

# Arguments for RGB editing

*Thanks to ICC-based color management, scanning, retouching, archiving and assembling images in RGB offers overwhelming productivity and quality advantages over traditional CMYK methods. This paper explains why.*

## Introduction

The most controversial aspect of color management is the concept of retouching and color correcting in RGB instead of CMYK. Most graphic arts scanner operators, dot etchers, retouchers and designers are used to working in CMYK and the idea of learning a new way of working is a real concern to many users.

We separate and print with CMYK inks, therefore it is natural to think of prepress retouching as a CMYK process. But the purpose behind today's retouching is more about correcting problems in the original than problems in the reproduction process, and because original photographic emulsions contain only three dye layers — sensitive to red, green and blue light — it just makes better sense to correct photographic errors in RGB than CMYK.

In the past, RGB retouching offered less control and greater uncertainty than working in direct CMYK units, especially when the final output was a CMYK file. But thanks to ICC color management and Apple ColorSync, RGB has now become the most logical, powerful, convenient, efficient and user-friendly way of retouching, no matter what the final output will be.

The simple explanation for this is that under an ICC workflow, the CMYK conversion process is fine-tuned to accurately reproduce the way a 'perfect' RGB image appears on the retouching monitor. Therefore if we edit each RGB image till it looks good on screen, the CMYK process will simply match that look automatically on whatever output device is selected.

## The new workflow

Because color management treats every device in the chain independently ('device-independent color'), it allows a powerful new change in how images are scanned, edited, archived, separated and retouched. Instead of making CMYK separations directly on the scanner, each scan can now be made without output-specific adjustments and saved as a 'raw' RGB file. The raw RGB file can then be converted to CMYK — or whatever output format is needed — as a separate, post-scan function through software like Photoshop® 5.x, ColorBlind™ Edit or LinoColor™. Not only can CMYK conversion be delayed till long after the original scan is made, but all color corrections or 'edits' needed to optimize or correct the image can also be made on the raw RGB file, prior to its conversion to CMYK.

Two things make RGB editing feasible in a CMYK workflow:

- ICC destination and display profiles let retouching software like Photoshop 5 display an accurate preview of the CMYK press sheet while the RGB file is being worked on.
- The operator can measure true CMYK percentages even though the file is still in RGB.

Thanks to these conveniences, traditional CMYK users can easily take advantage of the many benefits of RGB retouching.

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### ***Where the CMYK tradition came from***

Before explaining the advantages of RGB retouching, it's interesting to look at why we've become so attached to working in CMYK.

In the early days of four-color printing the absence of standard materials, repeatable conditions or scientific press control made the color separation process a virtual guessing game. There was little chance of actually matching the original and retouching was a laborious process with corrections literally painted in by hand on the litho stones, printing plates, or films. Looking back, the retoucher had three jobs; compensating for weaknesses in the color-separation process, compensating for weaknesses in the pressroom, and satisfying the artistic requirements of the customer.

With the advent of electronic scanners, pre-press proofing systems, better plate making and automated press controls, the reproduction process became more predictable. With a stable output process a careful scanner operator could use a 'standard' setting that matched a good original virtually perfectly on the first try. This alone eliminated much of the traditional reason for retouching, but there was still plenty to do because almost every transparency submitted for reproduction had a slight exposure error or color cast, or needed to be changed for creative reasons.

### ***Changing purpose***

With the advent of digital retouching, corrections continued to be made to the CMYK separations because that's how the files were generated, but the underlying reason for retouching was changing. Improvements in the output process greatly reduced the need to 'correct' for press errors, but almost every original submitted for reproduction still had a slight exposure error or color cast, or needed changing for creative reasons.

Some things never change and the need to alter an image for creative reasons is as strong today as ever. Therefore the main goal of today's prepress retouching is to improve the original, or solve a photographic problem, NOT to compensate for limitations in the printing process.

### ***Why RGB is easier & more logical***

Because the main reason for image retouching has changed from correcting the printing process to correcting the original, the ideal domain for color editing has shifted from CMYK to RGB, because;

- Color photography – like color vision – works on the RGB principle. Photographic problems originate either in the light which exposes the RGB-sensitive emulsion layers, or in the CMY dyes of each emulsion. It is therefore easiest and most logical to correct photographic errors in those terms.
- The concept of gray balance is much simpler in RGB than CMYK because equal RGB values imply a neutral gray. When passed through a CMYK output (e.g. press) profile, equal RGB values are automatically converted to correctly-balanced CMYK values, making it very easy to judge neutrals in an RGB file, or to create realistic drop-shadows.
- Because gray is defined equal RGB values, tone adjustments made equally to all RGB channels cannot introduce a color cast into a neutral gray area, and cannot distort the gray balance of a resulting CMYK file.
- Tone adjustments made equally to all four channels of a CMYK file can easily distort the precise ratio of CMY needed to create a neutral gray on press, and serve to lighten or darken the black printer at a completely different part of the tone curve than the three colors.
- In a profile-based color management workflow, no edit to an RGB file can ever cause over-range or gray balance errors in the resulting CMYK file, because RGB maximum black values (0, 0, 0) are converted automatically to the correct CMYK shadow percentages, while maximum white values (255, 255, 255) are converted automatically to the correct CMYK highlight percentages.
- A contrast increase made to a CMYK file can easily send the total dot area in maximum black areas past the allowed maximum (typically around 300%) without showing problems on screen. On press this can cause serious ink drying or rub-off problems and color errors due to unstable ink trapping.

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### ***Why RGB is more efficient***

CMYK retouching is still viable for small changes or legacy work, but there are some important productivity advantages to retouching a raw RGB image, BEFORE converting it to CMYK.

- Scan times are shorter because there is no scanner setup.
- Scanner operation is easier because no special color skills are needed at scan time.
- Scans are in the ideal form for archiving. Gamut compression (which can lose extremely saturated colors) is not applied to the archived image.
- Images are optimized faster and more effectively because the image editor (ex scanner operator) now works with an accurate 'soft proof', instead of mentally interpreting scanner percentages or an inaccurate screen.
- The same image can be output any number of times to any number of devices with different settings for GCR, Total Area Coverage, Black function, gamut compression etc.
- Valuable originals can be returned to their owners earlier in the production chain, even if corrections are anticipated that would normally require a re-scan.
- Re-scans due to color or tone errors are eliminated because if a color change is needed, all the operator needs do is re-open the raw RGB file and re-convert it to CMYK with altered settings.
- Corrections, retouching or creative effects applied to the RGB file are more valuable because they only have to be performed once, even if the file will be output many different ways.
- Corrections to a CMYK file must be repeated if the image is ever separated again for another device.
- Color corrections requested after the first proof is submitted can be made more effectively by re-separating from the original RGB scan, rather than by dot-etching the first CMYK file.

### ***Impact on traditional skills***

There is a natural reluctance among experienced workers in any field to make the switch to new technologies. Many CMYK workers just don't feel like putting in the effort, or feel daunted by the challenge of learning to work in RGB. Some are concerned that it will undermine the value of their current skills. Others fear that it will put the clock back and bring their value down to that of a newcomer with no experience.

While understandable, none of these concerns is valid in a properly set up ICC workflow, because;

- The changeover from CMYK to RGB is much quicker and easier than most people realize.
- This is just a new way of doing the same old job. The real skill lies in analyzing a problem and knowing when it is fixed. The particular tool or workflow is almost incidental.
- When a skilled CMYK retoucher adapts to the RGB approach, they become more valuable than before because they maintain the ability to interpret CMYK values, which newcomers cannot.
- Working in RGB is simply part of the natural evolution of the graphic arts. If it wasn't this it would be something else. Be prepared for more changes in the future.
- Anything that can be done in CMYK has an equal or better approach in RGB, but not everything you can do in RGB can be done in CMYK.

### ***Key points to remember***

- CMYK changes deal directly with PRESS variables and are best for solving press problems.
- RGB changes deal directly with PHOTOGRAPHIC variables and are best for problems in the original.
- There are some things you can't do in CMYK that are easy in RGB, but there is almost nothing you can do in CMYK that can't be done as well, or better, in RGB.