

**Piezography<sup>®</sup> BW icc**

*Black & White printmaking system*

# Users' Guide

Document Revision 3.0

Check for updates to this manual at:

<http://www.piezography.com/updates/>

**Piezography®BW ICC Black & White printmaking system  
Users' Guide  
Document Revision 3.0**

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# Introduction

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Thank you for purchasing the PiezographyBW ICC Black & White printmaking system.

This major upgrade to PiezographyBW now works with Mac OS9, OSX and all Windows since 98(SE). It now works with any imaging, desktop publishing, drawing and word-processing software. It now uses industry-standard PiezographyBW ICC printer profiles for unprecedented smoothness, tonal range, and repeatability from printer to printer. It's now easier to use than ever.

PiezographyBW ICC replaces the color inks in your Epson printer with a light gray, medium gray, dark gray and black ink - all made with only 100% pigment and a clear vehicle for trouble-free printing, unprecedented longevity, and without metamerism. PiezoTone inks are available in four different hue-tone inksets: Warm Neutral, Selenium Tone, Carbon Sepia and Cool Neutral. Each of them has an aesthetic look which replicates fine photographic printing paper.

The PiezographyBW ICC system brings the best of silver printing, palladium printing and digital technology together to produce more dynamic range than what over 200 years of photographic techniques and inventions has failed to deliver: a linearization between dMin and dMax. PiezographyBW ICC produces unprecedented shadow and highlight definition which darkroom paper can not achieve.

## Supported Papers

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The following papers are supported by the ICC profile library. This list may change over time; be sure to check for updates to the profiles periodically during your support period. See Appendix B for details. The abbreviations shown are used in the ICC profile file names and descriptions.

LGNeRag	Legion Concorde Rag
BCES308	Eclipse Soft White Satine
BCET308	Eclipse Soft White Watercolor
EPenhMat	Epson Enhanced Matte
EPmatteHW	Epson Heavyweight Matte
EPsmoothFA	Epson Smooth Fine Art
EPvelFA	Epson Velvet Fine Art
HANalbDur	Hahnemuhle Albrecht Durer
HANgretto	Hahnemuhle Allegreto
HANgerEtch	Hahnemuhle German Etching
HANptoM	Hahnemuhle Photo Matte
HANptoRag	Hahnemuhle Photo Rag
HANwilTur	Hahnemuhle William Turner
HANtorchon	Hahnemuhle Torchon
ILFFA	Ilford Fine Art
LGNphotoM	Legion Photo Matte
LGNsEnhTex	Somerset Enhanced Textured
LGNsEnhVel	Somerset Enhanced Velvet

## Supported Inks

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The following PiezoTone ink sets are supported by the ICC profile library. The abbreviations shown are used in the ICC profile names and descriptions.

PTCNM	PiezoTone Cool Neutral with Museum Black
PTCNP	PiezoTone Cool Neutral with Portfolio Black
PTCSM	PiezoTone Carbon Sepia with Museum Black
PTCSP	PiezoTone Carbon Sepia with Portfolio Black
PTSTM	PiezoTone Selenium Tone with Museum Black
PTSTP	PiezoTone Selenium Tone with Portfolio Black
PTWNM	PiezoTone Warm Neutral with Museum Black
PTWNP	PiezoTone Warm Neutral with Portfolio Black

# Installing the ICC Profiles on your Computer

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Most users will not find it necessary to install the entire library of ICC profiles onto their system. Consider installing only the PiezoTone inks and papers that you plan to use. This will make your selection of profiles more manageable. It takes longer to find the profile you're looking for if you have installed dozens of profiles that you will never use.

## Macintosh Users

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Installing Color or BW ICC profiles is a simple matter of copying the ICC files to the appropriate "COLOR" folder in the computer.

If you have installed OS X and OS 9 on your Mac, the two systems do not see or share each other's ColorSync Profile folders. If you wish to print using the same ICC profiles in OS X, you must separately install the profiles in the OS X ColorSync Profiles folder.

### Step 1

This illustration shows some ICC Profiles on a CD.

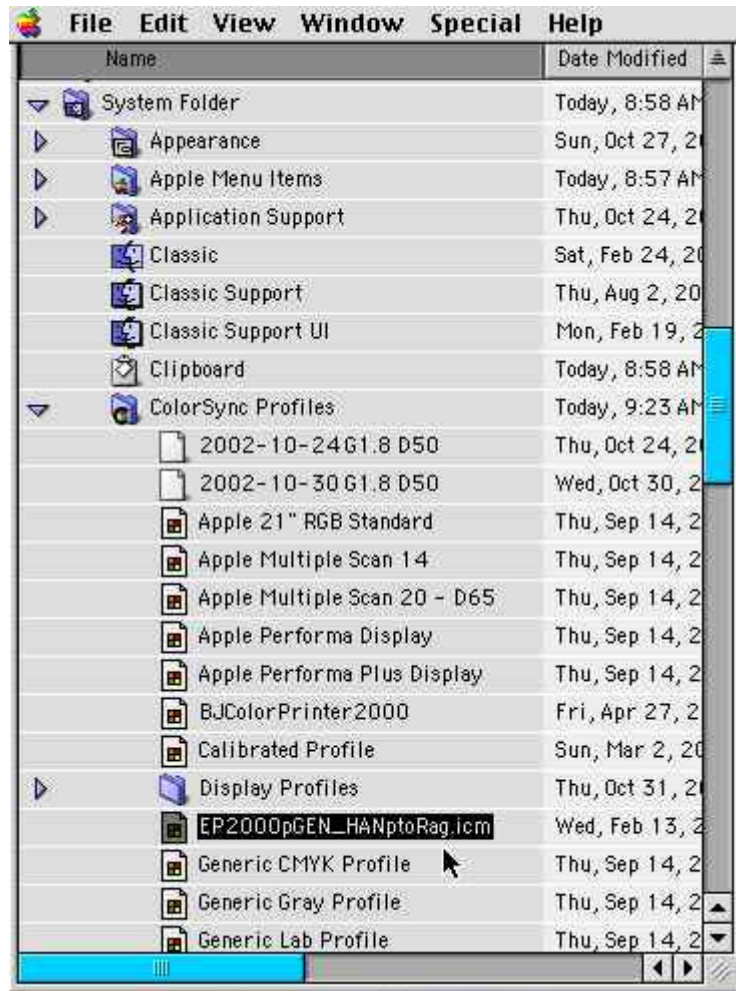


### Step 2

Open a window to the color folder. **For OS 8.x and 9.x the ICC profiles are stored in the "ColorSync Profiles" folder inside the "System" folder.**

### Step 3

Click and Drag the ICC Profile(s) as shown in Step 1, to the "COLOR" folder as shown in the Illustration below.



#### Step 4

That's it! - you are done. Close the windows.

**NOTE:** If your imaging application (i.e. Photoshop) is open, you may have to close it and then restart it for the newly installed profiles to be available for use.

## Windows Users

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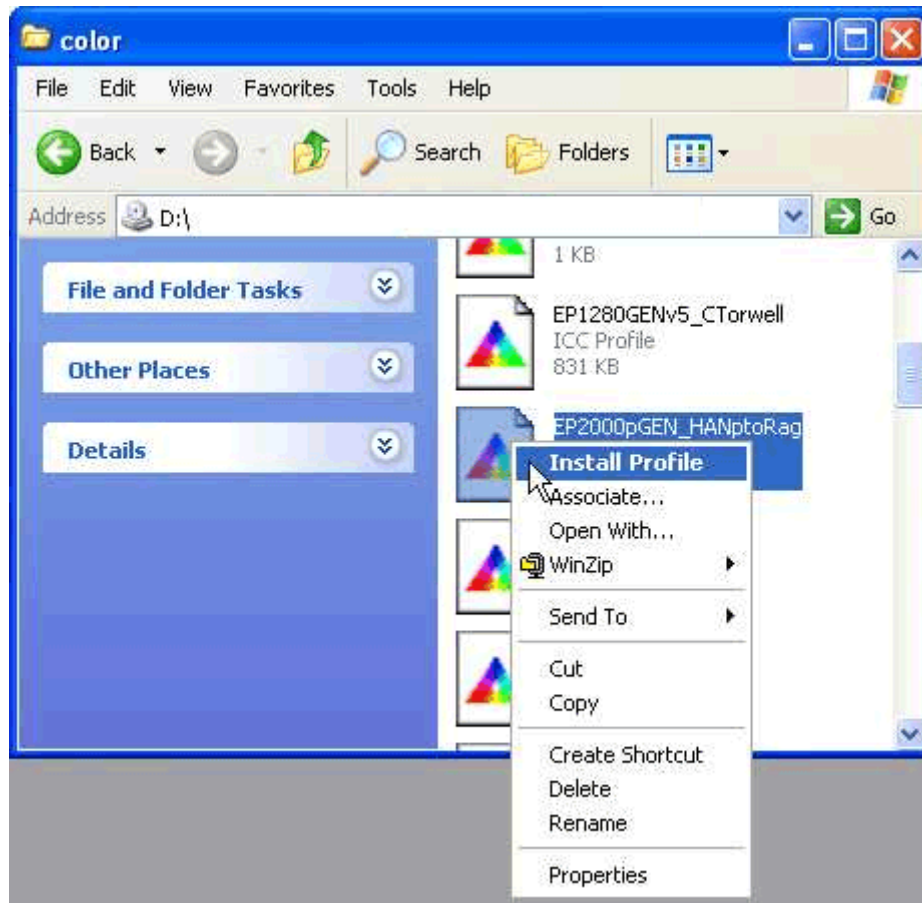
Installing the PiezographyBW ICC profiles is a simple matter of finding the profiles that you want to install on the CD-ROM that came with your Piezography kit, right-clicking on the ICC Profile icon and selecting "Install Profile" from the pop-up menu (shown below). This copies the profile to your system's color folder and registers the ICC profile with the operating system so that it can be used by various programs that use ICC Profiles to manage color.

There is a lot of information available about profiles in the Windows Help system.

**Windows 2000** - Click "Start" -> "Help", then the "Index" tab. Type "color" in the "keyword" box.

**Windows XP** - Click "Start" -> "Help and Support" and type "color" in the "search" box.





You may need to be logged into your computer using the “Administrator” account to install the profiles.

If your imaging application (i.e. Photoshop) is open, you may have to close it and then restart it for the newly installed profiles to be available for use.

# Configuring Color Settings on Photoshop and other Image Editing Software

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## Photoshop 6, 7 and CS

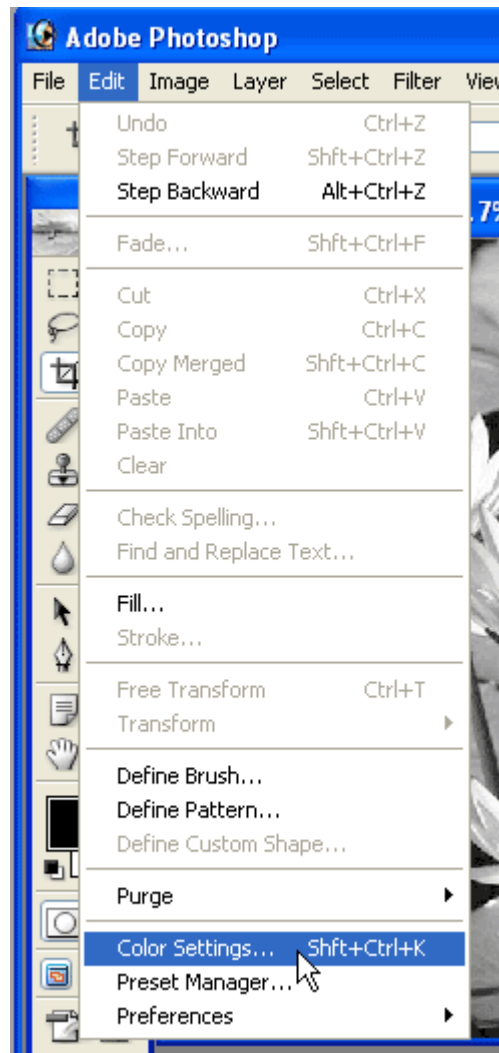
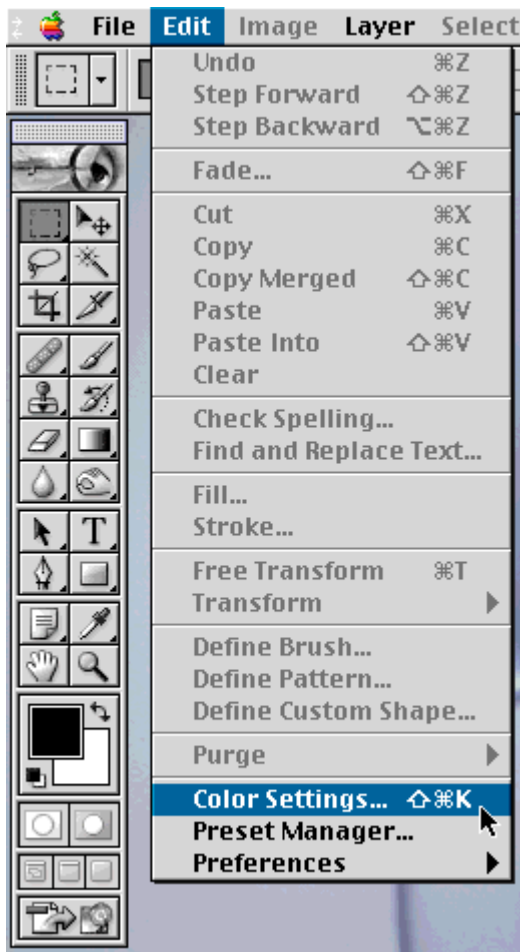
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Photoshop Preferences are very important to printing successfully. Follow the examples below to set up Photoshop to handle Grayscale images.

### Setting up the "Color Settings" for Photoshop 6, 7 and CS

#### Step 1 (Apple OS 8, OS 9, Windows 98SE, ME, 2000, XP)

Click on "Edit" -> "Color Settings" as shown below.



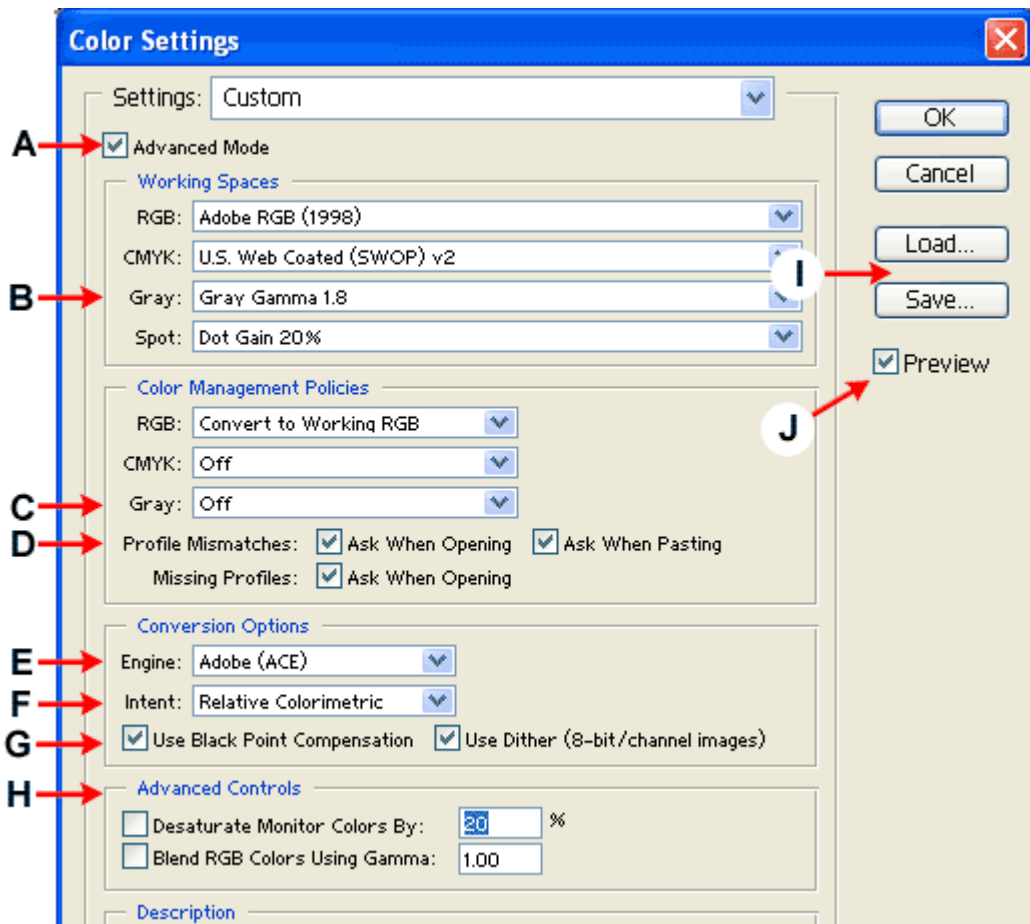
#### Step 1 (Apple OS X)

Click on "Photoshop" -> "Color Settings" as shown below.



**Step 2**

Set the Grayscale "Color Settings" as shown in the picture and table below.



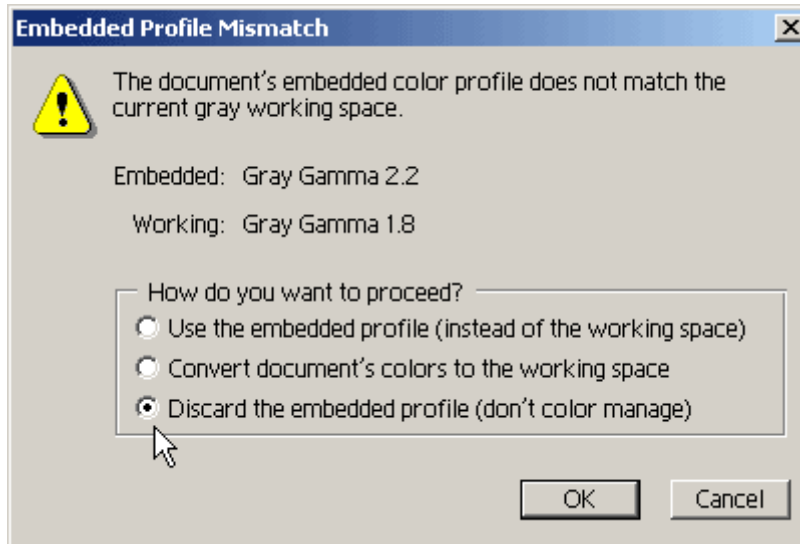
- A Check the "Advanced Mode" check box
- B Under the "Working Space" heading, set "Gray" to "Gray Gamma 1.8". The settings for "RGB, CMYK, and Spot" do not matter, and have no effect when working on a Grayscale image.
- C Under the heading "Color Management Policies", set "Gray" to "OFF"
- D Under the heading "Color Management Policies", check the three check boxes for  
 Profile Mismatches" = checked  
 "Missing Profiles" = checked  
 "Ask When Pasting" = checked
- E Under the "Conversion Options" heading, set the "Engine" to "Adobe ACE"
- F Under the "Conversion Options" heading, set the "Intent" to "Relative Colorimetric"
- G Under the "Conversion Options" heading, check both boxes for:  
 "Use Black Point Compensation" = checked  
 "Use Dither" = checked" = checked
- H Under the "Advanced Controls" heading, UNcheck the two check boxes for:  
 "Desaturate Monitor Colors By" = UNchecked  
 "Blend RGB Colors Using Gamma" = Unchecked
- I You can save this set up and reload it at a future time if needed using the "SAVE" and "LOAD" buttons
- J Last but most important, make sure to check the PREVIEW checkbox.

### **Images with an Embedded profile that does not match the current Gamma 1.8 working space**

By setting the default settings in Photoshop in this manner, you will cause a warning box to appear whenever a file is opened and there is a **mismatch** as shown below.

#### **Step 3**

Click the Radio button to select "**Discard the embedded Profile (don't color manage)**", then click "**OK**" as shown below.



*Example of an image with an **embedded** profile that does not match*

This option strips out the embedded profile, the image is "**Untagged**", and the image now assumes a preview of the working Grayscale color space selected previously - "**Gamma 1.8**". The image data is NOT changed.

We are discarding the embedded profile for a very specific reason. For **Grayscale** work, it is probable that the embedded profile was **not correct** for the last environment where the image was edited.

**Example 1:** An incorrect Embedded profile may be attached to Photoshop 5 images when a custom dot gain was used for on-screen proofing, and a profile was embedded (Photoshop 5 bug) even when Photoshop 5 was set to "Don't Embed a Profile"

**Example 2:** A person used a custom dot gain Photoshop 6 or 7 for soft-proofing with the original Piezography® plug-in, but forgot to tell Photoshop **NOT** to embed the profile as we recommended in the Piezography® plug-in instruction manual. In this case the profile was only used in Photoshop for the soft-proofing and **the plug-in ignored the embedded dot gain profile for printing.**

### **A Note for Experimenters**

**Converting will attempt to preserve the appearance** of the image in its previous environment, as defined in the embedded profile. This is recommended in a **Color RGB** workflow. For **Grayscale** work however, it is probable that the embedded profile was **not correct** for the last environment where the image was edited.

Depending on your image, how it was created and edited, what color space, dot gain or gamma was used when last saved, you may also choose to **convert** it to the working space. You can experiment with this, however **be aware** that converting **will alter the image data**. This may work well for some images, however you would "**never**" want to do this to a target reference file such as a 21 step strip where it is important that the patches remain at 5% increments of black density.

What is important is working in the Gamma 1.8 working space that was set in the steps above. How the image is best brought into this space could vary depending on your previous working setup. Experiment to see what works best for you.

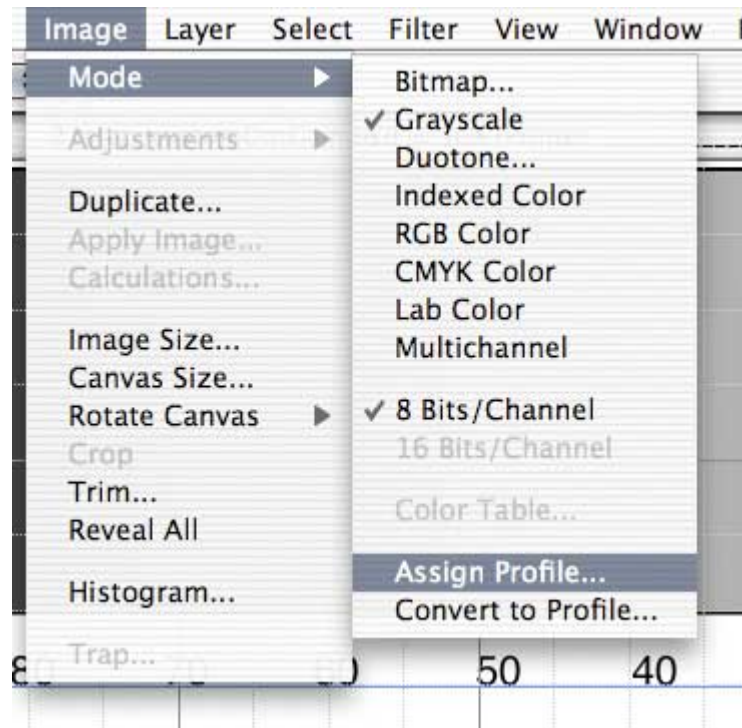
### Assigning the Gamma 1.8 working space to an UNTAGGED Grayscale image.

Whether you opened an **Untagged** grayscale image, or you opened an image with a **Profile Mismatch** and selected "discard the embedded profile" - you now have an Untagged Grayscale image. An Untagged grayscale image has **no** embedded profile, and by default Photoshop will use the currently selected Gamma 1.8 working space to **preview** the image.

However - this **will cause a problem later** when trying to print with the "**Source Space**" of **Gamma 1.8**. We now need to "**Assign**" the **Gamma 1.8** working space to the image.

#### Step 4

Open an image in Photoshop 6 or 7 - click on "**Image**", then "**Mode**", then "**Assign Profile**" in the drop down list as shown below.



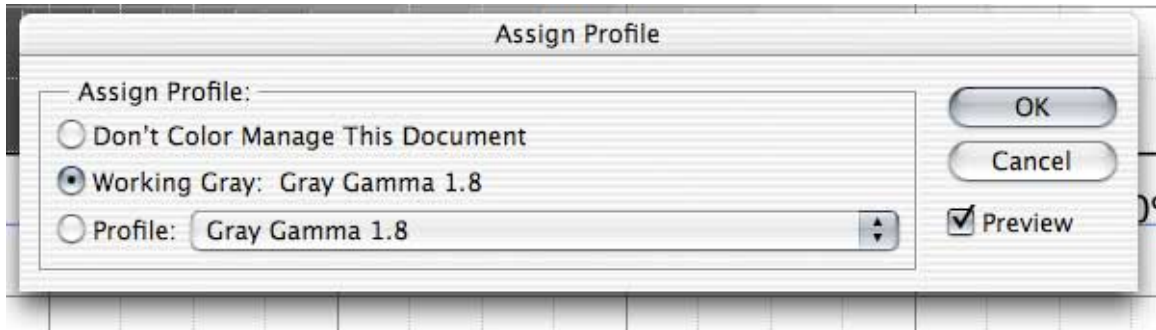
*Assigning a profile to an Untagged Grayscale file*

#### Step 5

In the **Assign Profile** window, click on the radio button to select "**Working Gray: Gray Gamma 1.8**"

#### Step 6

Click "**OK**" as shown below. This will allow us to select "**Gray Gamma 1.8**" later as the source space for printing.



*Assigning a profile to an Untagged Grayscale file*

## Other Imaging Applications

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There are many imaging editing applications available to us these days. Many applications do not address the topic of color management at all. There are too many applications for us to know them all intimately, but you should be able, with a little research, to find out what features your software provides and how to use it.

### Strategies for Unknown Applications - Color Settings and Preferences

- 1 - Read the documentation that came with your imaging program. Learn what options are available, usually found under a menu item called "**P**references" or "**O**ptions".
- 2 - Look at the Photoshop examples available here, and see if you can find similar features in your application. The names or wording may differ, but you may find the same concepts discussed.
- 3 - Look in the "Help" section of the application, and do a search for the word "color".
- 4 - Search the Web site of the application company and look at the FAQ's (Frequently Asked Questions), or other online help.
- 5 - If you find that your application **does** provide a method for Soft-proofing and Printing through ICC profiles - you should follow the **Photoshop 7** workflow for printing and disabling the printer's color management.

### Specific Color Management Preferences

- 1 - Does your application have an "**A**dvanced" or "**E**xpert" or "**C**ustom" mode that will reveal more selectable options?
- 2 - Can you select a Gamma for Grayscale image printing? We use Gamma 1.8 in Photoshop. The profiles are made to print using a Gamma of 1.8.
- 3 - How does your application handle embedded profiles? Can you convert to a Gamma 1.8?
- 4 - If you can print with ICC profiles, can you select differing rendering intents? The names used for the four general methods may be different from application to application. The International Color Consortium (ICC) has defined four different methods called rendering intents. (The methods used by the color management engine for color transformations.)
  - a) **P**erceptual - may be called **P**icture
  - b) **S**aturation - may be called **G**raphic

- c) **Relative Colorimetric** - may be called **Proof**
- d) **Absolute Colorimetric** - may be called **Match**

For printing with **PiezoTone inks** and **Piezography®BW PiezoTone ICC Profiles** we prefer to work using the Relative Colorimetric intent in Photoshop. There are no out of gamut colors in a Grayscale file and we want the color of "paper white" to be used.



# Using Photoshop's Soft-Proofing Feature

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Photoshop 6, 7 and Photoshop CS includes a soft-proofing feature which is beneficial for users who have a calibrated monitor and appropriate viewing conditions.

Before we begin, there are a few **very important** questions that must be addressed.

Do I have to calibrate my monitor?

Do I have to use a monitor calibrator?

How important is a viewing booth?

How important is the ambient light?

What Kelvin temperature should I set the white point of my monitor?

For information on these topics, please see the discussion in Appendix A.

## Step 1

In Photoshop **6, 7 or CS**, click on **View**, then **Proof Setup**, then **Custom** as shown below.



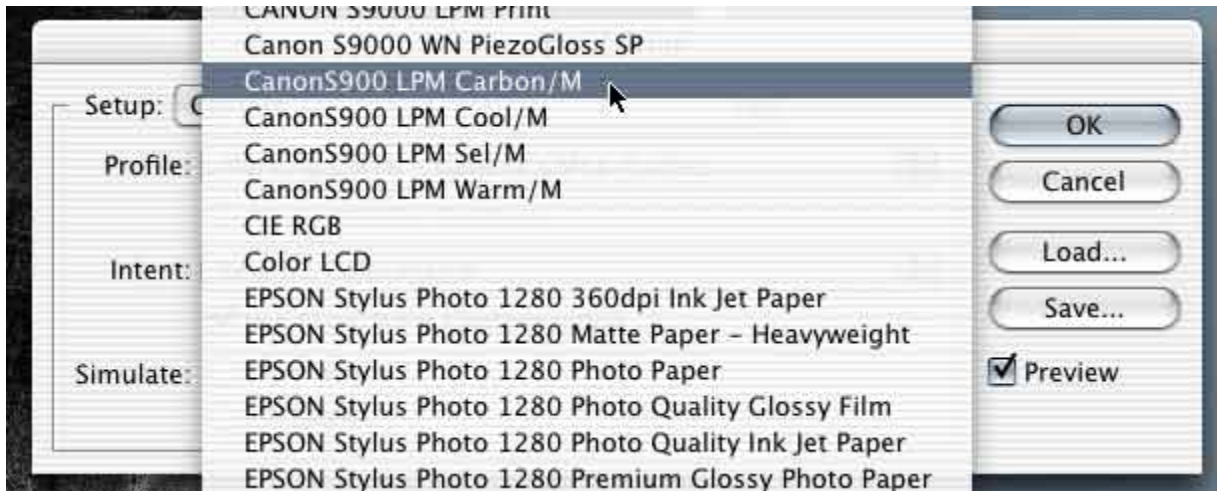
## Step 2

In the **Proof Setup** dialog box, click on the "**Profile**" dropdown tab and select the appropriate ICC profile as shown in the pictures below.

**NOTE: ICC profiles** are unique to a specific **media, inkset, and printer setup**. It is important to select the **correct match** for your printer, ink and media. The **name** of the profile will not be the same as shown in these examples.

The ICC profile "**CanonS900 LPM Carbon/M**" shown selected below is for:

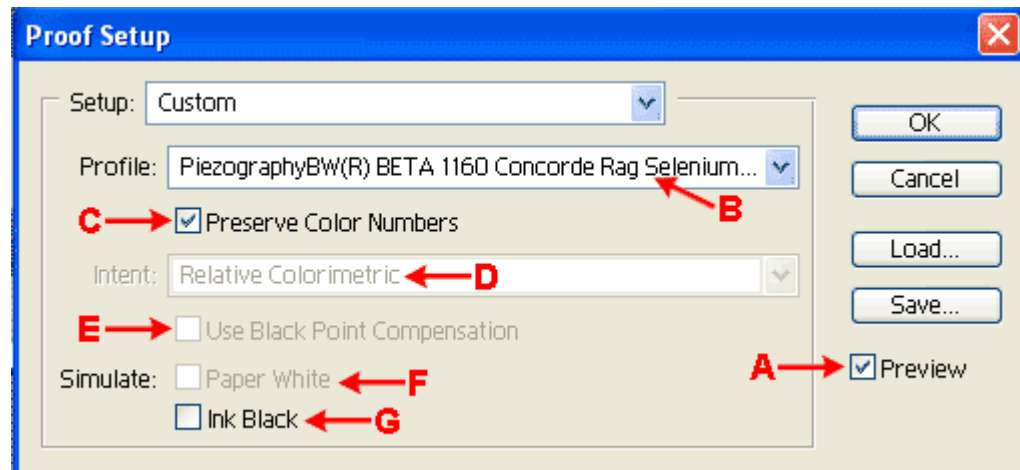
- a) **CanonS900** - the Canon s900 Printer,
- b) **LPM** - printing with Legion Photo Matte media,
- c) **Carbon/M** - using the Carbon Sepia inkset with Museum Black.

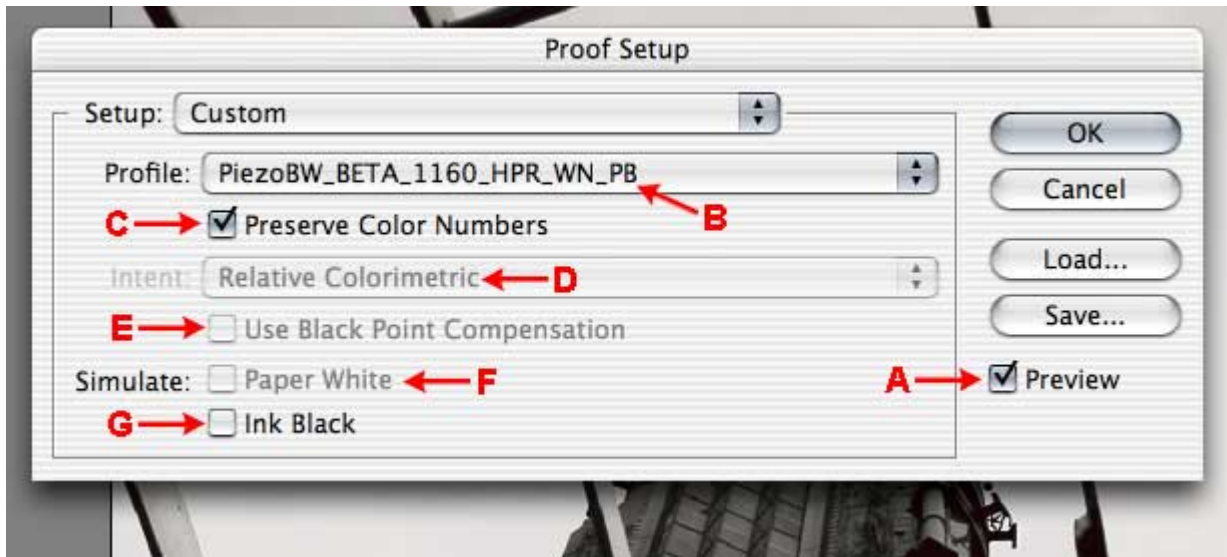


### Step 3

After selecting an ICC profile for soft-proofing in **Photoshop 6.x** and **Photoshop 7.x**, the rest of the settings in the "**Proof Setup**" dialog box are basically the same. Select the "**Proof Setup**" options as shown below:

**NOTE:** The only difference is that "**Use Black Point Compensation**" selection is **not available** as an option in **Photoshop 6.x**. The directions will use the **Photoshop 7.x** dialog box **shown below**.





- A Make sure that the "**Preview**" check box is checked.
- B Select the correct ICC Profile that is the **correct match** for your printer, ink and media
- C Make sure that "**Preserve Color Numbers**" is **checked**
- D The "**Intent**" drop-down list will be disabled once you select "**Preserve Color Numbers**". You don't have to worry about this setting.
- E **Photoshop 7 ONLY** - Make sure that "**Use Black Point Compensation**" is **NOT** checked.
- F "**Simulate Paper White**" is not applicable - paper white is modeled in the ICC Profile
- G Try using "**Simulate - Ink Black**" to see if you think it aids in the accuracy of the Soft-proof preview. It does not matter for the final print. The Ink Black option will reduce the contrast shown on your screen to better match a print when using a dimmable viewing booth. If you do not have carefully controlled print-viewing conditions, you may wish to leave this option unchecked.

# Print Setup: Choosing an ICC Profile before Printing

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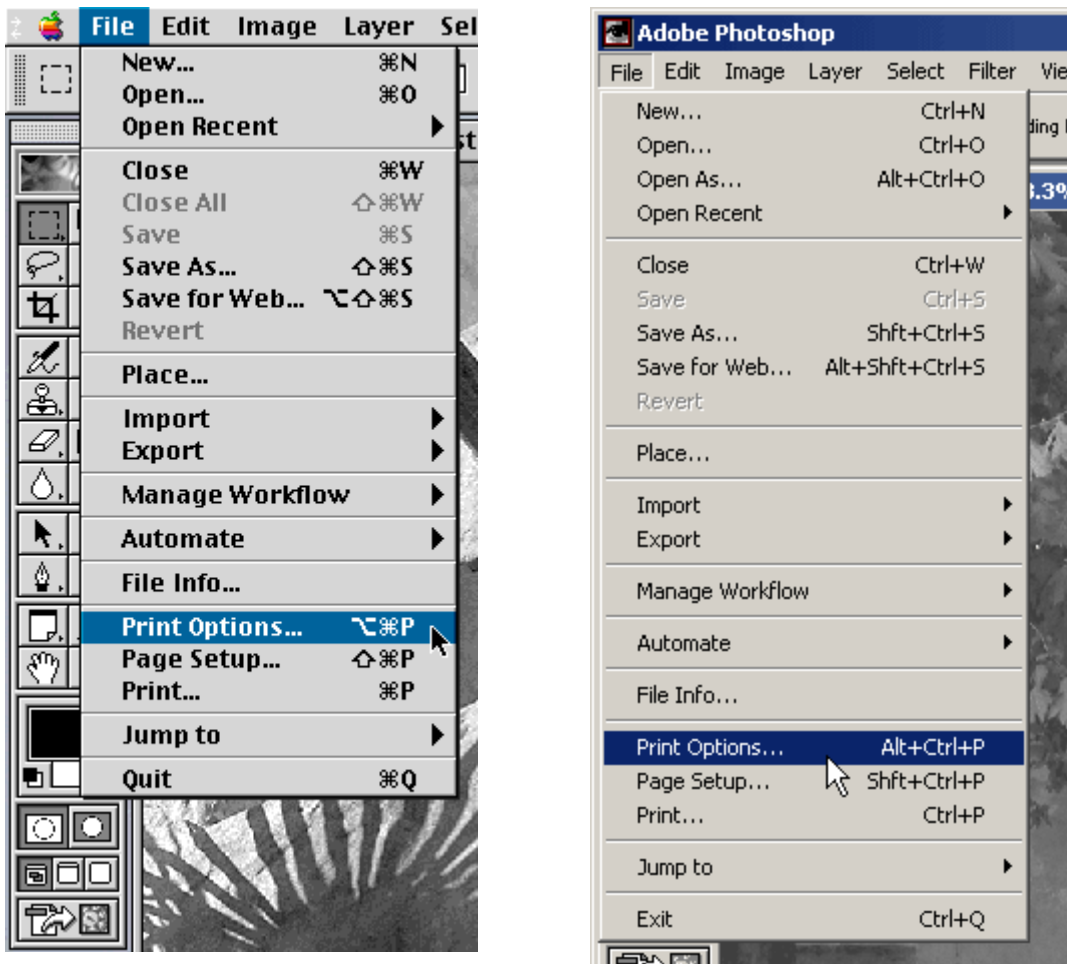
After you have edited your image, the next step is to correctly setup Photoshop to use the ICC Profiles before printing the image.

Photoshop uses the data in an ICC profile to intelligently color manage the image data being sent to the printer so that the image printed will look as you intended. It is important not to cause a double color conversion to take place. If that process were to happen twice as the data is sent from Photoshop to the printer, the resultant print will be of very poor quality.

It is important to follow the steps closely as shown below.

## Step 1

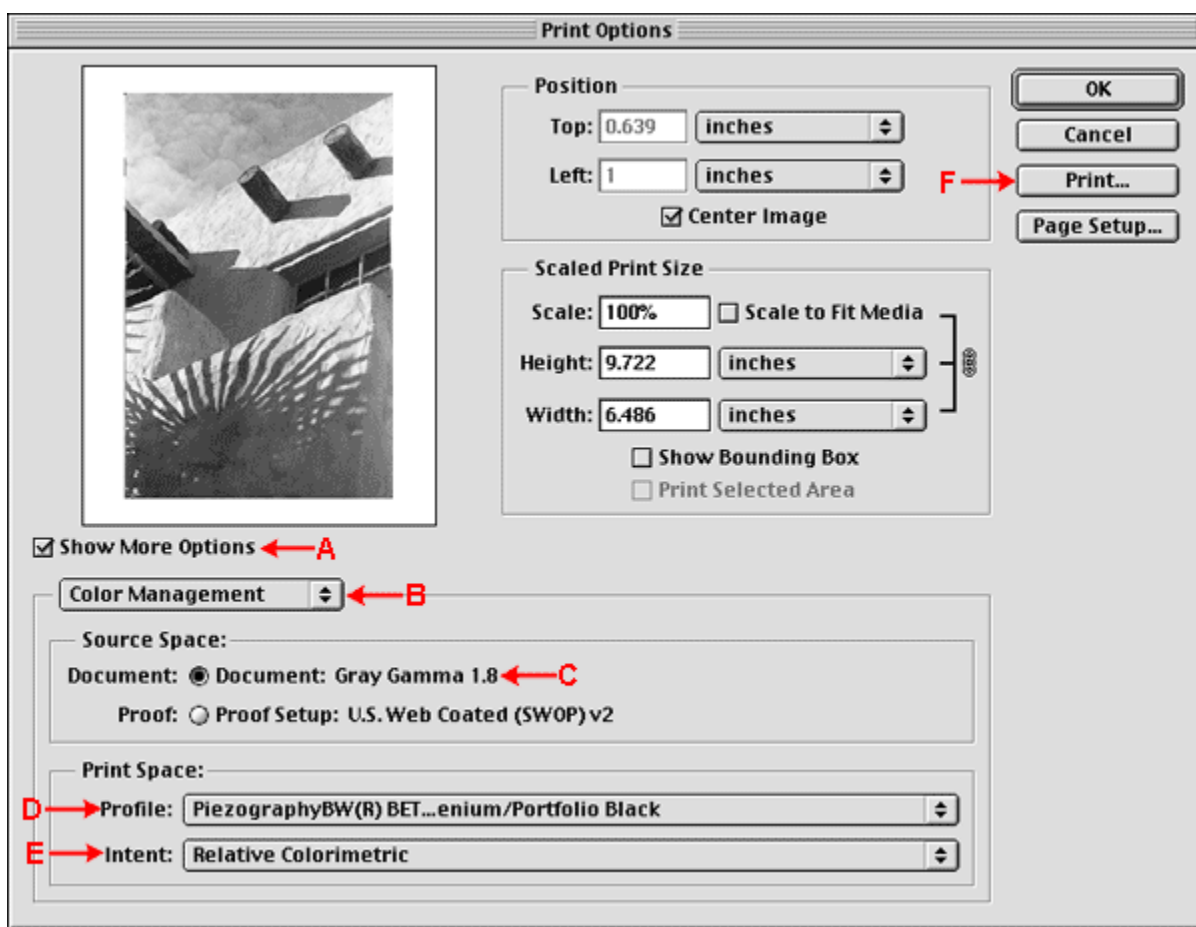
Select "File", and then "Print" options as shown below.



## Step 2

Select the settings in the "Print Options" dialog box as shown below:

- A - Make sure that the "Show More Options" check box is checked.
  - B - Select "Color Management" in the drop down list.
  - C - Under the heading "Source Space", make sure that the "Document : Gray Gamma 1.8" is checked.
- NOTE:** If **Gray Gamma 1.8** is not an option and the selection shows: **Untagged Gray**, then you did not correctly assign Gamma 1.8 to the image when opening. See the section "Configuring Color Settings on Photoshop and other Image Editing Software" in this manual.
- D - Under the heading "Print Space", select the correct ICC Profile for your specific ink and media in the drop down list.
  - E - Select "Relative Colorimetric" in the "Intent" drop down list.
  - F - If there is a check box labeled "Use Black Point Compensation", make sure that it is NOT checked off.
  - G - When everything is set up click on "Print" to go to the Epson print driver dialog box.

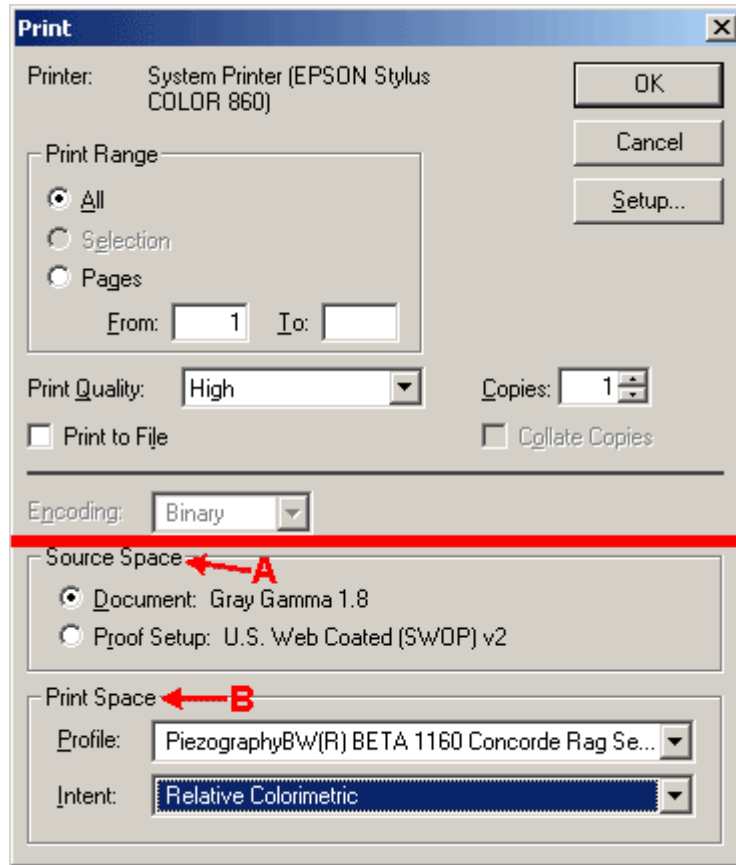


**NOTE** - Photoshop 6 was somewhat confusing because Photoshop 6 added the "Source Space and Print Space" to the "Print Options" dialog box and to the Epson OEM print dialog box similar to Photoshop 5.

This can be clearly seen below the **red line** in the two pictures below at point **A & B**.

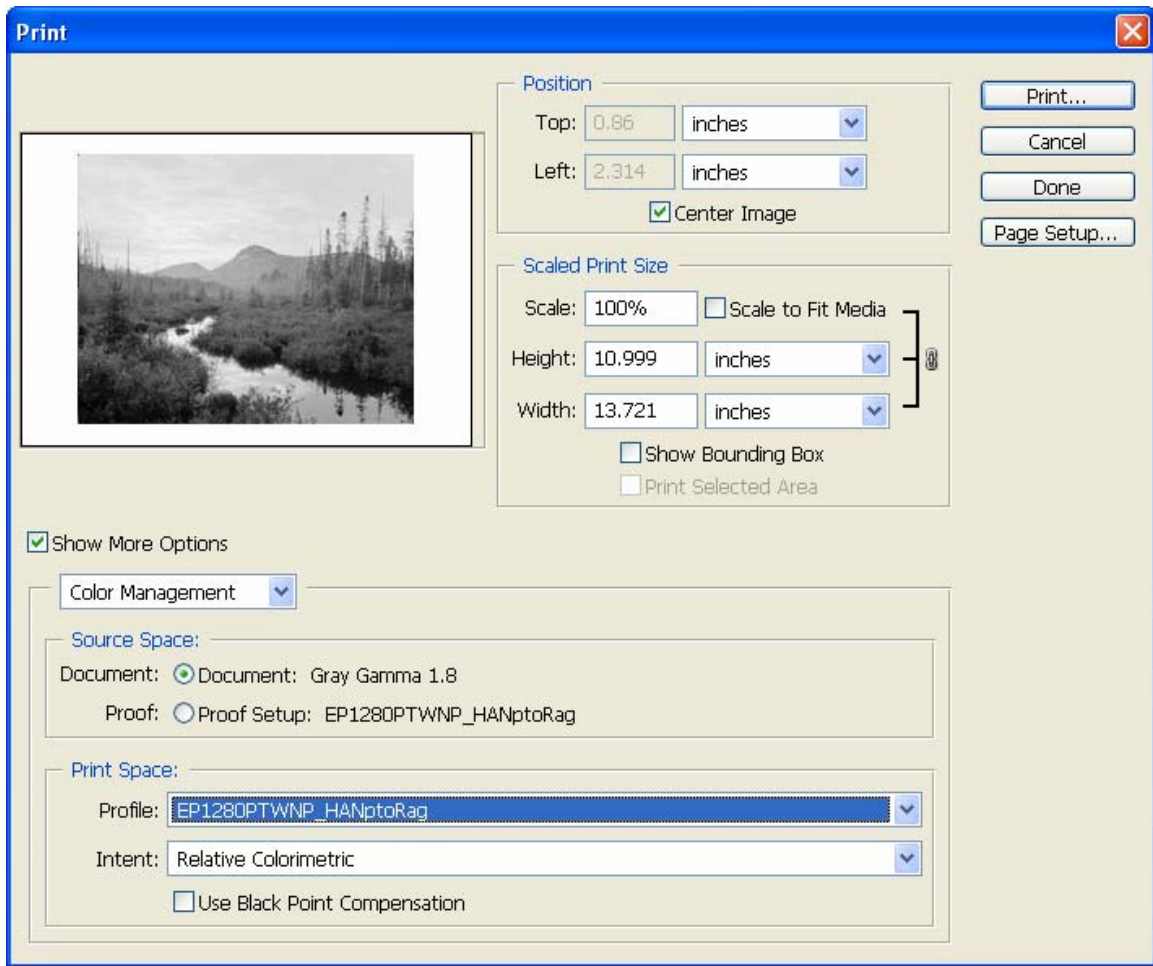
We chose to present this workflow through the "Print Options" dialog box in Photoshop 6 as shown above, because this is the method you will have to use if you update to

Photoshop 7. In Photoshop 7 - Adobe changed the name "Print Options" to "Print with Preview" and removed the "Source Space and Print Space" from the OEM print dialog box. Adobe also added a "Use Black Point Compensation" check box, which must not be checked off.



It is **very important** to disable color management in the Epson printer dialog boxes before printing. For more information about specific Epson driver settings, refer to the "**Help & Instructions**" page: **Printing - Epson print dialog box settings**.

Note: The "Perceptual" rendering intent may be used instead of "Relative Colorimetric" if you prefer. This will not effect the print in any way. We use Relative Colorimetric in all of our examples.



The image above shows the Print with Preview window from Photoshop 7 and Photoshop CS. Note that “Use Black Point Compensation” is not checked off.

# Printing: Epson Print Dialog-Box Settings

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## Use the Latest Version of the Printer Driver

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It is vital that you download and install the most recent version of the printer driver for your printer. Epson periodically makes updates available on their web site, and you should check their site periodically to make sure you're using the latest version.

On many computer systems, when you first unpack and connect your computer, the "plug-and-play" system will activate a driver for you automatically. These default drivers will not produce the same print quality as the most up-to-date drivers. Be sure to update the driver before using PiezographyBW ICC!

## Macintosh Users

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### ICC Capable Applications (Photoshop)

With ICC-capable imaging applications such as Adobe Photoshop, color management is applied in the Imaging Application (like Photoshop) and the Epson driver is basically set to "NOT" color manage the image while printing. We need to disable color management in the Epson driver. We are depending on Photoshop to do the color management before the data is sent to the Epson driver for printing. If the Epson driver were to apply a second round of color management, the resulting image quality would be very poor.

### Applications that are NOT ICC Capable (others)

If you are printing from an application that is not ICC-capable, (for example free software that came with a camera or scanner), then make sure that you have previously set up the ICC profile as the "**Current Profile**" for your printer. This is accomplished using the ColorSync Utility – Devices.

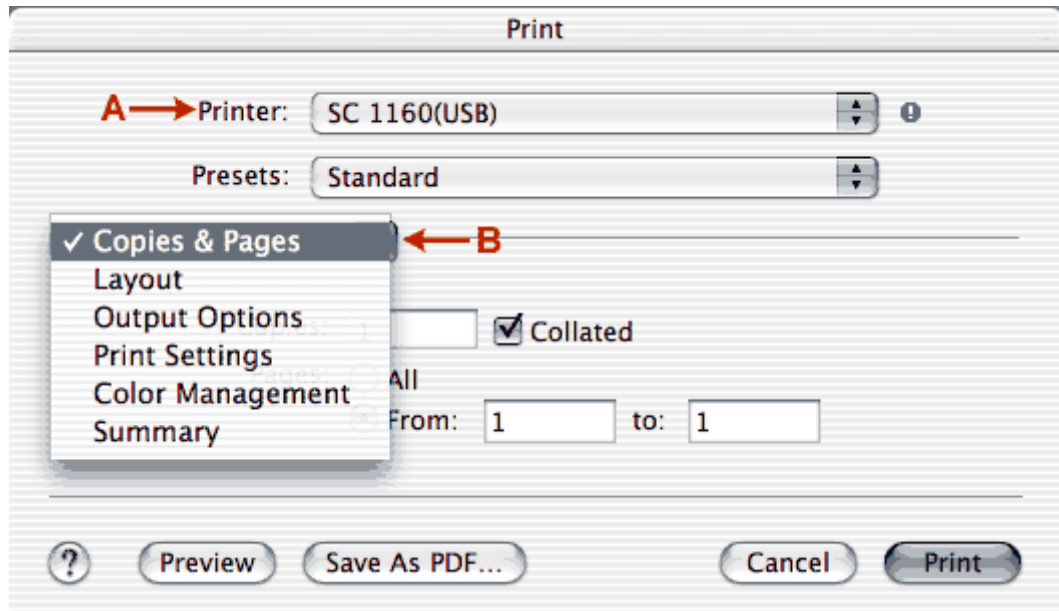
### Setting up the Epson Print Driver

The following pictures are to be used as a guide. In this example the Epson 1160 is used for the illustrations; your specific printer may differ slightly. Follow the settings in the chart at the bottom for the exact settings for your specific printer type, should your actual screen pictures differ slightly from what is shown.

#### Step 1

Select the settings in the "**Print**" driver dialog box as shown below:





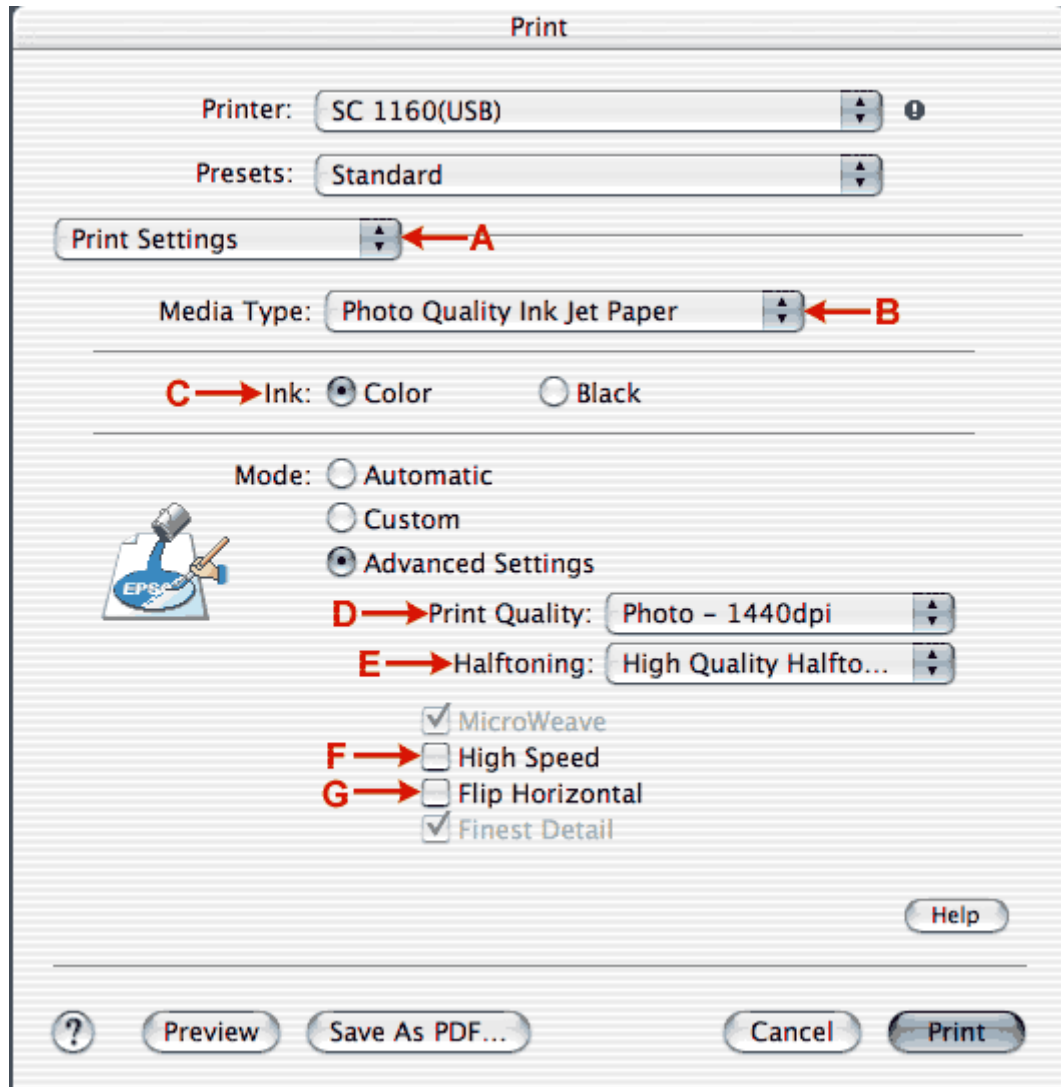
**A** - If you have more than one printer, make sure to select the correct printer in the "**Printer**" dropdown list.

**B** - Select the options dropdown list by clicking on the "**Copies & Pages**" button. Set up the options for "**Copies & Pages**", "**Layout**", and "**Output Options**" according to your preferences.

We are only concerned with the "**Print Settings**" and "**Color Management**" options, and they will be covered in detail below.

## Step 2

Select the settings in the "**Print**" dialog box as shown below:

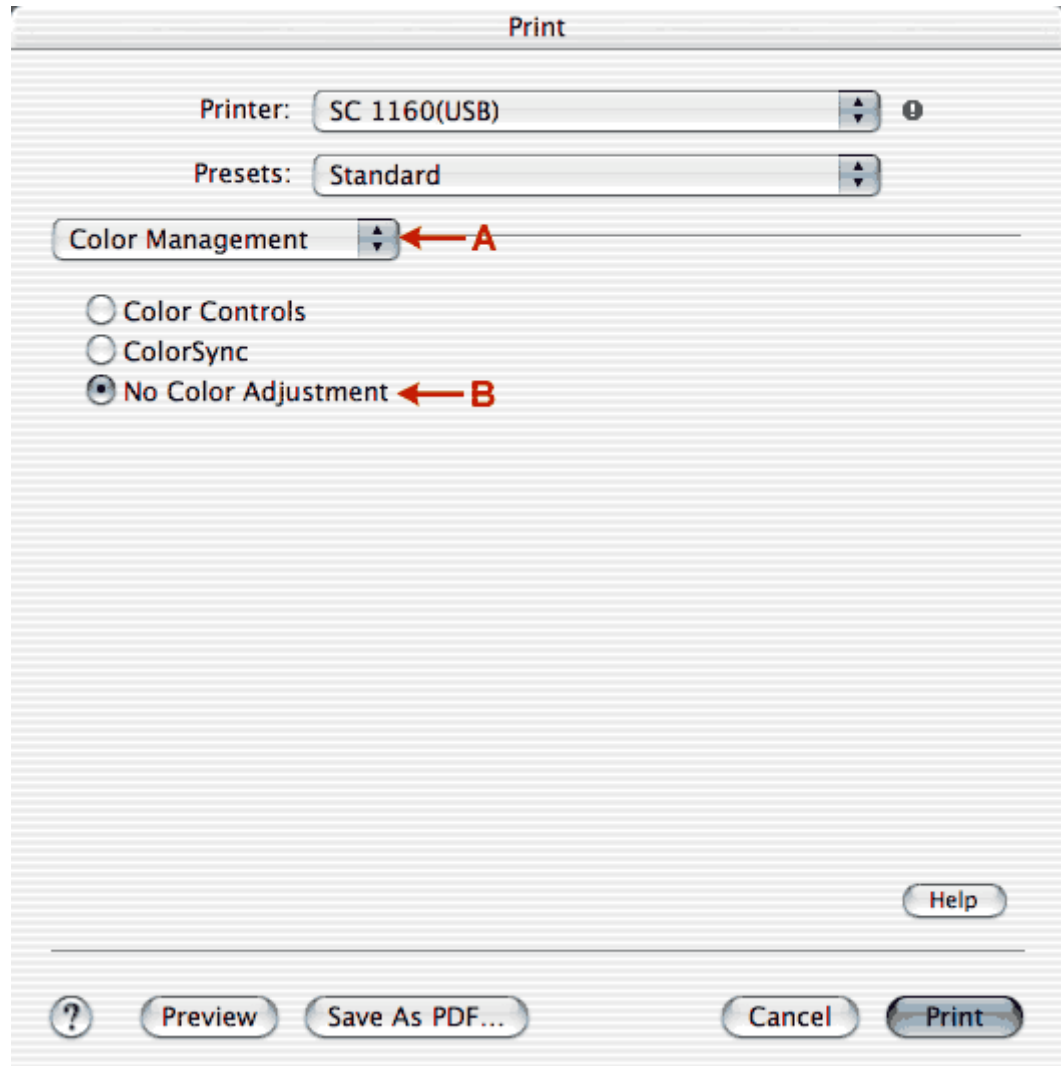


**A** - Make sure that you are on the "**Print Settings**" selection.

**B through G** - refer to the **Printer Settings tables** at the end of this chapter for your specific printer.

### Step 3

Select the settings in the "**Print**" dialog box as shown below:



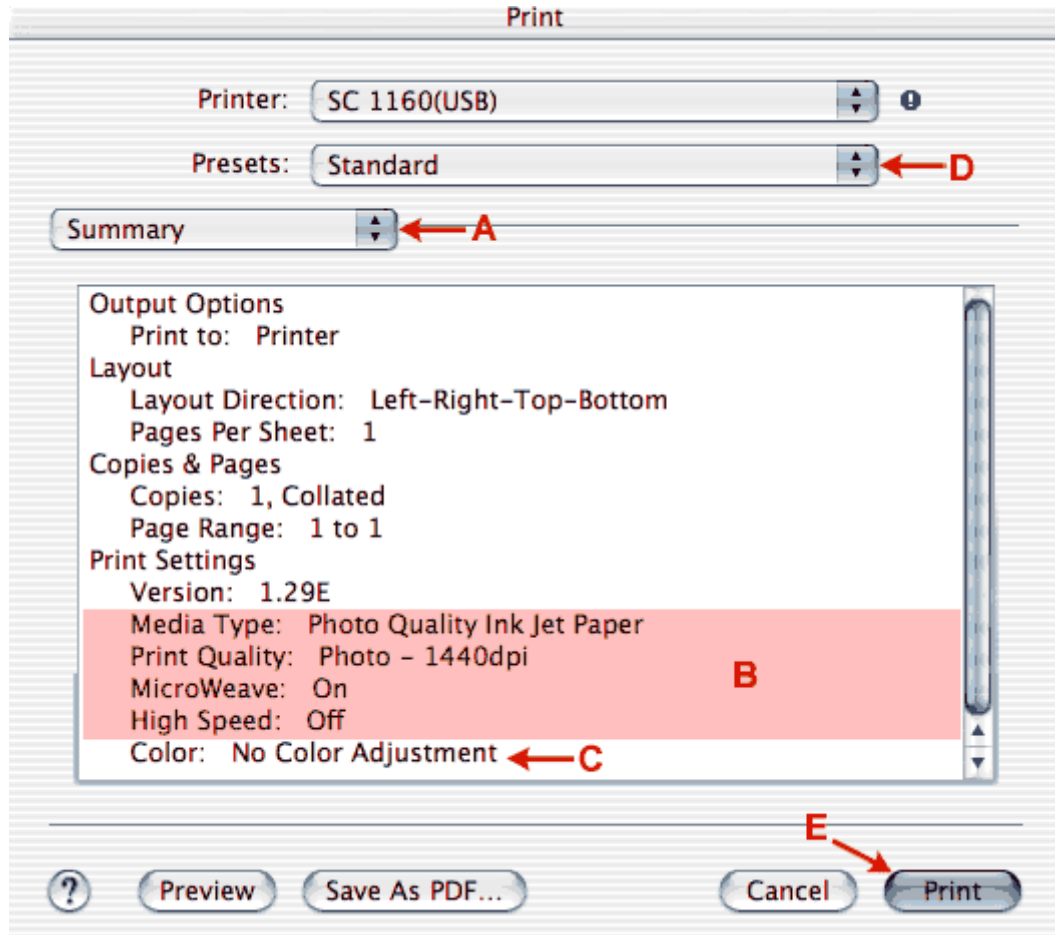
It is important to disable any Epson driver color adjustments.

Applicable to ALL printers and inks

- A Make sure that you are on the "Color Management" selection
- B PHOTOSHOP or other ICC Capable Application ONLY - Click on "NO Color Adjustment" as shown.  
Application NOT ICC Capable - Click on "ColorSync".

#### Step 4

You can review your setup by selecting the settings in the "**Print**" dialog box as shown below:



Applicable to ALL printers and inks

- A Make sure that you are on the "Summary" selection
- B Make sure that your settings match the ones specified in the tables above for your specific printer model
- C PHOTOSHOP or other ICC Capable Application ONLY - Click on "NO Color Adjustment" as shown.  
Application NOT ICC Capable - Click on "ColorSync"
- D You can save your settings for future use by clicking on the "Presets" dropdown list, and selecting "Save As" and typing an appropriate name
- E Click print to begin printing

## Windows Users

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### ICC Capable Applications (Photoshop)

With ICC Capable imaging application such as Adobe Photoshop, color management is applied in the Imaging Application (like Photoshop) and the Epson driver is basically set to "NOT" color manage the image while printing. If the Epson driver were to apply a second round of color management, the resulting image quality would be very poor.

### Applications that are NOT ICC Capable (others)

If you are printing from an application that is not ICC Capable, (for example free software that came with a camera or scanner), then make sure that you have previously "Associated" the ICC profile to the Printer. This is done by selecting your printer in the Printers folder and modifying it's Printing Preferences.

### Setting up the Epson Print Driver

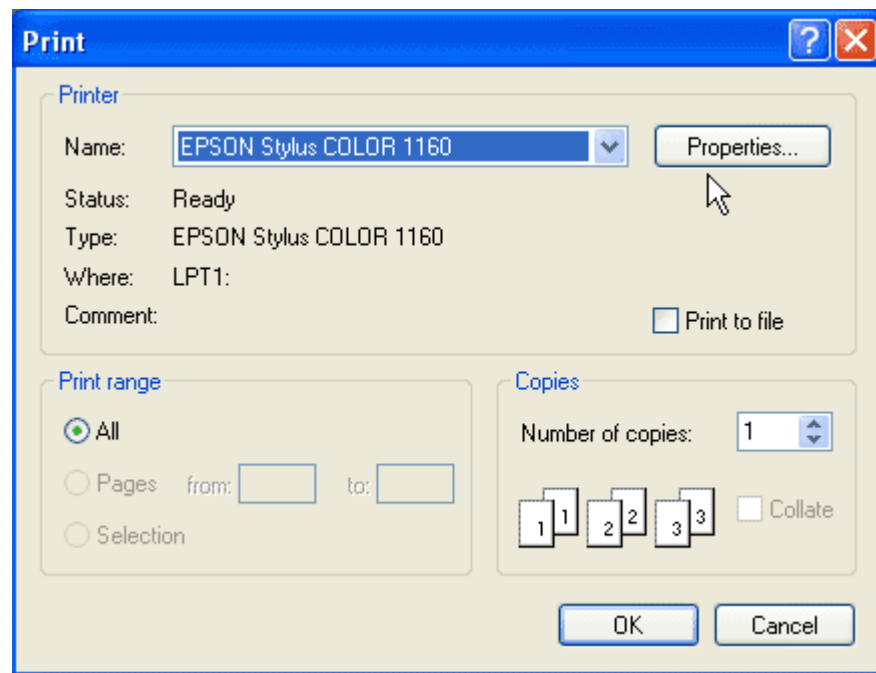
The following pictures are to be used as a guide. In this example the Epson 1160 is used for the illustrations; your specific printer may differ slightly. Follow the settings in the chart at the bottom for the exact settings for your specific printer type, should your actual screen pictures differ slightly from what is shown.

#### Step 1

If you have more than one printer, make sure to select the correct printer in the Printer "Name" dropdown list.

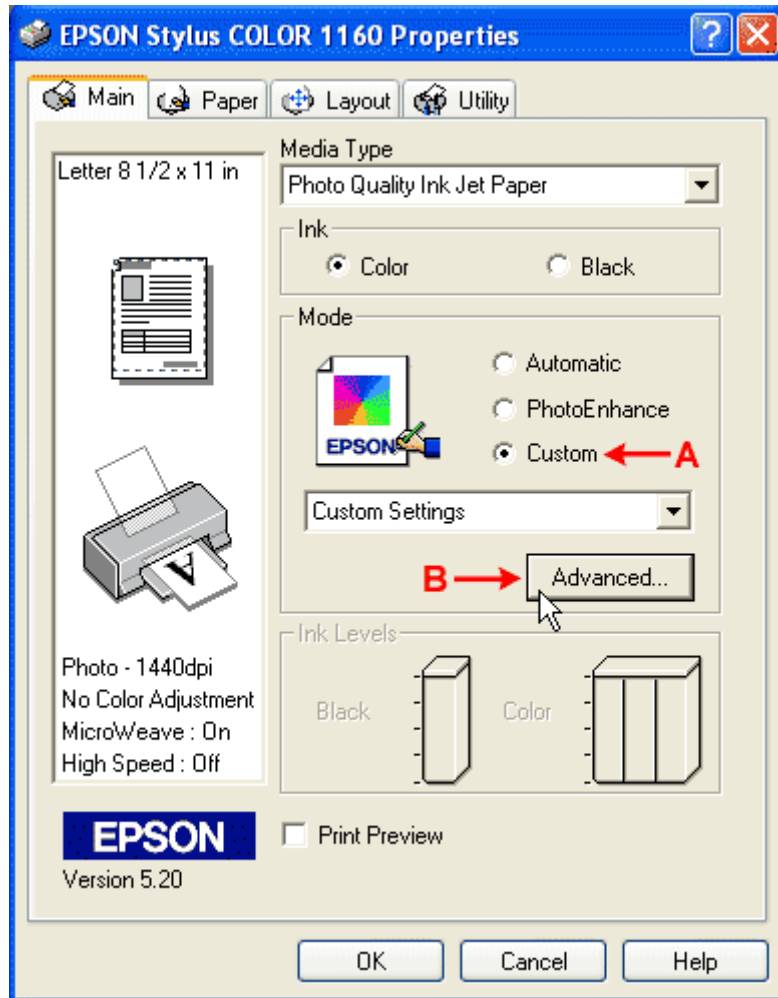
#### Step 2

Click on the "**Properties**" Button to access the Epson printer driver settings dialog box.



#### Step 3

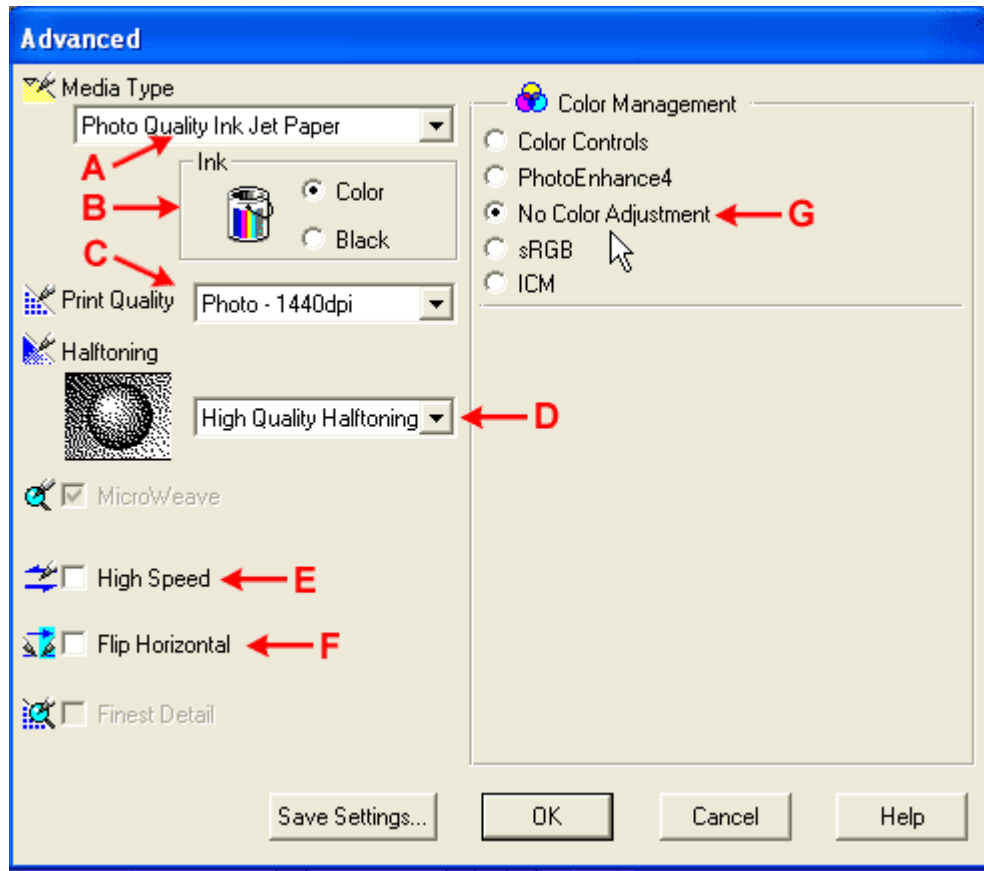
Select the settings in the Epson print driver dialog box "**Mode**" section as shown below:



- A** - Click on "Custom". This will change the options below to reveal the **Advanced** button.
- B** - Select the "Advanced" button.

#### Step 4

In the "Advanced" dialog box, set the options as shown below:



A through G - refer to the Printer Settings section at the end of this chapter for your specific printer.

NOTE - When you are finished setting up the options, you can save the settings for future use by clicking the "Save Settings" button.

### Step 5

Click "OK" to begin printing.

## Printer Settings

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For both Windows and Macintosh, find your printer model below and use the settings shown.

### Epson 860 and 1160

**Media Type:** Photo Quality Ink Jet Paper

**Ink:** Color

**Print Quality:** Photo – 1440dpi

**Halftoning:** High Quality Halftoning

**High Speed:** Unchecked

**Flip Horizontal:** Unchecked

**Color Management:** No Color Adjustment

### **Epson 1200**

**Media Type:** Photo Quality Ink Jet Paper  
**Ink:** Color  
**Print Quality:** Photo – 1440dpi  
**Halftoning:** Error Diffusion  
**Flip Horizontal:** Unchecked  
**Color Management:** No Color Adjustment

### **Epson 1270**

**Media Type:** Photo Quality Ink Jet Paper  
**Ink:** Color  
**Print Quality:** Photo – 1440dpi  
**High Speed:** Unchecked  
**Flip Horizontal:** Unchecked  
**Color Management:** No Color Adjustment

### **Epson 1280 and 1290**

**Media Type:** Photo Quality Glossy Film  
**Ink:** Color  
**Print Quality:** Photo – 1440dpi  
**High Speed:** Unchecked  
**Flip Horizontal:** Unchecked  
**Color Management:** No Color Adjustment

### **Epson 2000P**

**Media Type:** Glossy Paper – Photo Weight  
**Ink:** Color  
**Print Quality:** Photo  
**High Speed:** Unchecked  
**Flip Horizontal:** Unchecked  
**Color Management:** No Color Adjustment

### **Epson 3000**

**Media Type:** Photo Quality Ink Jet Paper  
**Ink:** Color  
**Print Quality:** SuperFine – 1440dpi  
**Halftoning:** Error Diffusion, with “Super” checked  
**Flip Horizontal:** Unchecked  
**Color Management:** No Color Adjustment

### **Epson 7000 and 9000**

**Media Type:** Photo Quality Ink Jet Paper  
**Ink:** Color  
**Print Quality:** Superfine – 1440dpi  
**Flip Horizontal:** Unchecked  
**Color Management:** No Color Adjustment



# Appendix A – General ICC Workflow Overview

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Color management can seem a bewildering topic with a new vocabulary, and many new concepts. The ICC workflow is actually fairly simple.

The general idea is this:

- A) Calibrate the parts of the system so they perform consistently time after time.
- B) Profile the parts of the system - measure how each device works against a known standard.
- C) Use software that understands how to use the data in the profiles, to move the image data from device to device so that color accuracy is maintained against the known standard.

Once a good color management system is in place and working well, you can avoid countless experiments moving the sliders around in the printers print dialog box, and save the waste and expense of good paper and ink, trying to print an image that closely resembles what you see on your monitor.

## Other useful links

<http://www.inkjetmall.com/store/information.html>

<http://www.inkjetmall.com/store/color-management.html>

## First - What is an ICC Profile?

A typical question we receive is: "I double clicked on the ICC profile and nothing happened! What's wrong?"

ICC profiles are not programs. They are files that contain tables of measured color values. It might be helpful to think of them as a spreadsheet of color measurements for a unique printer / paper and ink combination.

Color information stored in an image document (your picture) needs to be successfully translated into the monitors color space for accurate display to the user, and eventually to the printers color space for print.

## ICC Workflow

An ICC workflow can be broken down into a few simple steps:

- 1) Calibrate the monitor - set it into a known condition.
- 2) Profile the monitor - measure its color characteristics when it displays a calibration image.
- 3) Calibrate the printer - find a set of settings that consistently produce a good result.
- 4) Profile the printer - measure the color characteristics of a calibration print.
- 5) Establish an ambient environment that allows you to judge color from monitor to print correctly.
- 6) Edit your images in an application that can show what the image will look like when printed on your printer, with your ink and media combination. (Soft-proofing)
- 7) Print your images through the ICC profile using the same set of settings that were used to make the ICC profile.

## Monitor warmup period

Many people do not realize that your CRT monitor has to be "ON" for about **30 minutes** for the temperature of the circuitry to stabilize. Don't try to judge color after first turning on your monitor.

### Generic monitor driver ICC profile

The generic ICC profiles that are shipped with the monitor and installed with the monitor driver represent a theoretical monitor at the factory and rarely are a close match to your specific monitor. Remember visiting the electronics store and wondering why all those brand new TV's, having the exact same input video feed, look so different?

There is no way to accurately use an ICC workflow without actually measuring your specific monitor and creating an ICC profile from the measured values. The tradeoffs here are cost, and the degree of accuracy you require.

### White Point and Gamma

We highly recommend that you calibrate your monitor to 5000 K or D50, and use a gamma setting of 1.8. This is the **Printing** standard, not a Macintosh standard per se. We feel this works well with Fine Art Rag papers and Pigment Inkjet inks.

Our Quad Black ICC profiles are specifically created with a gamma of 1.8, so that all printer models will print very much the same.

There are a lot of people who feel that 6500k or D65 and a Gamma of 2.2 is better. If you are concerned about this - try both settings out, and use the one that best suits your tastes. What works - works, and there is no arguing with that.

## Calibrating and Profiling

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There are four basic methods you can utilize for calibrating your monitor toward the goal of matching your print.

### A ) No ICC workflow, manual monitor tweaking, fly by the seat of your pants.

This method involves adjusting your monitor until you achieve a close approximation from monitor to print. Countless dollars can be wasted here adjusting the monitor and print driver color sliders and printing and printing and printing proofs. Another big problem is discovered when you had two very different printers with very different inksets. These printers will inherently print differently. You would have to constantly adjust your monitor when you switched your printing jobs between the two printers.

If you are printing with Piezography® quad black ICC profiles, they are created with a gamma of 1.8 so that different printers will print similarly. It would be advisable to select this gamma on your monitors settings if possible.

**Pros** - Free

**Cons** - Percent accuracy usually in the 10's to 80's, media and ink wasted not free, works best if only one printer is used.

### B ) Software Only - Visual Calibration / Profiling

This method involves adjusting your monitor by eye, using software that helps by displaying a range of target images. After you are done tweaking, the software generates an ICC profile. The quality of the Soft-proof achieved can range from Fairly Good to Abysmal.

An example of "Abysmal" can be achieved by using the free Adobe Gamma Utility. This is useless and will actually make you go backward. There is absolutely no way you can produce a quality ICC profile from looking at 3 tiny squares of color on your screen. Disable this and

watch out for its reactivation whenever you reinstall an Adobe product or install a new Adobe product.

An example of "Fairly Good" would be Color Blind Proveit!. Proveit! had a visual method that presented many full screen targets that give you a much better chance of achieving a fairly decent ICC profile. Pantone and other vendors have similar products. In general, the more full screen targets the software presents to you, the better the result.

**Pros** - Free to modest cost

**Cons** - Percent accuracy usually 70's to 90's, monitor color can be influenced by an individuals eye quality, color blindness, mood, time of day, and how much coffee or chocolate one has consumed. Not recommended if more than one person uses the monitor, as no two people see color exactly the same.

### C ) Software and Measuring Equipment - Non-digital enabled monitor

This method involves using software and a hardware colorimeter (puck) that measure your monitor.

Examples would be ColorBlind Prove-it! or Colorvision. The new Gretag Eye One is very good. More information on these can be found at <http://www.inkjetmall.com/store/color-management.html>

You still have to manually adjust the Brightness, Contrast, and color guns to achieve a good result, but you are now doing so aided by a measuring instrument, and not the human eye.

Best results are obtained if you have a monitor that provides control of all three RGB guns. Many monitors only have a single slider that allow setting a general setting of 5000 to 10,000 K. In this case you can vary the white point, but can not compensate for a green cast, for example, if the gain of the green gun was set incorrectly at the factory in relation to the red and blue guns.

If you have a monitor without any RGB gun adjustment, get a different monitor for image editing.

If you have a monitor that has presets only down to 5500 K, then don't force it to 5000K.

**Pros** - Percent accuracy usually in the low to high 90's, semi-automated, does not rely on human color perception, modest learning curve.

**Cons** - Modest to higher cost.

### D ) Software and Measuring Equipment - Digital enabled monitor

This method involves using software and a hardware colorimeter (puck) and a digitally enabled monitor. Here, the software can communicate with the monitor and control its internal settings, measure the changes with the feedback of the puck. The software will typically repeat numerous adjustments very quickly, as a change of one of the guns will effect the overall brightness etc. and vice versa.

Examples of this kind of system would be LaCie Blue Eye, NEC Mitsubishi SpectraView, and Sony Artisan.

This is the best of all worlds. A small effort to learn how the program is run, the rest is automated. These systems not only adjust and set the color guns, but also can provide a much nicer interface for adjusting the geometry of the screen than the typical OSD monitor control panel one finds by pushing the buttons on the front face of the monitor. They may also provide the ability to measure the ambient light, or to match the light in a viewing

booth.

**Pros** - Percent accuracy in the high 90's, completely automated, does not rely on human perception, lowest learning curve.

**Cons** - Highest cost.

## Calibrate and Profile the Printer

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This part is already done for you when you purchase an ICC Profile. It is very important that you use the same settings that were used in making the profile to obtain accurate results.

The printer's color space is defined as a combination of Printer / Ink / Paper, as each one of these parts has its unique qualities and deficiencies.

The printer part of the combination is actually influenced by the printer type (what kind of printer you are using), and a set of settings in the print dialog box. Different printers have different amounts of print heads, and different print head qualities. Also, changing the settings in the print driver software changes how the printer prints ink.

During the making of an ICC profile, we test the various printer driver settings of the printer to find which set of settings prints best. Targets are printed and measured using this very specific set of print driver settings. Again, it is very important that you use the same settings that were used in making the profile to obtain accurate results.

Our Piezography® BW ICC profiles for the PiezoTone inks are created with a Gamma of 1.8, for all the supported printers.

## Ambient Environment

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Controlling the ambient light is a critical part of soft-proofing (matching monitor to print). This can not be emphasized enough. This is one area where a huge leap forward can be made in the accuracy of the monitor to print without spending any money.

### Imaging Room Wall Color

It is a good idea if the imaging room is painted a neutral color. Bright red walls are obviously not a good choice.

### Imaging Room Windows

An ideal set up is to block off any windows in the room. Controlling the ambient light so that it is consistent throughout the day is a crucial step. During the course of the day, not only does the intensity of the sunlight change with the passage of time, but the color of the light changes dramatically as well. The white light of the sun is approximately 5000K at noon, which is one of the reasons this has become a standard for viewing prints. Trying to make critical color judgments of a printed piece while a gorgeous sunset of pink clouds casts its warm reddish glow on the white of the paper is not a good idea.

### Imaging Room Overhead Lights

Dim any overhead lights. This reduces the influence of the wall color on your peripheral vision. Avoid wearing bright red shirts that will reflect in the monitor. Very expensive Radius monitors used to ship with a black Kimono for image editing to avoid just this problem.

## Image Viewing Booth

Ideally, we would all have viewing booths. Better yet - variable dimming viewing booths. A viewing booth without a variable dimmer is not recommended. The **color and brightness** of white light in the viewing booth should match the **color and the brightness** of the white point when you calibrated your monitor. Again this is another reason we choose 5000 K as our preferred white point. Viewing booths at 5000 K are available from many sources. More info on viewing booths is available at:

<http://www.inkjetmall.com/store/color-management.html>

The viewing booth is set up next to the monitor. The advantage is obvious when the overhead lights are dim, the image is displayed on the monitor, and the viewing booth's dimming slider is adjusted so that the light being reflected off white of the paper in the booth matches the **color and brightness** of the white of the paper as seen on screen. Brightness is really crucial here.

What may have looked like a poor match between print and monitor with bright overhead lights on, is now seen in its proper perspective. As you adjust the brightness of the viewing booth from too dark to too bright, you can watch and almost feel the huge impact this has on the perception of color.

The key point here is that the white of the paper as seen on the monitor, must be matched by the light reflecting off the white of the printed paper. The closer this match, the closer you will feel your soft-proofing is perfect.

## Viewing Booth alternatives

Viewing booths can be expensive. Low cost alternatives could be 5000k florescent bulbs for the overhead lights and a dimming switch on the wall. A cheap viewing booth could be made from foam core or plywood and a hot glue gun and a dimmable florescent fixture with a 5000K light bulb. Another choice would be to investigate OTT lights and their 5000k natural sunlight bulbs. Again - the ability to control the brightness of the light with a dimmer is very important.

Any improvements you can make in this area will increase your satisfaction with the accuracy of the soft-proof.

## Compare apples to apples

Another step that is often overlooked is very simple. If you are viewing your printed image surrounded by a white border (for example an 6 x 8 image on 8.5 x 11 paper) then to judge color properly you need to see the image on screen with a corresponding amount of white around the image.

Images need to be sent to the printer without the extra white surrounding the image so that the centering functions of the print driver can properly calculate where to place the image on the sheet.

However it is easy to temporarily add some white canvas (increase the digital sheet size) to make color critical decisions, followed by undo or a crop to remove the extra paper size before printing.

You can not accurately judge color when the border of the printed area is surrounded by paper white, and the image on screen is surrounded by the typical 50% gray background of Photoshop.

### **Image Editing**

There are many and voluminous books written on this subject.

Follow the instructions in this manual to set up the soft-proofing, so that you can edit the image with the color of the ink and media properly displayed.

### **Image Printing**

It is very important to use the same settings for printing what were used when creating the ICC profile.

Follow the instructions in this manual to print your images.

# Appendix B – Updates and Technical Support

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Email-based technical support is available to registered users of the system for a period of one calendar year from the date of purchase. Note that we only support PiezoTone ink sets, in cartridges and PiezoFlow bulk-ink systems, when used with papers that we have supplied ICC profiles for.

Registered users are also eligible to receive any updates to the purchased ICC profile library (based on printer model) during the support period of one calendar year from the date of purchase.

## Registering the Product

To register your product, go to <http://www.piezography.com/register.html> and fill out the registration page. You will need to supply the registration number that is printed on the envelope that holds the product CD-ROM.

## Checking for Updates to the Users' Guide or ICC Profile Libraries

Go to <http://www.piezography.com/updates/> to download any updates to the Users' Guide and find out about updates to the ICC profile libraries.

## Obtaining Technical Support

To obtain support, email [support@piezography.com](mailto:support@piezography.com)