



Hangin' with the Color Geeks

When you want real world answers to getting your press colors to match what you see on screen, or making your inkjet proofer behave, or figuring out how to use ICC profiles properly, where do you go? The ColorSync user forum is a good place to start.

by Michael Kieran



In today's fast-paced color production workflows, photographers and other creative people are implicitly accepting more responsibility for color quality, so everyone needs to be on the same page — figuratively and literally.

If color really matters to you, it means that you've had to learn a lot of new words and concepts lately—such terms as color spaces, rendering intents, degrees Kelvin, and device profiles. These are the currencies of today's new paradigm for color control, based on the ICC (International Color Consortium) standard profile format for describing the behaviour of all color input and output devices. Most major manufacturers of digital color hardware now support ICC profiles in their latest scanners, digital cameras, printers and film recorders, alongside the makers of most serious graphics applications (and the Macintosh and Windows operating systems).

Whether you like it or not, the adoption of ICC-based color management has taken us well beyond the safe old graphic arts world in which most of the responsibility for color quality rested with anonymous (and remote) scanner operators, retouchers and proofers. In today's fast-paced color production workflows, photographers and other creative people who produce original images are increasingly required to provide each picture in a known color space—that is, with an embedded ICC profile.

In doing so, they are implicitly accepting more responsibility than before for color quality, and therefore need to be more concerned with how to convey their visual intent to the reader or viewer. In fact, everyone in the graphic production chain, from

image originators to those involved in design, prepress, printing, and online publishing, needs to be on the same page—literally and figuratively—as far as color management is concerned.

WHERE ARE THE COLOR GEEKS WHEN YOU NEED THEM?

So where are you expected to learn all this stuff, plus keep up to date with ongoing innovations and product introductions?

In my opinion, there's only one color management resource that accurately covers all the essential topics, even while delving into the most arcane details of color science. It's the free mailing list at www.apple.com/colorysync (or directly at www.colorysync.com).

Sign up (did I mention it was free?) and you'll receive a daily e-mail containing on average a dozen or so messages. Scan the subjects and you can quickly read those of interest and trash the rest.

One of the most useful aspects of the ColorSync list is that many messages are from users having real-world problems with the latest color imaging hardware and software products. The proposed solutions come mainly from independent consultants and tech support personnel at the hardware and software vendors, as well as other users that include some of the top names in the color management industry. Among recent contributors you'll find consultants Bruce Fraser and Chris Murphy (two authors of the recently-released *Real World Color Management*), color scientist Bruce Lindbloom (developer of the ColorSynergy profiling package), John Naegy (a key ColorSync architect at Apple), Chris Cox and Mark Hamburg (from the Adobe Photoshop engineering team), and Marc Levine (at profiling tools developer Monaco

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Systems). The topics constantly evolve, but after watching the list for a while you'll probably notice a few broader themes—the memes that define today's discourse in digital color.

Overall, it's clear that ICC-based color management has been successfully integrated into production workflows in all kinds of graphic arts environments around the globe, from one-person design shops to the world's largest printing companies. The use of ICC profiles has improved color consistency and reliability, reduced re-work, revolutionized proofing, and saved some of these companies lots and lots of money.

But problems remain, including some rather thorny ones—and this is where the ColorSync mailing list is so worthwhile. Indeed, a review of the major issues discussed on the list in recent months provides a pretty good snapshot of the field of color management. Although the myriad postings to the list stray all over the map, there are five main themes that dominate the discourse:

Bugs, fixes, and workarounds

Tools and techniques for creating ICC profiles

Applying color management in popular applications programs

Drivers and RIPs

Matching color between the monitor and a printed page

BUGS, FIXES, AND WORKAROUNDS

Can't get your RIP to print JPEGs without crashing? Having trouble finding an OS X native scanner driver? Wondering what settings to use to match spot colors on a CMYK device?

You're not the first person to grapple with these questions, so why bother trying to solve them on your own? The ColorSync mailing list is full of this kind of dynamic back-and-forth as new products (and bugs) arrive constantly.

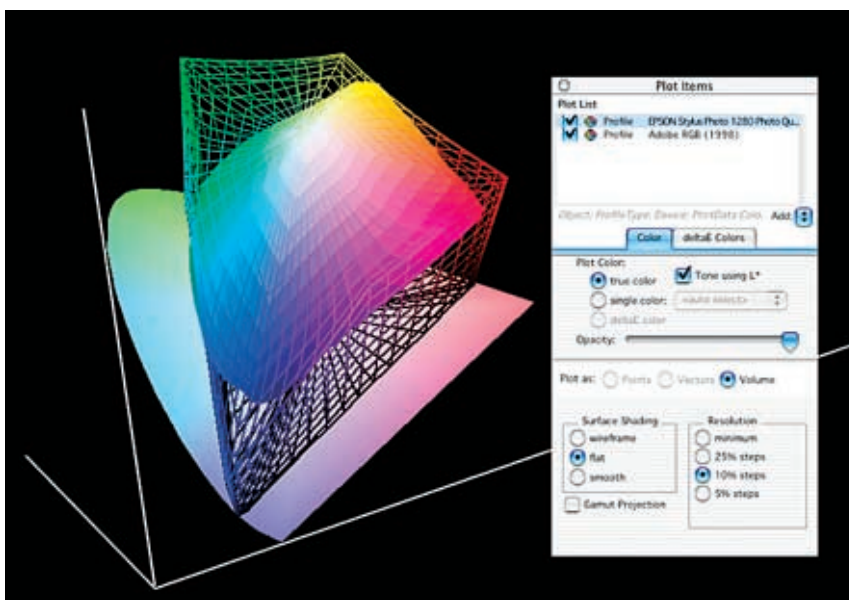
In recent months, migrating to OS X has been a major issue—not surprising given that most designers are serious Mac fans.

The whole subject of dongle-based copy protection heated up for a while when it caused major problems with the Jaguar version of a leading profiling application. Adobe Illustrator is a regular topic, given its propensity to treat CMYK files as if they were RGB, surely the kind of thing someone dedicated to color would find troublesome. And, as always, a great deal of time is devoted to various ways of working around the lame-ass color management support in QuarkXPress.

PROFILING TOOLS AND TECHNIQUES

Because ICC profiles are the lifeblood of any color management system, it's essential that they be properly created and edited. The problem is that the necessary hardware and software costs hundreds or even thousands of dollars. Unlike prepress and commercial print shops which can afford high-end profiling software and a color measuring instrument, many designers and other individual users who post questions on the list end up opting for lower-cost packages (such as Monaco EZcolor and ColorVision Spyder PhotoSuite Pro) that use a hardware monitor calibrator, but rely on a flatbed scanner to measure a printed target when generating print profiles.

On the other hand, the professionals on the ColorSync list who kindly provide most of the answers generally own Gretag-Macbeth ProfileMaker Pro, MonacoProfiler, or some other high-end profiling package, and take pleasure in debating the finer points of generating and editing profiles. This includes valuable lessons that new users may not have learned, such as how to ensure consistent settings in your print driver and application soft-



The **COLORSYNC MAILING LIST** is the place to learn about color management concepts such as gamut mapping, as demonstrated by this screen shot from the Chromic ColorThink utility. This graphic shows how almost the entire gamut of an Epson Photo Stylus 1280 inkjet printer (with PhotoGlossy paper) falls within the gamut of the Adobe RGB (1998) working space, with the exception of a small area in the blue-green part of the spectrum.

ware when printing test targets, so the resulting profiles can then be confidently applied when printing.

This part of the discussion also includes technical hair-splitting about miniscule color differences that some people can't see and don't care about. But these are color differences that I can see, and that my clients really care about.

For instance, with most profiling packages, it's hard to generate consistently neutral highlights in profiles for popular six-color and seven-color inkjet printers. But these printers are now being widely used in all kinds of design and production environments in place of much more expensive proofing systems, and neutral highlights are really important to color quality.

As some contributors to the list point out, if you're really meticulous about how you generate the profile and follow a few simple guidelines, you can produce profiles with much smoother neutral tones in the highlights. Other posters dispute these results, but I have tried these techniques and could see a visible improvement, so that decided it for me.

APPLYING COLOR PROFILES

Once you've created high-quality profiles for all your input and output devices, it's essential that they be properly applied, usually in your application. (The other options include applying profiles at print time in a RIP or specialized print queue package.)

For people working with images, Adobe Photoshop is by far the key application, and for quite a while there were tons of questions about how to set up its color management properties. For ex-

ample, Photoshop and other Adobe applications let you work in an RGB working space that is bigger (and more uniform) than the color space of your particular scanner or monitor, and for months people debated the merits of various working spaces, such as BruceRGB, EktaSpace, and Adobe RGB (1998). There are valid reasons for using one working space or another, but—as often occurs online—they were obscured by strongly-worded help opinions, and flamed by scarce information.

Fortunately, this particular debate was settled by some words of wisdom from Chris Cox, the Adobe engineer who wrote that particular chunk of Photoshop code. Now we've moved on to other issues.

It's pretty much impossible to use Photoshop today without taking advantage of its color management features, and Photoshop is so entrenched in the graphic arts industry that most images now come with an embedded ICC profile. But there are still all kinds of workflow issues that remain to be solved, including the sometimes complicated interactions between Photoshop and Illustrator, InDesign, PageMaker, CorelDraw, and of course QuarkXPress. In addition, contributors to the ColorSync list use all kinds of other workflows, including those in which color management is applied in a print queue or RIP.

RIPS AND DRIVERS

Most consumers who use color inkjet printers to produce family photos control the printer directly through a vendor-supplied print driver. But these crude drivers are limited to RGB (except in

FINALLY — COLOR MANAGEMENT EXPLAINED



Because of its complexity, color management is a field that's been crying out for a good book, one that's comprehensive, accurate, and practical. *Real World Color Management*, by Bruce Fraser, Chris Murphy and Fred Bunting is the first book I'm aware of that

fits this description.

Introducing color management into a production environment can be a challenge, in part because it forces you to learn some color science. For instance, when converting an RGB image into CMYK for printing, a skilled Photoshop user knows in advance which rendering intent is most likely to produce the best color appearance, based on the concept of how one color space is mapped into another in three dimensions. *Real World Color Management* does a great job of explaining these intricate but important concepts, with a level of detail that should satisfy the most demanding color geek.

This is an authoritative book that provides practical answers to many of the field's most difficult problems. For example, building high-quality print profiles involves more than simply printing a test target and taking some measurements with a spectrophotometer — it takes a good color eye, neutral viewing conditions, a properly calibrated and profiled monitor, and careful attention to detail. This book explains the entire process, step by step, with numerous tips and tricks.

Following the detailed explanations of ICC architecture and the profiling process, the second half of the book is devoted to the color management

capabilities of today's most important graphics programs — Photoshop, Illustrator, InDesign, PageMaker, Free-Hand, CorelDraw and QuarkXPress. These chapters help make it much easier for users to press the right buttons in just about any color-managed environment, whether Mac or Windows-based.

My only criticism of *Real World Color Management* is that it would benefit from more illustrations and visual examples. Otherwise it is an outstanding book which will prove invaluable to anyone working with digital color.

[Peachpit Press, 2003, 560 pages, ISBN: 0-201-77340-6]

As hardware and software systems mutate in real time, it's impractical to wait until everything's been properly documented. You need to get your work done today.



The screenshot shows the ColorSync website with the following content:

- ColorSync** logo and tagline: "The Standard for Communicating Color."
- Text: "ColorSync is the industry-standard color management technology that ensures color accuracy from capture to print or online display. It delivers powerful control over color matching at every step of the workflow process. Read more [about ColorSync](#)."
- Article: "Cook Book: Proof-primed Settings" (Requires Adobe Acrobat Reader). Text: "In the second cookbook, proofing is taken to the next level: the printed page. Learn the differences between ICC and PostScript color management, and when to do on-host or on-RIP color conversions. Download the guide to achieving the perfect match from monitor to output."
- Article: "Cook Book: Soft-proof Settings" (Requires Adobe Acrobat Reader). Text: "Soft-proof successfully and print color managed proofs using this color cookbook from GretagMunsell. Learn how to set up Adobe Photoshop (5.5 and 6.0.1), InDesign (1.5.2), Illustrator (10.0) and Acrobat (5.0) to leverage the power of ColorSync and ICC color management. Learn more about the [GretagMunsell for-Color-Profile color management tools](#)."
- Section: "ColorSync in Action" with sub-articles:
 - "Successful Soft-Proofing": "You don't need a fancy computer monitor for soft proofing. Bob Hutcheon of Hutcheson Consulting shares his soft proofing techniques."
 - "Taking Color to the Web": "Investing in online color management pays off—especially if you're an online retailer. Michael Kieran of E-Color explains the advantages of a ColorSync workflow."
 - "Color Habits for Digital Video": "While ensuring accurate color for digital video, QuickTime's built-in ColorSync color conversion features also allow producers to repurpose broadcast video for web, CD-ROM or DVD delivery."
 - "Shooting True to the Image": "Commercial photographer Kevin Foley relies on ColorSync and his Kodak professional digital camera to get more control over color."
 - "Testing your Profiles": "Roy Behnen of Chromastory, Inc. describes what makes a good calibration, how to eval color profiles and provides a step-by-step guide for testing profiles using iccProfile Viewer."
- Section: "Color Products" with text: "See the list of [products](#) that support ColorSync."
- Section: "Support" with links:
 - "ColorSync mailing list"
 - "Find a ColorSync consultant"
 - "Join the [Apple Consultants Network](#) if you're a ColorSync consultant."
 - "Get ColorSync: ColorSync is included in Mac OS X; [Mac OS 9.2.2.2](#) (includes ColorSync 3.0.4)
- Section: "Comments?" with text: "Do you have comments about ColorSync or the ColorSync website? [Tell us](#)."
- Section: "Made with ColorSync" with text: "If your company or website uses ColorSync profiles, let your customers

In addition to an invaluable (and free) mailing list, the **COLORSYNC WEBSITE** is packed with articles, links and other resources on color management for both Macintosh and Windows users.

theory under OS X) and provide no control over color separation or total ink limits. By contrast, most photographers and other graphics professionals use the same kinds of printers (sometimes even exactly the same printers), but control them through a third-party RIP (raster image processor) that sometimes costs more than the printer itself.

Over the past year or so, postings to the ColorSync list have made it clear that many such printers start with extremely non-linear behaviour, in which smooth variations in input values produce sharp color shifts when printed. After a number of users reported on their results, a consensus emerged that it's essential that the printer be linearized as part of the calibration process, prior to being profiled. It seems that this minimizes the gamut compression imposed by the color management engine and output profile, so the color management system is better able to fine-tune the properties of the specific output device, rather than compensating for it being grossly non-linear.

Users without a RIP are often at the mercy of the printer manufacturers, who are constantly backlogged trying to release func-

tional drivers for their current printers, let alone last year's models. In some cases, these drivers are rather difficult to set up properly, especially when applying an ICC output profile, and even then they provide limited control over color rendering. Once again, the ColorSync list has proven to be an excellent source for practical tips on making this work.

SCREEN TO PRINT COLOR MATCHING

One of the biggest benefits of color management is soft-proofing—being able to reliably preview colors on screen, knowing they'll match as closely as physically possible when printed. It stands to reason that for this to work, you need to ensure that both the monitor and your viewing conditions are set to the same white point (the color and intensity of the brightest white reproducible by a device).

Well, it may stand to reason, but that's not the way it works.

For reasons that color scientists can't really explain, most users report that they obtain the closest possible color match when the color temperature of the monitor is approximately 1000K (degrees Kelvin) to 1500K higher than the viewing conditions. For example, in the North American prepress and printing industries, standard viewing conditions for original images, proofs and printed sheets require a 5000K (D50) color temperature. Yet over the past year or so it's become increasingly clear that you get better screen-to-print color matching when the monitor is calibrated to 6000K to 6500K, rather than 5000K.

This is a good example of the beauty of online mailing lists, especially those where knowledgeable and generous individuals make life easier for the rest of their communities by sharing badly needed technical information and *experience*. I emphasize experience because, as computer hardware and software mutate in real time, it's impractical to wait a year or two until everything's been properly documented. You need to get your work done today, preferably without wasting more time on technical problems, especially problems that someone else has already solved.

So you find a solution in an online community. And maybe there's a special irony in the fact that when the bloody hardware and software are giving us such grief, there's always another human being out there across some unknown distance, offering the solace of a helping hand. 🙏

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