Developing an RGB Workflow

Traditionally, prepress has been based upon CMYK workflows. Generally, these workflows have stemmed from proprietary systems whose CMYK conversions have been developed for specific printing environments. While there is nothing fundamentally wrong with this approach, it does have limiting factors. Proprietary systems work best in a totally closed loop printing situation. Integrating additional input sources becomes problematic as does extending the multi-purposing use of the materials. Additionally, content creators working with CMYK workflows are limited in the tools and techniques available.

With the proliferation of RGB input sources such as desktop scanners and digital cameras, developing an RGB workflow has become important to a large number of design and publishing professionals. The problem comes from trying to find a suitable method of color management from an RGB color space to a CMYK color space. One method is to implement a ColorSync based RGB workflow.

Simple? No, but ColorSync is a powerful system and quite capable of producing high quality results that rival the top proprietary systems. This is how I use an RGB workflow in Photoshop 5.0.

Step 1 – Monitor profiles

First off, you need to have a very well characterized monitor. Assuming you do your image editing in Photoshop 5.0, this is the essential first step. While having a calibrated monitor is the ideal, Photoshop 5.0 is capable of using any accurate monitor profile to correctly display images. A word here about calibration vs. characterization. Calibrating requires setting the monitor to a known standard state and then profiling. Characterization is merely determining the exact monitor state while profiling. It is preferable to use a calibrated monitor because it allows maintaining a consistent viewing environment. I use a monitor that comes with a hardware calibration method that produces consistent and accurate results day to day. The profile created by the calibration procedure produces and extremely accurate and consistent displays in Photoshop 5.0. The calibration I use for my monitor is a screen gamma of 1.8, and a White Point of 5000K.
Step 2 – Input Profiles

Another important component of a successful RGB based ColorSync workflow is having accurate profiles for the various input sources. Having good profiles for the input source is fundamental for managing high quality color originals. Using a 3rd party program, I’ve created input profiles for my scanners that assure that the scans meet the criteria for providing accurate color rendition. While creating scanner profiles is rather easy, trying to create profiles for digital cameras is much more difficult. Digital cameras, by virtue of the different light sources and lighting conditions are not easy to profile. In the case of digital cameras, I use a standard color reference chart as basis to color correct digital captures.

Deciding how to use your scanner profiles is entirely dependent upon your own workflow needs. With the introduction of Photoshop 5.0 and the concept of RGB working color spaces that are independent of specific monitors, some people have been confused about how best to use RGB input profiles. Since I’ve profiled all my scanners, I’ve come to the conclusion that for my workflow, doing input conversions is inefficient. My legacy images (those scans produced prior to Photoshop 5.0) are all corrected to the ColorMatch RGB color space. This is one of the options in the Photoshop 5.0 RGB setup dialog.

Rather than do input transforms, I’ve created scanner curves that produce accurate color renditions without having to do color conversions. However, the very process of creating scanner profiles was needed to fine tune these curves. So, the process has merit even if you don’t actually need to use the profiles. As a result, I’ve set my Profile Setup to “None” for assumed profile and “Ignore” for profile mismatch. Remember, these settings are for my designed workflow, you own workflow might dictate a different setting.
Step 3 – Output Profiles

So, at this point, 2 out of the 3 required steps for an RGB ColorSync workflow have been established. The next step is extremely important and the most difficult to establish. Traditionally, ColorSync has been promoted as a color management solution from scan to printer. However, for my work, this is usually not practical. The work I do is usually intended for “run of the book” magazine reproduction. The process of trying to profile a single press in this situation is almost impossible. In addition to the logistical difficulties of remote profiling, most publications print on multiple presses at printing plants all over the country. An additional problem is that any given ad I produce may actually end up being run in a variety of publications over a period of time. So trying to “profile the press” is impossible. What I do is profile the proofing system. Depending on the needs and requirements of the client, I am willing and capable of producing separations based upon the majority of proofing systems currently in use as “contract proofs”. When delivering CMYK files, I always try to insist on using the same proofing system the separator is using.

Since instituting this proof profiling method, I’ve had very little problem with anticipating what the final output will look like. While I do “correct by the numbers” for CMYK output, I also heavily rely on “soft proofing” while working on RGB images within Photoshop. The method I use while working with RGB images is to always work with CMYK Preview on and have the correct profile selected that represents the final CMYK output device. By always viewing with CMYK Preview on, my clients are seeing what the image will look like once it’s converted to CMYK. Since the proof is my final product, once the client signs off on the proof, my job is basically done. The separator or printer is then responsible for matching, on press, the appearance of the proof.

If your workflow consists of always outputting to the same press/inks combination, profiling the actual press output is superior to merely profiling the proofing system. But, you can still see what the proof and press differences will be by using the proofing profile to preview the CMYK files prior to outputting. Also I should note that no monitor nor proof will ever be an exact match for the final printed piece. If your printing requirements are so stringent that exact color matching is required (to a low DeltaE), the only solution is testing.
In preparing for my book, *Adobe Photoshop Mastery* due in 1999 from Macmillan, I worked with the printer to profile the various proofing methods they use as well as actually making preliminary press proofs. The printer uses 3 different proofing methods, Fuji ColorArt, Kodak Approvals and Matchprints. The choice of the proofing method depends upon the nature of the proofed materials and the accuracy required. After assembling a variety of possible images for the book, I had the printer output the page using each of the proofing methods as well as actual press proofs. It was not surprising that each proof looked a bit different than the final press proof. What was surprising was that using Photoshop 5.0 and the proof profiles, I was able to preview VERY accurately how the various proofs would look. And, the ultimate surprise was that the soft proof (on the monitor) was as accurate if not more accurate than any of the hard proofs when compared to the actual press proof.

While the printer assured me that they could, while on press, match any of the proofs, I was very pleased that the soft proofing on screen was so accurate.

Another way to set up a test is to use the test image provided by Adobe. The image called Olé No Moiré has various shades of CMYK colors as well as a colorful image. By printing this image with your chosen printer, you can evaluate the proof to monitor relationship. However, a word of warning: adjusting your monitor to match a proof is a very bad idea. With previous versions of Photoshop, one could adjust the monitor so the proof and monitor looked similar, but this method will not produce accurate results with Photoshop 5.0. Manipulating the monitor will not solve the underlying problem of having an accurately characterized monitor and will lead to other color matching problems down the road.
Additional Information

ColorSync and color management Information:

Apple ColorSync www site:
http://colormanagement.apple.com

ColorSync email list:

International Color Consortium www site:
http://www.color.org

Commission Internationale de l’Eclaireage (the CIE)
http://www.hike.te.chiba-u.ac.jp/ikeda/CIE/home.html

Color Management Tools (that I’ve used)

ColorSynergy (for input, monitor and output profile creation)
By Candela
http://www.candelacolor.com

ColorBlind (for input, monitor and output profile creation and profile tuning)
By Color Solutions
http://www.color.com

ColorFlow (for input, monitor and output profile creation and profile tuning)
Kodak
http://www.kodak.com

Hardware/monitors

Mitsubishi SpectraView 1000/700
http://www.mitsubishi-display.com

Radius PressView SR
Since Radius recently sold it’s monitor line,
I’m unsure if these units are still available.

Apple ColorSync monitors
http://www.apple.com/displays

Hardware/other

X-Rite (monitor calibration/colorimeters)
http://www.x-rite.com

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