



Adobe® Photoshop® CS2

## Print with Colour Management



by Ian Lyons

I can't recall where, but I once read an article that included the comment: "you don't need to be an expert in colour management to print from Photoshop, but it helps".

Well the engineers and interface gurus at Adobe must have been reading the same article because the print workflow within Photoshop CS2 has undergone a very significant overhaul. In this tutorial I will discuss these changes in detail, so that by the time you finish reading it you too will be an expert in Photoshop print colour management (dream on!).

However, before I get into describing the various Photoshop and Print Driver configurations I need to clarify two aspects of print making that still seem to confuse a lot of Photoshop users:

- ∞ Desktop inkjet printers from Epson, Canon, Hewlett Packard, et al may use CMYK or CcMmYK coloured inks but this doesn't make them CMYK printers. The reason I stress this point so much is that the device drivers supplied with these printers are not designed to interpret CMYK data. So any attempt to produce a CMYK print directly from a desktop inkjet printer will result in disappointment.
- ∞ The image displayed on a typical computer monitor cannot be fully replicated in print. Yes we can often get close but an exact match is rarely if ever possible.

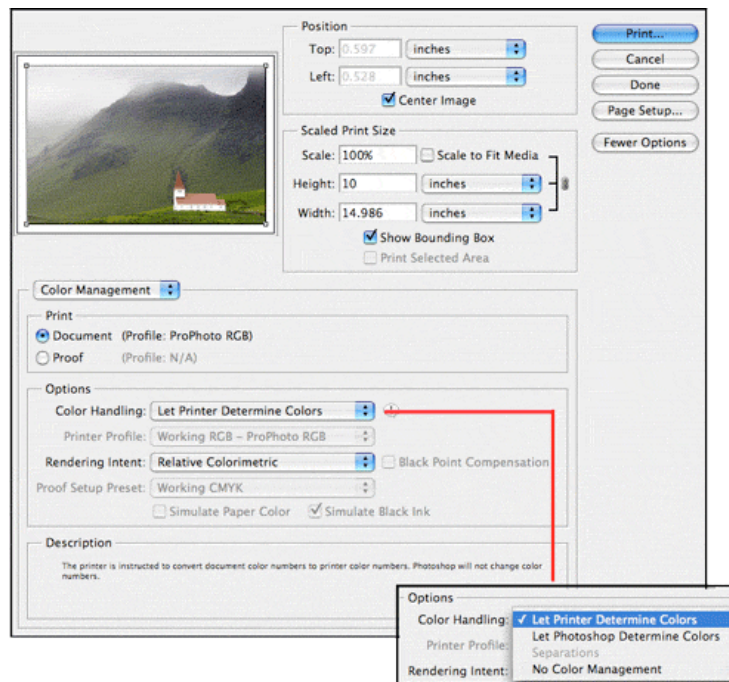
Note that while the initial screenshots used for this tutorial are based upon the Mac OSX version of Photoshop CS2 they should still provide more than ample guidance those of you using either Windows 2000 or XP. Nevertheless, the actual printer driver screenshots are OS specific; therefore I've included separate instructions for both Mac and Windows versions. These instructions and screenshots are based on the Epson Stylus Photo R2400, but should be compatible with most other current models from Epson.

### ***Producing an Inkjet Print***

As I mentioned at the outset Adobe has made some very significant changes to the Print with Preview dialog, alas I fear that many of these changes will likely lead to even more confusion than previous attempts to simplify printing from within Photoshop.

Photoshop CS2 has five Print menu options: Page Setup, Print, Print with Preview, Print One Copy and Print Online. By-the-way, the Print menu option opens the System print dialog, which means that none of Photoshop's print colour management options are available. I just thought I'd mention that because you would not believe the number of folk who still contact me asking were all the colour settings have gone. Anyway, this tutorial will concentrate on Print with Preview, which is where the printer colour settings have lived since Photoshop 7.

The Print with Preview menu option is only available when an image is open on the on the Photoshop desktop.



**Figure 1 - Photoshop CS2 Print with Preview**

If you've been using an earlier version of Photoshop you'll immediately notice that we now have a more extensive and very different list of options available. The Color Management settings are now shown by default, although you can change this if you wish (not recommended). Anyway, to keep things simple I will focus on those settings that fall within the area bounded by the red line in figure 1 above. I will also try to explain the meaning of each option and hopefully give you better idea why certain combinations will work and others don't: -

#### **Print:**

- ∞ Document: denotes the ICC profile embedded within or assigned to the image/document to be printed. The example shown in figure 1 shows ProPhoto RGB, but it could be any number of user specified alternatives (e.g. sRGB, Adobe RGB (1998), ColorMatch). If the image has already been converted (i.e. using the Photoshop Convert to Profile command) to a printer/media profile this will be the colour space reflected here. It's actually a good way of double-checking that you haven't mistakenly converted the image/document already.
- ∞ Proof: this field will normally display as (Profile: N/A). Once it's activated via the radio-button it tells Photoshop to convert the image/document on-the-fly from the image/document source colour space to the destination ICC profile shown in brackets. You can only alter the destination profile from within the Proof Setup dialog (see: Photoshop View menu). Also, note that you'll only ever need to use this option if you are intending to make Hard Proofs or Match Prints (i.e. trying to emulate another printer such as a press), therefore I don't intend to discuss this workflow further in this tutorial.

## Options:

- ∞ Color Handling - this is the new pop-up menu from which you choose the preferred method of managing colour when printing. By adopting this approach Adobe have separated the workflow aspects of printing from the media choices. In theory this should make life easier for the user, but only time will tell us whether it has. There are four different choices: Let Printer Determine Colors, Let Photoshop Determine Colors, Separations, and No Color Management. Each of these choices has its own associated preset configuration in the Print with Preview dialog thereby helping you avoid erroneous settings.
- ∞ Printer Profile - as its name implies this is the pop-up menu form which you choose the ICC profile associated with the printer/media combination you'll be using. This pop-up will only be active when the Let Photoshop Determine Colors is selected in the Color Handling pop-up.
- ∞ Rendering Intent and Black Point Compensation - again, depending upon your choice in Color Handling one or both of these settings may be greyed out.
- ∞ Proof Setup Preset - by default this pop-up menu is greyed out and will only be activated when the Proof radio button is selected. As mentioned above this option is normally only used when simulating or proofing other output devices such as a Press.
- ∞ Description - this is a useful addition to the Print with Preview dialog in so far as it provides short explanations for each of the settings and options. The description itself is triggered when you hover the mouse cursor over the various buttons and popups (e.g. Color Handling, Rendering Intent, Black Point Compensation, etc).

### *It's all about Workflow*

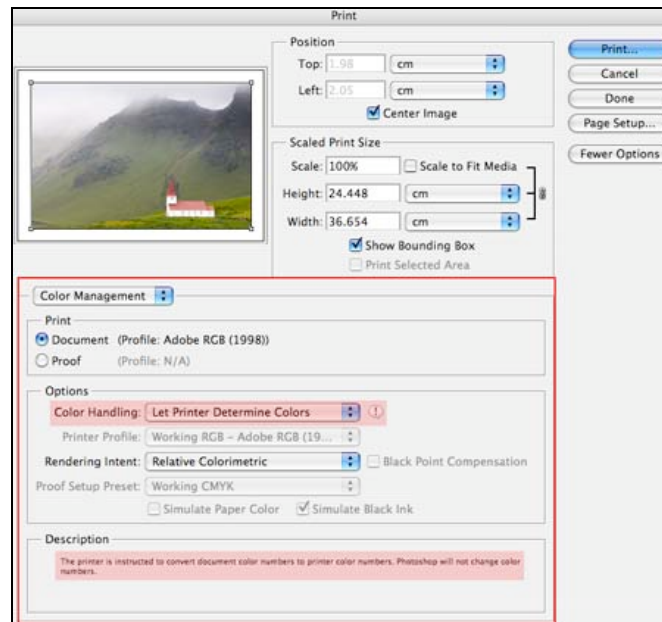
There are four choices or more accurately workflow options contained within the Color Handling pop-up. However, this tutorial will only discuss three of them, leaving the fourth (i.e. Separations) for others to explain.

#### **Print Workflow 1**

The default configuration for the Print with Preview dialog is shown below as Figure 2. Notice that Color Handling is set to Let Printer Determine Colors. For the purpose of this tutorial we'll call this setting Print Workflow 1.

If you've just upgraded to Photoshop CS2 from an earlier version then Let Printer Determine Colors is the direct equivalent of Printer Color Management in Photoshop 7 and CS. Let Printer Determine Colors is probably the easiest and safest choice for new Photoshop users or those who are not yet familiar with how to integrate printer ICC media profiles into their workflow.

When you choose Let Printer Determine Colors you're in fact informing Photoshop that the document should be passed directly to printer driver complete with details of the ICC profile listed against Document. Photoshop will not make any adjustments to the document colours nor will it take any account of the media specified in your printer driver. By tagging the document with the ICC profile Photoshop is providing the printer driver with all the information required to ensure accurate colour rendering of the print. The document colour management is handled solely by the printer driver.



**Figure 2 - Print Workflow 1**

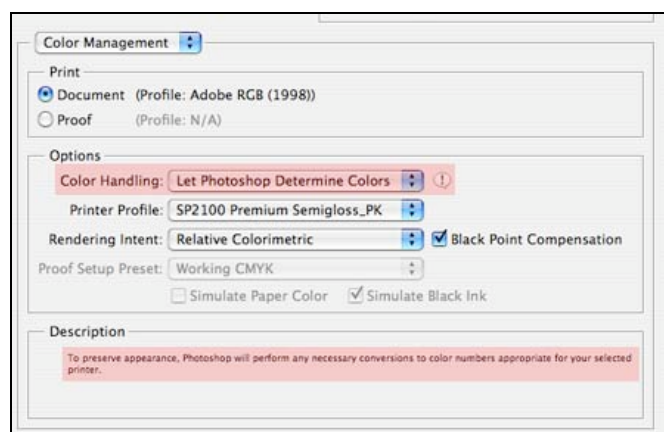
**Tip:** Depending upon your printer model it is possible that Rendering Intent may not be active for this workflow. Even if it is active there is every possibility that the printer driver will ignore your choice and use Perceptual, but don't worry either way.

## Print Workflow 2

This workflow is really intended for the more advanced/demanding Photoshop worker who needs total control of how their documents are rendered to print. With Color Handling set to Let Photoshop Determine Colors you are able to choose: specific ICC media profiles, the Rendering Intent, and whether Black Point Compensation is to be used. Trying to relate this particular option back to earlier versions of Photoshop is difficult because there was no direct equivalent.

When Let Photoshop Determine Colors is selected you'll immediately be given access to the Printer Profile pop-up. By default the profile shown in this pop-up is the Working RGB profile (defined in Photoshop Color Settings), but you'll very seldom want to leave it at Working RGB. It's important that your actual choice of Printer Profile matches the media and printer model that you'll be using otherwise poor quality prints are almost a certainty. The best quality will be obtained when you use an ICC media profile, which has been created for your specific printer. These can be created by you using specialist software/hardware or purchased from a third party.

**Tip:** Many Epson printers are now supplied complete with ICC media profiles for a range of media types although with some models you may have to install the PIM driver (see the cd-rom supplied with your printer) before they become available.



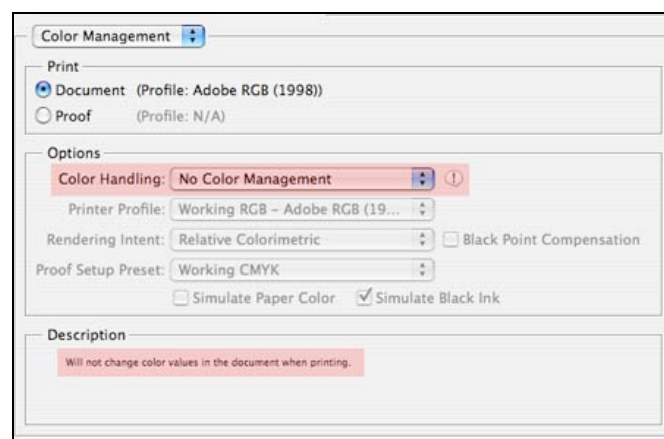
**Figure 3 - Print Workflow 2**

Notice that once a Printer profile is selected both Rendering Intent and Black Point Compensation (BPC) are activated. Generally you'll want to use Perceptual or Relative Colorimetric and have BPC checked. It's worth noting that with many of the newer models from Epson (e.g. 2100, 2200, R800, etc.) it is probable that choosing Relative Colorimetric will produce the more pleasing prints.

Tip: The important point to note about this workflow is that your printer driver **MUST** be configured so that **ALL** colour management features are disabled. Often you'll see this workflow referred to as the No Color Adjustment (NCA) workflow but as we'll see later Epson have made changes to their recent drivers that may render the term NCA obsolete.

### Print Workflow 3

The final workflow choice is No Color Management, which is primarily intended for Photoshop users who are creating customised ICC media profiles or printing the multi-patch targets for others to create them on their behalf. It's **NOT** recommended when printing normal documents. If you've just upgraded to Photoshop CS2 from an earlier version then No Color Management is the direct equivalent of Same As Source in Photoshop 7 and CS. With this choice Photoshop simply passes the document straight to the printer driver without making any colour adjustments or conversions. There will be no ICC profile embedded in the image, so this option is effectively telling Photoshop to **NOT** colour manage the process of printing the document.



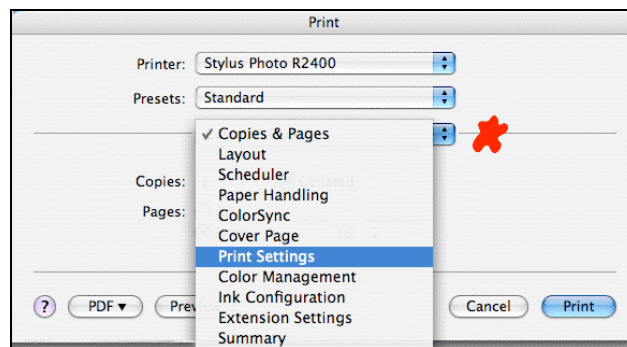
**Figure 4 - Print Workflow 3**

Once the Print with Preview dialog has been configured to suit your requirements it's time to press the Print button.

**Tip:** by holding down the Alt/Option key you will find that the Done button changes to Remember. Using this keyboard modifier will allow you to save the Print with Preview settings for future use.

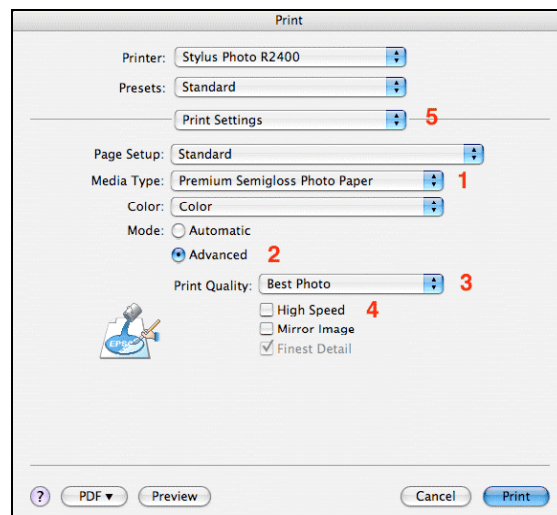
## Epson Driver Configuration with Mac OS X

The initial few paragraphs of this section are common to all three Print Workflows described earlier. When you press the Print button (i.e. top right hand corner of Print with Preview dialog) the System Print dialog as shown in Figure 5 should appear. The System Print dialog is actually quite complicated in so far as it includes menu options for many print setting that are better set within Photoshop itself or the actual Print driver, and are therefore best avoided. In particular, you should not need to access options such as: Layout, Scheduler, Paper Handling, ColorSync, and Cover Page. I really can't emphasise enough how it is important that you configure only those settings in the printer driver that I describe below, and only in the sequence shown, otherwise there is a good chance that one of the settings will revert to the Epson default.



**Figure 5 - System Print dialog**

Press the popup labelled Copies and Pages (shown in the screenshot with a red asterisk). Choose Print Settings from the list of options. When the Printer Settings panel (figure 6) appears choose the type of Media (1) that will be used. Next select the Advanced (2) mode.



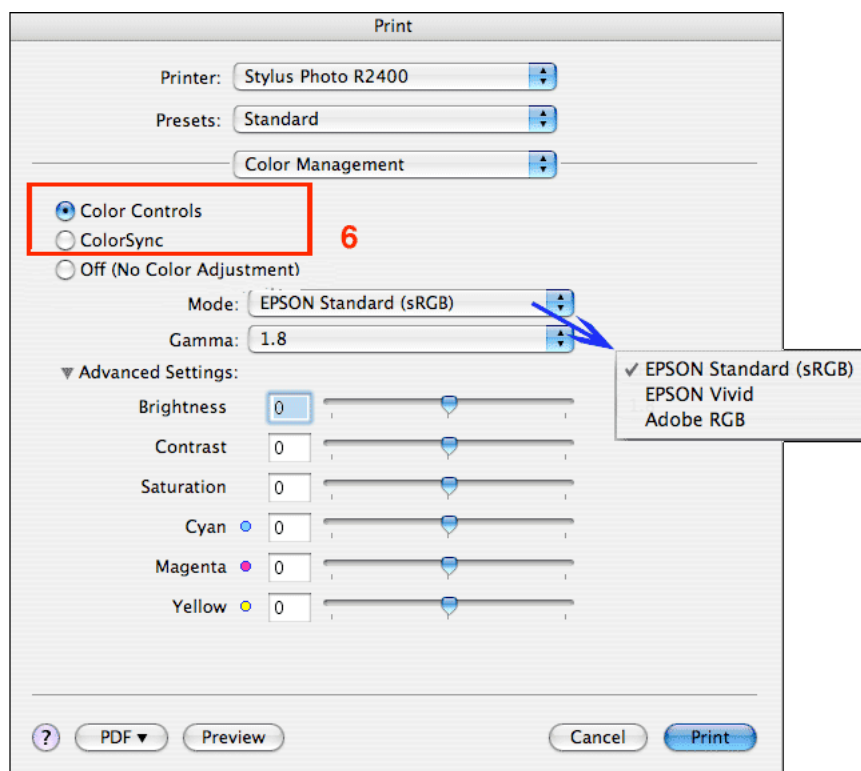
**Figure 6 - Epson Printer Dialog - Main Window**

Choose Best Photo or Photo RPM for the highest Print Quality (3) option compatible with the printer/media combination that you require. Also, for best quality High Speed (4) should be disabled.

Return to the popup now labelled Print Settings (5) and choose Color Management. The remainder of this page is separated into two parts, the first deals with Print Workflow 1 and the second Print Workflow 2 and 3.

### Print Workflow 1 (contd.)

For Color Management (figure 7 below) we have three options (radio buttons): Color Controls, ColorSync and OFF (No Color Adjustment).



**Figure 7 - Epson Print Driver: Print Workflow 1**

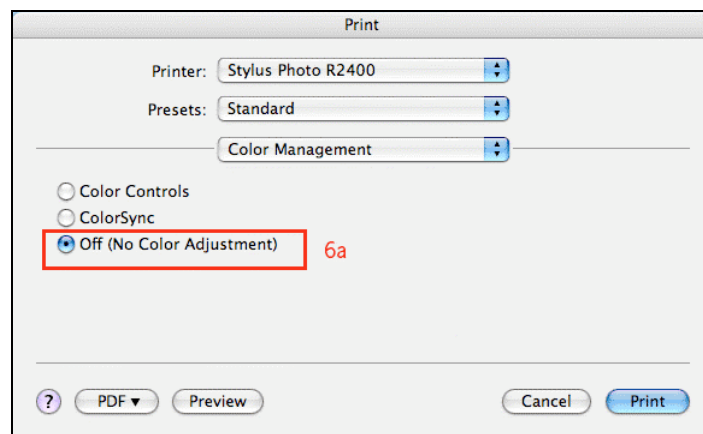
The first two options, and for this workflow we're only interested in these two, are designed to automate the process of printer colour management and you have the choice of Color Controls or ColorSync (6). I suggest that you avoid choosing ColorSync as it has been known to produce very unsatisfactory results with some printer models. Actually, I believe that Color Controls is the best option for novice users. Also, remember that when this setting is selected the Photoshop Print with Preview dialog should be configured as shown in Print Workflow 1.

With the latest Epson drivers for printers such as the Stylus Photo R800, R1800 and R2400 you will see 3 modes of which Color Controls with the Mode set to either Epson Standard or Vivid. Lastly, unless you have good reason to choose differently I recommend leaving the Gamma setting at 1.8.

## Print Workflow 2 and 3 (contd.)

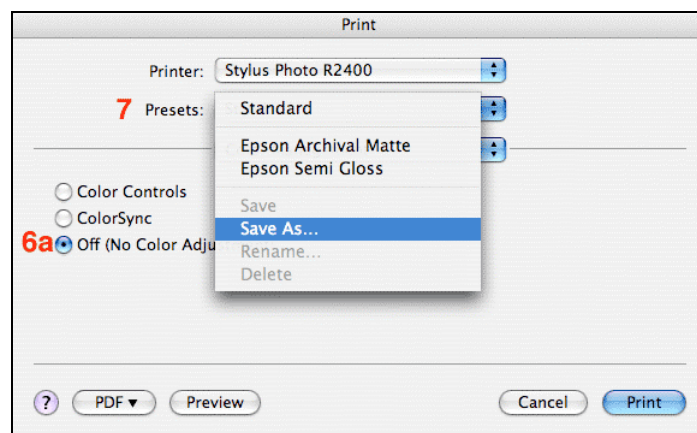
The third setting for colour management is referred to as Off (No Color Adjustment) (6a) and is ONLY appropriate when you're using ICC media profiles in Photoshop or printing the targets required for creating ICC media type profiles. In other words you should only use this setting if you have chosen to configure Photoshop Print with Preview dialog as shown in Print Workflow 2 or Print Workflow 3. This setting is by far the best setting for advanced Photoshop users. It's also worth mentioning that if you find your final prints are light and magenta in appearance then there's a very good chance that you chose one of the other two settings in error or that the sequence in which you configured the print driver was not exactly as I described above.

In the following screenshot you can see that choosing Off (No Color Adjustment) (6a) resulted in the Mode pop-up, Gamma and Color Sliders disappearing from the print dialog; this is how it should be, so don't panic.



**Figure 8 - Epson Print Driver: Print Workflow 2 and 3**

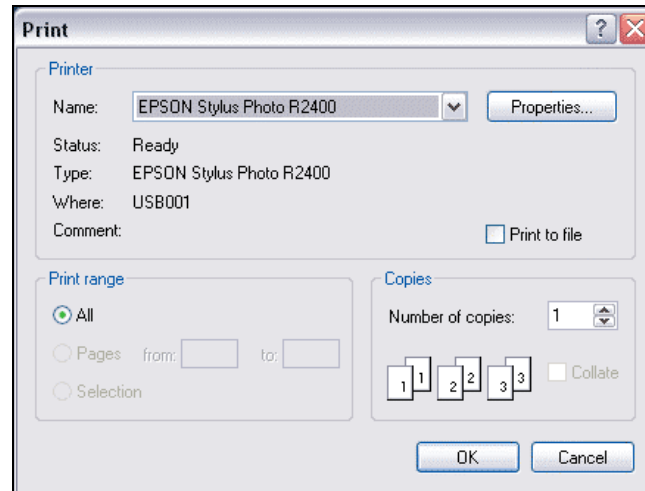
Once you have configured the driver for your preferred media, print quality and colour management settings it's a good idea to save them for future use. This is achieved by opening the Presets (7) popup and choosing the Save As option. However, do be sure to choose a meaningful name. Next time you need to make a print you can simply choose this media type from your list of Presets. In the example shown in figure 9 you can see that I have preset settings for Epson Enhanced Matte and Semi Gloss media.



**Figure 9 - Saving your settings as Presets**

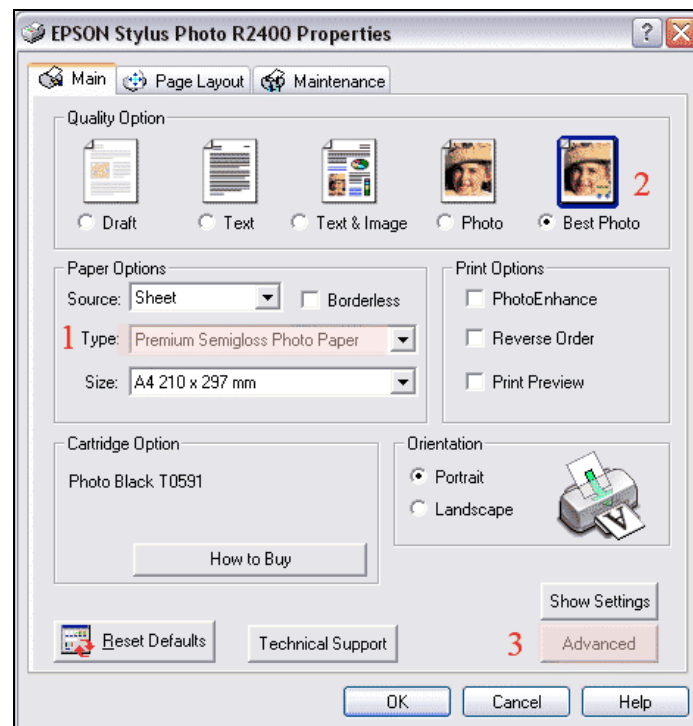
## Epson Driver Configuration with Windows XP and 2000

As with Mac OS X you'll find that the initial few paragraphs of this section are common to all three Print Workflows described earlier. When you press the Print button (i.e. top right hand corner of Print with Preview dialog) the System Print dialog as shown in Figure 10 should appear.



**Figure 10 - Windows "System" Print dialog**

Press the Properties button. Once the Printer driver dialog (Figure 11) appears choose the type of Media (1) that will be used. Next select either Photo or Best Photo for Quality Type (2). The last setting to choose in this dialog is the Advanced button (3).

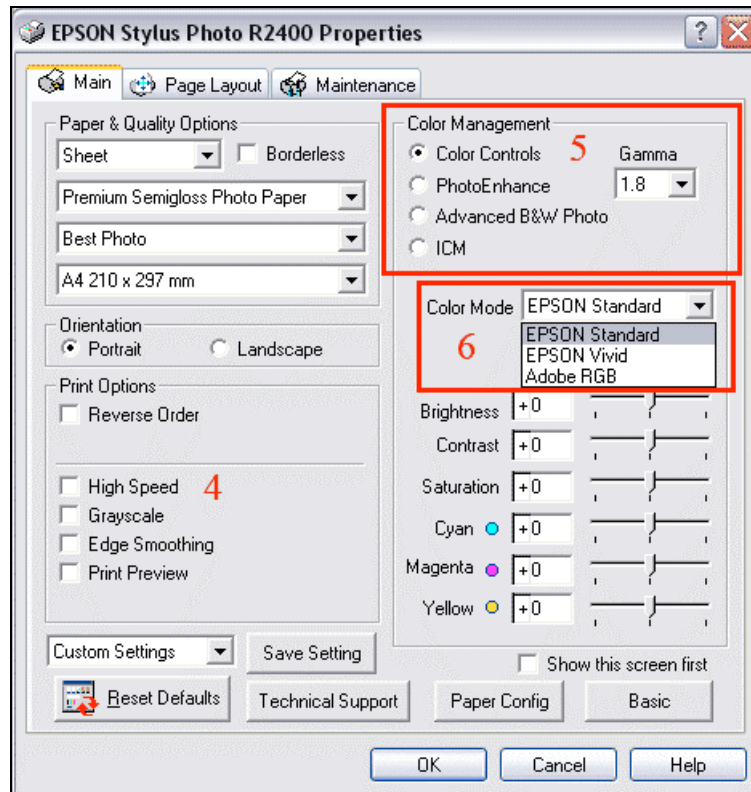


**Figure 11 - Epson Basic Printer Dialog - Main Window**

## Print Workflow 1

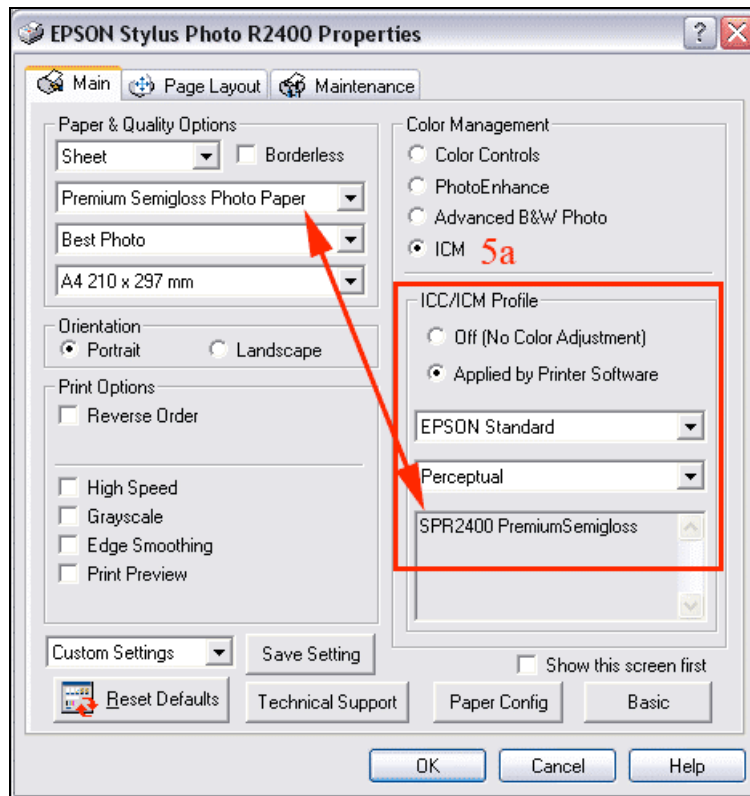
For Color Management (5) we have a number of options, many of which only serve to confuse and are completely unnecessary. Also, for this tutorial I'm ignoring Advanced B&W since it's only available on the Epson Stylus Photo R2400.

The following screenshot (Figure 12) is where we make the important selections. For best print quality you should disable High Speed (4).



**Figure 12 - Epson Print Driver: Print Workflow 1**

The first two Color Management options are designed to automate the process of printer colour management and you have the choice of Color Controls or PhotoEnhance. Both these options are best suited to novice Photoshop users but I suggest that you avoid using PhotoEnhance since it applies additional processing and sharpening to the image and can produce very unsatisfactory results with some printer models. I also suggest that you stick with Epson Standard or Vivid for the Color Mode (6). Also, remember that when this setting is selected the Photoshop Print with Preview dialog should be configured as shown in Print Workflow 1. Lastly, unless you have good reason to choose differently I recommend leaving the Gamma setting at 1.8.



**Figure 13 - Epson Print Driver: Print Workflow 1 (ICM Mode)**

By choosing ICM (5a) (see Figure 13 above) you gain access to the internal Epson printer colour management system (i.e. Applied by Printer Software) and the Off (No Color Adjustment) mode. The later mode (i.e. No Color Adjustment) is NOT compatible with Print Workflow 1 and should NOT be selected. When the former (Applied by Printer Software) is selected the driver automatically makes use of the Epson media profiles but does so in a way that means their selection in Photoshop should be avoided. Actually, using this method to select an ICC media profile in Photoshop and the Epson driver leads to double profiling, so the final prints will look awful. Therefore, to obtain the best results from this particular mode of operation you be configured as shown in Print Workflow 1.

### **Print Workflow 2 and 3**

The last setting for is referred to as Off (No Color Adjustment) (7) and is ONLY appropriate when you're using ICC media profiles in Photoshop or printing the targets required for creating ICC media type profiles. In other words you should only use this setting if you have chosen to configure Photoshop Print with Preview dialog as shown in Print Workflow 2 or Print Workflow 3. This setting is by far the best setting for advanced Photoshop users. It's also worth mentioning that if you find your final prints are light and magenta in appearance then there's a very good chance that you chose one of the other settings in error.

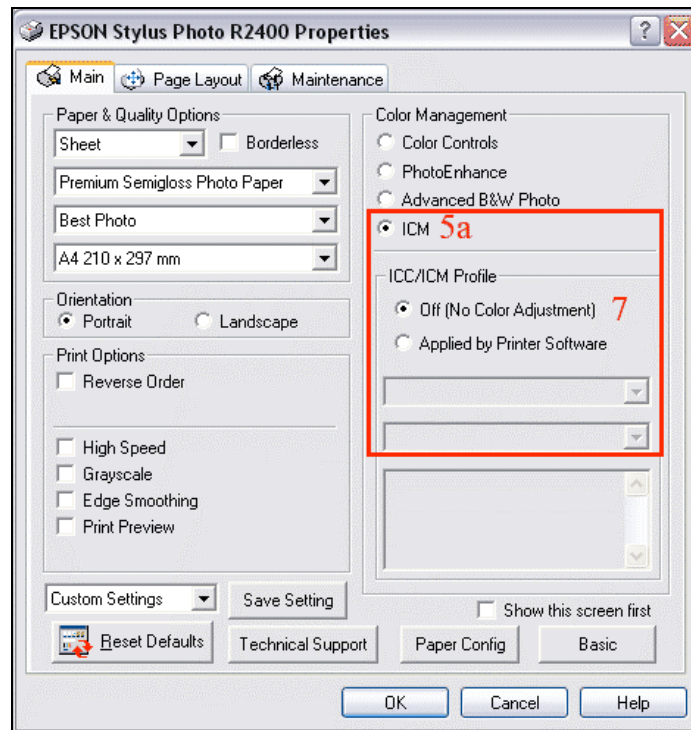


Figure 14 - Epson Print Driver: Print Workflow 2 and 3