

Tips & Tricks for Color Monitor Calibration

Featuring the X-Rite Eye-One Display 2

Introduction

There are many factors that contribute to our ability to perceive and experience color. In order to achieve consistent and good color, it is important to have a grip on color management. This includes successfully controlling one's lighting, display and printing devices. For this reason, color management experts have spent a lot of time and money investigating the phenomenon of color and creating devices that will help the amateur and professional image-maker and designer to create the best possible looking image. As Bruce Fraser, Chris Murphy and Fred Bunting, authors of *Real World Color Management* say,

“Color management won't make your monitor and your printer produce identical color, but it will produce a close and consistent visual match that, with very little learning, you can use as a pretty accurate predictor of the final output.” (Fraser 83)

Equipment Options

Color Management equipment ranges from simple monitor calibration devices to high quality spectrophotometers used for printer/press profiling, for users who are in need of exact color matching, such as those in the graphics industry. One of the primary manufacturers of calibration equipment is **X-Rite**. Aside from the Eye-One Display 2, some other devices for calibration are the ColorMunki Photo, ColorMunki Design, Pantone Spyder, and Monaco Optix.

The monitor calibration product that we will focus on is the Eye-One Display 2

Eye-One Display 2 is a professional monitor calibration tool that lets you achieve accurate color on all types of displays.

The award-winning Eye-One Display 2 delivers unrivaled color controls including Workgroup Match, Ambient Check and Match, Push Button Calibration and Validation—all essential tools for professional photographers and designers to attain accurate color throughout the digital workflow, whether in their own studio or in a collaborative production environment.

Preparations

Before you begin loading your software, please make sure that your workspace and computer system is properly prepared.

Lighting

How you light your workspace is incredibly important. It is best to have one consistent light source, rather than multiple sources such as a mixture of sun and lamplight because of the varying hues that are emitted at different light temperatures measured by degrees Kelvin: the lower the temperature of light the warmer the color and vice versa. 5000K is the best temperature of light for viewing because of its neutral color measurement, 6500K is the next best. According to The ISO (International Standards Organization), D50, approximately 5000K, (emits light at a very specific spectral power distribution) is the current industry illuminant standard for graphic arts and the ideal ambient illumination for your monitor should be between 32 lux and no greater than 64 lux. There are SoLux bulbs and lamps available through X-Rite or other lighting sources for this purpose.

Monitor Preparations

In order to get an accurate reading of your display, you will want to run your computer and monitor for 30-60 minutes prior to calibration. The authors of *Real World Color Management* suggest up to 90 minutes for LCD monitors. In addition, you will want to:

- Make sure your screen is clean.
- Have adjusted your monitor resolution to its ideal resolution setting.
- Turn the contrast all the way up (unless your monitor does not have a contrast adjustment) and the brightness all the way down.
- Turn off the screen saver and take your computer out of sleep mode. While the software ideally should keep your computer from going to sleep during the calibration process, it is good to turn it off anyway for the time being to be on the safe side.

System Requirements (As of 2008)

Macintosh

- Mac OS X (10.3 or higher)
- 128 MB of available RAM
- 80 MB of available hard-disk space
- Monitor resolution of 1024 x 768 pixels or higher
- USB support

Windows

- Windows 2000, Windows XP, Windows 2003 server
- 128 MB of available RAM
- 80 MB of available hard-disk space
- Monitor resolution of 1024 x 768 pixels or higher
- USB support

Software Loading

To begin, load the software from the disk that came with your equipment. Eye-Match 3.6.1 is the name of the software for the Eye-One Display 2. Click on the disk, then the Eye-Match icon. You can also download the most current driver software (3.6.2) at www.xrite.com.

A note on trouble-shooting

If you run into any difficulty launching your software or have technical questions about your equipment, X-Rite is very personable, helpful and can be contacted at 1-800-248-9748.

They also offer support online via tutorials and through email from the website: <http://www.xrite.com>.

Launching your software to begin

In order for the software to be fully accessible, you must have your equipment plugged in. Make sure that you have connected your calibration device to the unit with the USB cable. If the software cannot initialize, check your connection. If it does not register, try restarting your computer. If it still won't initialize, you may need to go into your disk utility and clear your user permissions. If it still won't work, contact X-Rite.

In Eye-One Match software, you have the option of calibrating your display, projector, scanner, camera, or to make profiles for your printer. This piece of equipment only allows you to calibrate your display.

1. Click on the image of the monitor to calibrate your display. You will be building a *Display Profile*.



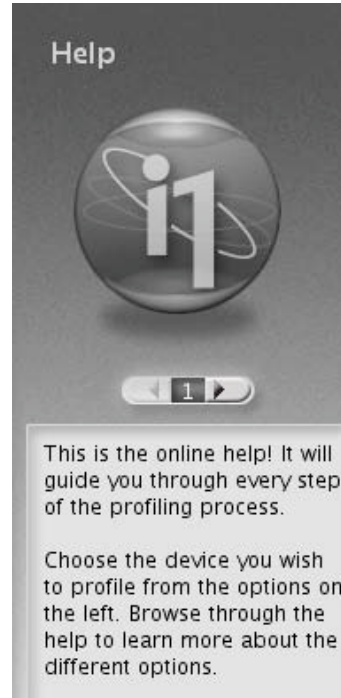
2. There are two options for calibration: Advanced and Easy. If you want to be able to calibrate with more discretion to suit your environment choose Advanced. In the advanced mode, you will be able to be more specific with your calibration settings and be able to choose the following:

White Point- defines the “color” of the white of your monitor.

Gamma- defines the perceived brightness in the monitor and detail in the shadows.

Luminance- determines the luminance of the monitor

- Please note there is also a Help Guide available in the software that will also guide you through the steps. This is located on the right side of the open window. To see a demonstration of what you are supposed to do with the equipment you can visually walk through the steps by clicking the right arrow at the top of the help guide.

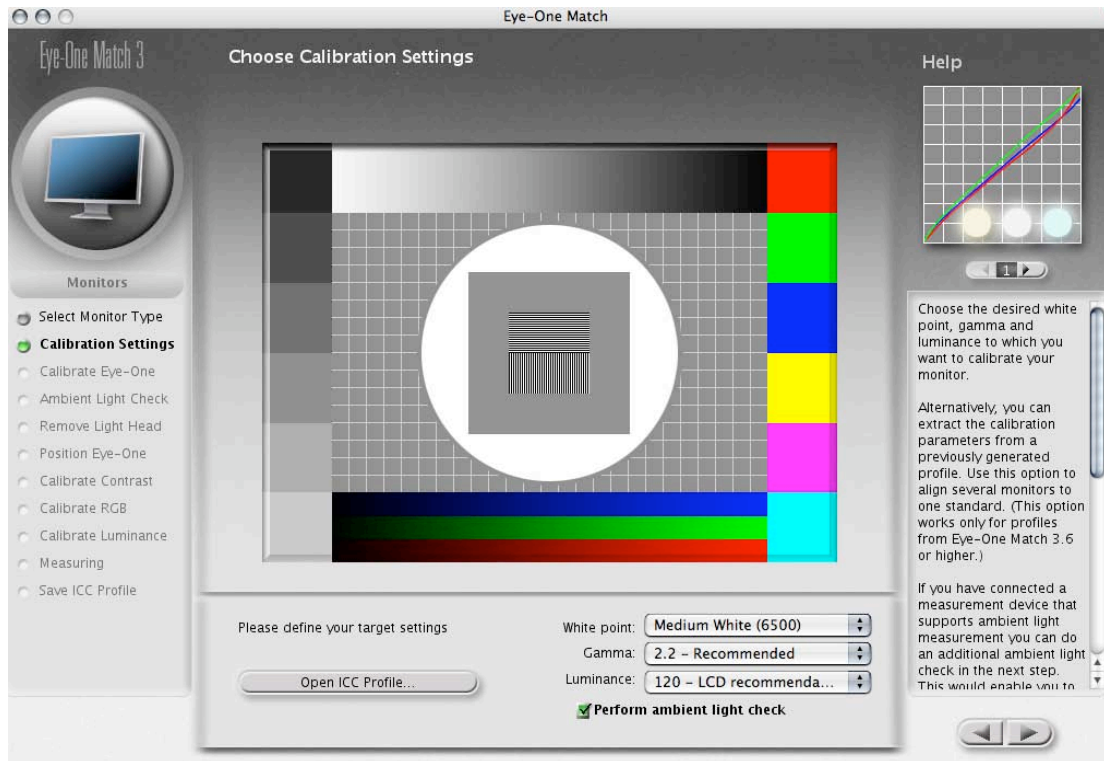


3. Click on the right arrow on the bottom right side of the screen in order to move on to the next step. You can go back to the previous screen by clicking on the left arrow.

4. Next, you will choose your monitor type. Your options are: Flat screen LCD, CRT or Laptop. Choose your monitor type and click on the right arrow.



5. If you chose Advanced, you will now define your target settings for White Point, Gamma and Luminance.



Suggested White Point, Gamma and Luminance Settings

CRT (Cathode Ray Tube)

White Point: 6500K (represents middle daylight white)

Gamma: 2.2

Luminance: 100 Lumens

LCD (Liquid Crystal Display)

White Point: Native White Point (Used to preserve the overall brightness of your monitor or if your monitor does not have the capability to adjust the white point manually.)

Gamma: 2.2

Luminance: 120 Lumens

Laptop (See LCD Recommended settings). Note: laptop displays have a smaller range of color possibilities than LCDs or CRTs. It is suggested that you calibrate and use a regular monitor for editing color in images or documents.

6. To measure the Target White Point of the room, check the box that says "Perform Ambient Light Check".

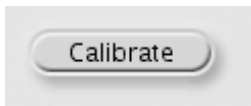
7. Click the right arrow.

Measuring Ambient Light



8. If you checked the Perform ambient light check box, this is the next step in the process. First you must calibrate the equipment. Mount the white, plastic ambient light head on your Eye-One unit.

9. Click on calibrate with your mouse to begin calibration.



10. When at the bottom it says, **“Eye-One calibration was successful!”** click on the right arrow.

You can now measure the illumination falling on the monitor as well as the color temperature of your ambient room light. With the ambient light head still on hold the device up to the monitor as shown in the example.



11. Press the Measure button or click the button on the side of the device to measure the light.

With this information you can make adjustments to your lighting situation and recheck it by clicking Measure. If the color temperature reads too high or too low, you can still calibrate your monitor. However, if you are making photographs or documents that require careful consideration of color, keep in mind that you will want to have an appropriate light source available to evaluate them. Again, there are SoLux lamps and Lightbooths that cast neutral light available for purchase by X-Rite for this purpose.

12. When you are done, click on the right arrow key and remove the ambient light head.

13. Position your calibration unit on your screen. To do this, attach the black weight to the cord, dropping it behind the monitor. Hang the Eye-One Display over the monitor. If you have a CRT monitor, use the suction cup to secure it to the screen. This is not suggested for LCD monitors because they are more fragile. Instead, gently hang it and position it so that it lays flat on the monitor.

Adjusting Contrast

14. You should already have set your contrast to 100% in your preparation. If not, do so now. This option is usually only necessary for CRT monitors. Typically, there are not any contrast control options for LCDs. If your monitor does have contrast control then be sure to adjust it as well.

15. Click on the Start button.

The program will find the calibration unit on your screen and begin taking measurements for contrast. It will show you an ideal range in the Contrast Indicator, as shown in the green section of the bar, and what it is actually measuring. Make adjustments, moving the contrast down until it falls within the ideal range.

16. When you have set your contrast appropriately, click “Stop”.

17. Click on the right arrow to continue.

Adjusting Luminance

Now you will have the opportunity to adjust the luminance level of your monitor. The writers of *Real World Color Management* suggest that you begin with your luminance set to the lowest point possible and move up from there, also as a note: keeping your monitor at less than full blast will actually extend the life of your monitor. When the Eye-One Match reads the luminance of your monitor, unless the monitor is already on the way out, the ideal measurement will be at about half of the full luminance.

18. Click on the Start Button.

As with the contrast measurement, the program will find the calibration unit on your screen and begin taking measurements. The ideal range is in the green section of the luminance indicator.

19. Increase your brightness until you are as close to the center point as possible. For LCDs, this is 120 and for CRTs, this is 100.

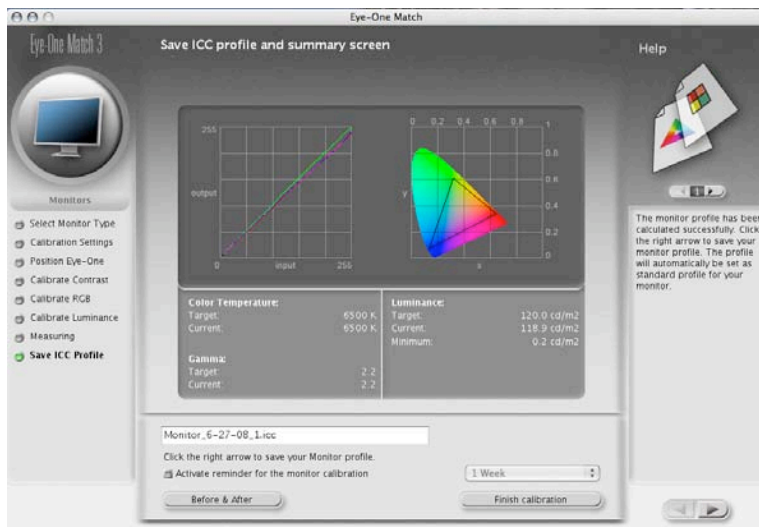
20. When you are satisfied with your luminance level, click “Stop”.

Calibration and Monitor Profile Creation

The program is now ready to measure color and to build a profile. Leave your equipment in position on your monitor and click the right arrow. The calibration will immediately begin. Be sure not to interrupt the measuring process.

Saving your monitor profile

The last step is to save the new monitor profile that has been created. A name will automatically be given to this profile: Monitor_date.icc. If you want to rename it, do so now.

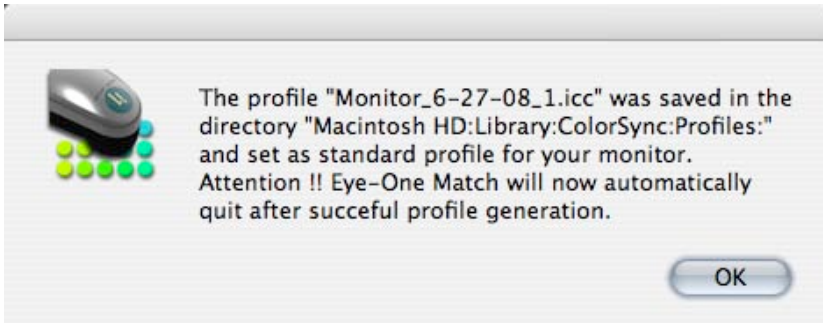


21. Check the Active Reminder for Monitor Calibration box if you want to be reminded to re-calibrate your monitor. It is suggested that you do this once a week for CRT monitors and at least once a month for LCD monitors.



22. Click on Finish Calibration.

A little screen pops up letting you know where your profile has been saved. In this case, on a Macintosh computer, it was saved in “Macintosh HD: Library: ColorSync: Profiles” and set as the standard profile for this monitor. You can check to see that this profile is loaded by going into Apple: System Preferences: Display: Color. Your new monitor profile should be highlighted.



...And you are finished!

Suggested Reference Materials

Andrew Rodney. *Color Management for Photographers*. Focal Press. UK: Oxford. 2005

Bruce Fraser, Chris Murphy and Fred Bunting. *Real World Color Management*. 2nd Ed. Peach Pit Press. CA: Berkeley. 2005

X-Rite: www.xrite.com

www.digital2you.cc

PO Box 219
Parker CO
303-934-2777