MIS UT-RC B&W Epson Driver Workflows
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The 260 UT-RC B&W 100% pigment inkset allows one to print with the Epson driver on either matte or glossy paper, depending on what black-position ink is used. It also allows a range of printing tones or hues, depending on which of the 3 shades of midtone inks are used. Paper choice also affects print tones.

A.   Ink Alternatives

Black-position inks:

Matte paper requires Eboni.

Glossy papers have 3 options for the Photo Black (PK):

> RC-PKW – a pure carbon, warm photo black for glossy paper;
>
> RC-PKN – a predominantly carbon photo black with blue toner to make relatively neutral blacks; and
>
> RC-PKC – a predominantly carbon pigment photo black with more toner to make cooler blacks.

The same chip can be used for all of these.

Mid-tone inks:

The R260 is a hextone printer with 6 inks. The same midtone inks (Y, LC, LM, C and M positions) are used for both glossy and matte paper types.

There are 3 light and 2 dark midtone positions.

The Yellow, Light Cyan and Light Magenta UT-RC positions all take the same lighter density of ink. The Cyan and Magenta ink positions take the same density of darker midtone ink. (The chips for the midtone inks are specific to the printer position, but they are easily put from one cart onto another.)

For each of the 2 midtone density levels, there are 3 ink tones or hues. These mostly change the Lab B (yellow-blue) measure.   On the Lab scale a technically neutral print would have Lab A and B equal to 0. However, a Lab A that is negative is often seen as greenish. All of the popular papers have a Lab A that is slightly positive, and the RC pigments keep it that way.   The popular "lightly selenium toned" silver print likewise has a slightly positive Lab A.

Carbon warm is from Lab B = 6 to about 12 (about half way to a sepia tone), depending on the paper. Carbon is much more lightfast and archival than the color pigments.   For the most stable and archival prints, pure carbon is recommended. MIS Eboni matte black is the only carbon ink that is neutral enough to print a relatively neutral, 100%

carbon pimgment print. Using QTR allows one to print 100% Eboni matte prints that are relatively neutral. This is discussed in another section.

"Neutral" inks have blue toner ink (a blend of color pigments) mixed in with the carbon pigments. "Cool" midtone inks have more toner.

To purchase the MIS R260 B&W inks, go to
http://www.inksupply.com/r260_blackandwhite.cfm

Matte Paper Printing Characteristics

Typically matte papers print with slightly warmer light midtones and slightly cooler dark midtones. To show this, a 21-Step test file is printed on the paper and read with a spectrophotometer.
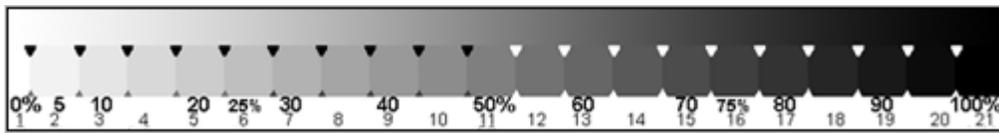
Typical 21-Step test file or "step wedge"

The Lab A and B values for each of the 5% steps can then be shown in a graph, such as the one below.
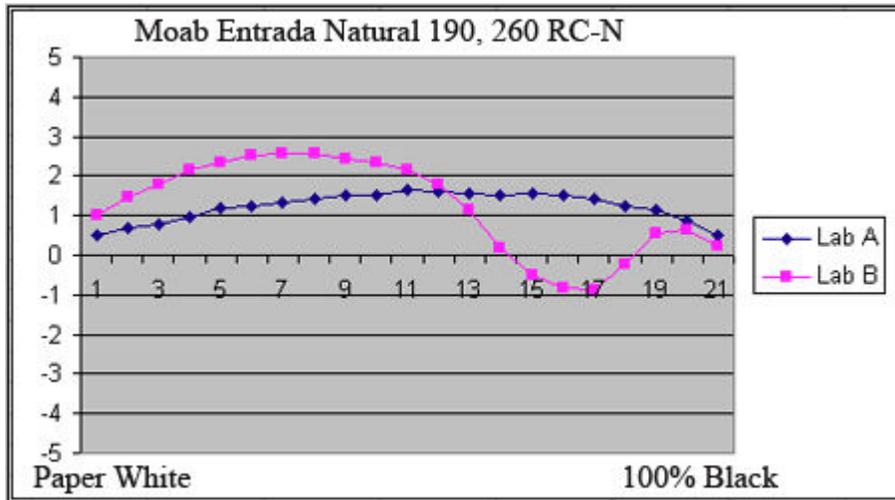
Graph of Moab Entrada Natural Lab A and B with 260 RC-Neutral pigments

The graph above shows a typical tonal distribution. Lab B (yellow positive, blue negative) is the main variable. If one drew a straight line between the paper white and 100% black, the tonal distribution of the RC-Neutral inks would be, roughly, an "S" curve around that line, with slightly warmer highlights can cooler shadows. A one unit Lab change is subtle. This "split tone" distribution is often prized by printers.

While Moab Natural is an un-brightened (no Optical Brightening Agents or OBAs) paper, many like the "bright" papers.

Premier Art's Matte Bright White is among the brightest matte papers and also a very good, high-dmax, acid-free paper. Its tonal distribution for RC-Neutral midtone inks is shown below. The Lab B is at the neutral point around 50%, which is #11 on the test strip and horizontal axis of the graph below.

Premier Art Matte BW, 260 RC-Neutral midtone inks

Paper White											100% Black

Legend: Lab A, Lab B
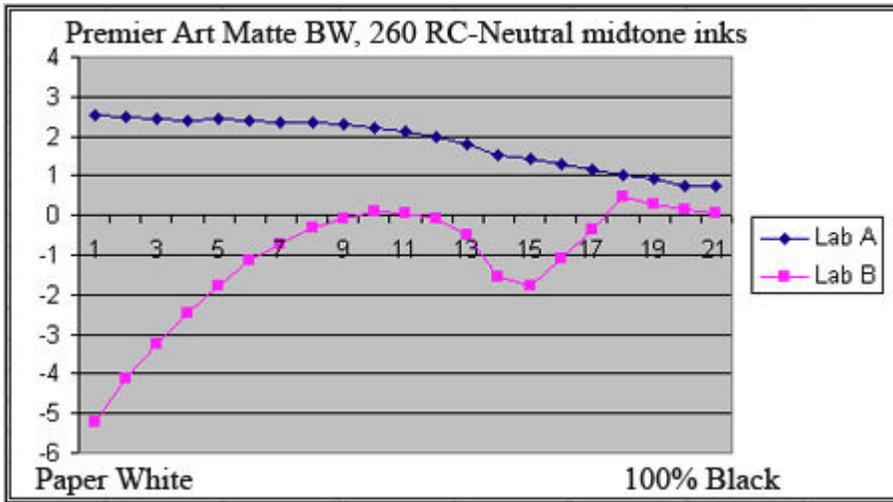
While the paper-ink combinations above have a split-tone that is so subtle most will not notice the differences in tone, a more pronounced split tone can be achieved by having warm carbon inks in the light midtone positions and neutral ink in the dark midtone positions. (Eboni remains in the K position, and is essentially neutral.)

The tonal distribution of Hahnemuhle Photo Rag with this ink setup is shown below.

Photo Rag, 260, RC-Warm Lt, RC-Neutral Dark midtone inks

Legend: Lab A, Lab B

Paper White — 100% Black
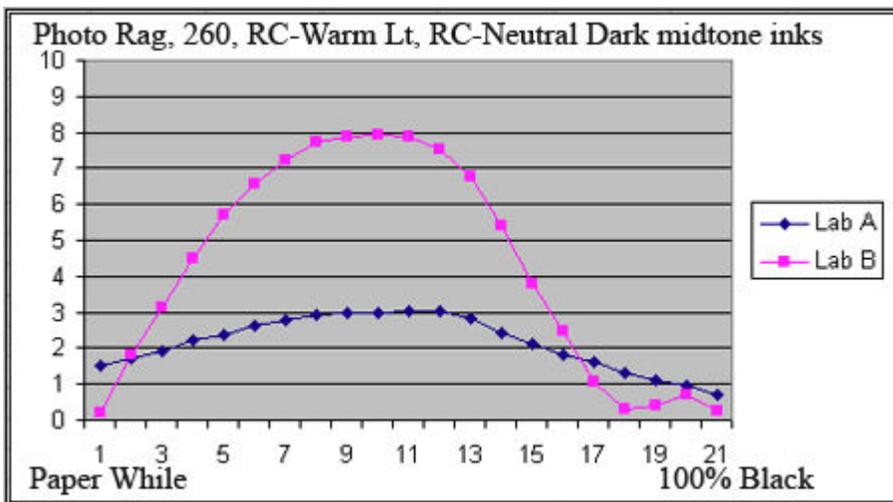
On the other hand, some may want to avoid the characteristic split tone. This can be done by having both warm and cool inks in the printer and using Photoshop image adjustment curves (or a RIP) to straighten the tonal response. One arrangement of ink to do this is to have RC-Warm light ink in the Yellow position, and RC-Cool light inks in the LC and LM positions. The light inks control most of the tones, so staying with neutral ink in the C and M positions works for neutral range prints. I call this ink distribution "WCCNN" to designate different tones in the different positions.

With the WCCNN ink distribution and appropriate Photoshop image adjustment curves (RGB mode), which can be in an ICC, an essentially straight-line tonal response can be achieved from the paper white to the deep blacks. See the graph below.
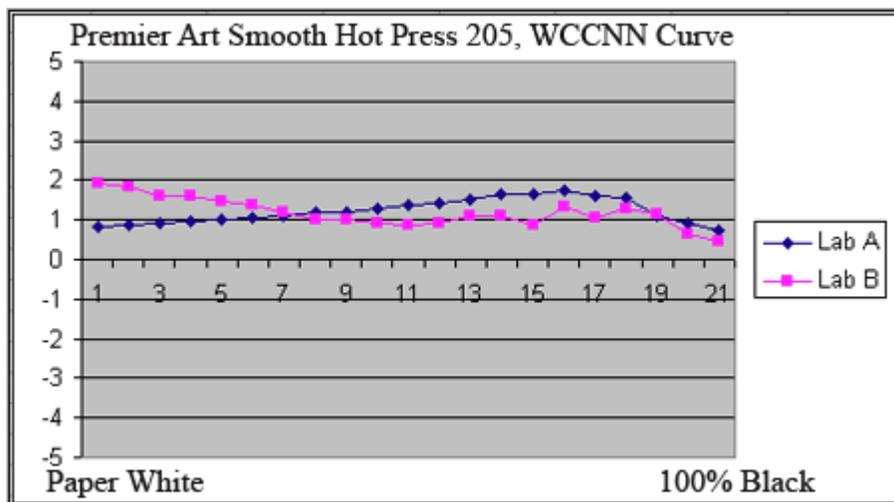
The curve that produced this response is "260-WCCNN-MK-N-1.acv" and is in the Zip file that carries the ICCs (http://www.paulroark.com/BW-Info/R260-ICCs.zip), discussed further below. The curve is a generic curve that will achieve a roughly straight line tonal response from paper white to deep shadows in most matte papers. It as well as the relevant linearization data are incorporated in ICCs that have "WCCNN" in their names. Note that when RGB curves or the ICCs with this designation are used, the driver must not be in "Grayscale" mode.

Paper and ink choice is ultimately a subjective choice and one of the dimensions of traditional B&W printing art.

Glossy Paper Printing Characteristics

With glossy papers the RC-Cool midtones produce a close to neutral midtone in the print. The graph below is typical of RC type glossy papers. In addition to the Cool midtone inks, RC PKN was used for the black position.
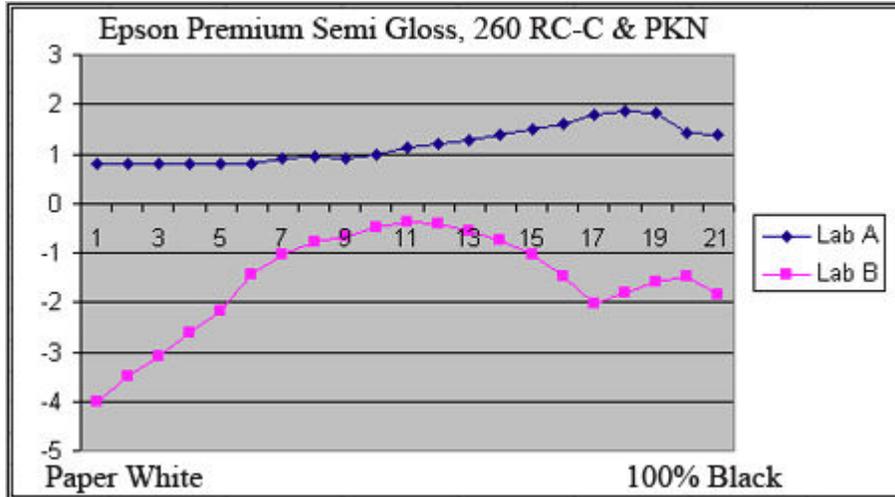
The graph below of the Innova fiber-based glossy paper shows a similar type of tonal distribution with the RC-C midtones and PKN.
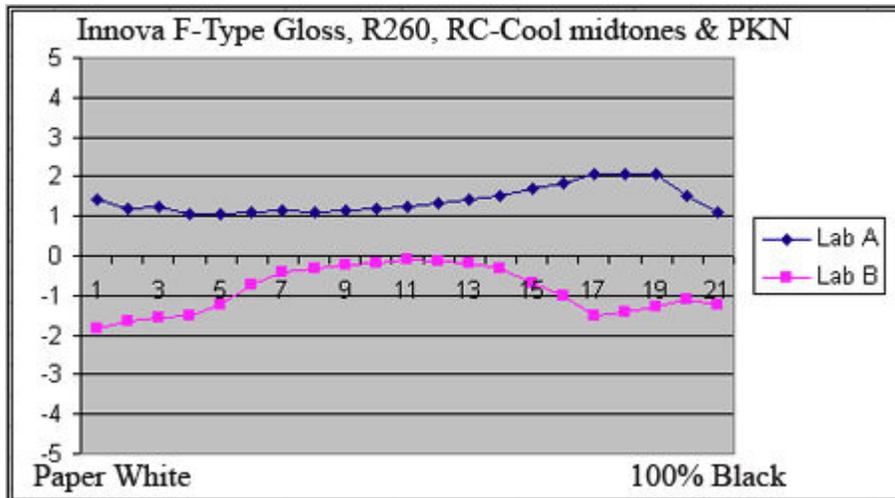
B.   Basic Epson Driver Workflow and Settings

With this workflow, one prints a grayscale file with or without an ICC. The printing workflows are treated separately below. An ICC does not need to be used. However, if the monitor is calibrated, it will often translate into a better match between the monitor and the resulting print.

Print Preview Where No ICC is Used:

The Print Preview does not need to be used, but on Photoshop or Elements it's an easy way to see what profiles might be associated with the file.

If no ICC is used, then the Print Preview in Photoshop or Elements should show "No Color Management."
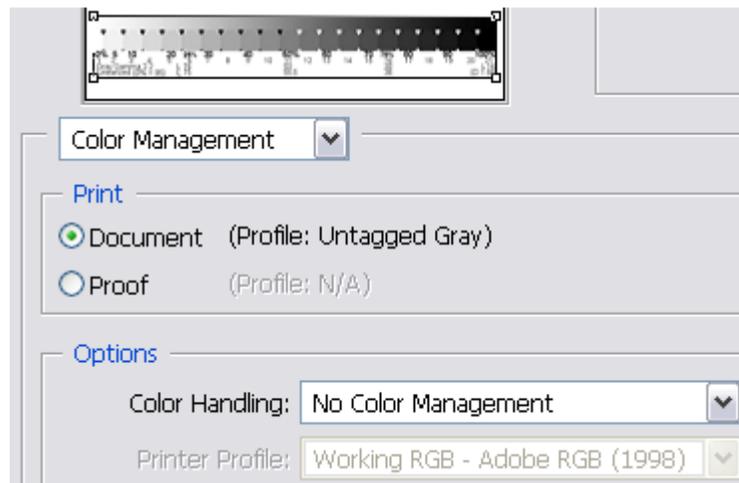
Screen grab of part of Photoshop CS2 Print Preview

The Document profile showing here is "Untagged Gray." The gray workspace is a variable that can be used to help match the print and monitor. While Gray Gamma 2.2 is a common standard that I prefer, Dot Gain 20% sometimes matches matte paper printer characteristics better if no ICC is used.

Print Preview Where an ICC is Used:

If an ICC is used, the Print Preview of Photoshop or Elements is where it is selected. The B&W ICCs made by QTR's "Create ICC" program are only recognized in Photoshop's and Element's print previews. The names of these ICCs all start with "QTR."
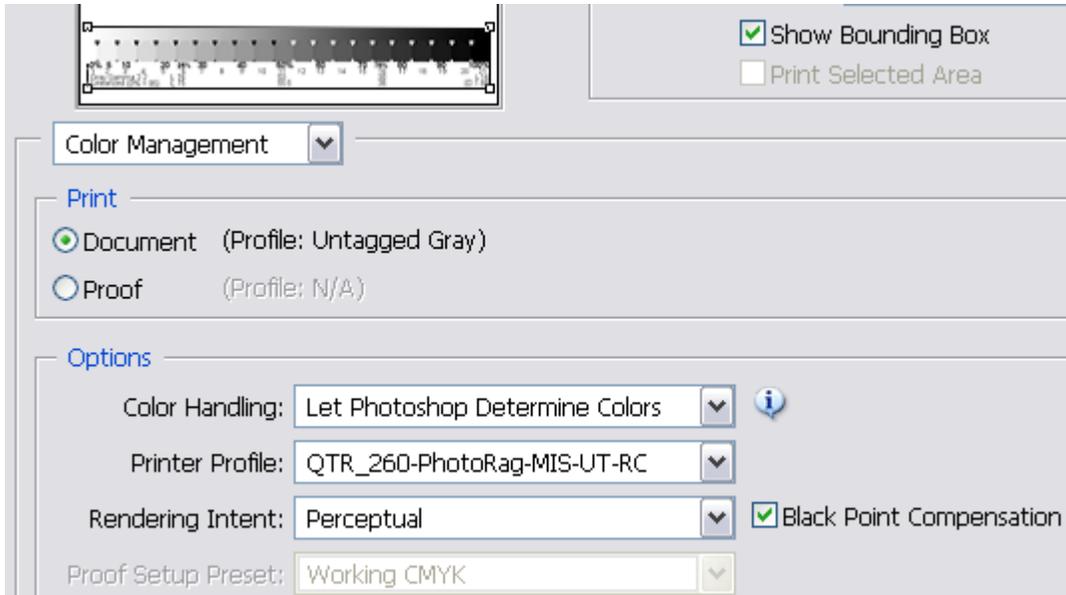
Screen Grab of Print Preview where an ICC for Photo Rag is being used.

Driver Settings – Matte Paper

The driver settings are different for matte and glossy paper types.

The settings are the same whether or not an ICC is used, unless the ICC is an RGB type that has curves in it that adjust the tones. The ICCs with names that include "WCCNN" (to be used only when that ink arrangement is used) require a different setting.

While these settings can be altered, they are the assumed starting settings and the settings for which the ICCs were made. If a specific paper needs different settings, it will be specified at the end of the ICC name.

The screen grab below shows the standard settings for matte paper. Note that I have saved the settings as the general "Standard Matte" settings. It's a good idea to save these settings to make it easier to remember what they are.
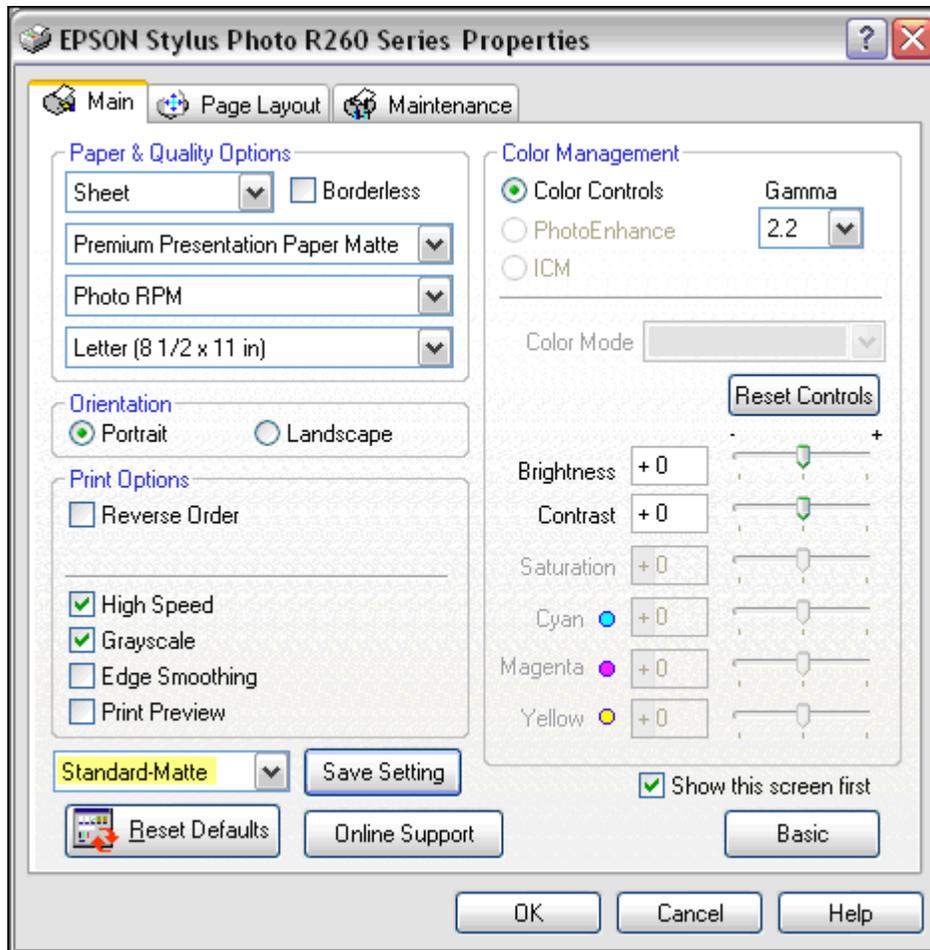
Using the "Color Controls" mode for the driver keeps a number of settings available in the driver for fine tuning the print. Note that I've found High Speed to be fine, although I do find the RPM quality setting helps. The Grayscale mode makes just a slightly straighter density ramp, but RGB is very close.

These settings and the curves in the WCCNN ICCs were made on a Windows XP computer. It is possible drivers for different OS's will have different characteristics.

Un-checking the Grayscale option allows one to use the color sliders for very mild tonal controls where more than one type of midtone ink is installed – for example cool in the one channel and warm in another. However, by the time significant tonal changes are made with this approach, the density ramp may be distorted. I do not recommend this approach to tonal control. Substituting ink cartridges or using curves, as in the "WCCNN" ICCs are much more effective.

The Gamma setting allows one to lighten the print by going to 1.8.

Driver Settings – Matte Paper with "WCCNN" Curves or ICCs

With an RGB curves set or an ICC that has such embedded in it, the "Grayscale" must be un-checked to allow the RGB information to be passed on to the printer.

The ICCs that have the RGB curves in them also have the ink arrangement specified, for example this one for Photo Rag (screen grab of Print Preview section) shows that it is for the ink arrangement "WCCNN":
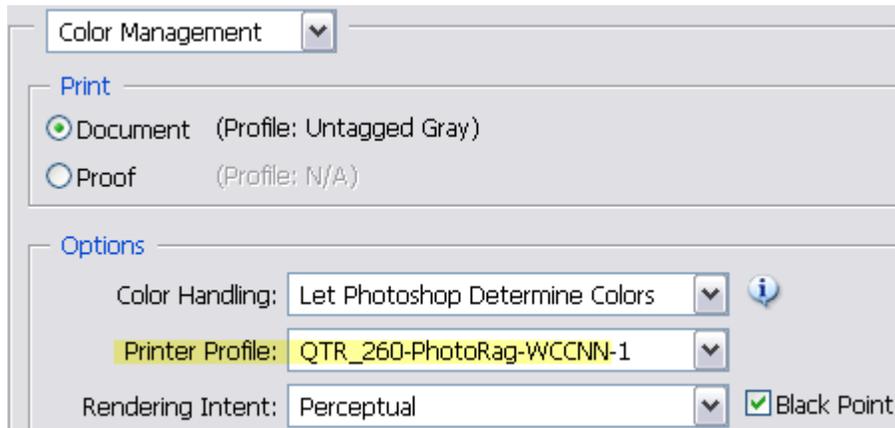
Then the driver properties settings are as shown below:

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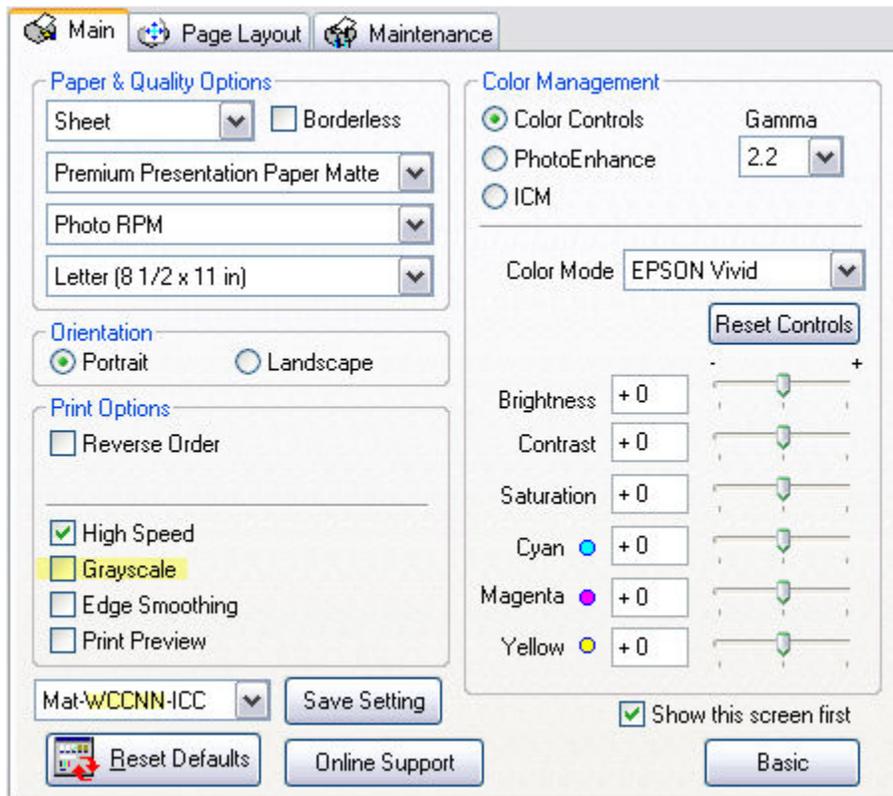
Driver Settings – Glossy Paper

The general glossy paper settings are the same as the recommended matte paper settings with the exception that the paper type is different.
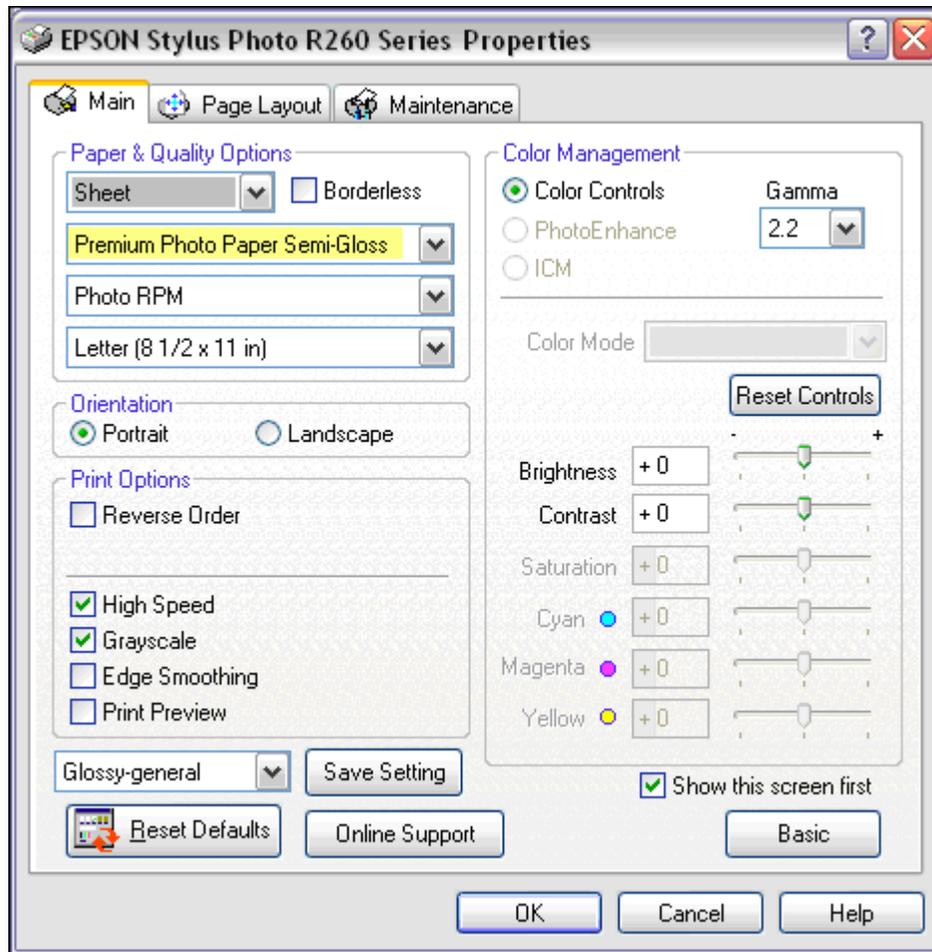
Some papers will need a different paper type or an ICC to lower the ink load. Crane Silver Rag is a notable example; it uses Photo Paper Glossy. Unless the ICCs state otherwise, the paper type should be set to Premium Photo Paper Semi-Gloss.

C.   Photoshop and Elements Color Settings

There are several ways to obtain a good match between the image that the monitor displays and what the printer produces. "Color Management" and a calibrated monitor are the typical approaches in color printing. The B&W ICCs discussed here also tap into this system and should produce quite a good match.

When no ICC is used, the printing system is not color managed. In that case other adjustments might help. In addition to the driver adjustments, the Gray Working Space might be helpful. This is accessed in Photoshop and Elements by clicking on Edit, then Color Settings.

In general, where no ICC is used matte papers print with relatively open shadows. Gray Working Space Dot Gain 20% might display the image on the monitor with open shadows that are similar.

Glossy papers, on the other hand, where no ICC is used, tend to have more compressed shadow tones. Gray Working Space Gray Gamma 2.2 displays images with compressed shadow tones and might be helpful in matching the monitor to glossy prints.

In Elements' Color Settings (Edit>Color Settings) the working spaces are labeled differently than in the full Photoshop. Where "No Color Management" is used the system will default to Gray Gamma 2.2. If "Always Optimize Colors for Computer Screens" is used, Gray Gamma 2.2 is also selected. The option "Always Optimize for Printing" appears to use Dot Gain 20% working space.

Where one uses an ICC in the Print Preview, that ICC reads the working space and prints in a manner that will match the working space – if the monitor has been calibrated.

While a good monitor calibration software package is almost always recommended, for B&W and where only the relative densities are being displayed for a grayscale file, I found that on my CRT the Adobe Gamma routine included with most Windows computers did quite a good job.

D.   ICC Profiles

Although no ICCs or profiles are needed, the use of these B&W ICCs in the Print Preview often makes the monitor to print match better. The use of these ICCs makes for the highest quality prints.

ICCs for a number of papers can be downloaded from http://www.paulroark.com/BW-Info/R260-ICCs.zip   Typically many paper types print well with the same ICC. Try an ICC for the general paper type.

Save the ICCs into the following folders, listed by OS:

> Windows XP -- c:\windows\system32\spool\drivers\color\
>
> Mac OS 9x -- Systems Folder/ColorSync Profiles
>
> Mac OS X -- User Library/ColorSync/Profiles

Windows 98/M -- \Windows\System\Color

Windows NT/2000 or XP upgrade from NT/2000 --
Winnt\system32\spool\drivers\color

Additionally, custom ICCs can be made with QTR's "Create ICC" routine.   Even a flatbed scanner can be used to make these, although a spectro is most accurate. See http://www.paulroark.com/BW-Info/Making_B-W_ICCs.htm

Custom ICCs can also be made that include an embedded RGB Photoshop curves set. These are made with QTR's "Create ICC-RGB." The general instructions for making this type of ICC are at http://www.paulroark.com/BW-Info/Embedding_Photoshop_Curves_in_ICCs.pdf