BLACK and WHITE DIGITAL PRINTING
by Ken Carney

Note concerning paper resources:

Some of these solutions will work best (or only) with "fine art" matte papers such as PhotoRag, Innova Smooth White and similar. To many this is not a minus, since these papers can present a beautiful and unique image. To others, it is a curse since these papers cannot produce the high dmax that a gloss or semi-gloss paper can. Black and white darkroom printers take a high dmax for granted.

However, there are troubles in paradise with gloss or semi-gloss inkjet papers. Many are based on the resin-coated (RC) papers, like those made for darkroom use and with most of the same drawbacks. The future lies in the new generation of "fiber" inkjet papers, designed to replicate, to a degree, the classic darkroom air-dried fiber papers such as Seagull, Portriga, Ilford FB, Zone VI and the like.

Here are the papers (as of May 2008, that is) that I like. There are dozens of specialty producers, and more papers are added every day.

Matte:
Hahnemuhle Photo Rag 308
Innova Smooth White Cotton
Innova Natural White Cotton
Epson Velvet Fine Art (outstanding for beautiful, saturated color images)

Gloss:
Harman (formerly Ilford) Gloss Fiber Paper
Epson Exhibition Fiber Paper
Innova F-type Gloss
Crane Silver Rag

Sources:

Papers:

www.shadesofpaper.com
www.atlex.com (also good for inks)

Inks and software

Inksupply.com
www.inksuppply.com.utez.cfm

These are the EZ Ultratone b&w inks for inexpensive Epson printers (printer cost anywhere from free to $80). They will make beautiful neutral (or warm tone) prints on

fine art matte papers such as PhotoRag, and now on gloss papers per their website. Photoshop is not required. This site and the Cone site deserve some detailed inspection..

Pros:

1. Ease of use and image quality
2. Low entry cost
3. Photoshop not required

Cons:

1. Limited to letter-size papers (8.5 x 11")
2. *Almost all* non-OEM Epson ink cartridges are prone to clogging if not used frequently. Therefore, a good strategy for these inks is to wait until you have a good number of prints, then print.
3. Do not buy a continuous ink flow system (CIS) unless you print almost daily, or yours will wind up in a landfill like mine did.
4. These are b&w only inksets

This supplier has other b&w only solutions besides the EZ inks, such as complete b&w only inksets for the wider-format printers such as the 1280 or 2400. These more sophisticated inksets usually require RIP software, as discussed further.

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Cone Systems
www.inkjetmall.com

This is the famed Piezography b&w system. Here you will find a number of dedicated b&w inksets for various Epson printers, including wider format printers. Jon Cone is the pioneer of b&w digital printing.

Pros:

1. Wide variety of inksets
2. Support with paper profiles
3. Ability to use wider format printers, such as the 2400 or R1800 or larger

Cons:

1. Requires the use of a software RIP (see above). Gives excellent results, but has a small learning curve.
2. These are b&w only inksets

ImagePrint RIP
www.colorbytesoftware.com

They have a huge library of paper profiles for download, and the software is simple to use. With Photoshop soft-proofing, I can usually get the print to match the monitor on the first try (this is with RGB images. So far as I know, there is no way to soft-proof with

grayscale files, although ImagePrint seems to do a great job on grayscale files even without soft-proofing).

Pros:

1. Ease of use
2. Very large number of "free" paper profiles for b&w or color
3. Epson OEM color inks, so the same printer works for b&w or color
4. Accurate matching of color to the monitor, with a calibrated workflow.
5. Ability to "tone" grayscale prints from warm to cool
6. Use of Epson OEM inks, so few clogging problems

Cons:

1. Somewhat higher software cost ($500 for the lite version for 13" printers, which is all most of us need).

QuadTone RIP
www.quadtonerip.com

Pros:

1. Ease of use
2. Ability to grade from cool to warm tones, including sepia variations
3. Use of Epson OEM inks (among others available)
4. Ability to use more extensive grayscale inksets, such as those by MIS and Cone for larger format printers
5. Price (shareware, $50 to register, otherwise free)

Cons:

1. Very few paper profiles available for Epson OEM inks
2. It is a B&W only RIP.
3. Will likely lead to the purchase of measurement hardware and software to make paper profiles, not a bad thing at all, but brings the price more in line with ImagePrint.

B&W Conversion:

Almost all of us start out in color RGB, either a digital capture or scan (I scan in RGB since many of the tools I use work only in RGB, even if the print is destined to be b&w.). Also, many times I do not know in advance if an image will work better in color or b&w, hence the great flexibility that digital provides. Here are the b&w conversion tools that I have found useful:

Photoshop plug-ins:

Alien Skin Exposure 2

(www.alienskin.com)

This is the software that I use, and it is generally regarded as the best pro software. You can pick any number of b&w or color print or slide films, with or without grain. For example, here you can find discontinued stock such as Agfa Scala b&w (one of my favorites), or Agfachrome 500 color (also one of my favorite color stocks).

Pros:

1. Ease of use
2. Great flexibility and controls
3. Time saving

Cons:

1. Cost: ($250) and requires Photoshop CS2 or CS3.

Using Photoshop:

John Paul Caponigro's technique:
http://www.adobe.com/digitalimag/pdfs/phs8bwconversion.pdf

John Paul is the son of famed photographer Paul Caponigro, and is a Photoshop guru.

Adobe Channel Mixer:

OK if you have a really good color managed workflow and lots of time. The same thing can be done more easily in Adobe Lightroom or Adobe Camera Raw (included in Photoshop CS3).

Convert to Black and White:

This Photoshop tool allows individual adjustment of the colors, similar to the b&w tools in Adobe Camera Raw or Adobe Lightroom.

Just a couple or so of things to remember that applies to all the above:

1. Like everything else, you should be shooting in RAW 16-bit mode if your camera allows that, or scanning in 16-bit. Any conversion loses quite a bit of data. This may not be so evident in color, but jumps out at you in b&w, where the tonality is so important.
2. In B&W, metamarism (color shift) is your enemy, unless using dedicated b&w inksets, so you should be using a RIP or custom paper profiles. This is where you get a color cast under certain lights (usually toward the magenta). Unless you are using a dedicated b&w inkset, you will always get some slight metamarism by

using color inks, but it tends to go away once the print is under glass, and is probably something only you would notice.

3. Since converting to b&w from an RGB image is based on the RGB colors, it is preferable if there is a correct white balance in the RGB image to start with. The easiest way to do this is to take a white-balancing shot in each different light with a gray balance card. The WhiBal (www.whibal.com) is a simple and accurate way to accomplish this. Taking photos in RAW mode, make a photo of the WhiBal card in each light condition, then when developing the raw images, use the WhiBal image to set white balance and transfer it to the other images in the same light. The tutorial at www.whibal.com explains further. It is theoretically possible to do this in jpg mode, but it is a royal pain.

Printing

Essentially, you have at least three choices for sending a b&w image the printer:

1. Send it to the printer as an RGB or grayscale file, and let the printer manage the b&w printing. This seldom works, with the exception being the MIS EZ inks described above.
2. Send the RGB image to the printer, using a custom paper profile and letting Photoshop manage the colors. You can also use the paper manufacturer's "canned" profiles for the particular paper, but these are seldom acceptable.
3. Send the image to a RIP, such as ImagePrint or QTR, with a matching paper profile

The advantage of sending an RGB image, with a custom paper profile, is that the same profile works for color or b&w. Another advantage is that you are able to "soft proof" your prints (see appendix below). The disadvantage is that RGB paper profiles accurate enough for b&w are very difficult to make. Color is so complex that we may not see errors that would jump out in b&w.

The advantage of using a RIP is that the software limits the use of various inks, or eliminates them altogether. For example, when an RGB b&w image "goes green" in various lights, it is usually because of the yellow ink. Typically the RIP will eliminate the use of yellow, or severely restrict it.

Appendix (soft-proofing an RGB image):

Regarding soft-proofing, it is the key to the castle printing an RGB image in either color and b&w. What is it? Essentially, it is seeing the image on-screen, *as your printer will print it.* Here is the workflow:

1. In Photoshop, make a duplicate copy (image>duplicate).

2. Align the original and the copy side-by side (Window>arrange>cascade. Note: especially if you are using a LCD monitor, both images should be small since a small change in the viewing angle will throw things off.
3. For the original, apply the paper profile (view>proof setup>paper profile).
4. Your original image will now look really bad, but that is how the printer will print it! Use curve and saturation adjustments so that the original and the copy now look the same. Send the original to the printer.
5. All of this assumes that your monitor is calibrated to match the printer. This is done by using a colorimeter and related software to make a profile for your monitor. I use the Pantone colorimeter and software, but there are many others. It is a cheap investment ($250 or less) to save your sanity.
6. Bonus: Everything above now works the same for color. Additional bonus: You will probably have a print that will match your monitor on the first try.

Issue: As noted, when using color inks, it is almost impossible to get an *absolutely* true b&w image with color inks. As a practical matter, you can get "close enough" and any differences tend to disappear when the image goes behind glass.