

# BEGINNERS GUIDE TO COLOUR MANAGEMENT

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If you are reading this it is because you have decided to change over from Epson inks to Lyson inks, in order to achieve better fade resistance from your prints. The changeover process is relatively simple but many users will be unfamiliar with some of the concepts involved.

It is easy to achieve great colour reproduction with Epson inks because the print driver (the software that drives your printer) knows exactly how Epson inks appear on Epson paper. There is effectively a large margin of error because the software and inks are perfectly matched.

When the inks are changed the print driver stops working for you and starts working against you. It was not possible to provide a print driver designed around Lyson inks. Instead we have developed working methods designed to give you predictable colours regardless of the nature of the image. Anything from Pale watercolours to vivid photographic images can be printed out with the same accuracy. In fact, once you have become accustomed to these new working methods, you will find your colour reproductions to be superior those images printed with Epson inks. In short it is worth the effort!

This guide looks at earlier versions of Photoshop first. However it should be said immediately that we recommend the use of Photoshop 5x. With version 5 Adobe completely changed the way Photoshop dealt with colour reproduction. Although it initially confused a great number of users, baffled by the inadequate explanations in the instruction manual, it eventually emerged as an extremely powerful tool for those looking for colour accuracy in their reproductions. This document explains how to use these tools in language everyone can understand. The latest version of Photoshop 5 is available as a cut price upgrade for registered users of versions 3 or 4.

Please read in full the sections of this guide that relate to your operating system and version of Photoshop before you start to print.

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Photoshop 3/4 users must match their monitors to their printed output before correcting for colour casts in Photoshop. Explained below.

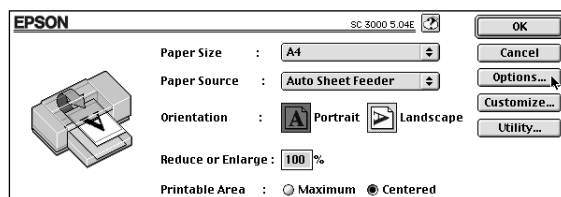
Photoshop 5 users will utilise a neutral calibrated monitor for accurate image representation. Printed output will be with the use of ICC profiles. Explained in the Photoshop 5 chapter.

## PHOTOSHOP 3/4

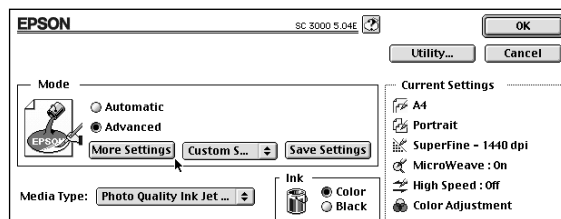
The first step is to finalise the settings in the Epson print driver. The following settings are designed to get as close to a neutral output as possible.

The colour controls in the Epson print driver are located as follows:

1. Go to FILE-PAGE SETUP
2. Click on OPTIONS

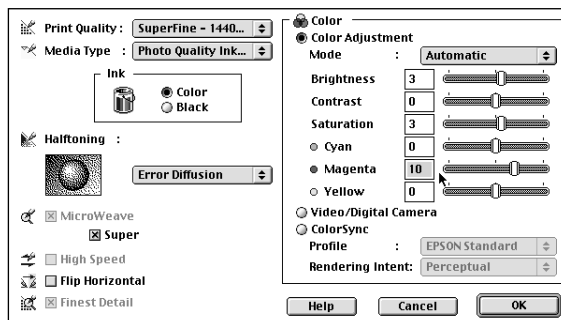


3. Click on MORE SETTINGS



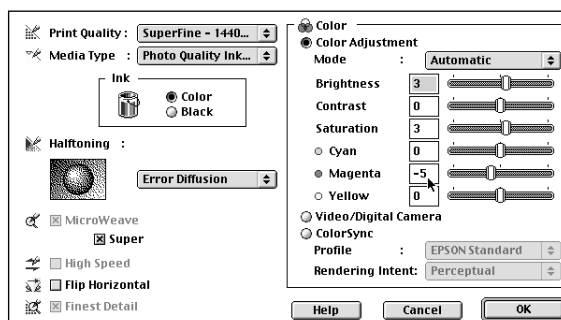
For Lysonic we recommend:

- Resolution: 1440 d.p.i
- Colour Adjustment: Automatic
- Halftoning: Error Diffusion
- Super: On
- Magenta: +10
- Brightness: +3
- Saturation: +3



For Fotonic we recommend:

- Resolution: 1440 d.p.i
- Colour Adjustment: Automatic
- Halftoning: Error Diffusion
- Super: On
- Magenta: -5
- Brightness: +3
- Saturation: +3



## PHOTOSHOP 3/4 Cont'

Next, select an RGB image with the widest possible gamut (range) of colours. Send the image to be printed using the relevant settings. Compare the print to the monitor display to see the colour casts the inks are introducing. We will now use Photoshop's built in monitor calibration program ("Gamma") to compensate for these changes.

*N.B. Many users of Fotonic will find that the printed outputs with the print driver settings given are sufficiently close to the original. In these cases it will not be necessary to use the "Gamma" software*

During the Photoshop installation procedure the "Gamma" software is installed on your computer's hard disk . The path to this software is:

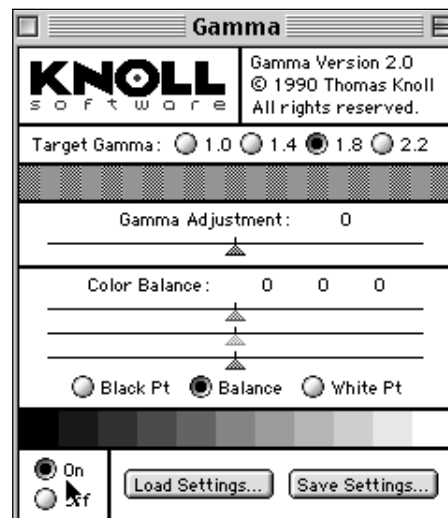
**Photoshop \ Goodies \ Calibration**

Double click on the Gamma icon.

Click the software "On" and move the sliders until the image on the screen matches the printed output.

Save the settings with a file name that refers to the printer/ink/media combination for easy recall later.

Repeat this process for all the printer/ink/media combinations in use.



*NB: Adobe Gamma can be turned off at any time to return your monitor display to normal. It is good practice to check on the status of Adobe Gamma at the beginning of every Photoshop session to ensure your display settings are in use.*

When an image is opened it must now be adjusted until the colours on the screen match the original colours on the file. Use the tools in Photoshop to colour correct the image.

Now send the image to the printer. The print out should now match the original appearance of the file.

### SUMMARY

Step 1. Set print driver settings

Step 2. Print full colour test image

Step 3. Match monitor colours to printed output

Step 4. Correct image for colour casts

Step 5. Reprint image

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# PHOTOSHOP 5x

The crucial difference between Photoshop 5x and previous versions of the software lies in the colour management. Photoshop 5 is designed to work primarily with ICC (International Colour Consortium) colour profiles. These profiles are essentially descriptions of the way any particular device reproduces colour information. There are 3 different types of profile used by Photoshop 5.

1. An **input** (source) profile. This is the profile that describes the device where the image came from, usually a scanner or digital camera.
2. A **display** profile. A profile of the monitor being used. Many high end monitors come with their own profile information. Photoshop 5 can make its own ICC profile of your monitor through its “Adobe Gamma” program.
3. An **output** (printer) profile. A profile of the Printer/Media/Ink combination used to print the image files.

In order for a printer profile to work correctly it is necessary to simulate the settings that were in use when the profiles were written. Destination profiles have been written for most of the modern Epson printers. These profiles are available for download from your distributor’s website or Lyson’s website ( [www.lyson.com](http://www.lyson.com) ) or can be sent directly from your distributor on CD or Floppy Disk. The profiles are unique to each Printer/ Ink/Media combination and must first be copied to the users hard drive:

Macintosh users: Copy the ICC profiles to the “ Color Sync” folder.

Hard Drive \ System Folder \ Color Sync Folder

*Please be sure to refer to the “Macintosh users: further information” chapter for further information about “ColorSync”*

Wintel PC users: Copy the ICC profiles to the “ Color” folder

Windows 9x: C: \ Windows \ System \ Color

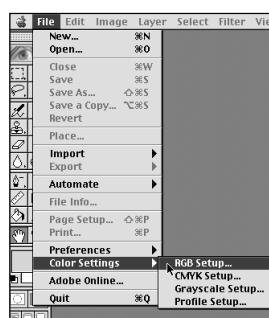
NT: C: \ Windows \ System 32 \ Color

*Please be sure to refer to the “PC users: further information” chapter for further information about the purpose of this folder. The profiles pre-installed by Windows (the files with the triangle icon) can be deleted at this point to leave only your new profiles.*

## Restart Photoshop 5.

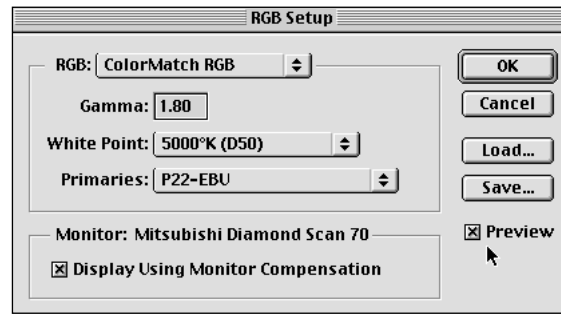
Before any prints are done Photoshop must be set up correctly. Although it appears that there are a lot of changes to go through here remember that this is a one off procedure. Once these changes are in place they need never be altered again.

1. Go to FILE-COLOR SETTINGS-RGB SETUP



## PHOTOSHOP 5 Cont'

Use the following settings.



### What do these settings mean?

Photoshop 5 has a range of different RGB gamuts, each with its own distinctive colour cast and gamut. ColorMatch RGB is the most neutral available and all the ICC profiles for Lysonic and Fotonic were written with this RGB selection.

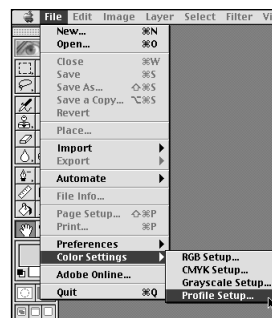
The Gamma setting should not be changed.

The White Point is the temperature of the whites displayed on your monitor. Different temperatures have different colours. Changing the white point from 5000k does not change the gamut selection although the header changes from “ColorMatch RGB” to “Custom”. Some users may prefer to raise the white point to 6500k to provide a cooler white. This is as far as we would recommend you push the white point. Many monitors have the ability to change the white point at which they operate. Refer to your monitor’s instruction manual for details on how to do this. If possible, match the white point of your monitor to the white point selection in this dialogue box.

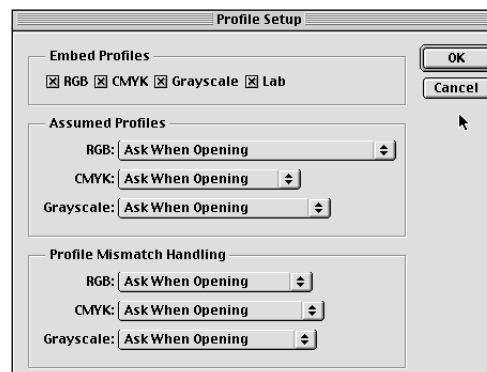
If you decide to change the white point you can save this combination of RGB and White Point as a custom setting for you. Simply click on “Save” and name your new setting. This setting will then be embedded in your image files when they are saved (See Profile Setup section below).

The Primaries selection should not be changed.

Go to FILE-COLOR SETTINGS-PROFILE SETUP



Use the following settings:  
*See next page.*



## PHOTOSHOP 5 Cont'

### What do these settings mean?

Photoshop 5 allows the user to view images as they appear on other peoples monitors. When an image is saved it “embeds” the RGB profile used to create it. ( See the “Embed Profiles” tick boxes at the top of the Profiles Setup dialogue box). In this way the saved file not only has colour information but also a description of the way the image appeared to the user on their monitor. When a file is opened in Photoshop it recognises the embedded profile. The default settings in the dialogue box instruct Photoshop to “convert colours” automatically if they contain a profile different from the one in use on your machine. For example, if you have received an image file from a client that contains a different embedded profile, Photoshop will attempt to simulate the appearance of this image on your client’s monitor. Unless you can vouch for the other user’s setup absolutely, ie, you know that they are displaying and reproducing colours accurately, this conversion of colours is a bad idea as the image data is permanently changed. The settings given for the Profile Setup dialogue box ensure that Photoshop does not change any of the colours on an image file automatically. Instead the user is informed of a “Profile Mismatch” and will be given an option to convert when the file is opened. Choose the “Don’t convert” option, preserving the integrity of the file and displaying the image accurately.

This completes the changes needed. The next step is to ensure your monitor is displaying colours accurately. Photoshop 5 provides a utility to calibrate your monitor called “Adobe Gamma”

Firstly open an image that contains neutral greys (Photoshop’s info palette will show equal amounts of cyan, magenta and yellow). Alternatively, open a colour image and go to IMAGE-ADJUST-DESATURATE. This equalises the amount of cyan, magenta and yellow in the file, creating a monotone image. If your monitor is correctly calibrated the greys on the screen will not contain any colour casts. If so, skip to the next section. If the greys on your monitor are not neutral your monitor needs calibrating.

With the image still on the screen, open “Adobe Gamma”

PC Installations.

C:\Program Files\Adobe\Photoshop 5\Goodies.

Many PC installations also place Adobe Gamma in the Control Panel.

Mac Installations.

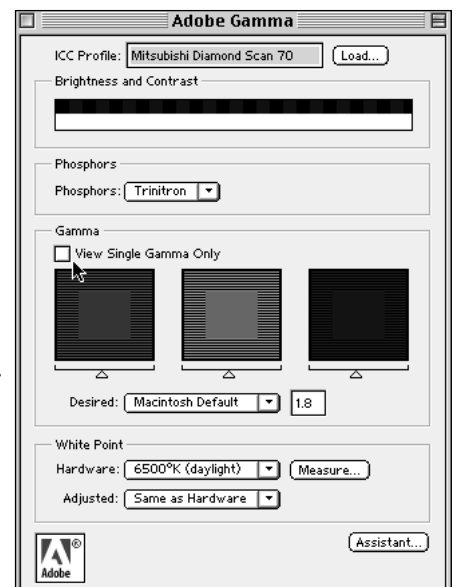
Hard Drive:\Photoshop 5\Goodies.

*If your monitor was supplied with its own ICC profile, click “Load” and select the relevant profile. Follow steps 1-2 then save your changes.*

1. Make sure the contrast setting on your monitor is at maximum. Reduce the brightness setting on the monitor until the black squares are just about distinguishable from the grey squares in the “Brightness and Contrast” strip.

2. Check the White Point temperature of your monitor. Select the same temperature in the White Point Hardware box. Select “Same as Hardware” in the Adjusted box.

3. Unclick the “View Single Gamma Only” box so that the three individual colour boxes are shown.



Move the sliders so that the centre box of each colour fades into the outer box. Note: Macintosh computers will show changes to the entire monitor display immediately. PCs may require the changes to be saved before the overall colours are changed. When all the colours are set correctly, save the profile and name it as the monitor model you are using. This will differentiate the profile from the others that are already installed on your system. (See the chapter “Windows users: an introduction). Now the monitor is calibrated the image file on your display should contain perfectly neutral greys. If not, go back to the software and correct the relevant colour.

## PHOTOSHOP 5 Cont'

**Restart Photoshop.**

**The Profile-to-Profile method described here will work for users of PCs and Apple Macs alike, for Windows 95, 98, 2000 and NT users and those working with Mac OS 8, 8.1, 8.5, 8.6, 9.0.**

**However, at this point Macintosh users should refer to the chapter “Macintosh users: Further Information”. Follow the printing method described there first.**

**PC users should proceed with the method described below. A detailed description of Windows and colour management can be found in the chapter “PC users: Further Information”.**

1. Open an image file. If a “Profile Mismatch” or “Unknown Profile” dialogue box appears, click “Don't Convert”

2. Make any colour corrections necessary. Fix image size and resolution.

3. Go to the Epson print driver.

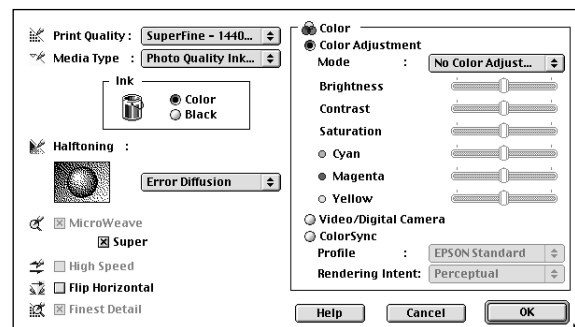
Enter the following settings.

Resolution: 1440d.p.i

Halftoning: Error Diffusion

Super: On

Colour Adjustment: No Colour Adjust



**PC print drivers: ICM *should not* be selected.**

These settings can be saved for easy recall later.

When using Fine Art Paper or 170g Matt Paper, select “Photo Quality Ink Jet Paper” in the Media Type selection box.

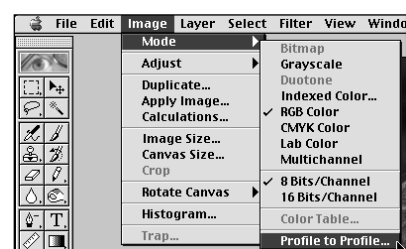
When using 180g Gloss Paper, select “Photo Paper” or “Gloss Paper” depending on the print driver options.

The “Super” option tells the printer to make an extra pass over the paper. as it is printing. Although this slows down the printing speed slightly it is still worth selecting for the improvement in print quality, especially on the thicker Fine Art Papers.

**Save your image with these changes.**

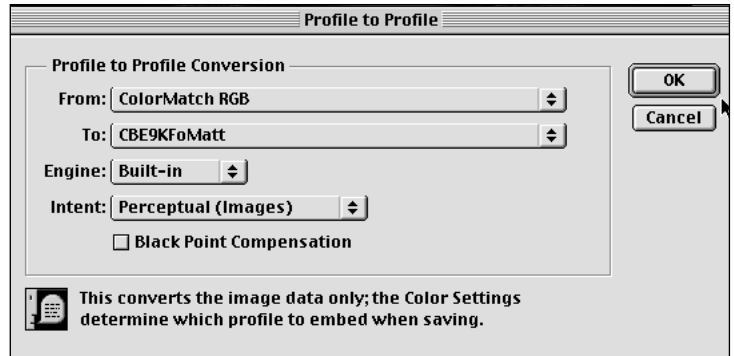
**We will now convert the colours on the screen to compensate for the casts that the printer and the ink introduce to the image.**

4. Go to IMAGE-MODE-PROFILE TO PROFILE



## PHOTOSHOP 5 Cont'

Use the “**Built In**” conversion engine.  
Select “**Perceptual (Image)**” as the intent.  
Click “**Black Point compensation**” off.



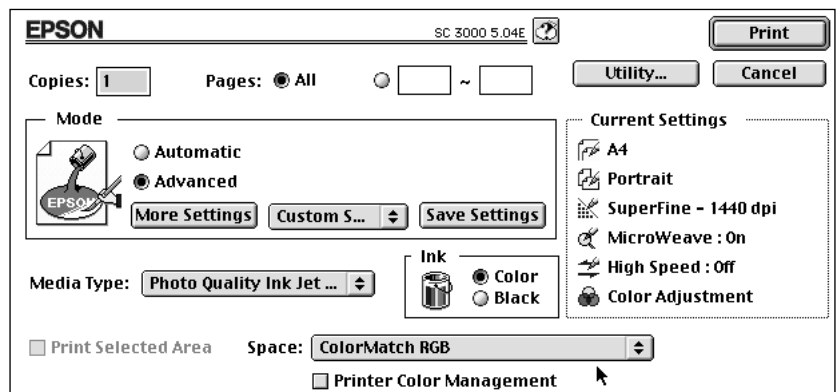
**From:** Select ColorMatch RGB if the image is an RGB image. If the image is in CMYK select CMYK.

**To:** Select the relevant Printer/ Ink/ Media combination profile, such as E9KFoMatt where E9K is the Epson 9000, Fo is Fotonic (Ly is Lysonic), Matt is 170g Matt Coated Paper ( FA is Fine Art Paper).

Click “**OK**”

**The colours on the screen now change. Do not attempt to correct the colour balance again but go straight to print.**

Go to FILE-PRINT



**Be sure to select “ColorMatch RGB” in the space dialogue box.**

**If you see a “Printer Color Management” option be sure it is not selected.**

**Click “Print”**

The output should now closely resemble the appearance of the image on your monitor *before* the profile was applied. As the Profile conversion was the last action you performed in Photoshop you can easily “undo” it by selecting “Edit - Undo”. The file will revert to its original appearance.

Now Photoshop 5 has been set up correctly, any image can be opened, have a profile applied, and printed out with excellent results.

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## **WINDOWS 95 / 98 Further Information**

### **WINDOWS AND “ICM”**

- 1. The Colour Folder**
- 2. Installing/ Uninstalling.**
- 3. Monitor Profiles in Photoshop and Windows**

*The domestic versions of Windows, windows 95 and windows 98, rather than windows NT, both include a feature called “ICM”. This feature is designed to match the colours displayed on your monitor to the output from your printer.*

*Windows 98 expanded the ICM options offered by Windows 95, allowing multiple printers and monitors to have their own unique associated profile. However, the accuracy and effectiveness of the ICM system falls short of the standards required by most Photoshop users and best results will be obtained by deselecting any ICM options.*

*Care is needed to ensure that ICM is taken out of your workflow. Follow steps 1 and 2 and use step 3 if you intend to keep more than one monitor profile on your system.*

**1.** Windows places a large number of ICC profiles in the “Colour” folder ( C:\ Windows\ System\ Colour ), the vast majority of which can be discarded. This is good practice as these profiles can interfere with Photoshop 5 and the way it prints out colour images. Before installing any profiles sent to you by your ink supplier, delete the profiles pre-installed by windows. The only profiles you need to keep is are the ones created for your monitor, see step 3.

**2.** You will notice that some profiles will have white icons and some will have grey icons. A white icon indicates that the profile is installed. If you decide to keep any profiles be sure to “uninstall” them by right-clicking on the profile and selecting “Uninstall” from the pop-up menu. The profile icon will then turn grey. The purpose of this is to start with a clean slate to which you can add your new printer profiles. All the icons in the “Colour” folder should be grey before proceeding.

### **WINDOWS 98 ONLY**

**3.** When you turn on your computer Windows uses a “system” monitor profile to display colours. Photoshop 5x can use this system profile or one created specifically for it. Selecting a system profile or Photoshop profile is easy and in most cases you need use only one profile for both applications. However you may be using other software that utilises its own independent monitor profile or be working with more than one monitor. This is how to select a profile for your system and for Photoshop.

## To Set Your System Monitor Profile (Windows 98)

1. Right-click on your desktop and select "Properties" from the pop-up menu.
2. Click on the "Settings" tab.
3. Click "Advanced"<sup>(a)</sup>
4. Click on the "Color Management" tab.<sup>(b)</sup>

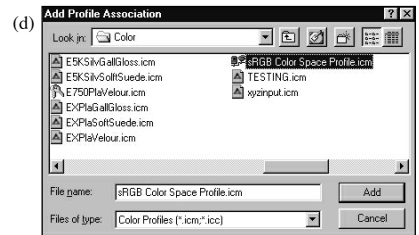
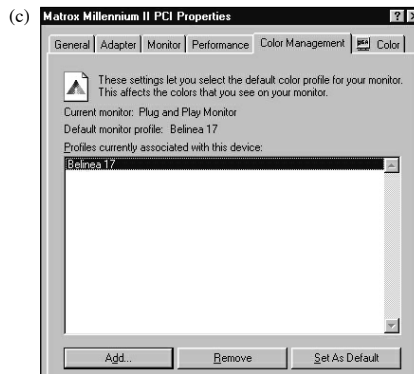
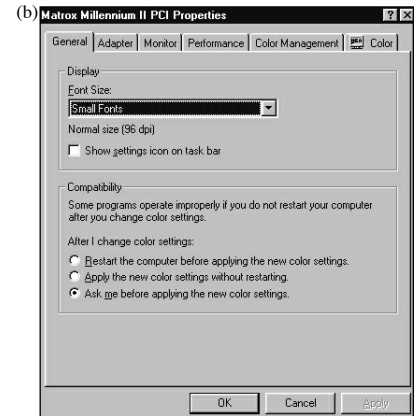
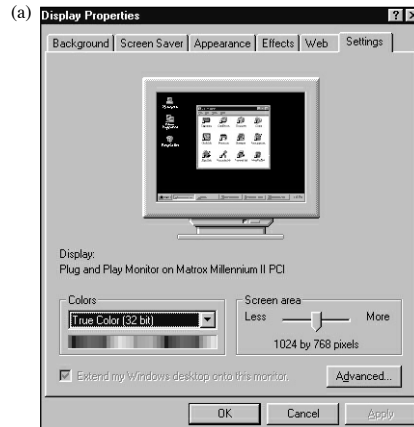
The window shows you the profile that is "associated" to your monitor, ie, the settings Windows is using as the system profile.<sup>(c)</sup>

5. If you wish to change this system profile, Click "Add"

6. Windows looks in the "Color" folder automatically.<sup>(d)</sup> Select the profile you want to use and click "Add"

The profile joins the list associated with your monitor. Select this profile and click "Set As Default"

**Windows will now use this profile as your system profile**

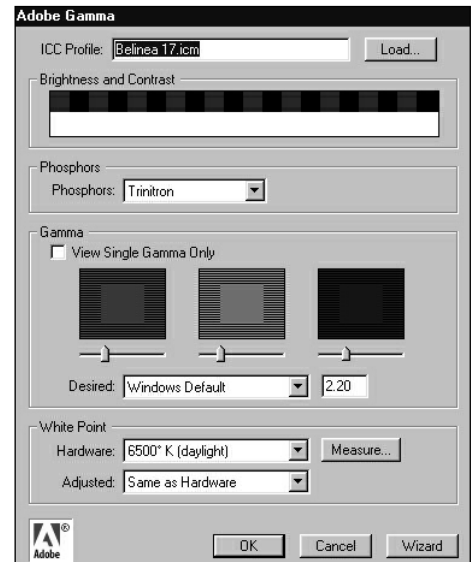
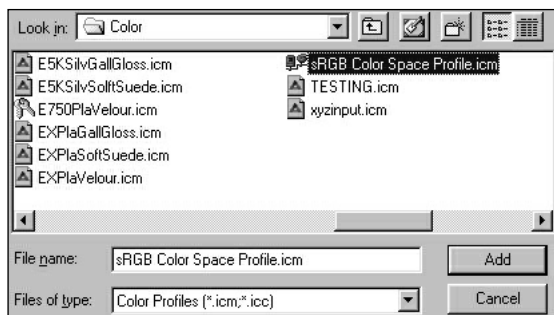


## To Change Your Photoshop 5x Monitor Profile ( Windows 95 / 98 )

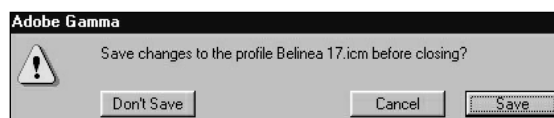
The monitor profile that Photoshop uses is selected through the Adobe Gamma utility only.

Open "Adobe Gamma". The ICC profile in use by Photoshop is displayed here. To change the profile simply click on "Load".

Select the profile you want from the list in the "Color" folder.



When you close the "Adobe Gamma" box you will be asked if you want to "save changes". Click "Yes"



**Your new profile selection will be in use when you restart Photoshop. The name of your profile selection will appear in the RGB setup box ( File - Colour Settings - RGB Setup).**

## Macintosh Users: Further Information

All modern Apple operating systems incorporate “ColorSync”, a system for controlling colour reproduction throughout the workflow from monitor to printer. ColorSync has been constantly updated independently from the operating system. Users of **ColorSync 2.5** or greater now have a high level of control over their colour.

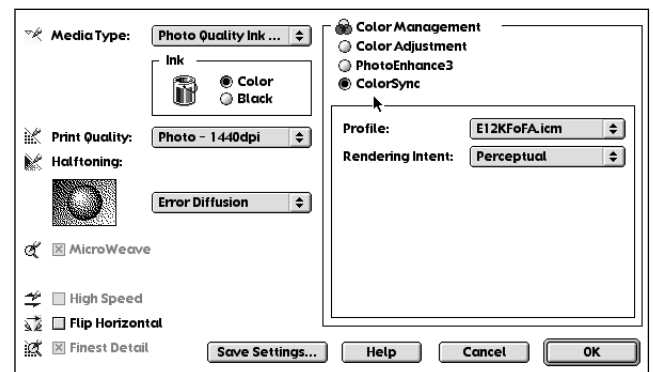
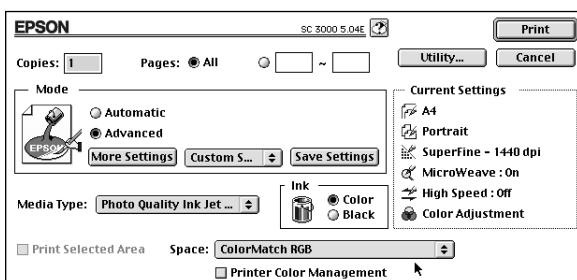
A crucial difference between ColorSync and Windows ICM is that in ColorSync an output ( Printer) profile exists independently from the input profile (Monitor/ Scanner etc), whereas with the Windows system ICM, changes in the monitor profile will automatically affect the printed output. In ColorSync the translation between input and output values is handled to a very high degree of accuracy.

Macintosh users with OS 8.0 or greater and ColorSync 2.5 or greater should be able to access ICC profiles through the Epson print driver. This eliminates the need for a profile-to-profile conversion in Photoshop on page 7. The advantages to this method of working are obvious.

With Photoshop setup as detailed previously it should be possible to print with ICC profiles running transparently in the background. Photoshop 3 and 4 can also be used with ICC profiles, although the degree of colour accuracy will not be as high as it would be with Photoshop 5.

Before printing it is advisable to check exactly which ColorSync folder is active. Go to the Finder and ask your computer to find all folders called “ColorSync”. Occasionally there can be a number of these folders, installed by print drivers, software such as Photoshop, and operating system upgrades. Photoshop and Epson print drivers will both look at the same active folder so you can easily check what profiles are present and delete the inactive folders.

Access the ICC profile from this section of the print driver only. Ensure that “ColorMatch RGB” is selected in the Space dialogue box before printing and that the “Printer Colour Management” box is not ticked.



It may be that your setup is not able to print using profiles through the print driver alone. This does not mean that there is anything wrong with the profiles or with your computer. Check what version of ColorSync you have installed and make sure you are running with the latest version of your print driver. If your system checks out but still fails to print, revert to the profile-to-profile method described on page 7.

## TROUBLESHOOTING

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*Problem:*

**Photoshop cannot see the ICC profile I have installed.**

*Mac System Cause:*

**The profile is installed in the wrong folder.**

*What to do.*

**Write down the profiles that Photoshop does see in the Profile-to-Profile dialogue box. Look on your hard disk for the ColorSync folder that contains these profiles and copy your new profiles to this folder.**

*PC System Cause:*

**The ICC Profile requires a .icc or .icm suffix on the file name. For example, if you have received a profile for an Epson 3000 with Fotonic ink on Fine Art paper your profile should be called E3KFoFA.icm. If your profile does not have the .icm your computer will not recognise it as a profile and neither will Photoshop.**

*What to do.*

**Rename your profile, adding the .icm suffix.**

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*Problem:*

**The profile I received was named correctly on my hard disk but Photoshop sees the profile as a different name.**

*Cause:*

**The profile has a hidden “tag” that is read by Photoshop and other ICC aware applications. If your profile was re-named rather than re-tagged then it will appear in Photoshop under a different name.**

*What to do.*

**Contact your distributor and verify that a profile for your printer is available. Ask them to send the correct profile.**

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*Problem:*

**I cannot find the “No Colour Adjustment” setting in my print driver**

*What to do:*

**This option either appears as a separate option under the sRGB and ICM options or can be found as an option in the Colour Adjustment pop-up menu along with “Photo-Realistic” and “Vivid”. Consult your printer manual for further details.**

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*Problem*

**My printer has developed an imbalance in the colour output.**

*Cause:*

**The latest generation of high resolution printers can operate with nozzles mis-firing and the print out will not show the usual banding (thin white lines in the print). Instead the colour balance is affected as there will not be the correct amount of colour going down.**

*What to do:*

**Perform a nozzle check (through the “Utilities” menu of your print driver). Carry out a head clean if necessary.**

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*Problem:*

**My prints looked OK with Epson ink but look wrong with my new ink. I have verified that Photoshop and my print driver are setup correctly.**

*Cause:*

**This can be down to the information in the image file. Because of the large margin of error when using Epson inks together with an Epson print driver, many users would be achieving good results even when their image files were not correctly colour balanced. The ICC profiles are designed to accurately reproduce the information in your image file. This is why it is important that your monitor is displaying these colours accurately.**

*What to do.*

**Check the calibration of your system by using a test pattern that contains neutral RGB greyscales. Use the “Info Palette” in Photoshop to check that these greys are neutral. The Red, Green and Blue values should be equal.**

**If the print out of this test file is correct you will need to look at the settings of your monitor as it will be displaying colour inaccurately. Your existing image files will need to be re-balanced.**

**If the print out is incorrect, re-check all your Photoshop settings, comparing them to the recommendations in this document. If you continue to have problems please contact your supplier.**

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