CalMAN RGB

Monitor Calibration Software

USER GUIDE

Contents

About CalMAN RGB

Introduction

Thank you for trusting CalMAN Software for your calibration solutions. CalMAN RGB is fast, easy to use, and accurate – with step-by-step instructions included on each software page. With CalMAN RGB you will:

- Achieve images that appear rich and lifelike.
- Experience full detail throughout images – whether in bright light or shadow.
- Correct glaring or washed-out colors.
- Eliminate the bright blue tint typical of uncalibrated computer monitors.
- Maintain image accuracy as your monitor ages.

The following user guide provides everything you need to know about calibrating a computer monitor with CalMAN RGB. If you have further questions after using this guide, please contact us at **support@spectracal.com**.

How Monitor Calibration Works

CalMAN RGB software communicates with SpectraCal's pattern source software – CalMAN Client 3 – to place reference patterns on your screen and measure them with a light meter. CalMAN RGB uses the measurements taken by the light meter to detect color deficiencies in your monitor and correct them accordingly. The calibration software judges monitor deficiencies by measuring their variance from a specific color standard, to which all monitors should ideally adhere.

Our Software

CalMAN RGB provides three workflows to guide you through the calibration process:

Introduction – The Introduction workflow contains a software tutorial that explains the basics of using CalMAN RGB, and includes a full overview of the software's layout and navigational features. It is useful to read through this workflow before calibrating a computer with CalMAN RGB.

Standard Monitor Calibration – The Standard Calibration provides a complete and automated calibration for Mac or Windows computers (single or multiple monitors).

Advanced Monitor Calibration – The Advanced Calibration allows users to customize local or networked monitor calibrations. It includes advanced controls for setting brightness, color-temperature, backlight, and white balance. The advanced calibration also allows flexibility in setting custom calibration targets and facilitates the creation of an ICC profile.

The workflows in CalMAN RGB can be accessed from the software's welcome screen, or selected from the software's Main Menu under "Open Workflow Templates."

Frequently Used Terms

The following section provides a brief list of terms that are used frequently within this User Guide, as well as the CalMAN RGB software.

Workflow: SpectraCal uses the term "workflow" to refer to the set of software pages that together contain the instructions and action buttons for a specific calibration process. CalMAN RGB, for instance, includes the Standard Monitor Calibration workflow and the Advanced Monitor Calibration workflow – both of which provide instructions and action buttons for their respective calibration processes.

Host Computer: The host computer is the computer on which CalMAN RGB is installed. A host computer can be used to calibrate any connected monitors, or to calibrate a remote computer on a shared local network.

Target Monitor: The target monitor is the monitor you intend to calibrate with CalMAN RGB software. "Target monitor" may refer to a monitor connected to the host computer directly, or it may refer to a monitor that is connected to the host computer through a shared local network.

CalMAN Client 3: CalMAN Client 3 is the internal pattern source software used by CalMAN RGB during calibrations. The Client 3 also stores calibration data from CalMAN RGB, which is then accessed every time your computer is opened to ensure you monitor adheres to the calibration adjustments made by the software. CalMAN Client 3 is housed in your computer independently of the calibration software itself.

Light Meter: A light meter is the device used to measure the chromaticity (the color of output light) and luminance (the brightness of output light) of your computer monitor.

Pattern Window: A pattern window displays reference patterns on your computer monitor, which are then measured by the light meter and read by CalMAN RGB software. There are two pattern windows used by CalMAN RGB – one within the CalMAN RGB application and one uploaded from CalMAN Client 3.

DDC (Direct Display Control): DDC is a software feature included in the Advanced Monitor Calibration workflow that allows you to control your monitor's display settings through the CalMAN RGB software itself.

LUT (Look Up Table): A LUT (lookup table) is a set of data-points stored in your computer during Advanced Monitor Calibrations that provide correction values for the errors exhibited by your monitor. The data in an LUT is used by your computer to compensate for the inaccuracies detected in your monitor's output signal.

ICC Profile: Like a LUT, an ICC Profile is created and stored in your computer during the calibration process. An ICC Profile informs computer applications of your monitor's color errors. The applications then use the ICC Profile to provide an output signal that compensates for the monitor's color inaccuracies.

Getting Started

Hardware Requirements

Hardware requirements to run CalMAN RGB Monitor Calibration Software (on host computer):

Use the following hardware requirements to determine whether your computer will support CalMAN RGB.

Requirements for Mac

Mac OS X 10.7.x, with latest operating system updates installed

(Recommended: Mac OS X 10.8.x, with latest operating system updates installed.)

Intel® Core 2 Duo processor

2 GB RAM

(Recommended: 4 GB RAM)

2 GB available disk space

VMware Fusion®

Windows Vista™ 3SP, with latest operating system updates installed

(Recommended: Windows® 7 SP1 or higher, with latest operating system updates installed.)

Microsoft® .NET Framework v 4.5

Requirements for Windows

Windows Vista™ SP3, with latest operating system updates installed

(Recommended: Windows® 7 SP1 or higher, with latest operating system updates installed)

2GHz processor

(Recommended: 2GHz dual core processor)

2GB RAM

(Recommended: 4GB RAM)

2 GB available disk space

Microsoft® .NET Framework v 4.5

Hardware requirements to run CalMAN Client 3 Software (on target computer):

Use the following hardware requirements if you are downloading CalMAN Client 3 independently of CalMAN RGB on a target computer. (CalMAN Client 3 needs to be downloaded on any computer that will be calibrated remotely across a shared local network.)

Requirements for Mac

Mac OS X 10.7.x or 10.8.x, with latest operating system updates installed

Latest graphics adapter driver

Requirements for Windows

Windows Vista™ SP3 or higher, with latest operating system updates installed

Latest graphics adapter driver

Installation

Once you have received your Calibration Package from SpectraCal (which includes a SpectraCal C3 Colorimeter), you can download CalMAN RGB software from **http://color.spectracal.com/downloads**.

Those running CalMAN RGB on a Mac need to run the software from a virtualized Windows machine with VMware Fusion®. To purchase VMware Fusion software, and for further instructions on operating a virtualized Windows machine through your Mac OS, go to **www.vmware.com/products/fusion**. Those running CalMAN RGB on a Mac will additionally need to download CalMAN Client 3 for Mac from **http://color.spectracal.com/downloads**.

To calibrate a remote computer on a shared local network, you will need to have CalMAN Client 3 installed on the remote computer. If you intend to use CalMAN RGB to calibrate more than three computers, you will need to download add-on Client 3 licenses from our website at **http://color.spectracal.com/store/**.

All users need to download Microsoft® .NET Framework 4.5 from SpectraCal's website.

Before Using CalMAN Software

A software tutorial for CalMAN RGB is included in the Introduction workflow. The tutorial familiarizes users with the layout of our software, illustrating the locations of significant buttons, control panels, and settings menus. To access the Introduction workflow, select *Introduction* from CalMAN RGB's welcome screen.

SpectraCal recommends reading the software tutorial, as well as the Installation and Hardware Setup instructions contained in this User Guide, before using CalMAN Software to calibrate your computer monitor.

Standard Monitor Calibration

The Standard Monitor Calibration provides a complete, easy-to-use, calibration workflow that runs a fully-automated calibration on a Mac or Windows computer. Standard Monitor Calibration offers any user – regardless of their level of calibration experience – a chance to apply our calibration technology without exposure to the technical details or manual controls often associated with monitor calibrations.
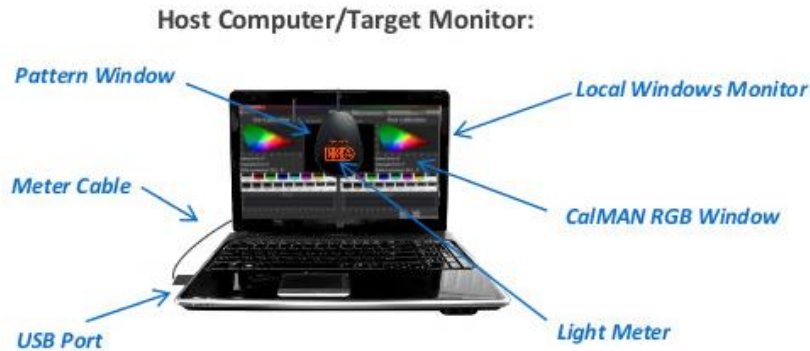
(Note: The Standard Monitor Calibration workflow cannot be used to calibrate a remote computer. To calibrate a remote computer, use the Advanced Calibration workflow.)

Hardware Setup

The following setup diagrams illustrate the two possible hardware configurations supported by CalMAN RGB in the Standard Monitor Calibration workflow. Both setup configurations are compatible with Mac as well as Windows computers. For instructions on downloading and installing calibration software, see "Installation" above.

### 1.1 Calibrating a Single Monitor (Mac or Windows)

Use this setup to calibrate a single monitor connected to the host computer.

Host Computer/Target Monitor:

1. Connect the light meter (SpectraCal C3 Colorimeter) to the USB port on your computer.

2. Open CalMAN RGB.

3. Select *Standard Calibration* from CalMAN RGB's welcome screen.

4. Follow the instructions within the Standard Calibration workflow for placing your meter on the pattern window provided. Be sure *Single Monitor* is selected to the left of the pattern window.

5. When prompted, click the *Read* button to connect the meter to CalMAN RGB.
6. Continue using the instructions provided within the workflow to complete the calibration.

1.2 Calibrating Multiple Monitors (Mac or Windows)

Use this setup to calibrate multiple monitors connected to the host computer.
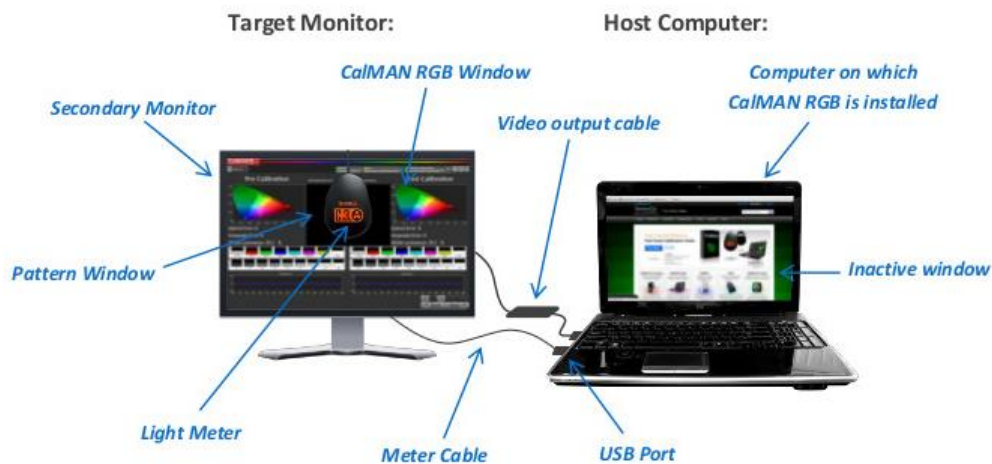
1. Connect the light meter (SpectraCal C3 Colorimeter) to the USB port on the host computer.

2. Open CalMAN RGB.

3. Select *Standard Calibration* from CalMAN RGB's welcome screen.

4. Drag the CalMAN RGB window to the screen of the monitor you wish to calibrate.

5. Follow the instructions within the Standard Calibration workflow for placing your meter on the pattern window provided. Be sure *Multiple Monitors* is selected to the left of the pattern window.

6. Select Display Type from the drop-down provided.

7. When prompted, click the *Read* button to connect the meter to CalMAN RGB.

8. Continue using the instructions provided within the workflow to complete the calibration.

Running a Standard Monitor Calibration

Once the light meter has been placed in the pattern window on your target monitor and connected to CalMAN RGB, you are ready to calibrate your computer monitor. Click the *Calibrate* button to automatically calibrate.

Once you have finished, you may calibrate a second monitor on the same computer, or go online to **http://color.spectracal.com/store** to purchase CalMAN Client 3 licenses for additional computers in your home. (CalMAN RGB includes software licenses for up to three computer calibrations.)

Advanced Monitor Calibration

Hardware Setup

Setup arrangements for the Advanced Calibration are more complex than those for the Standard Calibration. With a Mac, the Advanced Calibration requires use of a CalMAN Client 3 pattern window (labeled below), however setups including the Client 3 pattern window may be used for Windows computers as well.
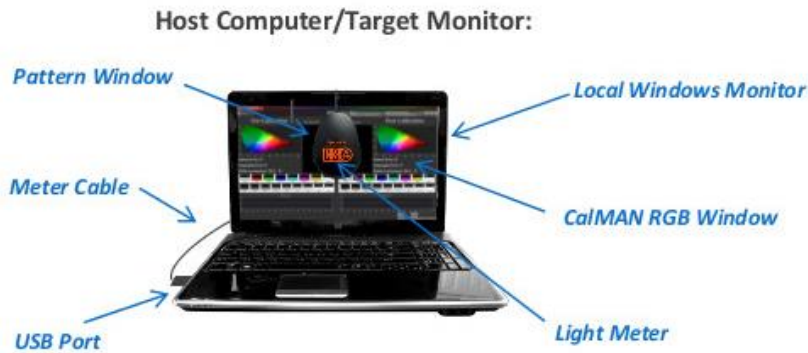
In each setup diagram, note that the meter is placed over the monitor that is to be calibrated (target computer), while CalMAN RGB is run either from that same monitor or a secondary monitor.

(To calibrate a remote computer on a shared network, see diagram 2.5.)

Those calibrating a Mac must open a pattern window from CalMAN Client 3 on their Mac OS but open CalMAN RGB separately from a virtualized Windows machine. When calibrating a Mac, the pattern window provided by CalMAN RGB software is therefore inactivated. For best results, calibrate a Mac monitor by running CalMAN RGB on a secondary, local monitor (figure 2.3).

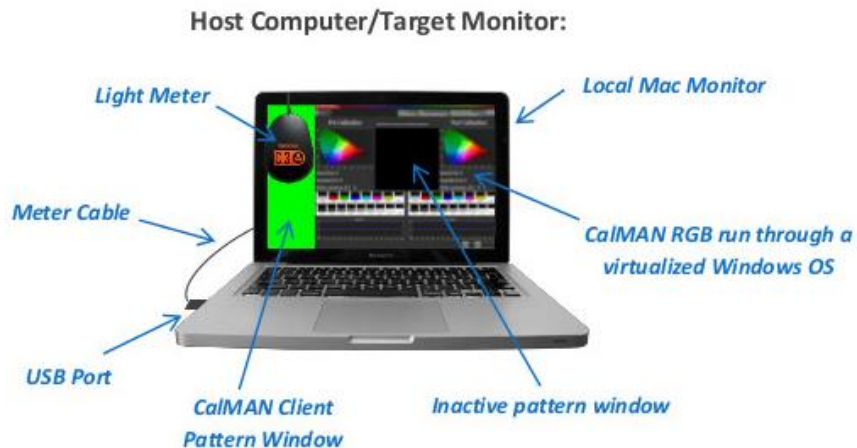**2.1 Calibrating a single monitor on a local Windows computer.**

Use the setup diagram below to conduct an Advanced Calibration on a single monitor connected to a Windows computer.

Host Computer/Target Monitor:

Pattern Window — Local Windows Monitor
Meter Cable — CalMAN RGB Window
USB Port — Light Meter

1. Connect the light meter (SpectraCal C3 Colorimeter) to the USB port on the host computer.
2. Open CalMAN RGB.
3. Select *Advanced Calibration* from CalMAN RGB's welcome screen.
4. From the opening screen of the Advanced Calibration workflow, select "This Computer," "Windows," and "Single" from the drop-downs in the bottom right-hand corner of the screen. When finished, click *Next*.
5. Follow the instructions within the workflow for connecting to CalMAN Client 3 and the SpectraCal C3 Colorimeter.
6. Continue using the instructions provided within the workflow to complete the calibration.

2.2 Calibrating a single monitor on a local Mac computer.

Use this setup to conduct an Advanced Calibration on a single monitor connected to a Mac computer.

Host Computer/Target Monitor:

Light Meter — Local Mac Monitor
Meter Cable — CalMAN RGB run through a virtualized Windows OS
USB Port
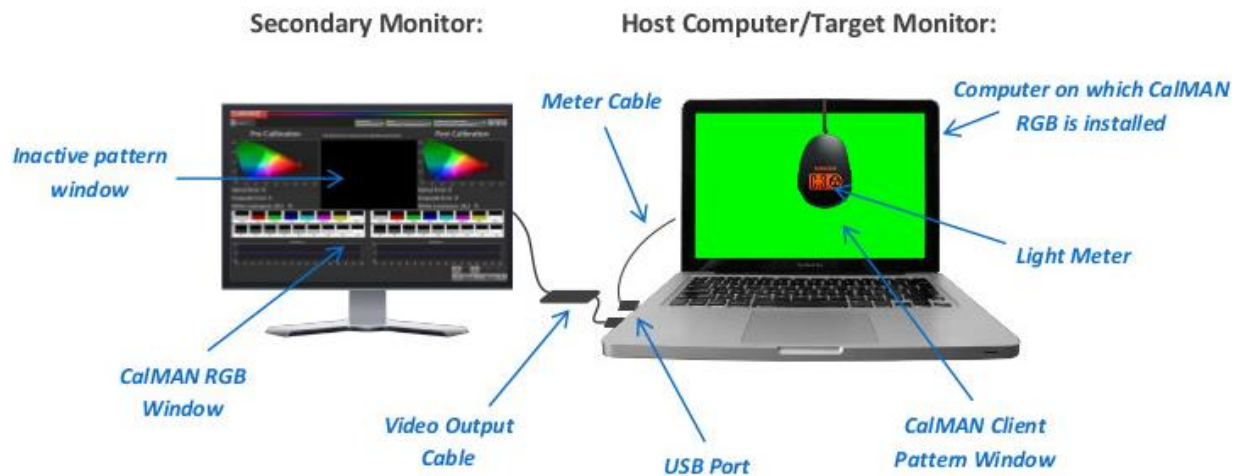CalMAN Client Pattern Window — Inactive pattern window

1. Connect the light meter (SpectraCal C3 Colorimeter) to the USB port on the host computer.
2. Open CalMAN RGB from a virtualized Windows machine.
3. Select *Advanced Calibration* from CalMAN RGB's welcome screen.
4. From the opening screen of the Advanced Monitor Calibration workflow, select "This Computer," "Mac," and "Single" from the drop-downs in the bottom right-hand corner of the screen. When finished, click *Next*.
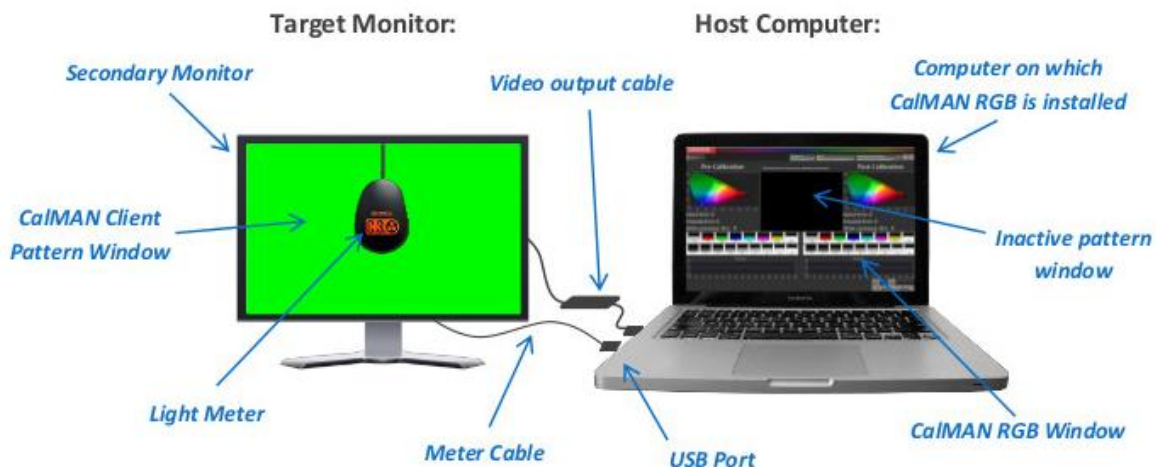
5. Follow the instructions within the workflow for connecting to CalMAN Client 3 and the SpectraCal C3 Colorimeter.
6. Continue using the instructions provided within the workflow to complete the calibration.

2.3 Calibrating multiple monitors on a local computer (Mac or Windows).

Use this setup to conduct an Advanced Calibration on multiple monitors connected to the host computer. (See below for possible Windows setup alternatives.)
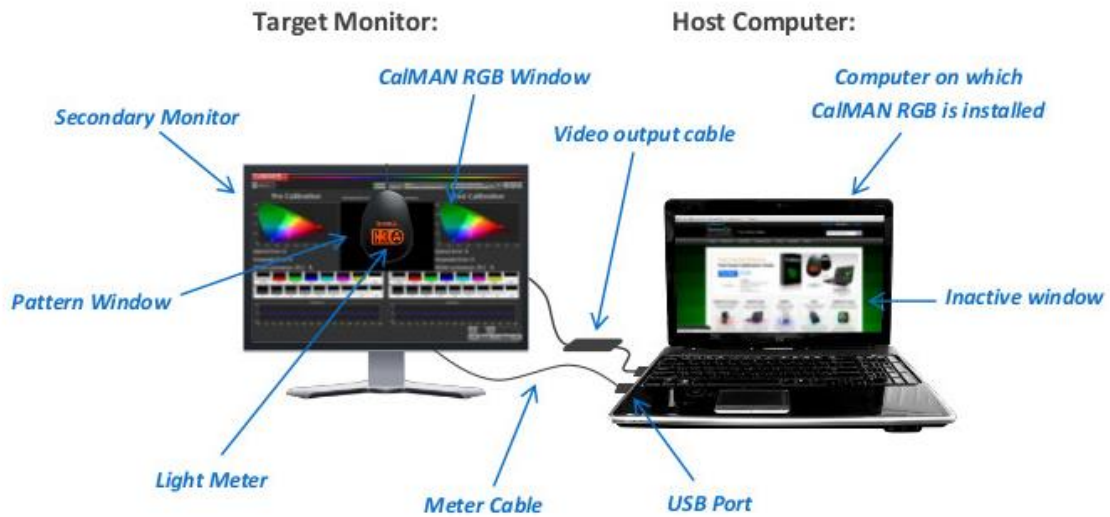

OR

1. Connect the light meter (SpectraCal C3 Colorimeter) to the USB port on the host computer.
2. Open CalMAN RGB. (If using a Mac, open the software from a virtualized Windows machine.)
3. Drag the CalMAN RGB window to the monitor you are not currently calibrating.
4. Select *Advanced Calibration* from CalMAN RGB's welcome screen.
5. From the opening screen of the Advanced Calibration workflow, select "This Computer," "Mac" or "Windows," and "Multiple" from the drop-downs in the bottom right-hand corner of the screen. When finished, click *Next*.
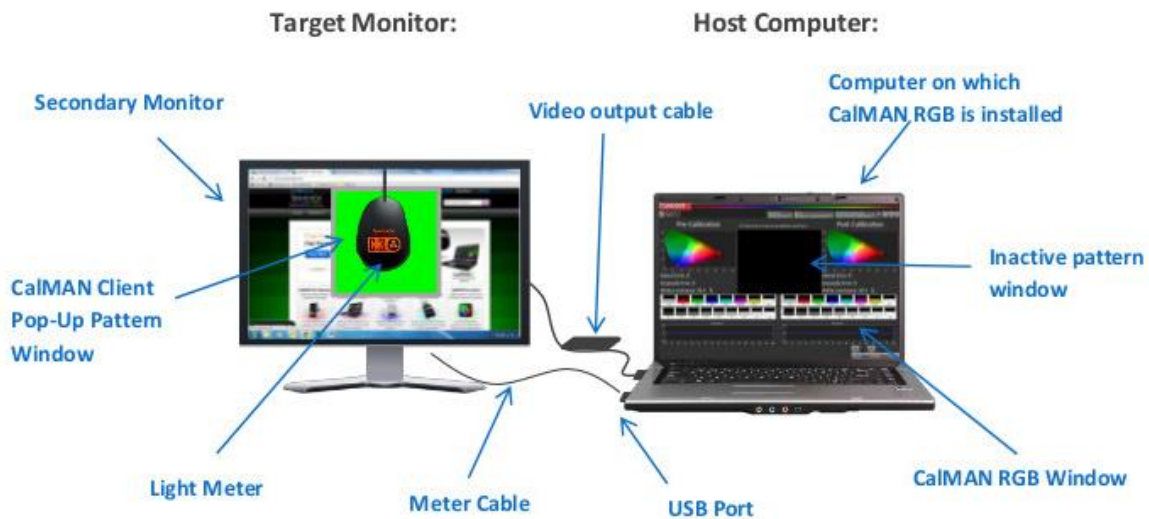
6. Follow the instructions within the workflow for connecting to CalMAN Client 3 and the SpectraCal C3 Colorimeter, ensuring that the C3 colorimeter is placed in the center of the target monitor.
7. Continue using the instructions provided with the workflow to complete the calibration.

2.4 Calibrating a secondary monitor on a local computer (alternative for Windows only).

If conducting an Advanced Calibration on a Windows computer, you may use these alternative setups.
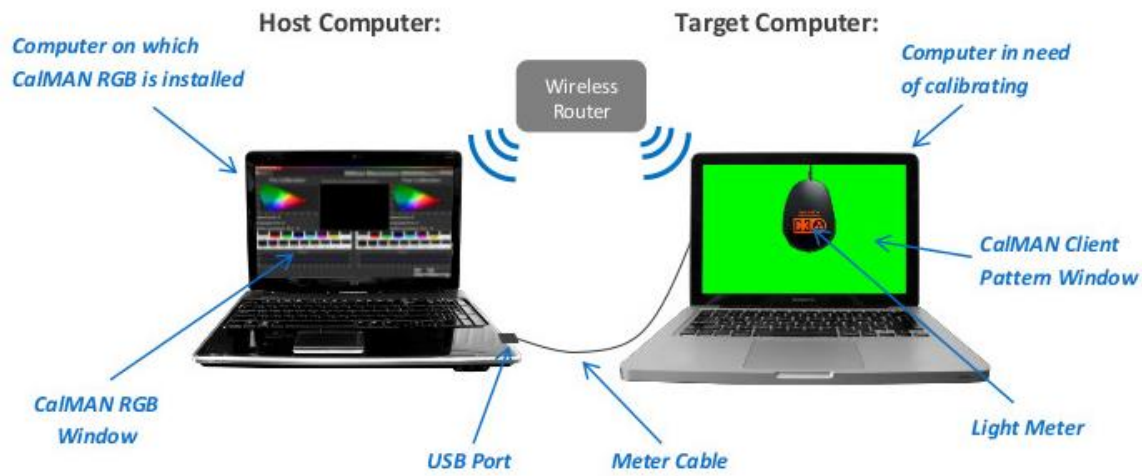

OR

1. Connect the light meter (SpectraCal C3 Colorimeter) to the USB port on the host computer.
2. Open CalMAN RGB.
3. If using the pattern window within CalMAN RGB, drag the CalMAN RGB window to the monitor you wish to calibrate. If using the CalMAN Client 3 pop-up pattern window, leave the CalMAN RGB window on the monitor you are not calibrating.
4. Select *Advanced Calibration* from CalMAN RGB's welcome screen.

5. From the opening screen of the Advanced Calibration workflow, select "This Computer," "Windows," and "Multiple" from the drop-downs in the bottom right-hand corner of the screen. When finished, click *Next*.

6. Follow the instructions within the workflow for connecting to CalMAN Client 3 and the SpectraCal C3 Colorimeter, ensuring that the C3 colorimeter is placed in the center of the target monitor.

7. Continue using the instructions provided within the workflow to complete the calibration.

2.5 Calibrating a remote computer.

Use this setup to calibrate a remote computer on a shared local network.

1. Connect the light meter (SpectraCal C3 Colorimeter) to the USB port on the host computer.

2. Open CalMAN RGB on the host computer.

3. Select *Advanced Calibration* from CalMAN RGB's welcome screen.

4. From the opening screen of the Advanced Calibration workflow, select "Networked Computer," "Mac" or "Windows," and "Single" from the drop-downs in the bottom right-hand corner of the screen. When finished, click *Next*.

5. Follow the instructions within the workflow for connecting to CalMAN Client 3 and the SpectraCal C3 Colorimeter, ensuring that the C3 colorimeter is centered over the target computer.

6. Continue using the instructions provided within the workflow to complete the calibration.

Running an Advanced Monitor Calibration

The following is provided to walk you through the pages contained within the Advanced Monitor Calibration workflow. Similar instructions as these are provided within the workflow itself.

Pre-Calibration Capture

Click *Read Series* (shown at left) to measure your monitor's performance before calibration. The

results of the pre-calibration capture will be used at the end of the Advanced Calibration workflow to compare the monitor's performance before and after calibration.

Adjusting Contrast

Use the "Adjusting Contrast" page of the Advanced Calibration workflow to optimize the contrast settings on your monitor.

Note: Not all monitors have adjustable contrast settings. Skip this page of the workflow if you are unable to manually adjust your computer monitor's contrast.

Follow the instructions listed on the "Adjusting Contrast" page of the Advanced Calibration workflow to measure and correct your monitor's contrast settings.

To accurately read measurement results, you will need to open the help panel from the *Help* button provided at the bottom of the screen.

Adjusting Brightness

If your computer monitor has manually adjustable brightness controls, click the *AutoCal™* button (shown at left) on the "Adjusting Brightness" page of the workflow to optimize brightness settings.

Monitor Optimization

Use this page of the workflow to select the optimal color temperature and white balance settings for your monitor.

Follow the instructions within the workflow to take readings of the available color temperature settings on your monitor. Use the RGB Balance chart provided to measure your monitor's variance from ideal color temperature settings.
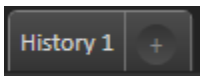
Create History Tabs at the top of the CalMAN RGB screen to aid in tracking the measurements for each color temperature setting.

When you have finished collecting color temperature measurements with the *Read Series* button (shown at left), use the instructions provided within the workflow for selecting the proper color temperature setting for your monitor.

Ultimately the correct setting will be whichever color temperature measured nearest to the yellow target lines on the RGB Balance chart within the workflow.

Monitor Calibration

Click the *AutoCal™* button to calibrate your monitor's gamma curve and repeat on the following page to create an ICC Profile.

Calibration Results and Visual Verification

Click *Read Series* to compare pre-calibration and post-calibration results. On the following page, click various photo thumbnails and switch between display profiles in the drop-down provided to see the before and after results of your calibration.

Online Resources

Additional resources for calibrating your computer monitor(s) are available on our website, **http://color.spectracal.com/support**. Further questions about using CalMAN RGB may also be directed via email to Customer Support, **support@spectacal.com**.

More from SpectraCal

Interested in calibrating your home theater? Be sure to check out our television display calibration software at **http://store.spectracal.com**.