

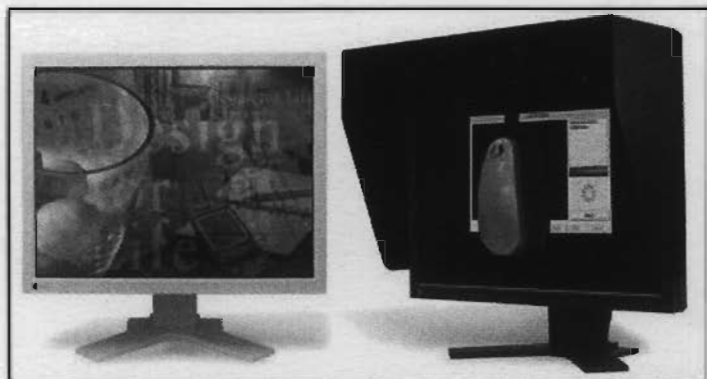
Colour management: A black art?

We all struggle - often frustratingly - to get our prints to look just like we saw them on the screen. This new series is aimed at helping you to clear the mist and know how to achieve that colour match from monitor to print. Below we start with the monitor calibration guide from Phil Binks, who works in colour management at Bodoni Systems. Phil has been a keen photographer using both film and digital for 25 years. Call Phil at Bodoni

Systems on +44 (0)1895 825776 for further advice and available calibration systems and see Bodoni's online shop at www.bodoni.co.uk

Seeing the right colour on screen

The monitor is the device which you will ultimately be using to first judge image colours, and is the device used for judging subsequent changes. This makes it the most



important device to be calibrated and profiled. Both CRT (Cathode Ray Tubes) and LCD/TFT (flat screens) can be calibrated. However, do remember that LCD/TFT screens have fixed black and white end-points, meaning that only the shades between can be lightened or darkened.

How to calibrate your monitor

Visual calibration methods such as Adobe Gamma are unreliable, as colours, environmental aspects and dark and light shades are often misjudged. The range of colours used is also very limited, leading to discrepancies in both highlight and shadow areas.

Important notes for Windows users: Remove Adobe Gamma Loader from your Start-up items folder, as Adobe Gamma is likely to conflict with any alternative monitor calibration. And NEVER save the monitor profile using an existing document profile name such as sRGB or Adobe RGB.

Colorimeters

Hardware monitor calibration devices are called colorimeters. They measure the response of the screen to reproduce a range of colours, typically Red, Green and Blue, then neutral tones. High quality colorimeters include Gretagmacbeth's Eye-One Display2, X-rite's Monaco OPTIX XR and Colorvision's Spyder2. These devices will all calibrate both Mac and Windows PCs, LCD and CRT monitors.

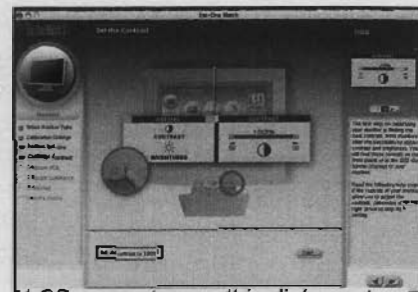
Using a colorimeter

With the guidance of the colorimeter, you first adjust the contrast and brightness (if you have suitable controls) on

the monitor, to achieve the working white point. This process is often followed by measured RGB adjustments. This is the calibration. The colorimeter then performs a series of colour measurements and writes the file: this is the profiling.

Important notes for LCD/TFT users

Following the instructions of your colorimeter's software, you may be asked to change the contrast settings on the screen, typically to raise it to 100%. IGNORE this request! Adjusting your LCD monitor in this way will not help your colour calibration and may even prevent it from working, giving awful results. Leave the contrast setting at the factory default, often 50% on a 0-100 scale.



Also, RGB controls (if you have them) on the LCD monitor are often best left at default settings. Brightness adjustment requests however should be followed on an LCD monitor.

Presets

Most high-level colour calibrators have two calibration modes, Easy and Advanced. Easy mode will simply calibrate the monitor to standard default settings - often good for Laptop and low end LCDs. Advanced mode gives you some options to select. The following guidance should help.

Monitor settings - white point

Well, if anything were to prove that colour management is a moving target, the white point consideration is it! Whiteness depends upon the lighting. If you shine an orange light on a white piece of paper, then the white paper appears orange. So, what is a white point?

The white point setting is basically asking you: What type of light do you want the image to be shown as being lit by? Or put differently: In what lighting will you be viewing your finished print?

Morning light is a different colour from mid-day light, or evening light. This colour is measured in Kelvin (K) and referred to as colour temperature. Loosely, as shown in the diagram below, an orange warm light has a lower number - 4500K - mid-day light is about 5500K and cool blue light would be about 9000K.

The recommended settings for white point on a CRT monitor is 6500K or D65 as it's referred to. This setting is recommended as it is most likely to match the whiteness of your printed paper. 6500K represents daylight on bright day, with a light cloud covering. 5000K is also used, especially in the USA, but is rather too warm for most tastes, and doesn't represent the whiteness of most photographic/inkjet papers.

White point settings for LCD screens can be set to 6500K, but they often look better if the Native setting is selected. Native retains the fixed white point of an LCD, as measured by the

colorimeter. This improves the tonal gradations up to that white point.

Monitor settings - gamma

Gamma adjusts the mid-tone lightness of your monitor. It has the same effect as raising or lowering the mid-point of a curve. Gamma 1.8 appears lighter than 2.2, displaying lighter shadow details. Apple Macintosh computers were originally manufactured to use a 1.8 gamma, whilst Windows uses a 2.2 gamma. Today, it is common to set 2.2, even for Mac users.

You may wish to experiment with these settings to find which you are happiest with and, ultimately, which most closely represents your printer's tonal range.

Monitor settings - luminance

Luminance is the measure of the brightness of the screen most regularly measured in cdm^2 (Candelas or Candles per square metre). For a colour calibrated monitor these target settings are recommended:

- CRT 100 cdm^2
- LCD (Laptop) 100 - 120 cdm^2
- LCD (Standard 8 bit model) 100 - 120 cdm^2
- LCD (High-end & 10-bit) 120 - 140 cdm^2

Generally speaking, achieving a higher cdm^2 up to the 140 mark is ideal. Above this you will have a brightness value which will simply not be replicated on printed output. The figures above are recommended as they are mainly as good as you will get with the particular monitor type.

As your monitor gets older it is likely that the measured level will reduce to a point where you should question the effectiveness of the monitor for colour critical work!

Back to the darkroom!

Monitors are susceptible to light reflection. Light has the effect of reducing the contrast range by raising the black point (darkest point) to a dark grey. The colours also

become less saturated and have a corresponding reduction in tonal range. So here are some monitor tips

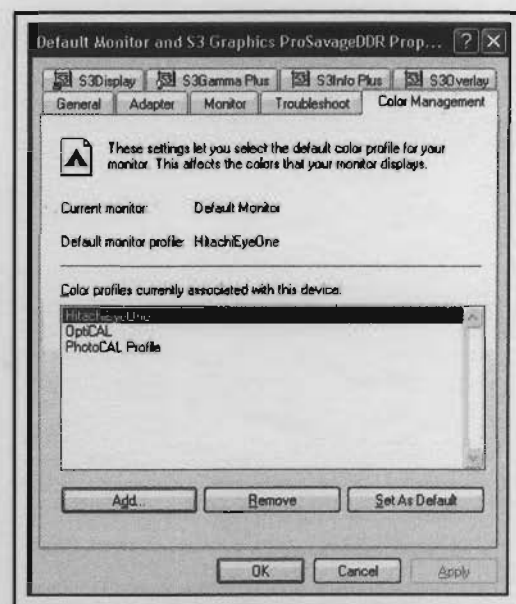
- View your monitor in shaded, dim or dark conditions;
- Keep the lighting conditions as constant as possible between calibration and viewing/working;
- Don't calibrate during the day, if you only work on your images at night!
- Turn on your monitor to warm-up an hour before you calibrate or begin colour-critical work.

How do I use the monitor profile?

The calibration function always ends with a *Save profile as...* dialogue box. Once saved with your chosen name, both Windows and Mac operating systems automatically reference the profile. By default the software saves the profile with the current date as a name but this serves only to fill your profile folder with useless old profiles! So, save the monitor profile using a unique name, perhaps that of the monitor, or your profiling device, for example OPTIX XR.

It is very rare that you need to select the monitor profile within an application dialogue box, and it should only be chosen if the application specifically asks for the monitor profile.

You can check on Windows XP that the profile is being used by navigating to the Displays section in the Control Panel. Click on Advanced and select the Colour Management tab, as shown here.



The screen shows you the current working monitor profile, and any others you may have created using different names in the past. Mac OS X users can simply check the System Preferences>Displays>Color tab to reveal which monitor profile is currently being used - it will always be the latest one made, unless you select an alternative.

In the next colour management instalment I will provide you with more background information to help you understand which settings to use to achieve matching printed colour. And remember that Bodoni Systems offer Colour Management training on a one day course at our offices in Harefield, Middlesex. If you'd like more details please ring or email me, mentioning DIGIT, at phil.b@bodoni.co.uk