphics display adapter, the DreamColor monitor's internal test patterns are used.

### SI Advanced Calibration Workflow

The SI Advanced Calibration workflow in CalMAN is used to automatically create a 1D display calibration LUT, adjust the color matrix, and create an ICC profile. To open this CalMAN workflow, in the main menu select Open Workflow Template / SI Advanced Calibration. Proceed through each step of the workflow (Figure 2) in a normal fashion, using the following notes for DreamColor monitor specifics.

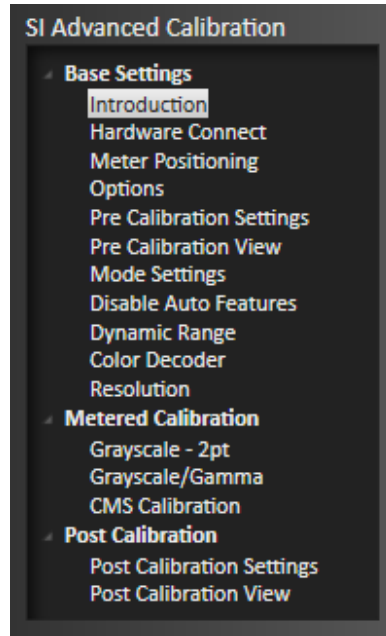


Figure 2. SI Advanced Calibration workflow outline.

## Base Settings section

In the Base Settings section of the SI Advanced Calibration workflow (Figure 2), step through the following pages:

### ***Hardware Connect page***

Follow the instructions on the *Hardware Connect* page to connect to your meter and to connect to your DreamColor display, both as a test pattern source and for display control. If you haven't already done so, connect the DreamColor display to the host calibration computer with a USB cable, as detailed in the initial setup section above.

**Meter** - Connect your color meter to the CalMAN computer.

Then, 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 *Find Meters* dialog, just click *Search*.

The DreamColor Z27x has a very wide color gamut. For the Target Display Type for a colorimeter, select "LCD (LED Blue Green DCI/P3 Gamut)." No special selection is required for a spectrophotometer.

The DreamColor pops up message windows in the middle of the screen. Position your meter at least 3 inches to the side of the screen center to avoid those message windows. Alternately, you can move the message window

away from the center of the screen (Main Menu > Menus and Message Control > Menu and Message Position).

**Source** – Click the *Find Source* button. On the Source dialog, select “HP – DreamColor Z27x (USB),” then click *Connect*.

*Note: The HP internal test patterns are used in this situation.*

**Display Control** – First, in the DreamColor menu (Main Menu > Open Menu > Color Space), select “Native.”

Then, in CalMAN, click the Find Display/Processor button. On the Display dialog, select “HP – DreamColor Z27x (USB),” then click Connect.

During the connection process, the following message is displayed on the DreamColor: “The LUT download is in progress. Do not turn off your display during the download process.”

When the connection is about complete, the following message is displayed on the DreamColor: “The LUT has been successfully downloaded.”

While connecting to the DreamColor monitor, CalMAN automatically resets the DreamColor internal 1D LUT.

NOTE: If CalMAN fails to connect to the DreamColor Z27x, you may need to reset the monitor. To do this, cycle the master power switch on the rear panel of the DreamColor Z27x, and then wait 2 minutes before connecting to the DreamColor within CalMAN.

### ***Meter Positioning page***

Position your color meter at the center of the DreamColor screen, touching the screen.

### ***Options page***

- On the *Session Options* page, make any desired changes to the default Color Space, White Point, and Gamma targets.
- On the Settings tab (gear wheel), select “PC (0-255)” for *Luminance Levels*. This is required to support 1D LUT calibration.

### ***Pre Calibration Settings page***

If you wish to document the monitor’s control settings prior to calibration, you can record that information on this page. This information will then be available on a calibration report.

***Pre Calibration View page***

If you wish to document the monitor's performance prior to calibration, you can do that on this page. This information will then be available on a calibration report.

***Mode Settings page***

On the Mode Settings page, you can make monitor measurements to help decide which modes in which to operate the monitor for calibration.

***Disable Auto Features page***

Skip this page. The DreamColor monitor has no automatic features that require disabling.

***Dynamic Range page***

Follow the instructions on the Dynamic Range page to adjust the monitor's Contrast control as high as possible without causing one of the red, green, or blue lines to become nonlinear. Do not be concerned that the RGB lines are separated from each other at this point in the calibration process.

Adjust the monitor's Brightness control to produce the desired maximum luminance level.

***Color Decoder page***

Skip this page. The DreamColor monitor has no color decoder with its associated color and tint controls.

***Resolution page***

Skip this page. The DreamColor monitor has no controls that can degrade resolution.

**Metered Calibration Section**

The DreamColor monitor requires a specialized calibration process. In the Metered Calibration section of the SI Advanced Calibration workflow, first perform the CMS Calibration, then perform the Grayscale/Gamma calibration, then repeat the CMS Calibration.

***Grayscale – 2pt page***

Skip this page.

***Grayscale/Gamma page***

Start the calibration on the CMS Calibration page.

***CMS Calibration page***

Start the calibration on the CMS Calibration page by pressing the AutoCal button.

Then, perform the AutoCal on the Grayscale/Gamma page.

Finally, repeat the AutoCal on the CMS Calibration page.

**Post Calibration Section**

In the Post Calibration section of the SI Advanced Calibration workflow, step through the following pages to check and document the DreamColor monitor calibration:

***Post Calibration Settings page***

If you wish to document the monitor's control settings after calibration, you can record that information on this page. This information will then be available on a calibration report.

***Post Calibration View page***

If you wish to document the monitor's performance prior to calibration, you can do that on this page. This information will then be available on a calibration report.

**DONE** – You are done with calibrating the HP DreamColor that is not normally connected to a computer's standard graphics adapter output.

## 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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