

## Black & White Conversion

### Converting Color Images to B&W

One of the great advantages of working in a digital darkroom is the tremendous flexibility you have to output the same image in many different ways. This can open new opportunities with your work that was previously either impossible or difficult to achieve. One example of this is certainly the ability to take a color image and make a B&W print from it. With advances in digital B&W printing such as Piezography™, Epson K3™ ink-set, and new papers simulating the feel of traditional darkroom fiber papers -- there has never been a better time to make fine art B&W prints and draw upon your library of color images -- it can expand your choice of subject matter immediately! Some photographers have gone as far as to give up shooting B&W film entirely, knowing they can always convert their color images later.

There are numerous strategies for converting color images to B&W for printing. Each gives a slightly different result and each serves as a starting point for further refinement of the B&W image. Determining which strategy to choose can make the difference between an average and an excellent print. In this paper we will describe some of the ways the Master Printers at Color Folio do B&W conversions to create fine art prints.

### What Can Go Wrong?

Probably the easiest, and most commonly used, method for converting a color image to B&W is to change the image mode from RGB (or CMYK) to Grayscale. Photoshop™ in this case mixes the red, green and blue color channels using an internal formula giving each a specific weight in the resulting image. While this sometimes can produce an acceptable result, often the resulting image looks flat. Why is this?

The explanation involves understanding the three elements that create differences in color images and how that translates when the image is converted into grayscale. Colors can vary in their hue (or color), saturation and density (lightness/darkness). Each singly or in combination can create an appearance of differentiation in an image.

Consider the following color patches as an example.



Each square looks different from the others. Now look at the patches after converting them to grayscale using a simple mode change.



Why do the colors in the two blocks in the first two columns suddenly become the same? It is because in a grayscale image, only density differences are visible. In the first column, the two colors are different only in their hue - they have the same saturation and density. In the second column, the two boxes differ only in their saturation - they have the same hue and density. It is only values that differ in density that will differ after conversion to grayscale. Of course, most values differ in some combination of hue, saturation and density. But it is only the degree of density difference that survives the transition.

If you are going to convert to grayscale with this method, you may first need to increase the contrast in your color image. While the color version may now look strange, the changes in density created by the contrast adjustment will probably create more detail in your grayscale image.

### Finding the Right Grayscale

As we said, there are many ways to create a grayscale image for printing from color. Each will give a different starting point and there is no one strategy that will work best for each image. You may have to try out multiple strategies and choose the one that works best for your objective with the image. Many of the strategies involve using one of the color channels of the image and saving it as a grayscale file. This is possible because a color channel is itself a grayscale image representing by its density the amount of a particular color in the image.

#### **Method #1: Mode Conversion to Grayscale**

We rarely use this method as it provides you the least control over the resulting mix of densities.

#### **Method #2: Desaturation**

You can either use the Image->Adjust->Desaturate command or open the Hue/Saturation tool and set overall saturation to 0 (they are identical). All the color is removed from the entire image. This produces a slightly different result after converting to grayscale than simply doing so to begin with. Again, since there is little control over the result, this is not a technique we recommend.

#### **Method #3: Use Red, Green or Blue Channel**

In the Channels palette, click on each of the R, G and B channels in turn (assuming you are working on an RGB file). Each will give you a different grayscale version of the image. You can choose one of them by copying and pasting it into a new file or by using the Split Channels option in the palette and closing the unwanted channels. We find that most images

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look best in the red and green channels, where there is more detail to be found. Often the blue channel can be noisier or blocked up. Note that the red channel will give a similar appearance to an image shot on B&W film using a red filter - a favorite technique of B&W photographers to create more dramatic images.

### **Method #4: Use the Lightness Channel in Lab Mode**

In order to use the actual density only values of the image, you can first convert the image to the Lab color space via a mode conversion. Then select the Lightness channel and copy it using one of the techniques already mentioned.

### **Method #5: Channel Mixer**

For even more control over your starting point, you can use the Channel Mixer tool. We like to open an adjustment layer for this tool so that you can revisit your adjustment later by simply double clicking the layer icon to reopen the tool. Once the tool is open, select the Monochrome option box at the bottom so you see the image in grayscale. Now you can blend in different amounts of each of the channels to create an almost infinite variety of B&W renditions. Note that in order to keep the same overall density in the image the values of the red, green and blue channels should add up to 100%.

### **Method #6: Black/White Adjustment Layer ( CS3 only)**

This method (introduced in Photoshop CS3) is similar to method #5 but allows much more tonal control. There are presets designed to mimic traditional black-and-white filters. You may further adjust the luminance of specific colors to fine-tune tonalities and control separation. Unlike the Channel Mixer method, you don't have to worry about channels adding up to 100% to maintain overall density. Used as an adjustment layer, you can revisit it during editing if further adjustments are needed.

All of these strategies will produce a somewhat different starting point. Remember, that's all it is. Once converted to grayscale in some manner, you are likely to want to make additional adjustments in density and contrast.

## Matching Your Monitor

Color management for B&W printing using the K3 inkset is similar to printing color images. Your display should be calibrated using a colorimeter like the Spyder2 Pro. You may use Photoshop's Softproofing feature to simulate the tonal response for your intended paper based on ICC printing profiles for your paper/ink/printer combination. You can add a warm or cool tone (similar to darkroom toning) by specifying one or two points of color with a Color Balance adjustment layer, or using the new Tint feature in the Black and White adjustment layer as described in Method #6. There are

infinite combinations of toning using this method, so you'll have to experiment to find a "flavor" of toning you like.

Getting grayscale images intended for Piezography™ printing to match your monitor display is a little different than doing so with color images. In the case of grayscale, there is no such thing as color management and ICC profiles. Instead, you will assign different dot gains to the file or to your monitor display to create the same tonal separation on your monitor as will occur when the image is printed. Different papers and printing processes will handle the distribution of tonal values differently.

In the Color Settings dialogue you can either select different preset dot gains in the drop down menu, or you can create a custom dot gain through adjustment of the dot gain curve. In order for a custom dot gain curve to take effect, you must first make sure the image open on your monitor does not have a grayscale tag associated with it already. You can remove any such tag in your opened file by selecting Image->Assign Profile and selecting "Don't Color Manage". We use this method at Color Folio for creating different custom dot gain curves for each paper we print on our Piezography™ printer.

Finally, it is extremely difficult to print a neutral B&W image on a color printer. Unless a printer is very well linearized and the output profile very well balanced, complete neutrality is unlikely. For this reason, we have always advocated the use of quadtone (or hextone) inksets in which the colorants are replaced by different dilutions of black ink. Not only does this eliminate color shifts, it offers greater tonal separation across the entire image. Our Piezography system has two different inksets that simulate selenium toning or platinum printing. The Piezography™ printing system used at Color Folio is the finest example of quadtone processes available today.

The Epson K3™ printers used at Color Folio produce significantly better B&W prints than the previous generation of Epson printers. The improved printing technology and inkset greatly reduces the slight color shifts in different parts of the tonal range that occurred with previous generations of inkjet printing. The Dmax on photo papers like Epson's Premium Luster and Premium Semimatte is deeper than Piezography prints. Choosing the Epson K3 printers allows printing on new papers designed to mimic the qualities of traditional darkroom paper, like Crane's Silver Rag.

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### Summary

In summary, as is the case with many issues in digital imaging, there are many ways to achieve the same end result. This is a great advantage but can sometimes be a frustration. In the case of converting color images to grayscale, there are many choices - the best choice may vary image by image. Be sure to play with each image - try different approaches and see which one gets you the best starting point. Then continue to refine the image. In some cases, you may have to actually make changes to the color image before using any of the conversions. Don't hesitate to try this to see if it improves the result.

Now you should be able to look at your color images with a new eye for their potential!