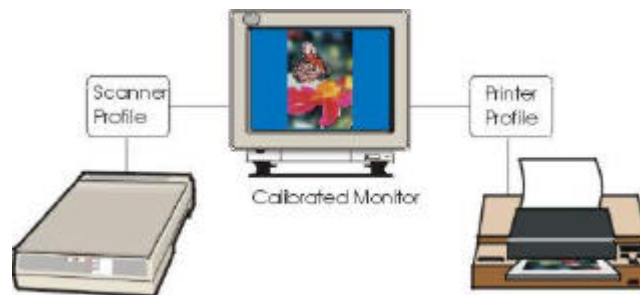


Why we need colour management

In an ideal world, you would take a photograph, scan it in, and the image on the screen would look just like the photo. You would then print it out, and would be able to put the original and the copy next to each other without being able to tell the difference. And you could also put an image from your digital camera straight up on your screen and be able to print out something that looks pretty close.

Only a few years ago, this would have been total fantasy. We will probably never actually reach this ideal, but nowadays we can get close, and this is achieved by colour management systems.



What does it do?

To understand this, we first need to look at how a real-world image gets into the computer, where it has to be stored as a series of numbers. Say that you are scanning in an image: the scanner works its way down the original and measures the light reflected from each picture element (pixel). Because the eye sees colour as combinations of red, green and blue light, the scanner measures the amount of each of these separately for each pixel, and gives it a score of 0 to 255. The collected scores make up the digital image, which is then displayed on the screen. But without colour management, there is nothing to say that the colours on the screen are going to come out the same as the ones that have been scanned in. Unless the monitor has been calibrated, it could be a mile out - you can alter the brightness and contrast controls until you see what you want, but is it a fair representation of the image as captured by the scanner?

Up to now, we have been dealing with light - the red, green and blue light reflected from the print is converted to red, green and blue luminous dots on the screen. But as soon as we want to print, everything is turned on its head. The white paper that we start with is the lightest colour available, and all we can do is subtract from that by putting down dots of dye. We use cyan to absorb red light, magenta to absorb green, and yellow to absorb blue light. So, to print a green area, the printer puts down both yellow and cyan, in order to take out the red and blue and leave only the green. Because of this, printing a good colour match is not easy to do, and the range of colours (gamut) that can be printed is not the same as the gamut that can be displayed on the screen.

Colour management allows you to improve the consistency between what you see on the screen and your original work. It also gives you a better idea of what your final print will look like.

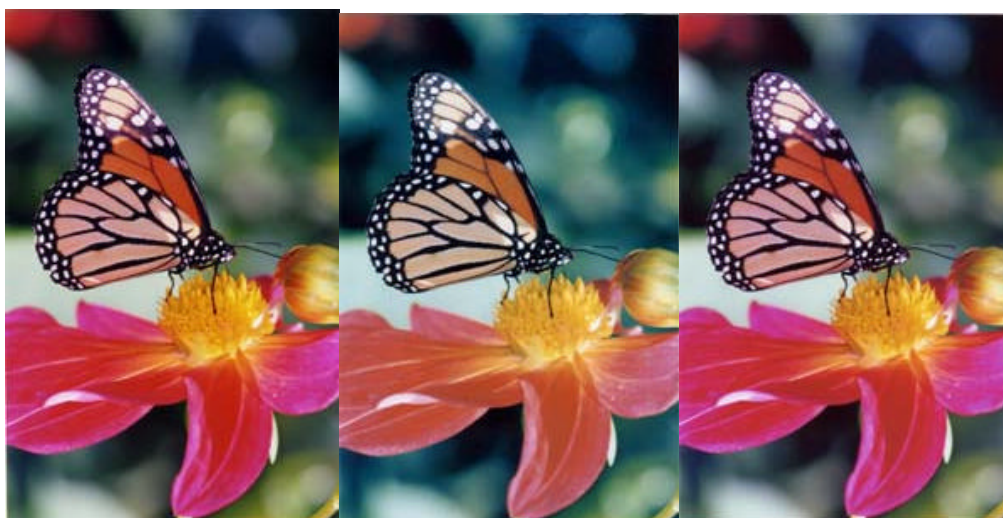
How the ICC profiling system works

The International Color Consortium (ICC) system www.color.org/ was devised in order to remove some of the uncertainties, and Microsoft consequently built colour management into Win98 and later versions of Windows www.microsoft.com/hwdev/devdes/icmwp.htm . A critical part of this is to have a standard way of describing the properties of a digital image. This is achieved by the sRGB colour space, in which a colour can be defined by its sRGB co-ordinates. So before you start, make sure that sRGB is your chosen option for a colour space in your image manipulation programs.

The first step is to calibrate your monitor. Many image manipulation programs will allow you to check the monitor's set-up, or alternatively, a quick search on the web will take you to a choice of set-up pages. But once you have done it, be careful. If you adjust the controls, or the lighting around the monitor, or even after a period of time, you will have to go back and set it up again - fortunately it is a quick and painless process.

The scanner profile should be loaded with the scanner software, but will only be fully active if the sRGB option is chosen in the TWAIN interface. Printers will normally come with a default profile that is activated on loading the driver. But check that the profiles are activated, by looking in the printer and scanner properties from the Start menu.

The printed image should now be reasonably close to what you see on the screen, so you can edit your images and be confident about the results that you will get. Of course, not all the images will start life in your scanner, but a well-produced image from a web page or CD should conform to the same standards and give good results. If there are any problems, you can see them on the screen and correct them. Digital cameras are, of course, one of the most important sources of images, and are particularly difficult because no profile can take account of the illumination at the time of exposure. However, with confidence that what you see on the screen is what you will get in the print, then the final adjustment of the image is in your hands.



Original

No management

Colour managed

What if I use a Mac?

It's well known that the monitors on Macs are set to a different gamma (contrast), but this is no problem in practice. Apple have built ColorSync colour management into their operating system. This allows you to calibrate your monitor and use profiles defined by the manufacturer. <http://www.apple.com/colorsync/>

The Future

Over the next few years, we will see colour management being universally used, with improved ICC profiles being provided by printer and scanner manufacturers. Inevitably, expectations are going to get higher, and you are going to want to have profiles that are tailor-made to your favourite media. At present that is only possible if you generate them yourself, but ICI Imagedata is pioneering the development of profiles for its Olmec dye thermal and inkjet media, and selected profiles for the most popular printers will shortly be on the website at www.ici-imagedata.com available for download.

This article has just scratched the surface of the subject of colour management. The good news is that there is a lot more information that can be found by a simple search on the web. As a start, you could look at these pages: www.digitaldog.net/tips.html and www.linocolor.com/colorman/links.htm.