

Evaluating ICC profiles with ColorThink Pro software

Valid profiles

How do you know if your ICC profile is valid? If the profile is for a printer, you can output a number of representative images and examine the prints under controlled lighting. My Printer Test File, a document with memory colors and synthetic imagery, can aid you in eval-

uating a printer profile; download the file at www.digitaldog.net/files/Printer%20Test%20file.jpg.zip.

Various problems, including poor output quality or print-to-screen mismatching, are not uncommon, and it can be difficult to root

out the problem within the color management chain. Was the device behaving properly prior to generating the profile (are all ink heads firing)? Is a series of gray patches really gray or do they only appear to be under this lighting? Is the gamut of the device sufficient to reproduce the colors in your images? Such questions are best answered with the analytical and statistical data obtained from a profile. Looking at the problem as numbers can point you toward areas to further examine then fix.

One utility for gathering a wealth of information about ICC profiles is ColorThink Pro from Chromix. If I were stranded on a desert island and had only one color management utility on my laptop, I would want it to be ColorThink Pro. It would take many more pages than I have at my disposal to give an overview of all the features and capabilities of ColorThink Pro, so I'll just hit the highlights.

ColorThink Pro is a new, improved and more powerful version of the original ColorThink. Its new power comes in a surprisingly easy-to-use mode called ColorSmarts Guide. Simply select the function, such as evaluating the quality of a profile or device, and select the tests in the box at the left. A step-by-step wizard will ask you to select a profile or other necessary information, and the ColorSmarts Guide will do all the work. You really don't need to know anything else about the program's internal workings.

Let's look at a few useful tests that provide feedback about how an ICC profile behaves. I've selected Evaluate a Profile and then Evaluate Neutral Rendering, then I'm asked to select an ICC profile. ColorThink Pro did all

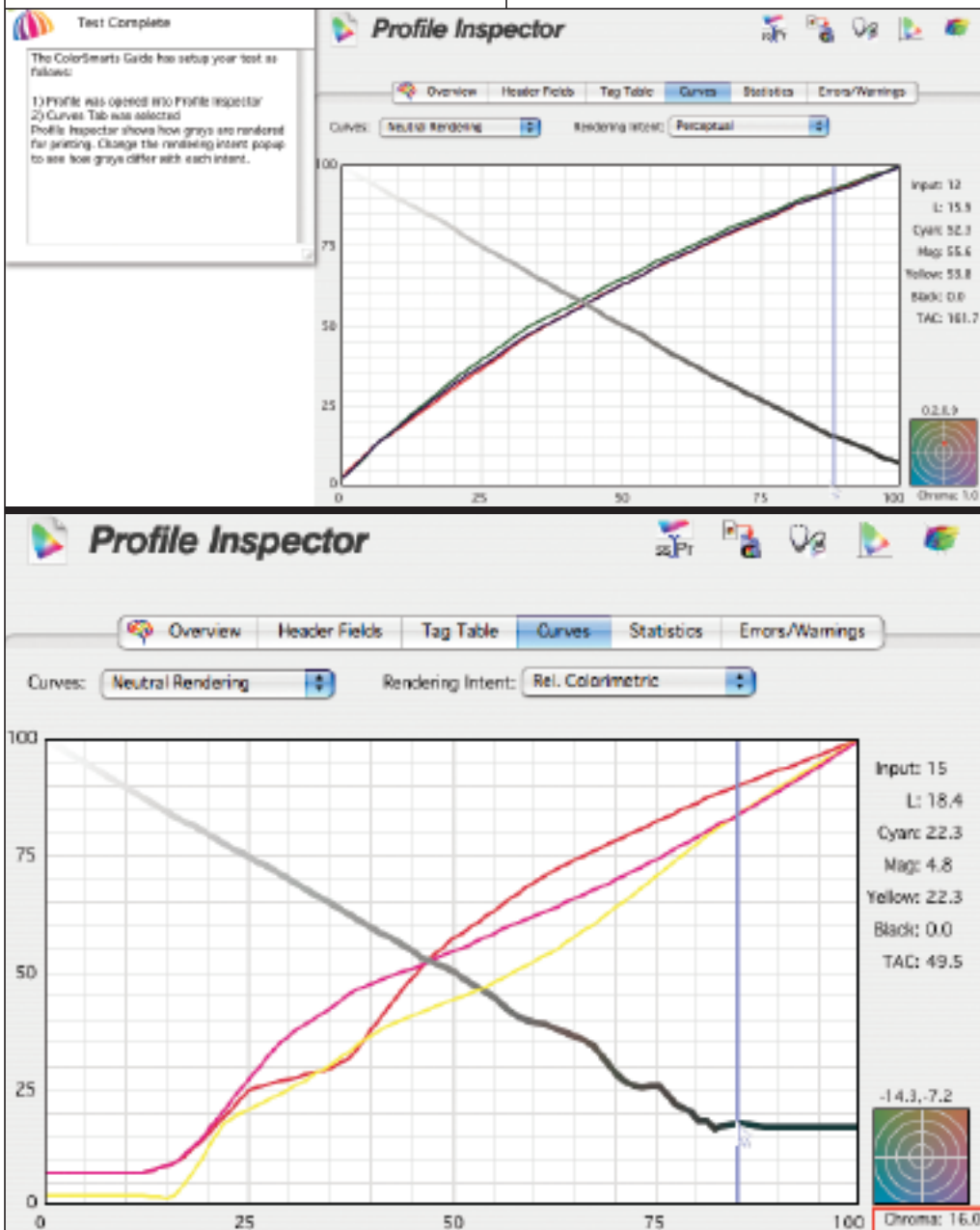
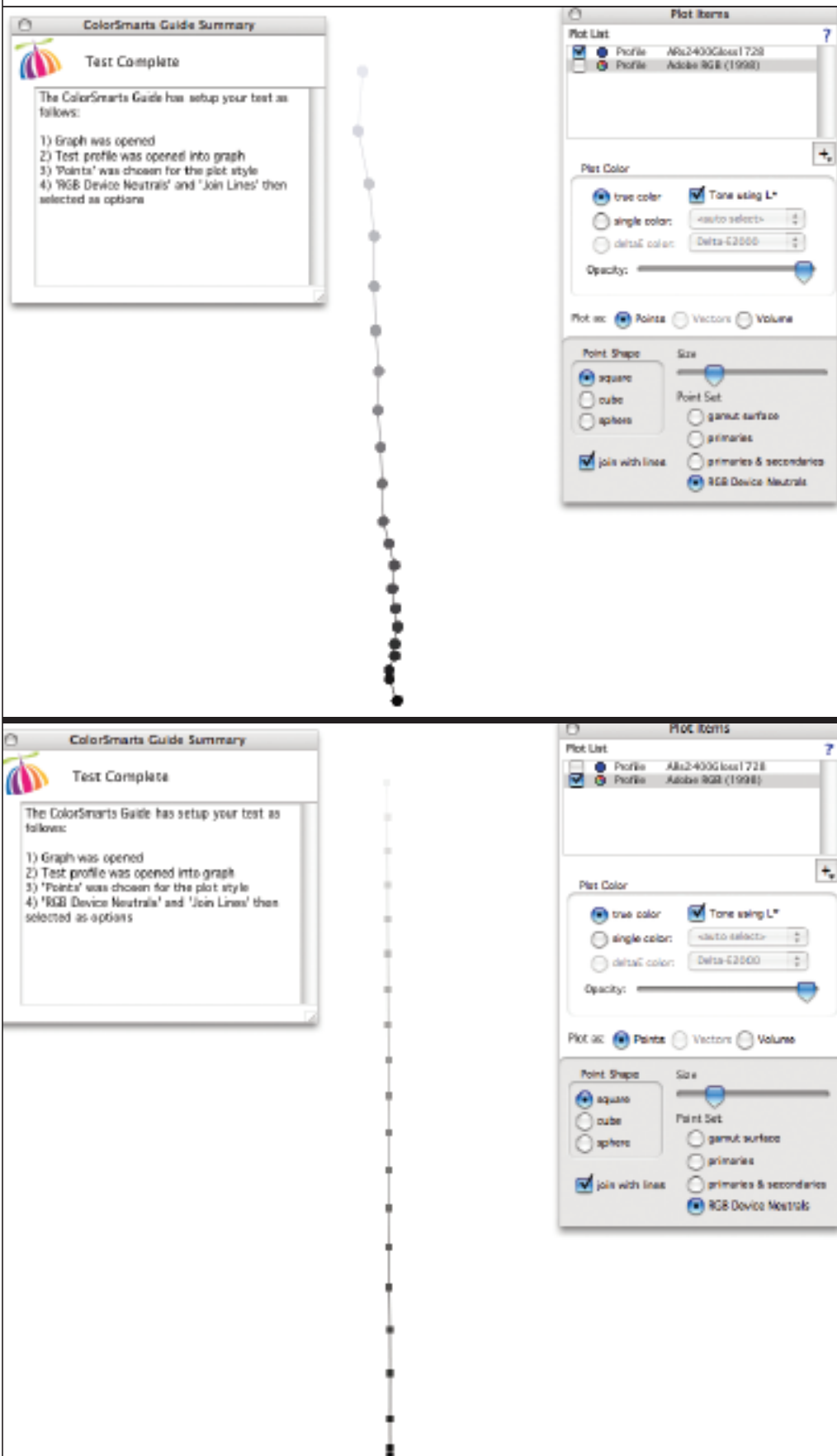


Figure 1: The first Profile Inspector window shows a very low chroma value of 1.0 at level 12. However, the second Profile Inspector window shows a very high chroma value (outlined in red) of 16, due to this profile's having been built on a printer with a clogged print head.



the work in producing the results in **Figure 1**. You see the red, green and blue curves of the ICC profile I selected (an Epson Stylus Photo 2400 and glossy paper). As I move the cursor from left to right, I can examine the neutrality of the curves within the ICC profile, from black to white, while keeping a close eye on the chroma bull's-eye at the lower right of the Profile Inspector window. A chroma value of 0 would indicate a perfect neutral; 0 chroma indicates no hue. This profile is pretty good; the worst area has a 1.0 chroma at level 12. Notice in the second Profile Inspector, a profile of an Epson 2200, neutrality is so poor you can't see even a red dot in the chroma area. At this point in the curve the value is a whopping 16. Obviously something's wrong with this profile, and thanks to ColorThink Pro, we know why; due to a clogged print head, there was no dark cyan ink used when the profile target was built.

Since an output profile provides data about the device it is based on, this profile provides useful information about each device. When I click on Evaluate a Device in the ColorSmarts Guide, I'm presented six options. I select Evaluate Device RGB Calibration. ColorThink Pro's online help (in the far right window) tells me this test will evaluate the neutrality of a device at the time the profile was built. I simply select a profile and click the Next button. ColorThink plots the neutrals in a three-dimensional graph that can be rotated. In **Figure 1** you can see the results from the same Epson 2400. Spinning this plot around an axis makes it much easier to see where the grays fall outside a perfect neutral; a perfectly straight line of dots run-

Figure 2: The results of this test show how well the printer behaves with respect to neutrals from black to white. Spinning this three-dimensional graph makes it easier to see where neutrals fall outside a perfect neutral. Notice that even in print, the graph of Adobe RGB is perfectly straight along the vertical axis.

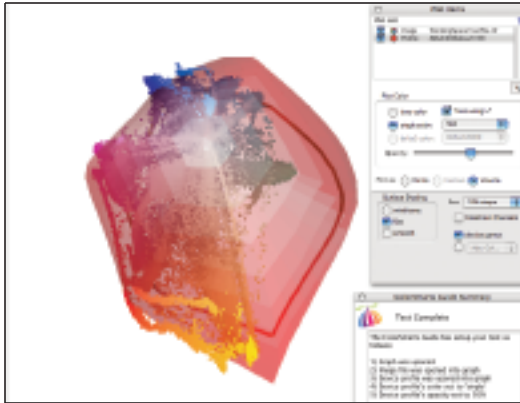


Figure 3: This is the gamut of a printer and an actual image. Each colored dot represents the gamut of the color in the image.

ning vertically from black to white. This is illustrated when I plot an RGB working space—Adobe RGB (1998)—using the same test. The balls line up perfectly in the vertical axis. Each of the 256 values in Adobe RGB (1998) is neutral, a benefit of all RGB working spaces.

One more useful test: I can compare the color gamut of any image to the gamut of any device using ColorSmarts Guide. I simply select an image and an ICC profile. I again selected the Epson 2400 and a drum-scanned image with highly saturated colors. In **Figure 3** the gamut of the printer is in red and the actual colors from the image are represented as colored dots, one dot per color. You can see that some yellow, blue and magenta dots fall outside the gamut of this printer. I can spin this three-dimensional graph to see the entire color space. Notice, too, that the red gamut representing the Epson printer has a controllable translucency so I can see where the colors of my image fall.

ColorThink Pro and ColorThink are great teaching tools because they show us how the color spaces of devices and images interact. I can even record a QuickTime movie of a spin of these gamut plots to share with others .

You can download a demo version of both ColorThink and ColorThink Pro for Mac OS X and Windows 2000/XP at www.chromix.com/colorthink. ■