

## Monitor Calibration and Characterization

If you are serious about getting control of your color workflow, proofing your color output in Photoshop, and generally reducing the frustration of creating consistent color, you should calibrate and characterize (profile) your monitor. Calibration places a monitor into an accurate condition, making the monitor behave predictably and consistently. Characterization creates a profile that describes that condition to your color management system.

### Standard Desktop Monitors

Monitor manufacturers typically set monitors for both Macintosh and PC platforms with an excessive blue content and a very high color temperature of about 9300 Kelvin, roughly twice that of normal daylight. These monitors are bright, easier to read text from than less bright monitors, and appear color neutral after staring at them for any period of time. Most monitor vendors also include a generic profile for a given model line. These general profiles are less than useful since the monitor is not first calibrated to put it in a neutral state before profiling.

What is calibration, and why is it necessary before profiling?

### Monitor Calibration

Monitor calibration consists of setting a proper white point color temperature and then neutralizing color casts. The initial calibration of a factory preset monitor, for instance, would lower the color temperature to 6500 or 5000 Kelvin and neutralize the strong blue color casts. Even the same model monitor from the same manufacturer will have unique characteristics that will be neutralized during calibration and will be included in the creation of the monitor's profile.

Most monitors on the market today will allow you to set brightness and contrast. If you are going to do color image creation or editing on your monitor, you should get one that also allows you to set color temperature and control the individual red, green, and blue color guns. Without these controls, you will not be able to place your monitor in a proper white point color temperature and neutralize color casts by manipulating the individual colors.

Some monitors are self calibrating, and some ship with built-in calibration hardware. If you do not have one of these higher-end monitors, you will need to use some sort of monitor calibration system. Adobe supplies a visual calibration and profiling utility with Photoshop called Adobe Gamma. You can also purchase third party calibration and profiling systems. Hardware calibration systems are generally much more reliable than visual only calibration systems like Adobe Gamma. The hardware device in these systems reads colors directly off the screen of your monitor allowing for the precise neutralization of color casts. This is extremely difficult to do visually.

### Which Color Temperature

5000 Kelvin is roughly the same color temperature as early afternoon sunlight and has been the prepress standard for years. Some monitors have a hard time achieving enough luminance when

set at 5000 K, and some users object to a perceived yellowish cast at this temperature. If you are producing images for the web, or you are producing both print and web images, a 6500 K temperature setting may make more sense. If you are producing only print images, 5000 K may be the better setting. The best result for an individual user can be determined by trying both settings before choosing a preferred working temperature. In a workgroup, the entire group should be set to the same color temperature.

## Monitor Age

The color phosphors in monitors wear out. If your monitor is in the 3 to 5 year age range, it may be ready for replacement. As monitors age, they get harder to calibrate and they need to be calibrated more frequently. Even new monitors should be recalibrated every couple of weeks. As the phosphors wear out, it is difficult to achieve the necessary luminance at lower color temperatures, and it is definitely time to replace the monitor or plan on working in a totally darkened room.

## Viewing Conditions

The conditions under which you view your monitor have a strong effect on your perception of color. The amount of light in your workspace, light reflections off your screen, color casts from strongly colored walls are all important factors in your ability to perceive an image on a monitor. At the very least you should shade strong light sources such as windows and position monitors so that light sources do not reflect on your screen.

Some high-end monitors ship with shades for the sides of the monitor. If you do not have one of these, it is a simple matter to make a shade out of cardboard painted matte black that projects from the sides and top of your monitor to shade your screen from stray reflections.

## Reasonable Expectations

Computer monitors produce additive RGB color. If your output is print, the final image is CMYK reflective color. You should not anticipate that you are ever going to get a perfect match between what you see on your monitor and your final print.

You can, with careful attention to color management and use of good color profiles for your monitor and printer, get reasonably close. Close enough with experience, in fact, to be able to reasonably and accurately anticipate printed results. Calibrating and profiling your monitor is one of the absolutely key steps in a successful color management system.

---

This article is from the Tutorials section of MikeRollins.com. Additional tutorials relating to digital imaging, as well as links to digital imaging resources, can be found on this web site.