

Quad-Black Printing

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June 25, 2003

I recently entered the field of quad-black printing in an effort to improve my black and white imaging. What follows is a summary of the experiences I gained in the process of making the transition from printing black and white using color inks to using all black inks. This is not an endorsement for any particular printer or ink set. Before making an investment in this technology one should review the available reference material carefully and consult with knowledgeable people in this field. It can be more costly than color printing and it has its own set of issues that must be dealt with. However, in the end, it must be said that this technology can produce a beautiful black and white print that is difficult to discern from a darkroom print.

What is quad-black printing?

Quad-black printing is a method for producing high quality black and white images on inkjet printers. It uses four black inks with intensities of 100%, 75%, 50% and 25% instead of the standard black, cyan, yellow and magenta inks. In practice the standard three-color ink cartridge is replaced with a cartridge containing specially formulated black ink diluted to give three shades of gray, typically 75%, 50% and 25%. The standard black ink cartridge is replaced with one containing undiluted black of the same ink. Often, software comes with quad-black ink packages that either replaces or supplements the standard printer drivers to ensure proper ink application.

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Why not print black and white using standard inks?

While it is possible to print black and white images with an inkjet printer using the standard black and color cartridges, it is sometimes difficult to balance the application of black and color inks in such a way that the images are toned correctly and look their best in all lighting conditions. Quad-black printing can simplify the process of turning an inkjet printer into a reliable and easy-to-use black and white printer.

Why quad-black printing?

After several years of doing only color printing, I wanted to try my hand at black and white. I tried to print some black and white images on an Epson 2200. The Epson drivers did a beautiful job of applying the ink – the tonal gradations were very nice with no visible dots even under magnification. Unfortunately the prints were magenta toned and I was looking for a more traditional neutral tone. I tried workflows suggested by various web sites but found no magic bullet. Further, the process of establishing neutrality seemed long and tedious with the possibility of having to be repeated with every cartridge change and paper type. I also tried printing using just the black ink cartridge but the results, while neutral, were fairly grainy and contrasty. Quad-black printing seemed to offer a way out of this maze.

Where do you start?

First select an ink system - there are several on the market. After talking to some colleagues, I went to the web and began researching the field. I looked into a number of quad-black printing systems which I've listed at the end of this article. My decision was to go with the Cone Editions Press, Ltd. PiezographyBW system. Their inks seemed to have a very good reputation for reliability and durability although perhaps a little more expensive than some others. In addition the people there were very accessible and answered all my questions quickly.

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What hue of ink to use?

The PiezographyBW inks I use are called PiezoTone inks. They come in twelve combinations of gray hues and blacks. The gray ink hues are Cool Neutral, Warm Neutral, Carbon Sepia and Selenium and the blacks are called Museum Black, Portfolio Black and Black Black. The blacks vary in their longevity and blackness with Museum Black having the best longevity and Black Black being the blackest. I chose Selenium and Museum Black. This combination gives me the look I want in my prints with the best longevity. The Museum Black opens up the darker areas in my prints a little more than the others do for more shadow detail. Cone offers sets of small sample prints of all twelve ink hue and blackness combinations to help you make your choice.

One printer or two?

The use of quad-black inks in a printer precludes color printing on the same printer unless the heads are flushed between cartridge changes. Flushing cartridges are expensive and the process can waste ink if extended cleaning and flushing is performed. For these reasons and the fact that Cone did not have a black and white system available for my 2200, I decided to get a second, dedicated, printer for black and white. Since I wanted to go up to seventeen inches wide, Cone recommended the Epson 1280. I purchased a low-mileage (hopefully) unit on eBay. Cone warned against getting a used machine that has been used too much (over 1000 pages) since they say the heads wear out with extended use.

Cartridge or continuous inking?

Inks for most quad-black systems come in cartridges just like the standard ink cartridges except filled with black inks. You simply replace the color and black cartridges with the all-black set. This is the simplest and cheapest way to get started. Over time the cartridges run out of ink and must be replaced. Although cartridge replacement is easy, the cost will mount up.

An alternative to the cartridge ink approach is the continuous ink system (CIS). This involves ink bottles that stand outside of the printer and feed ink into it through tubes. The tubes connect to special cartridges that feed the ink to the nozzles. These cartridges never need to be replaced. When

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ink runs low in a bottle, the user simply pours or injects more ink into it. Setup complexity and cost are substantially higher for this system but in the long run it costs less since you buy the ink in bulk. Changing ink brands and/or hue on a continuous ink system is much more involved than doing the same with cartridges.

It's probably best to start off with cartridges until you're settled on ink brand and hues. This was my approach. I'm going to wait and see how long these first cartridges last and then decide about CIS.

Getting started

The PiezographyBW system currently consists of two ink cartridges as previously described and a CD-ROM containing the PiezographyBW software and manual. You install the software which is easy and straightforward and optionally print out the manual. You do this first so that you can read how to install the cartridges. Next, you do a nozzle test on the standard cartridges and if the printer is OK, go onto the next step. This step saves you the cost of opening the PiezographyBW cartridges if there is a problem with your printer. Cone says that previously unnoticed printer defects can show up on a nozzle test and that a single bad nozzle can ruin your black and white printing.

You remove the old cartridges and install the PiezographyBW cartridges. I didn't flush the heads out as recommended by Cone. The flushing cartridges are expensive and not strictly necessary unless the previous inks were non-Epson. The PiezoTone inks are compatible with Epson color inks so nothing bad happens when you skip the flushing step. If you were using OEM cartridges, a flush would be in order. In lieu of flushing, you can print several black and white test prints until all hint of color is gone. About five three-by-five prints did the job for me. I had a small clogging issue that turned up after about the tenth print. I followed Cone's unclogging instructions and quickly resolved the problem. I've been clog-free since (knock on wood). See more about clogging below.

Some fine points

According to Cone the maximum length of USB cable you can use for your printer is six feet. They claim that beyond this distance there may be printing problems. For me this meant that I couldn't locate the 1280 next

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to the 2200 as desired. I put the 1280 on a cart and use the same USB cable for both printers, hooking up whichever one I need since I never use them both at the same time.

Depending on your printer model you may need to make sure that it's turned off when not in use so that the printhead will park itself. Most printers are self-parking either when they finish printing a document or if they haven't been used for a while. If a printhead is left unparked, it will probably clog much sooner than otherwise (see below).

While printing with PiezographyBW you don't get a print preview window as you do when printing with the Epson drivers. Also, while printing is in progress, Photoshop cannot be used; so you have to wait. This can affect productivity. More on this below.

Clogging

Nozzle clogging is something that is going to happen sooner or later to quad-black printers. Carbon-based inks such as PiezoTone are prone to clog the printer heads if not used frequently. Cone says that the anti-clogging agents put in regular inkjet cartridges are incompatible with their inks. Therefore, clogging is likely to happen. The best way to avoid this in my experience is to run a nozzle check every day. This uses very little ink but keeps the heads clog free.

There are several different levels of clog ranging from a clog that clears up during a nozzle check to the "clog from hell". If a clog does not clear after two or three nozzle checks, then one exercises the head cleaning function from the Epson maintenance interface and then retries the nozzle check. If this doesn't resolve the problem after about three cycles, then one must resort to more drastic measures. Most authorities suggest placing a paper towel wetted with Windex in the printhead rest area and allowing the printhead to come to rest on it. Turn off the printer and wait overnight. This should clear up the situation.

Whenever a print has a mechanical looking problem such as banding, too little ink, too much ink, overspray, etc., the first thing to check for is a blocked nozzle. This is probably the most common problem with quad-black printing, generally speaking.

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Printing in black and white

PiezographyBW is a Photoshop Export Plug-In. This means that you must have Photoshop 6+ in order to use it. It works by “exporting” your current Photoshop image to the printer (performs the entire printing task on its own.) It bypasses the Epson drivers and therefore loses some of their nice features such as previewing and background printing.

In order to print you select **File > Export** on the menu and then select PiezographyBW. You make various selections related to paper type, image size, positioning, etc. and then PiezographyBW prints the image. This is different from normal Epson printing in that it goes around the Epson drivers to control ink flow and placement. There are a couple of disadvantages to this approach as already discussed but this is the way the software works for now.

Cone says that with their next software release (this summer?) you will be able to use their inks directly with the Epson drivers and the relatively small inconveniences associated with the export plug-in process will be eliminated.

Some people have reported using the PiezoTone inks successfully without the PiezographyBW software. I've not explored this avenue but it will save you \$150 if you can make it work.

Results

I'm very pleased with PiezographyBW and the 1280 thus far and recommend it without reservation. I'm getting very nice selenium toned prints from my black and white images with none of the issues that I encountered using color inks. The best thing about this system for me is the ease with which I can produce my prints. I can print to my heart's content with no tedious adjustments per print. There's no gray balancing or tweaking of color controls such as I found with printing black and white using color inks. The ease of use of this system is liberating to me in that I can devote more time on printing images instead of fiddling with the printer settings.

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Some quad-black systems

PiezographyBW
Cone Editions Press, Ltd.
www.piezography.com (Information)
www.inkjetmall.com (Ordering)

Lyson Quad Black Inks
Lyson, Ltd.
Lyson, Inc.
www.lyson.com

PermaJet Varitone (VT) Blax
PermaJet Imaging Systems, Ltd.
www.permajet.com

Sundance Neutral Quad Black Inks