Using FotoTune

Welcome to FotoTune 2.0.1 - Agfa's color management software. FotoTune provides open color management technology, based on internationally accepted color standards, and supports a variety of work flows in digital color reproduction.

FotoTune matches color seamlessly throughout the entire prepress and printing process, allowing you to proof your results at any time on different devices. Using FotoTune, even novice users are able to learn to match colors from input to output, and reproduction professionals have access to the high-end color technology they need, including soft-proofing and hard-proofing. With FotoTune, short-run color printing, as well as reproductions directly to plate or to press, are no longer futures.

FotoTune is compatible with a wide variety of popular devices and applications, and conforms to industry standards in desktop publishing. Color input from flatbed scanners and video cameras can match and proof on desktop color printers, digital print systems, and offset presses. You can manage color from within Adobe Photoshop and QuarkXPress. PostScript Level 2 and International Color Consortium (ICC) Profiles are fully supported.

Regardless of how your prepress and printing work flow is currently organized, you can count on FotoTune to manage your colors, each step of the way.

Chapter 1: Understanding Color Management

This chapter explains the key concepts and principles of color management as they are used in FotoTune. It uses realistic examples to illustrate how FotoTune can solve traditional problems in digital color reproduction.

Chapter 2: Using FotoTune with Photoshop

This chapter tells you all you need to know about using FotoTune while working in Adobe Photoshop. It describes how to load FotoTune separation tables, how to match color on input and output devices, and how to produce true color soft-proofs and printed proofs.

Chapter 3: Using FotoTune with QuarkXPress

This chapter tells you all you need to know about using FotoTune while working in QuarkXPress. It describes how to prepare color photographs and artwork for FotoTune, and how to match color on input and output devices.

Chapter 4: Using FotoTune with PostScript Level 2

This chapter tells you all you need to know about using FotoTune together with PostScript Level 2. It describes how to download Profiles to the printer, and then how to proof the output on your monitor.

Chapter 5: Using FotoTune with ICC Profiles

This chapter tells you all you need to know about using FotoTune together with ICC Profiles, and describes how to save FotoTune Profiles as ICC Profiles.

Chapter 6: Integrating FotoTune with your Work Flow

This chapter summarizes how FotoTune works together with other applications. This chapter can be used for quick reference.

AGFA ◆ *Agfa*

The complete picture.

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About this Guide

This guide introduces the principles of color management, and explains how to use FotoTune with other applications. Although a working knowledge of Windows is assumed, no previous knowledge of color management is required.

How This Guide is Organized

This guide is divided into six chapters, each of which can be read independently.

- **Chapter 1: Understanding Color Management**

  This chapter explains the key concepts and principles of color management as they are used in FotoTune. It uses realistic examples to illustrate how FotoTune can solve traditional problems in digital color reproduction.

- **Chapter 2: Using FotoTune with Photoshop™**

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- **Chapter 6: Integrating FotoTune with your Work Flow**

  This chapter summarizes how FotoTune works together with other applications. This chapter can be used for quick reference.

Printed Documentation

This booklet provides general information about color management, as well as instructions on how to use FotoTune with Adobe Photoshop, QuarkXPress, PostScript Level 2, and ICC.

- ■ If you need information about installing the FotoTune software onto your hard disk and about FotoTune 2.0.1 compatibility with older versions, refer to the "Installing FotoTune" booklet.

- ■ If you need information about characterizing monitors or input devices or about working with Profiles, refer to the "Characterizing Monitors and Input Devices" booklet.

Chapter 1 — Understanding Color Management

This chapter introduces the key concepts and principles of color management as they are used in FotoTune. It uses realistic examples to illustrate how FotoTune can solve traditional problems in digital color reproduction.

Introduction

Color can be defined as a sensation or as an object that absorbs different wavelengths of light to different degrees. As a sensation, the first definition is psychological and as an object, the second definition is physical. The color is seen as a result of the physical modification of light by colorants, observed by the human eyes, and interpreted in the brain. As such, the reproduction of colors requires three things:
(1) a source of light, (2) an object which it illuminates, and (3) the eye and the brain to perceive the color.

(Electronic Color Separation, Dr. R. K. Molla. R.K. Printing & Publishing Company, Charleston, West Virginia 25301)

Color Basics

Additive Colors

Subtractive Colors

Color Definitions

The Standard Observer

Our perception of colors in nature is determined by three factors - the type of light source, how substances change the reflected or transmitted light, and the sensitivity of our eyes to the resulting light.

The sun radiates a wide variation of electromagnetic waves, each having a different wavelength. The human eye is sensitive to only a small range of these wavelengths, known as white light.

Rainbows are created when white light is split up by droplets of water. Passing a beam of white light through a glass prism produces a similar effect. The shorter wavelengths are bent (refracted) more than the longer ones, splitting the white light into its component spectrum of visible colors. Each color causes a specific reaction in the eye's red, green and blue cones or receptors. Yellow is perceived by both the red and green cones, for example.
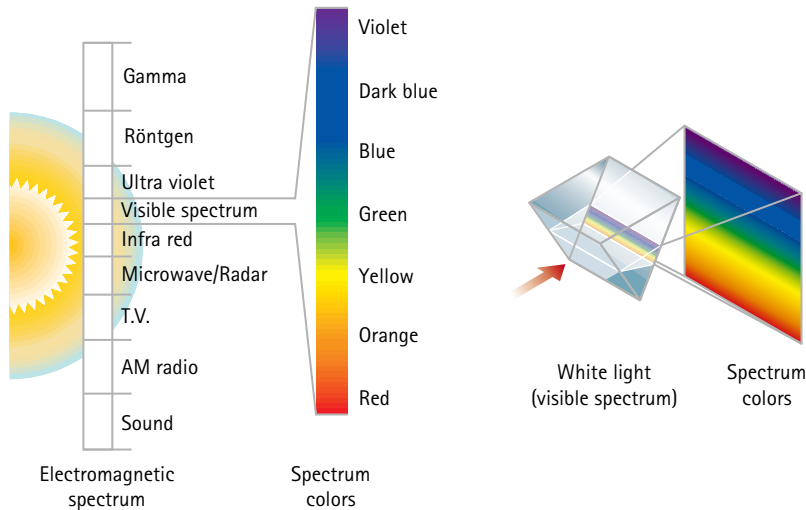
The spectrum colors are the basic building blocks of a much wider range or gamut of colors. When selections of these pure wavelengths are mixed or added together in differing proportions, thousands of different color sensations can be perceived.

Additive Colors

Color monitors and televisions mirror the function of the eye by emitting red, green and blue colors (RGB) - the three primary colors of light. All other colors can be composed by adding these primaries in different proportions and intensities, giving rise to the term additive mixing. Green and blue light result in cyan (C), red and blue light make magenta (M), and red and green light form yellow (Y). C, M and Y are known as the secondary colors of light, or the primary colorants when referring to pigments. White light is produced when red, green and blue are added in similar proportions, whereas black results from their total absence. In reality, the black displayed on color monitors is likely to be a dark green or brown gray due to stray light emissions. The gamut of colors that can be displayed on a monitor is smaller than that seen in nature because it is limited by the characteristics of the phosphor screen coatings that emit the light.

The merging of light emitted from colored light sources is an additive process. All spectral colors and white light can be created by adding red, green and blue light.
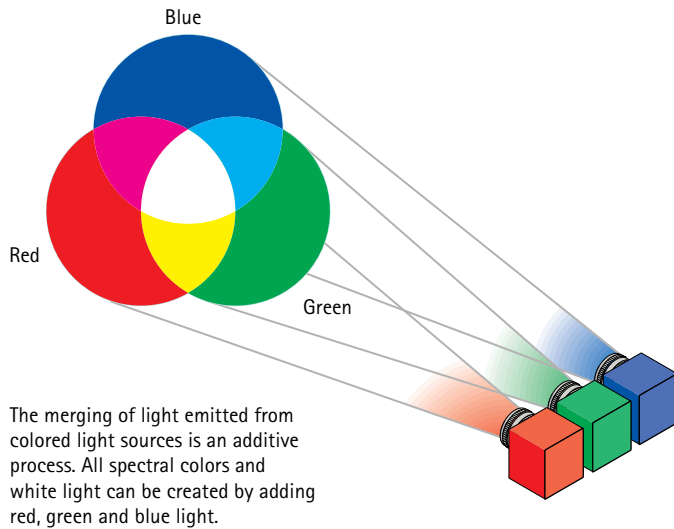
Subtractive Colors

All substances absorb, transmit or reflect specific wavelengths of white light. When an object absorbs some light, only the remaining mixture of reflected or transmitted wavelengths is detected by our eyes. An opaque white material reflects all wavelengths, whilst a black one absorbs them. Translucent or transparent materials absorb or subtract certain wavelengths of white light and transmit the others. All of the spectral colors can be produced from a white light source by passing it through single or pairs of translucent CMY filters. This is a subtractive process since the transmitted light will be less intense than the light source. A cyan filter, which transmits blue and green light but subtracts red light, followed by a magenta filter, which subtracts green light, results in only the blue light being transmitted. Weakening the cyan filter allows some red light to be transmitted, producing violet light.
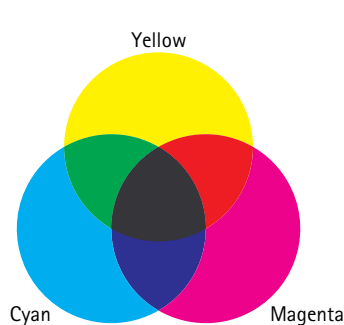
Cyan, magenta and yellow filters or pigments subtract varying quantities of red, green and blue from white light to produce a limited gamut of spectral colors
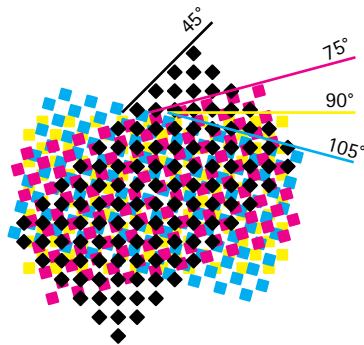
Halftone color printing normally employs four overlapping grids of dots (CMYK), which subtract differing amounts of RGB light in proportion with dot size.

Color photography materials incorporate variable density, subtractive CMY dyes, which filter light to reproduce life-like images. In printing techniques such as offset lithography the density of the CMY process inks cannot be continuously varied across an image, so a range of colors is produced by a halftone technique, where CMY dots of variable size are printed in overlapping grids. The smaller the dot, the less light it will absorb, decreasing apparent density by increasing the amount of reflected light. Process ink pigments are less pure than photographic dyes, so pure black cannot be obtained by over-printing solid CMY inks. For this reason, black (K) ink is printed in addition to, or instead of dense CMY combinations. Process ink impurities, combined with the incomplete reflectance of printing paper generally result in a smaller color gamut than photographic materials.

Color Definitions

The ability to measure and define colors is essential in the reproduction of images. All visible colors can be defined by the three factors described below. Alternative terms are shown in brackets.

Hue - the color perceived when one or two of the three RGB colors of light predominate (color).

Saturation - the extent to which one or two of the three RGB colors predominate. As quantities of RGB equalize, color becomes desaturated towards gray or white (chroma, purity, intensity, vividness).

Lightness - the strength or amplitude of the RGB wave forms activating the eyes' receptors (luminance, brightness, value, darkness).

Frequently associated terms for these three factors are HSV (hue, saturation, value), HSL (hue, saturation, lightness), and HVC (hue, value, chroma).

These characteristics can be illustrated by a three-dimensional model consisting of stacked "disks". Circular movement around each disk varies the hue. Upwards movement from one disk to another increases the lightness. Radial movement from the center of each disk outwards increases saturation. The model is irregularly shaped because the eye is more sensitive to some colors than others.
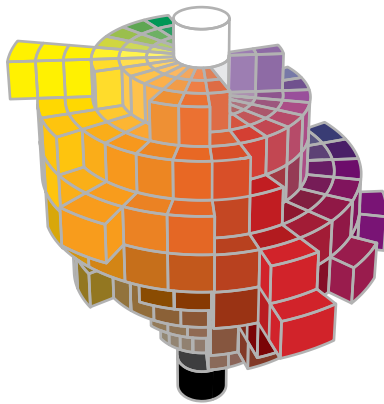
Visible spectrum
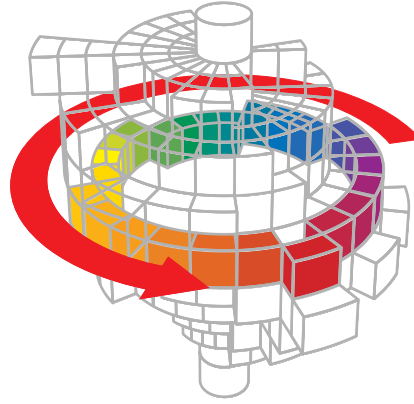
Hue
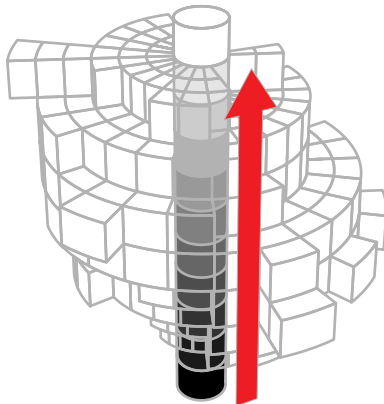
Lightness
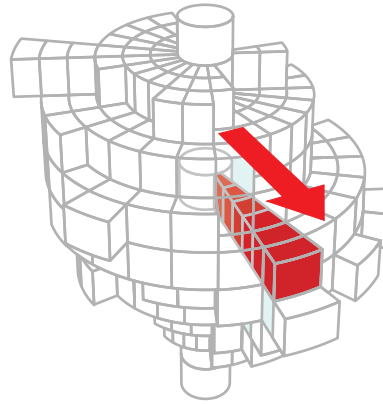
Saturation

The Standard Observer

In 1931 the "Commission Internationale de l'Eclairage" (CIE) precisely defined three primary colors, or tristimulus values, called X (red), Y (green) and Z (blue) from which all other colors visible to a "standard" observer could be created. More recently, the CIE Yxy color model was introduced.

All colors having the same lightness lie on a roughly triangular flat plane. The horizontal x axis in the illustration of the CIE Yxy model shows the redness of colors and the vertical y axis indicates the amount of green in colors.

SWOP - CMYK   Monitor   Pantone®
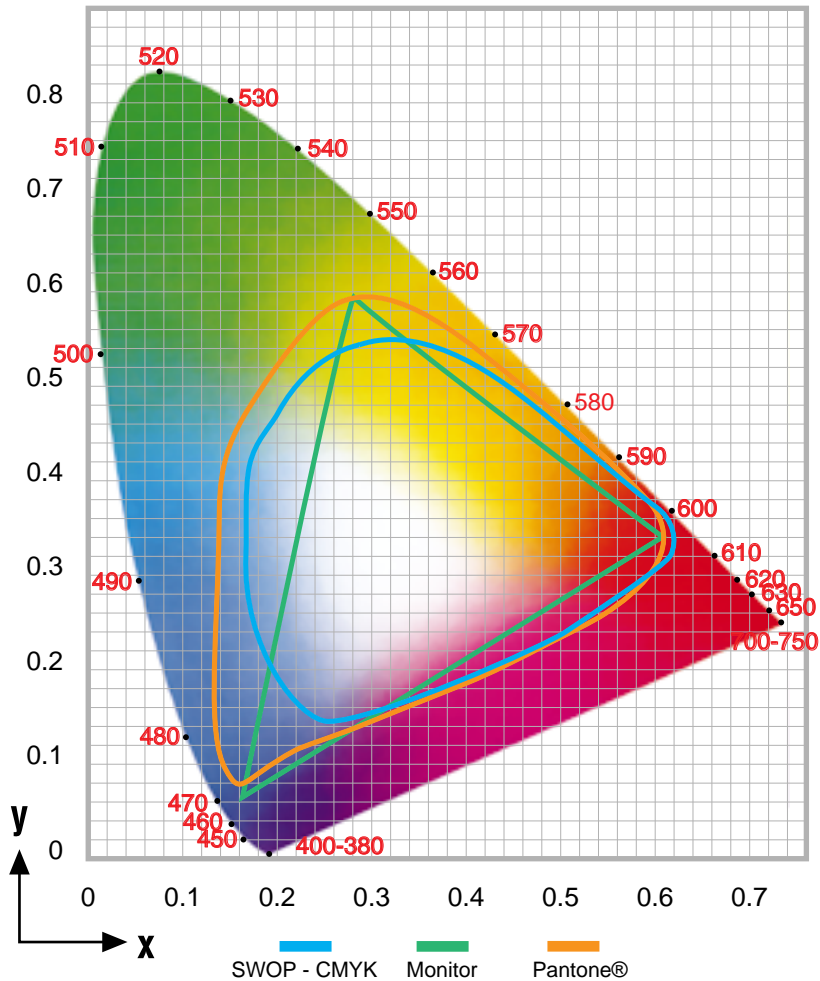
The Y axis representing the value or lightness of colors can only be shown in a 3-D view of the CIE Yxy model, since it comes out of the page.

Pure wavelengths of light lie on the curved edges of the triangular gamut of visible colors. The lower straight edge represents the colors obtained by mixing red and blue wavelengths from both ends of the spectrum. Although distances between colors in this model do not correspond to perceived color differences, it allows us to indicate the relative gamuts of RGB monitors, and different sets of printing inks.

Ink colors in the PANTONE MATCHING SYSTEM® provide a much larger color gamut than CMYK process color inks, such as the Standard Web Offset Press set (SWOP). A special fifth ink color is sometimes used to extend the CMYK gamut.

The non-linear CIE Yxy color model was mathematically transformed in 1976 to the uniform CIE L*a*b* model, in which distances between colors more closely match those perceived. All colors of the same lightness lie on a circular flat plane, across which are the a* and b* axes. Positive a* values are reddish, negative a* values are greenish, positive b* values are yellowish and negative b* values are bluish. Lightness varies in the vertical direction.
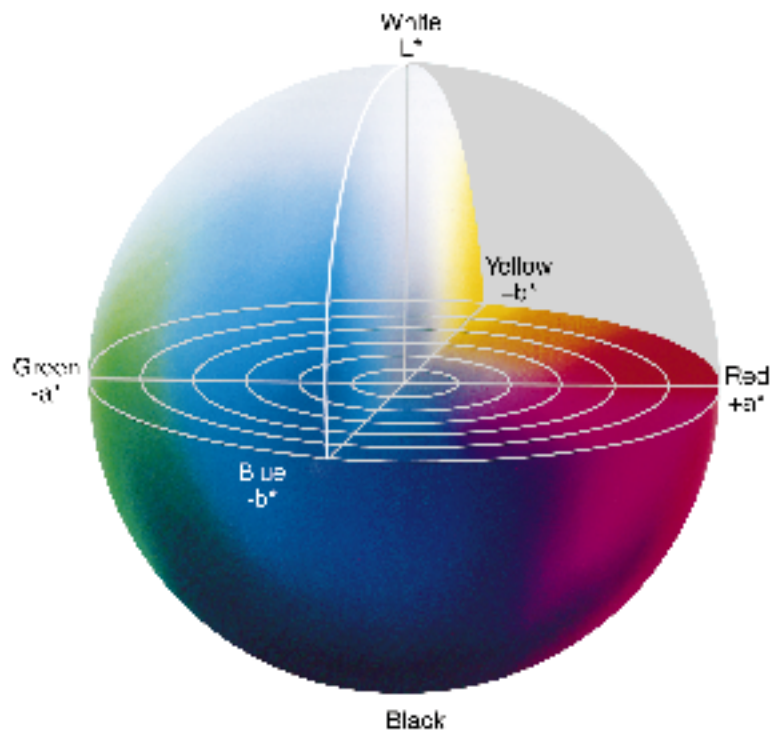
Color on the Desktop

Desktop publishing has come of age. High-resolution scanners, images on PhotoCD, digital photography, affordable color laser printers and photographic quality short-run color printing, all contribute to a level of professionalism in DTP that was unimaginable only a few years ago. In this world of increasingly accessible image reproduction, color is a key player.

Until recently, color was mostly a problem. Unexpected changes in the colors of the original as it moved from input to monitor and from monitor to output were hard to avoid.

Such changes occur because each of these devices has its own characteristic color behavior. Technological differences between color devices, and variations in the color models they use to recognize and render color, produce unwanted color transformations.

How the colors look in the end is determined by a number of interrelated factors:

■ the color modifications produced by the filters used to separate colors

■ the numerical differences in the electronic processing of color

■ the imperfection of printing inks

Most desktop publishers know from experience that color transformations can be hard to predict and control.

Managing Colors

Why Color Management?

From Input to Monitor

From Monitor to Output

Managing colors means making sure that the colors you see in your original remain the same throughout the digital reproduction process. Regardless of whether you acquire your images by scanning or via other digital equipment, you want colors to look right:

■ on your monitor

■ in your proofs

■ in print

Why Color Management?

Matching colors in printed output to those in scanned originals is no simple task, due to the number of variable factors in the reproduction chain.

Image-capturing devices output different values when reading the same original. Adjustments to monitor controls cause wide color variations. Gamut differences between monitors and printing processes mean that unprintable colors can be introduced during image retouching.

The conversion of scanned RGB data to CMYK separations differs from one program to another. Proofing devices vary wildly in color rendition, due to pigment and substrate characteristics. Viewing proofs and printed matter under non-standard lighting conditions introduces errors of judgment.

Ink-based press adjustments permit wide variations in ink densities. Alternative ink sets and paper types affect color rendition. Paper coating and texture affect dot gain, which modifies colors.

Attempting to compensate for all these color variations by trial and error is too expensive in time and materials. Color Management Systems (CMS) solve the color mismatch between input and output devices. These systems vary in their method of application and level of quality but ideally, the gamut of each device in the color reproduction chain is related to a standard color space such as CIELab. Variations from the chosen standard are recorded in a device-specific Profile. Future input or output from each device is then matched by use of its Profile, resulting in device independence or portable color.

The input characterization process requires industry standard color reference targets of transmissive (IT8.7/1) and reflective (IT8.7/2) varieties to be scanned using normal settings. These reference targets contain 264 patches of color and neutral grays, representing the complete gamuts for the media used to create them. The CMS relates scanned readings for each patch to colorimetric readings of the IT8 reference, which have been measured by a spectrophotometer.

Output device characterization (by the CMS manufacturer) is achieved by printing an IT8.7/3 reference file, which contains more color patches than the IT8.7/2 used for input devices. The results are accurately read with a spectrophotometer or a colorimeter and are fed back into the CMS to create unique Profiles. A range of Profiles may be made for a device that uses more than one pigment or paper type. Varying levels of dot gain on ink-based systems can also be Profiled. Having made Profiles for scanners, proofers and printing devices, final results should now reliably match original images, assuming that no colors are judged and corrected on a monitor display.

A crucial step in this process is accurate monitor calibration. Profiles for specific brands of monitor may be created and supplied as digital data by the CMS manufacturer. These allow approximate calibration but settings vary between monitors. On-screen colors may be visually matched to standard color patches, although some monitors now include their own calibration sensor, providing automatic adjustment to match CMS Profiles. Monitor calibration completes the chain, permitting reliable on-screen color corrections to be carried out.

The success of any CMS relies upon the color stability and correct calibration of all devices in the reproduction chain. Keeping printing press results identical to their measured reference targets is a difficult task, although modern ink-based presses are fairly stable once correct color balance for a specific job has been achieved.

Due to increasing demand for low-cost, high-quality color printing, manufacturers of computers, input and output devices are working together with software developers to implement highly-beneficial color management facilities throughout the design and production chain.

From Input to Monitor

Scanning is the most frequent used method, of digitizing images for desktop processing. When a full-color scanner passes over a color photograph, it senses the red, green, and blue in the original. These three color registrations suffice to record nearly all the colors in the original.

However, the sensitivity of the scanner sensors, the filters which are used, and the optical path along which the image travels as it is scanned, bring about color transformations between the original picture and the scanned image. Moreover, the monitor on which the scanned image is displayed speaks a different color language than both the scanner and the original. Whereas the photographic paper of the original reflects light, the monitor emits it. Because of this physical difference in how color is produced, even an ideal monitor will display colors that are slightly different from their original red, green, and blue.

Without a color management system, there are two things you can do to display color correctly on your monitor. Firstly, you can check if your monitor is properly calibrated. If this is the case and your colors are still displayed incorrectly, you can correct them using an image-editing application. By experience, and through trial and error, you may succeed in matching the colors in your original to the image displayed on your monitor. However, every image you acquire has to be manipulated in this way to compensate for device-dependent color.

Managing colors without color management software can therefore be extremely tedious, and since the results depend on your own experience, this method also remains far from full-proof.

From Monitor to Output

When you have edited an image to your satisfaction, with many fine color nuances and gradations, you are ready to proof and then print it. Here, again, you are in for more color transformations. This time, these transformations are not only due to device-dependent shifts affecting the red, green, and blue of your original: The different color mode used in printing produces its own color transformations.

Printing devices do not handle color the way scanners or monitors do. In print, light is not reflected but absorbed. Color is not produced with millions of combinations of red, green, and blue light, but with tiny ink-dots of solid cyan, magenta, yellow, and black ink that sit next to or on top of each other on the page. The only way to produce color gradations on paper, is by patterning and overlaying these ink dots, using the white of the paper for the lighter colors.

Your image-editing software will translate the red, green, and blue (RGB) values of your input into output cyan, magenta, yellow, and black (CMYK) values as best as possible. Transforming an RGB into a CMYK image is called separating colors for printing. Black generation, under color removal, and gray component replacement — all of which can be performed with your image editing software — optimize the quality of color separations.

Nevertheless, poor approximation of the original color information may omit some colors, while distorting others. Color correction may again impose itself, this time to map the color range — or gamut — of your monitor onto that of the printer or printing press.

Since the color behavior of different output devices varies, you need to make different color corrections for your digital proofs and for the offset press. To avoid repeated color corrections, you may imitate the final output color as you print your proofs. Alternatively, you can create different files for different output devices.

Managing color successfully in this way depends on how well you understand the color behavior of your output devices, and whether or not you can keep track of the necessary corrections. Again, this may be tedious, and is far from full-proof.

Chapter 2 — Using FotoTune With Photoshop

This chapter tells you all you need to know about using FotoTune while working in Adobe Photoshop. It describes how to use filters, exporters, and FotoTune separation tables to match color between input and output, and to produce true color soft-proofs and printed proofs.

Setting Up a Monitor Using Photoshop

The color conversions in Photoshop are based on the Monitor Setup. Because the monitor is the first device on which you judge and manipulate an image, it is important to set up your monitor correctly within Photoshop.

The Monitor Setup option allows you to change the way colors are displayed on your monitor. You should set up your monitor according to the monitor type and the light in the room in which you are working. You can also adjust the gamma of your monitor to regulate the brightness of medium-range colors and calibrate your monitor.

❖   For detailed instructions, refer to the Adobe Photoshop User Guide.

1.   Run Adobe Photoshop.

2.   Choose File->Preferences->Monitor Setup.

    The Monitor Setup dialog box is displayed.

Monitor Setup

Monitor: Other ▼

Monitor Parameters

White Point: 6500°K ▼

Phosphors: Custom... ▼

Room Parameters

Ambient Light: High ▼

Target Gamma

Gamma: 1.80

OK

Cancel

Load...

Save...

Calibrate...

Help
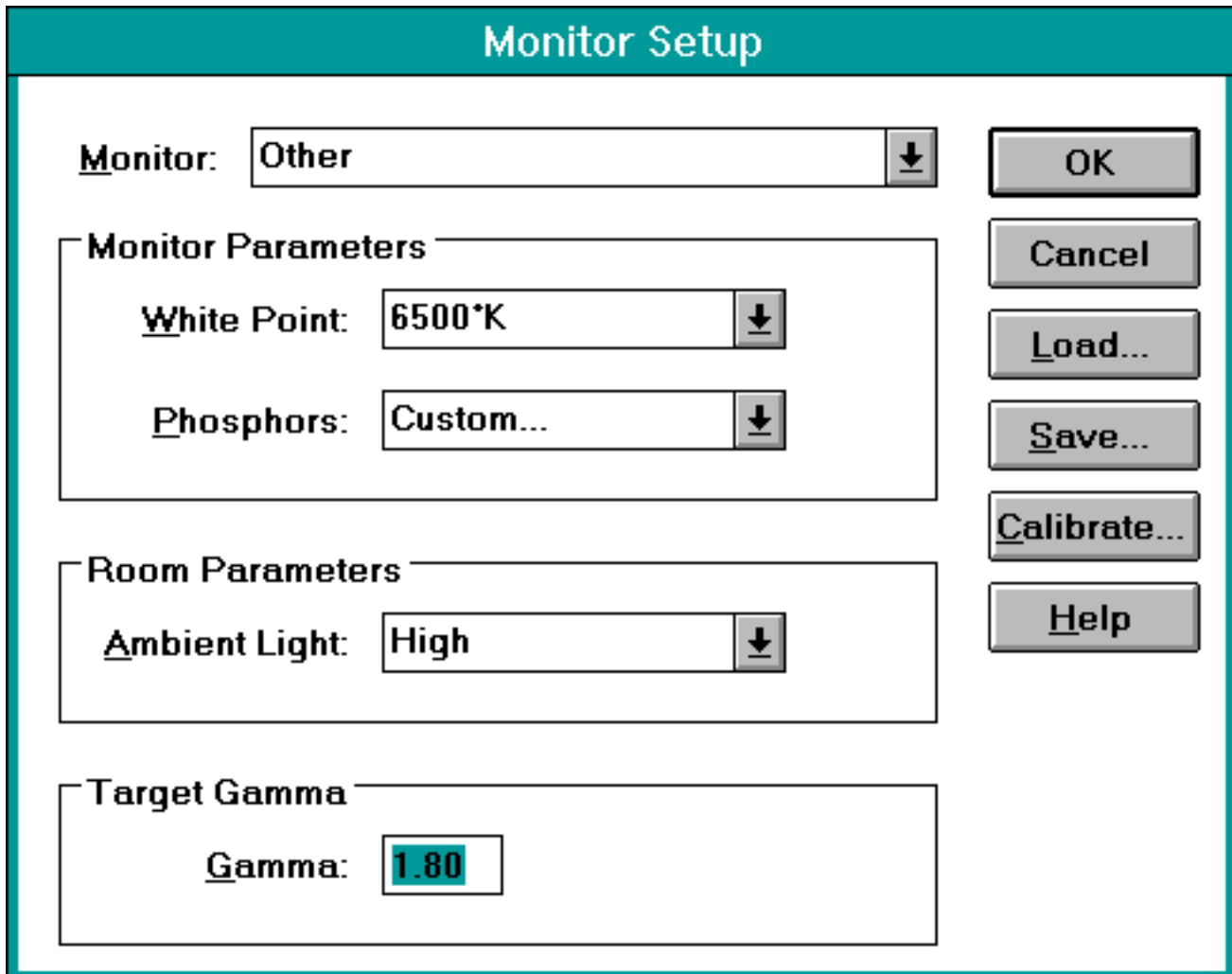
3. From the Monitor pop-up menu, choose the monitor that you are adjusting.

4. Click Calibrate.

    The Calibrate dialog box appears.

```
                        Calibrate

        Gamma                      15
        _____|_____
                                      △

        Color Balance:    -2      -2      -2
  Red  _____|_____
  Green _____|_____
  Blue _____|_____

        ○ Black Pt   ◉ Balance   ○ White Pt


  [ Preview ]      [ Load... ]   [ Save... ]

  [ Help ]         [ OK ]        [ Cancel ]
```
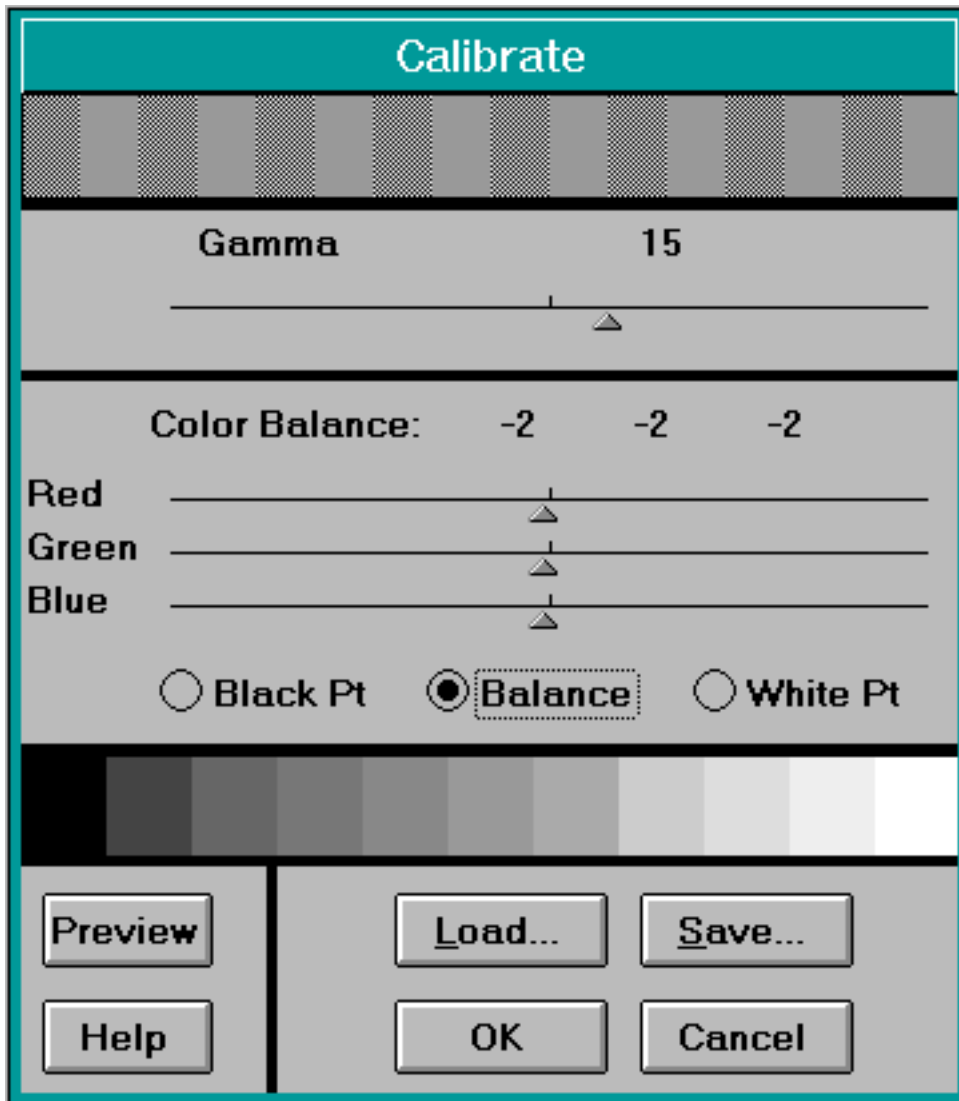
5. Set the white point, the gamma, the color balance and the black point.

6. Click OK.

7. Enter the Gamma value.

    The lower the value, the darker the image. If you are using a third-party utility, enter the gamma value set by that device (refer to your monitor documentation). We recommend the following settings:

    Gamma 1.8   White point 6500K

8. Choose a setting from the White Point pop-up menu.

    This gives the Kelvin temperature of the lightest color value established by that device. If the setting you require is not available, choose Custom and type in your own values. Normally, you can find valid values in the documentation that came with your monitor.

9. Choose the monitor type from the Phosphors pop-up menu.

This specifies the type of screen your monitor uses. If the correct type is not available, choose Custom and enter the red, green, and blue chroma values as specified by your monitor manufacturer. For these values, check the documentation that came with the monitor. This option compensates for the different red, green, and blue phosphors used by monitors to display color.

10. Choose a setting from the Ambient Light pop-up menu:

   □   Choose High if your room lighting is brighter than the image on-screen

   □   Choose Low if your room lighting is not as bright as the screen

   □   Choose Medium if the levels are about the same

   Remember that it is important to maintain consistent room lighting.

11. Click Save, and enter a distinctive name for your setup.

How Does FotoTune Support Photoshop?

The FotoTune package contains four plug-in modules for Adobe Photoshop:

■   Two filters:

   □   ColorMatcher

   □   SoftProof

■   Two exporters:

   □   ColorMatcher

   □   Hard Copy Proof

The plug-in modules for Photoshop can be divided in two functional groups:

■   color matchers

■   color proofers

The color matchers guarantee an optimal color conversion from the input to the output color space, whereas the color proofers allow the user to judge the image printed on a proof printer or displayed on the monitor, as if it was printed on the final output device.

❖   Depending on the type of Profile you choose (CMYK, RGB, Lab), the bitmaps in the dialog boxes of the plug-in modules will change.

In addition to the plug-ins, FotoTune supports Photoshop by converting FotoTune Profiles to Photoshop separation tables (FotoTables).

❖   Remark: When you choose two Profiles in your ColorMatcher filter or exporter, the ColorMatcher will calculate the conversion from one device to another (Dynamic Linking). Once the ColorLink is generated, ColorMatcher will store it in encrypted format in the directory called "tlinks" contained within the ...\ fotoflow \ clinks directory.
Generating the ColorLink will take a while the first time; however, on the next occasions the ColorLink will no longer have to be generated physically, but it will be retrieved from the directory "tlinks".

When to Use What in Photoshop?

Each module has its own strengths:

- **SoftProof filter:** to see how your image will look when it is printed on your output device.

- **ColorMatcher filter:** to convert your image from an RGB input color space (scanner or monitor) to an RGB output color space (monitor, RGB printer) or to convert your image from a CMYK input color space (CMYK printer) to a CMYK output color space (CMYK printer).

- **ColorMatcher exporter:** to convert your image from the scanner, monitor, or Lab color space to the CMYK output color space or the Lab color space.

- **Hard Copy Proof exporter:** to simulate your image (in the scanner or monitor color space) on an output device other than the final output device.

- **Separation tables:** to increase the speed of complex Photoshop operations (such as separations or certain filters) if you have an accelerator board installed. Accelerated Photoshop separations are much faster than the FotoTune separations with the ColorMatcher exporter (when no accelerator board is installed, the ColorMatcher exporter is faster than Photoshop). You can take advantage of the speed increase of the separations through the accelerator board, and keep the accuracy of the FotoTables (Photoshop Separation Tables created by FotoTune) by loading these Tables in Photoshop and letting Photoshop calculate the separations. The info tool will allow to predict the FotoTune based RGB, Lab and CMYK conversions.

For specific tasks, use the most appropriate module:

- **To fit your RGB images correctly in the monitor color space**
  Photoshop considers the monitor as the key element in the prepress work flow. From the monitor, Photoshop converts the colors to the output color space based on the Separation Setup and the Printing Inks Setup in the Photoshop Preferences. Unfortunately, your raw input images will have some color deviations because of the color characteristics of the filters, lenses, CCD, etc. of your input device. The ColorMatcher filter will perform a color correction on the raw RGB image, and map the input color space to the monitor color space. If you have your monitor properly setup and calibrated, you will get the same colors on the monitor as on the original.

- **To convert your image colors back from the output color space to the monitor color space**
  If you receive your images from a drum scanner in CMYK, or you receive CMYK files prepared for certain CMYK output devices, you must use the ColorMatcher exporter to convert your image colors back from the output color space to the monitor color space.

- **To convert your image to the appropriate output color space**
  From the monitor color space you can convert your image to the appropriate output color space in one of several ways:

  - ☐ You can use the ColorMatcher filter to convert the image from monitor RGB to an RGB output color space (if you use a non-PostScript printer).

  - ☐ You can use the ColorMatcher exporter to convert your image to a CMYK output color space, or the device-independent Lab color space.

  - ☐ You can load a FotoTable (an Output Profile that has been converted to the Photoshop Separation Table format) and let Photoshop calculate the color conversion based on the accuracy of the Agfa Profiles.

- **To see how the image will look when it is printed**
  If you want to see how the image will look when it is printed, you can use the SoftProof filter to display a representation of the output file on the calibrated monitor, or you use the Hard Copy Proof exporter to create a proof file which you can print on a proof printer, simulating the final output device. For example, you may want to print the Offset CMYK Hard Copy Proof image on a dye sublimation printer to get an idea of how the image will look in offset printing.

Work Flow for the ColorMatchers and Color Proofers

ColorMatcher Filter

ColorMatcher Exporter

SoftProof Filter

Hard Copy Proof Exporter

We assume the monitor has been calibrated and all required Profiles have been made and are ready to be used. For more information on how to make and/or modify Profiles, refer to the "Characterizing Monitors and Input Devices" booklet.

- The raw images you have to start working with still have the color deviations caused by the input device. Displayed on a properly calibrated monitor, they do not look the same as the original photographs. You can correct these color deviations by converting the images from the input color space to the monitor color space. Use the ColorMatcher filter for input RGB images or the ColorMatcher exporter for images in other than RGB color spaces (CMYK or Lab).

- Since all the images are converted to the same color space, you can now work on the images, combine them, edit them, use filters, etc. The colors displayed on the monitor will correspond to the colors of the original.

- When you are satisfied with your work, you can use the SoftProof filter to display - on the monitor - how the image will look when printed on the final output device.

- Before you actually output the file, you may want your customer or superior to approve your work. To do this, you can save the image in the monitor color space, which gives you the option to further edit or rework the file. You can use the Hard Copy Proof exporter to create an image that will look like the final output printed on your proof printer.

- When the customer has approved your work, you can open the monitor image and use the ColorMatcher exporter to create the final output file (separations).

ColorMatcher Filter

The ColorMatcher filter will convert images from one color space to another within
the same color mode (RGB->RGB, CMYK->CMYK).

In most cases the ColorMatcher filter is used to convert images from the input to the monitor color
space.

Supported combinations:

	Source	Destination
RGB image:	scanner	monitor
	monitor	monitor
	scanner	RGB printer
	monitor	RGB printer
CMYK image:	CMYK printer	CMYK printer

1. Choose Filter->FotoTune->ColorMatcher.
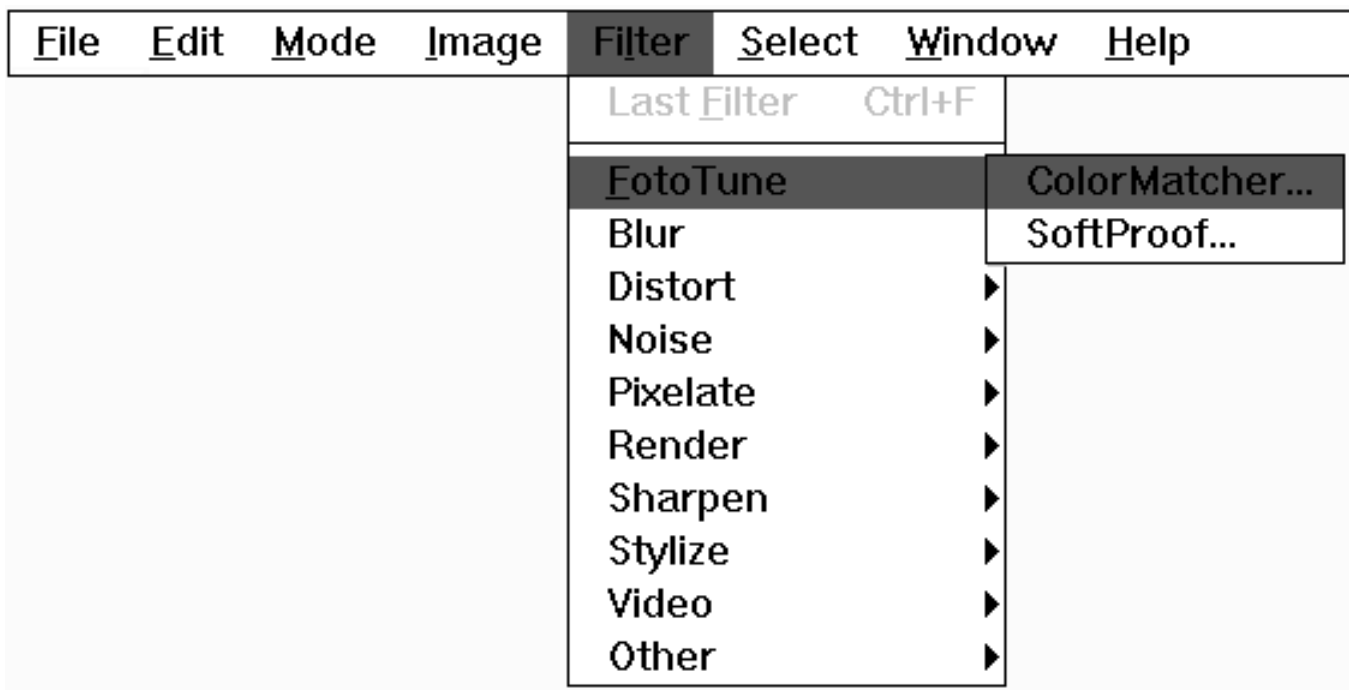
The ColorMatcher dialog box appears.
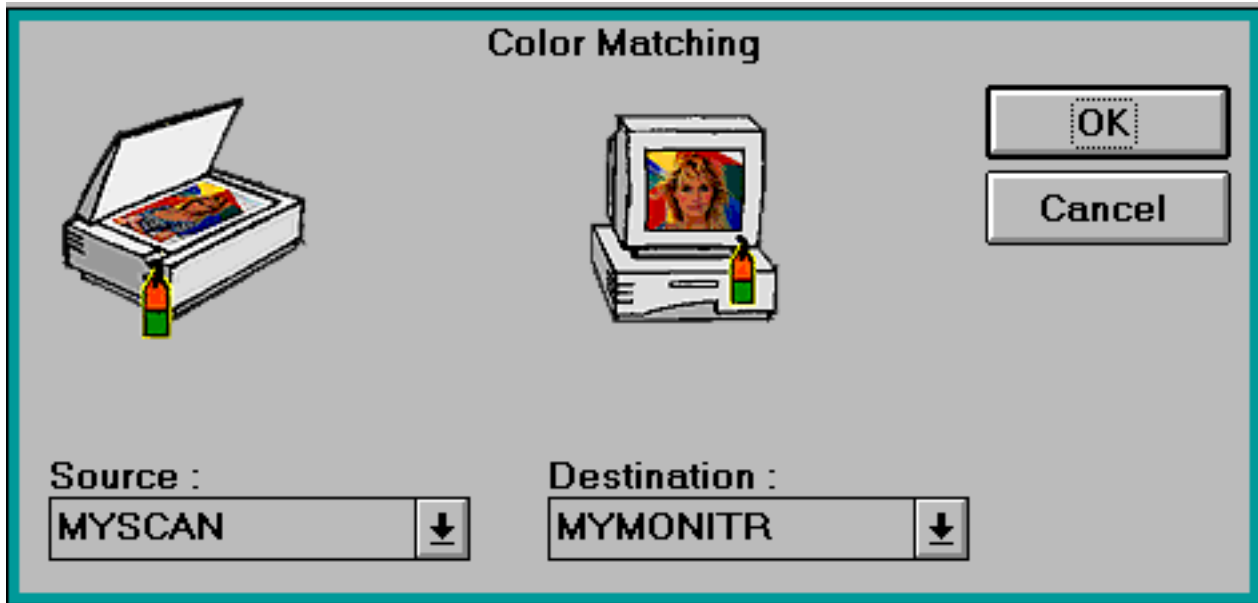
2. Choose the Profile for the current image color space from the Source menu.

3. Choose the Monitor Profile or the Output Profile of the image in the Destination menu.

   The Destination indicates the color space to which you want to convert the image.

The ColorMatcher will calculate the conversion from input to output and correct the image data so that you get matching colors from source to destination.

For example, on a calibrated monitor, the image on screen will match the original picture after the conversion from scanner to monitor has been executed.

ColorMatcher Exporter

The ColorMatcher exporter will convert images from one color space to another in **the same or different color modes**. While calculating and executing the color conversion, the image is exported (saved) to disk.

You will typically use the ColorMatcher exporter to convert your RGB input or monitor images to a CMYK output color space or the device independent Lab color space. If the source color space of your images is a certain CMYK color space (images from drum scanners or already separated images), you will use the ColorMatcher exporter to convert the image to Lab or the monitor color space.

Supported combinations:

	Source	Destination
RGB image:	scanner	RGB/CMYK printer
	scanner	monitor
	scanner	Lab
	monitor	RGB/CMYK printer
	monitor	monitor
	monitor	Lab

CMYK image:	CMYK printer	RGB/CMYK printer
	CMYK printer	monitor
	CMYK printer	Lab
Lab image:	Lab	RGB/CMYK printer
	Lab	monitor

1. Choose File->Export->ColorMatcher.

| File | Edit | Mode | Image | Filter | Select | Window | Help |

New...	Ctrl+N
Open...	Ctrl+O
Open As...	
Place...	

Close	Ctrl+W
Save	Ctrl+S
Save As...	
Save a Copy...	
Revert...	

| Acquire | ▶ |
| Export | ▶ |

| Amiga HAM... |
| Color Matching Exporter... |
| Hard Copy Proof... |
| Paths to Illustrator... |
| Quick Edit Save |

File Info...	
Page Setup...	
Print...	Ctrl+P
Preferences	▶

1 D:\HIG\FOTOTUNE.PC\MEXPMATC.TIF
2 D:\...\IT8RX612.TIF
3 D:\C40305.GIF
4 D:\FRANCINE.TIF

| Exit | Ctrl+Q |

The ColorMatcher dialog box appears.

2.   Choose the Profile for the current image color space from the Source menu.

3.   Choose the Monitor Profile or the Output Profile of the image in the Destination menu.

      The Destination indicates the color space to which you want to convert the image.

The ColorMatcher exporter will calculate the conversion from input to output and correct the image data so that you get matching colors from input to output. The color converted image is saved on disk, the original image stays open on the monitor.

For example, a CMYK file, prepared for printing with Euro Standard inks, can be converted to a CMYK file ready to be printed with SWOP inks. A scanned image can be color-corrected and separated in one operation when you choose the scanner Profile in the source pull-down menu, and the CMYK Output Profile in the destination pull-down.

SoftProof Filter

The SoftProof filter is used to display a representation of the image as if it was printed on the final output device, and to check which colors exceed the gamut on the selected output device.

The SoftProof filter simulates the active image on the monitor as if it was printed on a certain output device. The user can optionally perform a gamut check to see which colors are unprintable on the selected output device.

Supported combinations:

	Source	Destination	Monitor
RGB image:	scanner	RGB/CMYK printer	monitor
	scanner	none	monitor
	monitor	RGB/CMYK printer	monitor
	monitor	none	monitor

1.   Choose Filter->FotoTune->SoftProof.
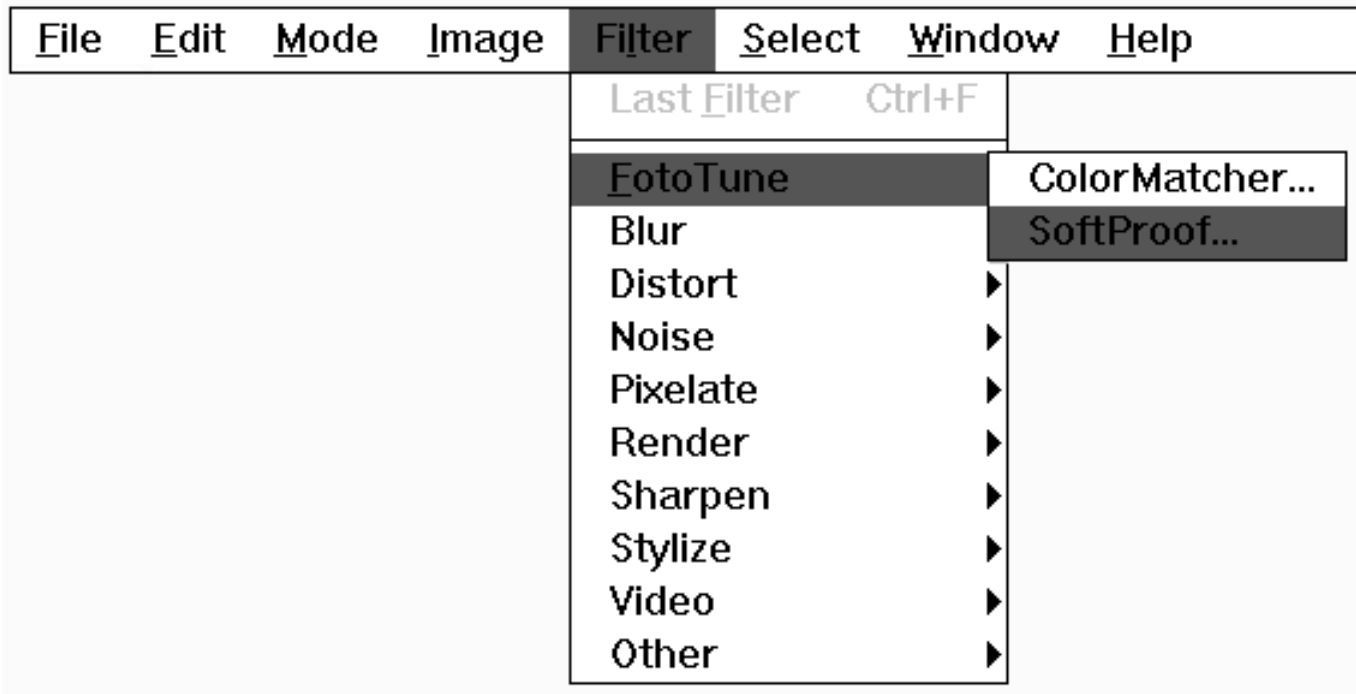
The SoftProof dialog box appears.
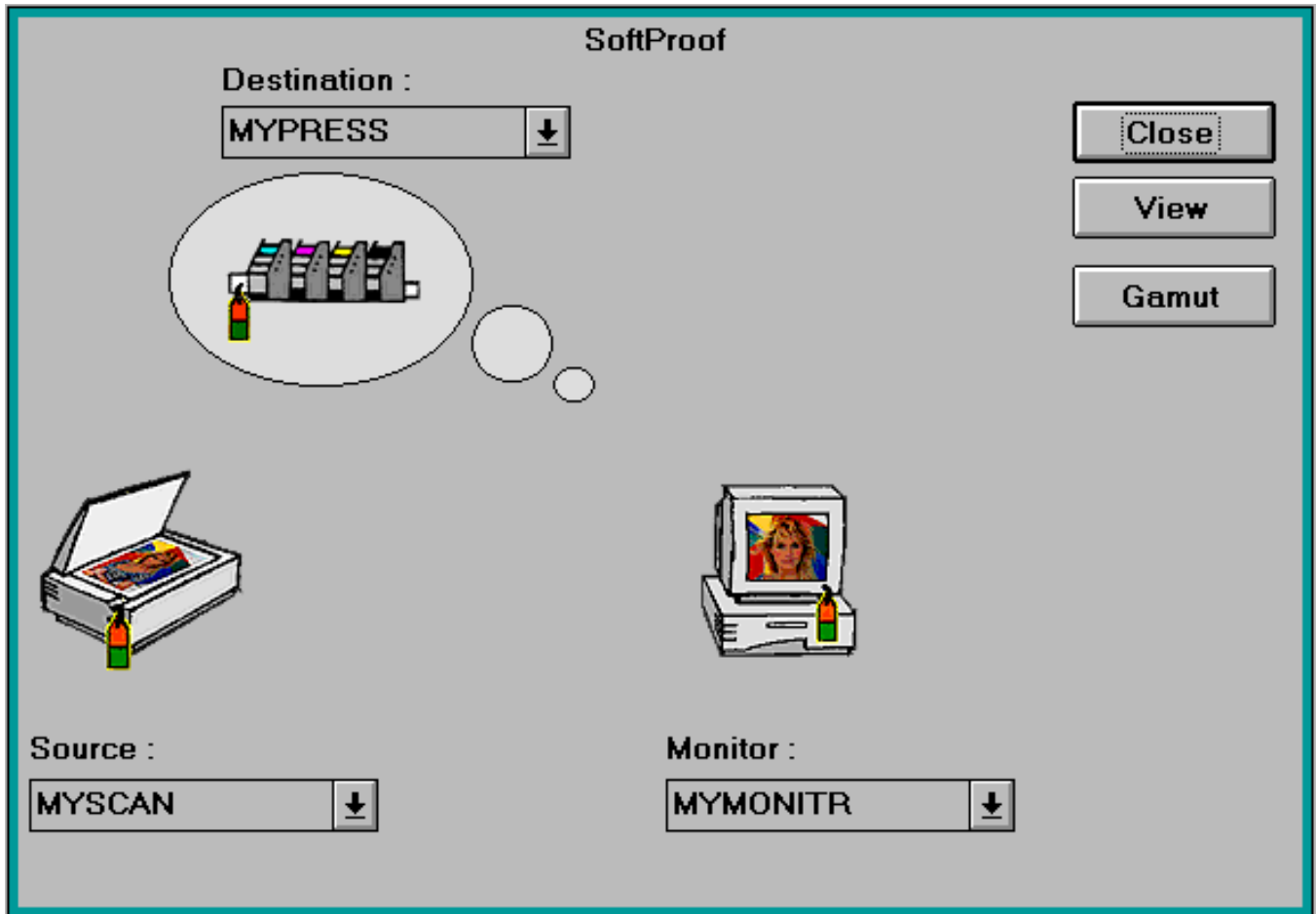
2. Choose the Profile for the current image color space from the Source menu.

3. Choose the Profile corresponding to the Photoshop Monitor Setup from the Monitor menu.

4. Choose the Profile for the final output device, which you want to simulate on the monitor, from the Destination menu.

   ❖ If None is selected in the Destination menu, then only two Profiles are involved, which is the same as matching the colors to the monitor color space.

■ To see the result on your image, click View.

A low-resolution display image will be created, simulating the image as if it was printed on the final output device. When the display image is visible on the monitor, the SoftProof dialog box disappears. Closing the display image will bring the SoftProof dialog box back on screen.

■ To see the unprintable colors, click Gamut.

A gray-scale display image will be created showing the unprintable colors in red. When the display image is visible on the monitor, the SoftProof dialog box disappears. Closing the display image will bring the SoftProof dialog box back on screen.

■ To close the SoftProof dialog box, click Close.

Hard Copy Proof Exporter

The Hard Copy Proof exporter will create and save an image that simulates the final output device on the proof printer. The image will be converted from the source color space to the final output color space and then to the color space of the proof printer. Printing the Hard Copy Proof image, the proof printer will act as if it was the final output device.

It is important that the proof printer has a larger gamut than the final output device. If the proof printer has a smaller gamut than the final output device, the proof printer cannot print all the colors that can be printed by the final output device, and cannot therefore match the final output.

Supported combinations:

	Source	**Destination**	**Printer**
RGB image:	scanner	RGB/CMYK printer	RGB/CMYK printer
	scanner	none	RGB/CMYK printer
	monitor	RGB/CMYK printer	RGB/CMYK printer
	monitor	none	RGB/CMYK printer
CMYK image:	CMYK printer	RGB/CMYK printer	RGB/CMYK printer
	CMYK printer	none	RGB/CMYK printer
Lab image:	Lab	RGB/CMYK printer	RGB/CMYK printer
	Lab	none	RGB/CMYK printer

1.   Choose File->Export->Hard Copy Proof.

File	Edit	Mode	Image	Filter	Select	Window	Help

New...   Ctrl+N
Open...   Ctrl+O
Open As...
Place...

Close   Ctrl+W
Save   Ctrl+S
Save As...
Save a Copy...
Revert...

Acquire   ▶
Export | Amiga HAM...
                                     | Color Matching Exporter...
File Info... | Hard Copy Proof...
                                     | Paths to Illustrator...
Page Setup... | Quick Edit Save
Print...   Ctrl+P

Preferences   ▶

1 D:\HIG\FOTOTUNE.PC\MATCH.TIF
2 D:\HIG\FOTOTUNE.PC\MEXPMATC.TIF
3 D:\...\IT8RX612.TIF
4 D:\C40305.GIF

Exit   Ctrl+Q
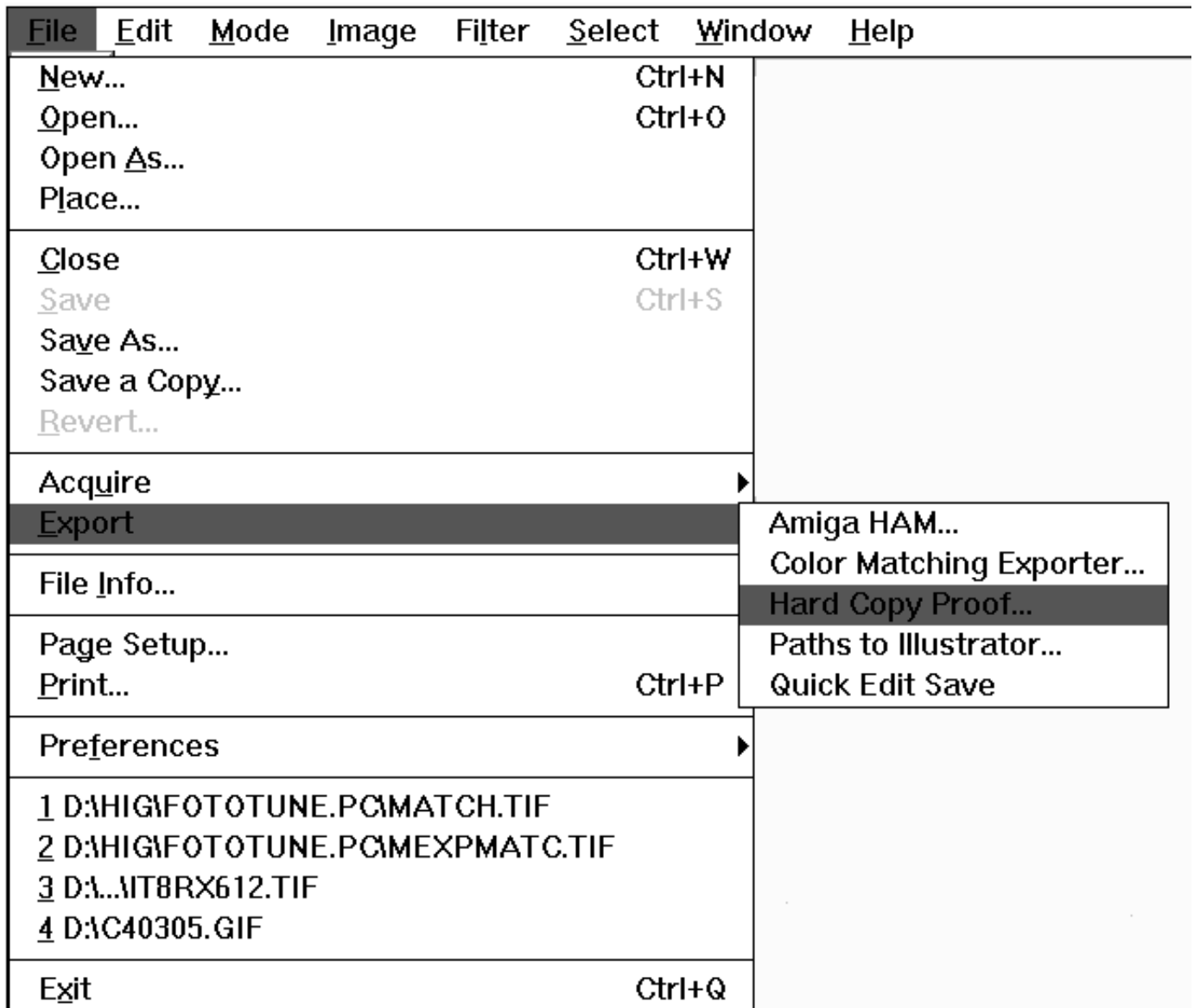
The Hard Copy Proof dialog box appears.
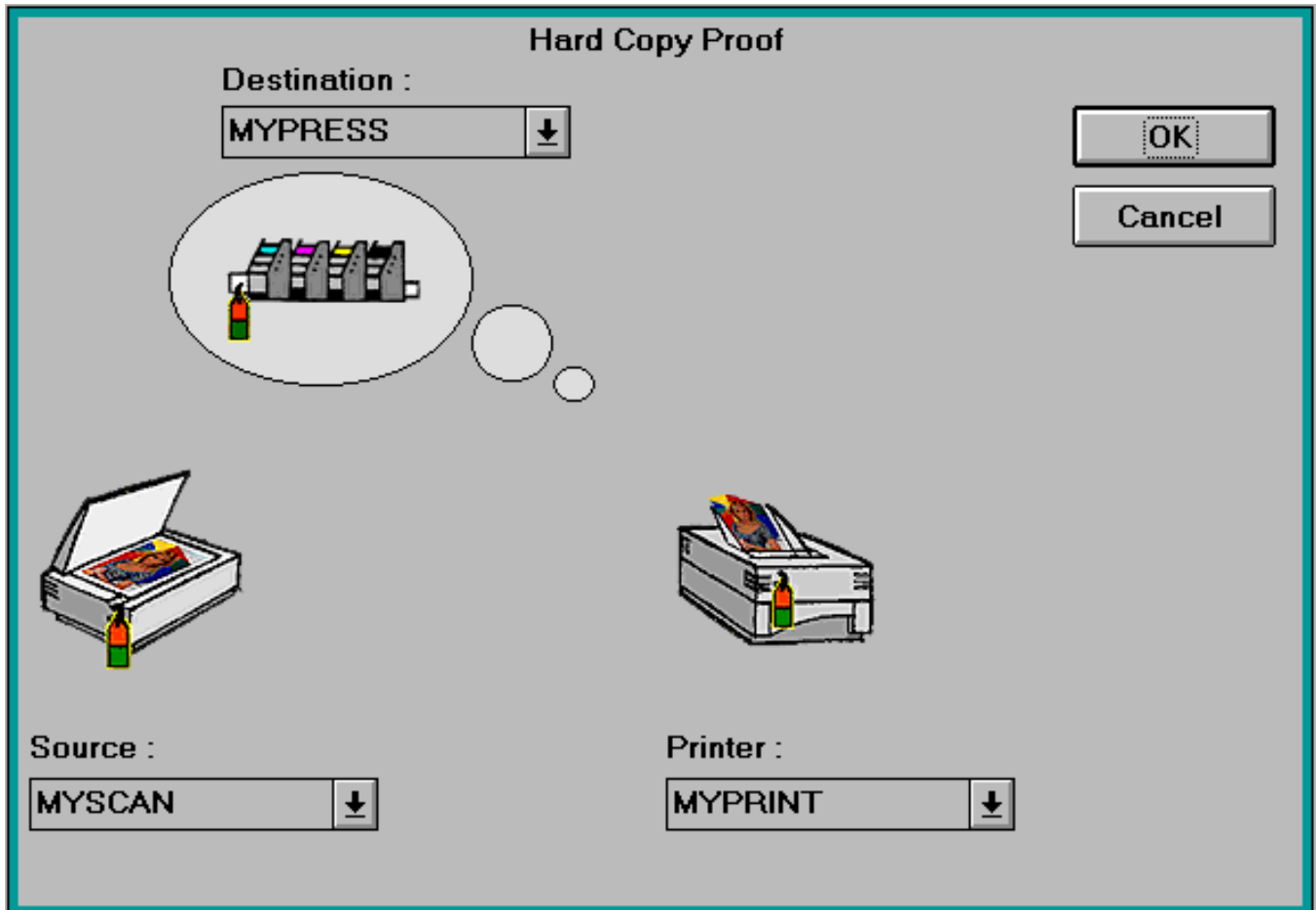
2. Choose the Profile for the current image color space from the Source menu.

3. Choose the proof printer Profile from the Printer menu.

4. Choose the Profile for the final output device, which you want to simulate on the proof printer, from the Destination menu.

   ❖ If None is selected in the destination pull-down menu, then only two Profiles are involved, which is the same as matching the colors to the printer color space.

5. Click OK.

   The Hard Copy Proof dialog box closes and the color conversions will be calculated.

6. When the Save As dialog box appears, save the Hard Copy Proof image.

7. Open the image and print it on the proof printer.

Work Flow for Using Separation Tables

Photoshop Separation Tables

How do the Separation Tables work?

Monitor Setup

How to Make Photoshop Separation Tables?

How to Load Photoshop Separation Tables?

After a short overview of the work flow, the most imported topics are discussed in detail.

1. Create a Photoshop Separation Table from the Output Profile of your printing device.

2. Open the image that you want to print.

3. Convert the image to the monitor color space with the ColorMatcher filter or ColorMatcher exporter.

   Make sure the Monitor Profile was made with the same settings as used in the Photoshop Monitor Setup.

3. Use the SoftProof filter to judge the image displayed on the monitor as if it would have been printed on the final output device.

4. Modify the image if necessary.

5. Choose File->Preferences->Separation Tables in Photoshop.

6. Load the Photoshop separation table (converted Output Profile).

7. Choose Mode->CMYK in Photoshop.

8. Save the CMYK file.

Photoshop Separation Tables

To achieve the same color on different devices, you must send different data to these devices. The color conversions necessary to create this different image data can be performed using FotoTune Profiles in the application programs that support them (such as QuarkXPress and Adobe Photoshop). Alternatively, you can convert the FotoTune Profiles to Adobe Photoshop separation tables containing the necessary information about each device. The separation table can be loaded in Adobe Photoshop, and Photoshop will use the table to translate the color data from one color space to another, ensuring matching colors between your devices.

Adobe Photoshop provides a Monitor and Separation Table mechanism that you can use instead of the default color conversion mechanism. FotoTune takes advantage of this mechanism. Once the separation table created in FotoTune is loaded, these tables will be used whenever you convert images between RGB, Lab and CMYK.

To translate colors from a monitor which describes colors as intensities of red, green, and blue, to a printer which renders colors as percentages of cyan, magenta, yellow and black, Photoshop 3.0 uses its Monitor Setup. Monitor Setup translates the RGB intensities into the Lab color space, and then uses the FotoTune separation tables to convert from Lab to the appropriate CMYK percentages in order to achieve matching colors.

❖ Do not convert between RGB and CMYK multiple times, because each time the image is converted, the colors must be recalculated, resulting in less accurate colors.

How do the Separation Tables work?

When you have loaded the Photoshop Separation Tables that you created with FotoTune, Photoshop will use them whenever you choose CMYK from the Mode menu to convert an image to CMYK. They have no effect on RGB or Lab images except during the mode change to CMYK. If you display a CMYK image, the Separation Tables are used to calculate the inverse transformation from CMYK to monitor RGB (there is an implicit mode change when you choose Print in CMYK in Photoshop 3.0).

A mode change or color conversion takes place when you choose RGB, Lab (from Photoshop 2.5 on), or CMYK from the Mode menu to change an image to a different color space. Photoshop converts between these different color spaces by performing known mathematical conversions between one color space and another. Photoshop uses internal tables to perform this conversion.
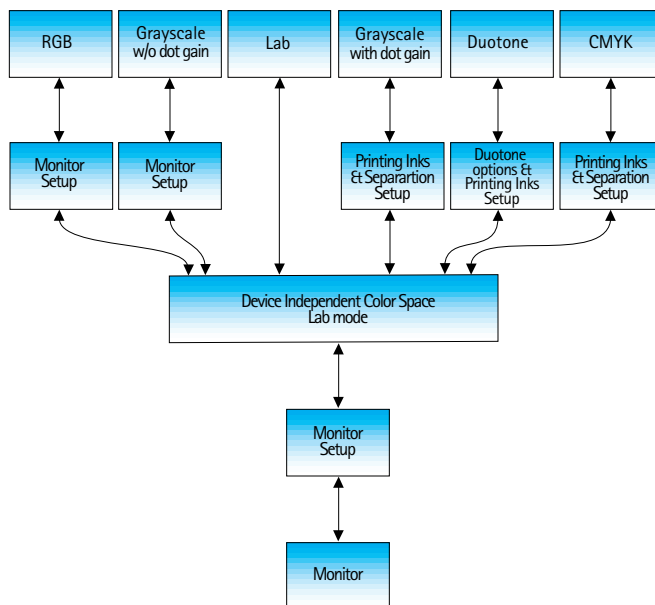
When you load the Separation Tables created by FotoTune, the conversion takes into consideration the characteristics of the output device as defined by Agfa's sophisticated characterization process. For example, if you are printing to a device that cannot print a certain deep red, the reds of an image will be mapped to the closest printable values for that given device.

Separation Tables created by FotoTune contain the data Photoshop needs to calculate the best approximations.

When you convert from RGB to Lab or vice versa, the Photoshop Monitor Setup is used. When you convert from Lab to CMYK or vice versa, Photoshop 3.0 uses the loaded Separation Table.

In Photoshop both the Monitor Setup and the Separation Setup are used to convert from RGB to CMYK and vice versa. It is therefore important to set up the monitor in Photoshop with the same settings as used to create the Monitor Profile. If you want to convert a scanned image to CMYK, you must first convert the image to monitor RGB with the ColorMatcher filter, and load the appropriate Separation Table (the Profile for the given output device, converted as Photoshop Separation Table in FotoTune). Photoshop 3.0 will convert the image to Lab first (based on the Monitor Setup) and then from Lab to CMYK (based on the data in the loaded Separation Tables).

Photoshop 2.0.1 treats all three channel images as RGB images. Photoshop 2.5 or higher treats all images with three color channels as Lab images, and uses RGB for the display.

Monitor Setup

Since Photoshop 3.0 uses the Monitor Setup to convert RGB images to Lab before converting to CMYK, it is important to set up the Monitor in Photoshop the same way as the settings in the Monitor Profile. We recommend the following settings:

Gamma 1.8   White point 6500K

If your monitor requires other settings, you can still use these settings if you build a Profile for them. We recommend that you calibrate the monitor for accurate monitor display and consistent color in all steps of the reproduction process.

How to Make Photoshop Separation Tables?

1.   Run FotoTune.

2.   Click the Open Output Profile button.
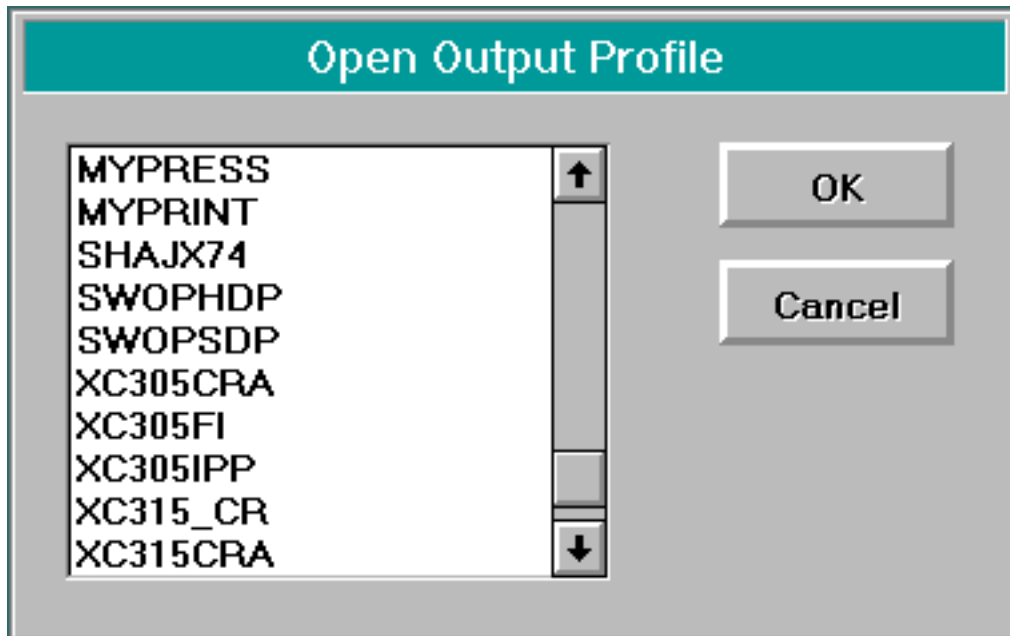
3.   Select the Profile for your output device and click OK.

     The Output Profile information dialog box appears.

4.   Choose File->Export->Separation Tables.

File	Edit	ColorLink	Help

New ▶
Open ▶
Close
Save
Save As...

Export
Exit

Color Rendering Dictionaries...
ICC...
Separation Tables...
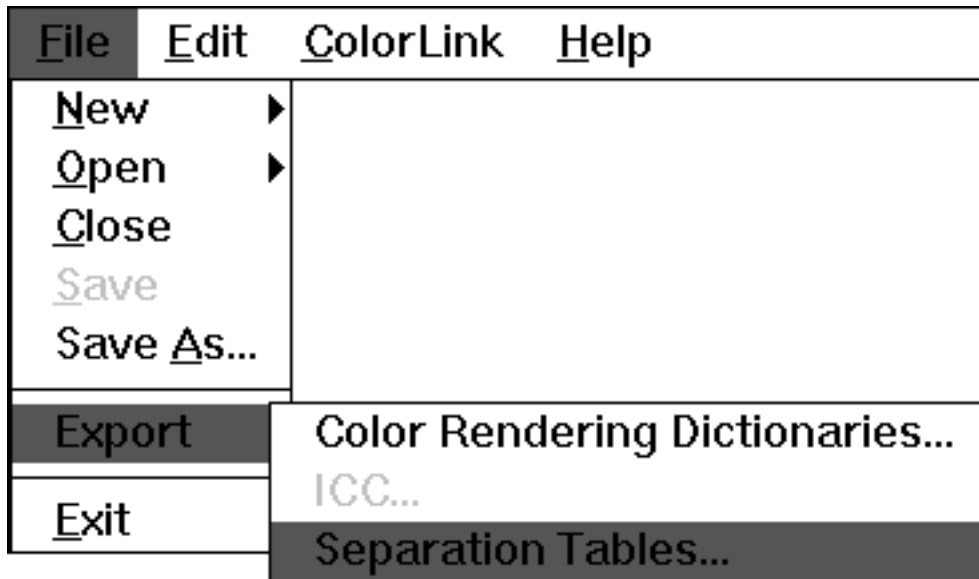
The Exporting Photoshop Separation Table dialog box appears. FotoTune proposes <name>.ast as the name for the separation table.

5. Save the FotoTable.

How to Load Photoshop Separation Tables?

1. Run Adobe Photoshop.

2. Choose File->Preferences->Separation Tables.

    The Separation Tables dialog box appears.
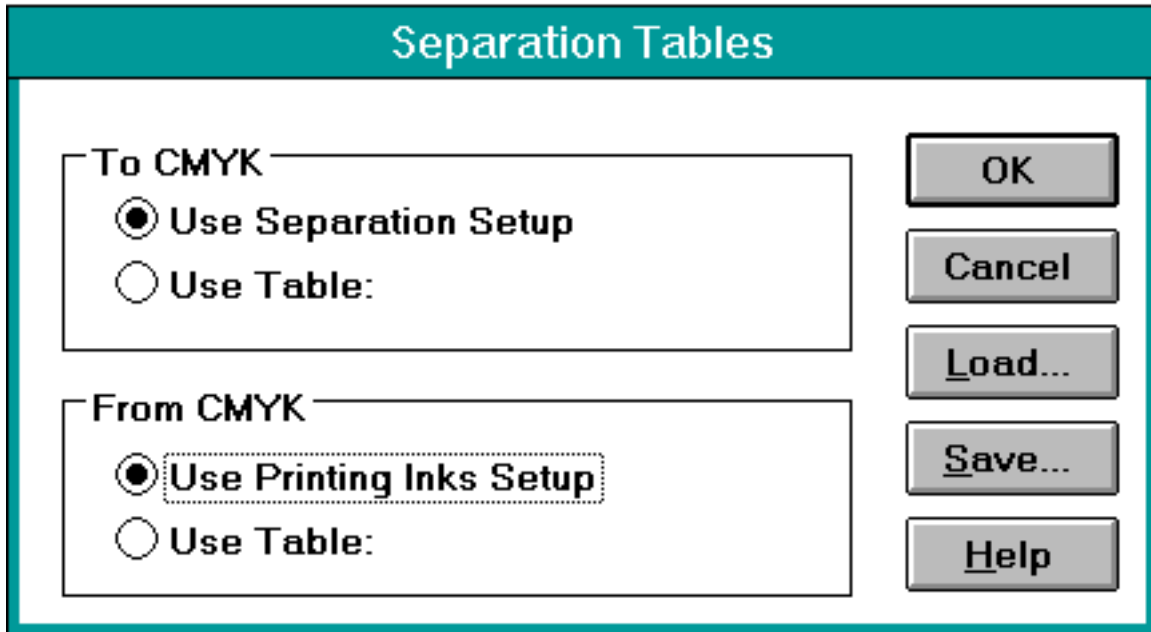
3. Click Load.

    A standard Open dialog box appears.

4. Select the FotoTable you exported from FotoTune and click OK.
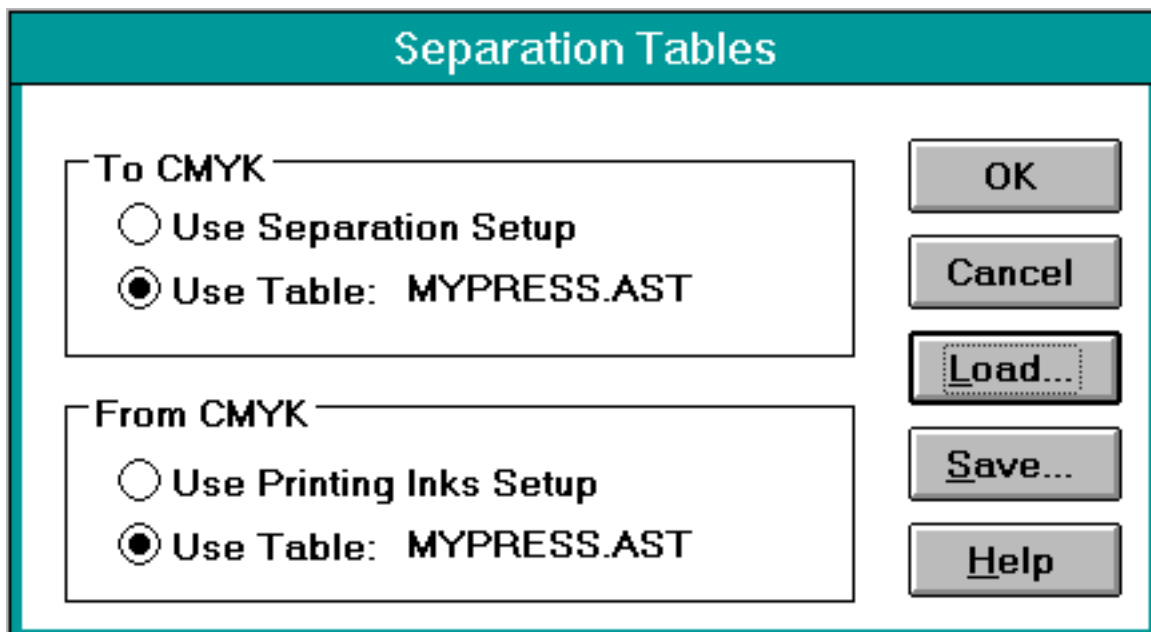
5. Click OK.

   The FotoTable is loaded and will be used by Photoshop for accurate mode conversions to and from CMYK.

Chapter 3 — Using FotoTune With QuarkXPress

This chapter explains all you need to know about using FotoTune while working in QuarkXPress. It describes how to prepare all graphic files in your document for using FotoTune and how to match color on input and output devices.

Introduction

Installation

Setting Preferences

If you want to proof the layout of your QuarkXPress documents or you want to present the mock-up of a new advertisement to your customer, you not only want the layout to be printed correctly, but you also want the colors in your document to look good. Since the color rendition of your proof printer and the final output device are completely different, the colors of the different elements in your QuarkXPress file have to be changed according to the output device you are using. To avoid having to make different version of the document, one for the proof printer and one for the final output device, Agfa has developed a QuarkXTension that provides Color Management to QuarkXPress, enabling colors specified in QuarkXPress and colored images imported in QuarkXPress to be rendered accurately on any output device.

The FotoTune QuarkXTension allows you to:

■ Create quality separations based on the FotoTune Profile mechanism.

■ Match the printouts and separations from QuarkXPress on all output devices when using well calibrated and characterized equipment.

■ Perform soft proofing of the document if your monitor is characterized and calibrated (accurate previewing can be enabled or disabled).

■ Assign a color identity to every element in the QuarkXPress file. Each element in the document can be tagged with a Profile.

■ Have the color conversions calculated while the document is displayed, printed on a digital color printer, or when the separations are being made on an image setter (dynamic linking).

Installation

Refer to the "Installing FotoTune" booklet.

CAUTION: Make sure Efi Color is not installed.

Setting Preferences

QuarkXPress uses two levels of preferences. A number of preferences can be considered as system preferences; they will be used as default preferences when you create a new document.

If you create a new document in which you do not want to use the system preferences, you can define a number of preferences at document level. These preferences are saved with the document. If you open this document in QuarkXPress with different system preferences, the document preferences in your document will be used instead of QuarkXPress' system preferences.

A similar dual preference concept is used in the FotoTune XTension. The first time you use this XTension, you will have to set the system preferences. They will apply to all new documents. Here, you define the default color spaces for the different elements in your documents (Quark Colors and imported pictures) and the default output devices (monitor, proof printer, and final output device).

If you are creating a new document and the FotoTune system preferences do not correspond to the source and destination of the elements that will be used in this document, you can change the document preferences while leaving the system preferences untouched. The settings will then be different for the current document, but the following new document will revert to the system preferences. If you change the document preferences or individual Profiles in the document, the system preferences will be overwritten for that particular image, element or document.

Setting the System/Document Preferences

1. Choose FotoTune from the main menu bar.

QuarkXPress

FotoTune	Help
FotoTune OFF	
√ FotoTune ON	
Final Print	
Proof Print	
Change Profile...	
Profile Usage...	
System Preferences...	
Document Preferences...	
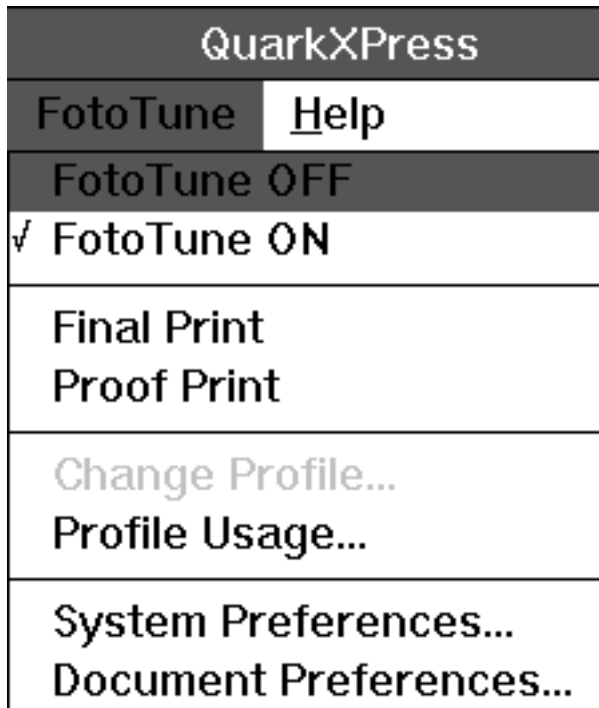
2. Choose System Preferences...

3. Set the system defaults by selecting a default Profile for the different elements in your documents.

SpotColors Profile Preferences

Color Model	Profile
PANTONE	PANTCV
TRUMATCH	<None>
FOCOLTONE	<None>
PANTONE Process	PANTPROC
PANTONE ProSim	PANTPROS
PANTONE Uncoated	PANTCVU
DIC	<None>

Select Profile: PANTCV

Save   Cancel
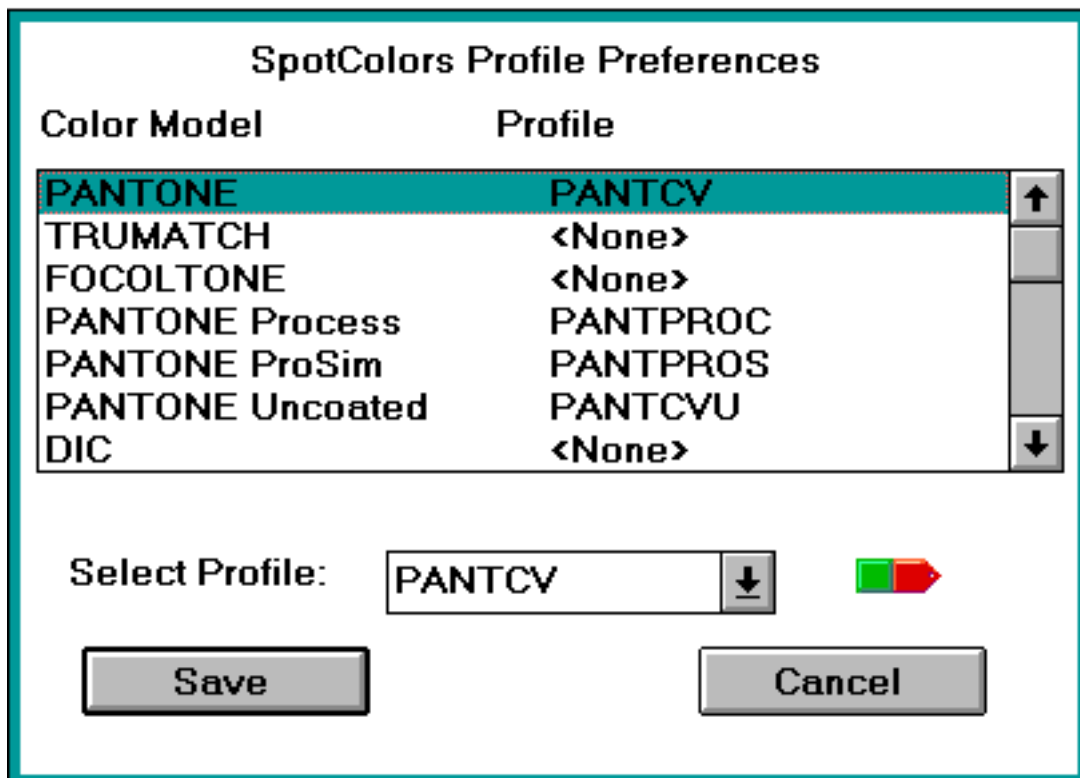
Quark Colors

The term Quark Colors is used for the colors you define in QuarkXPress (Edit->Colors...->New). You can choose the color model of that new color (RGB, CMYK, HSV, PANTONE,...).

In the XTension System Preferences you can specify the device color space for these colors more precisely.

- Source RGB: If you defined your Quark Colors in the RGB model, these colors are considered to be in the monitor color space. You can choose the Monitor Profile for your specific monitor to get optimal linking from your monitor to the output device.

- Source CMYK: If you defined your colors in CMYK, you use certain CMYK percentages. You specified your color in CMYK values as function of a certain CMYK output device. Since different devices have different color behaviors, you can name the CMYK device you had in mind by selecting the corresponding Profile for that device. By doing this, FotoTune XTension knows the meaning of your CMYK colors, and can reroute them according to the selected output device to make sure your CMYK colors will be printed correctly on the proof printer and the final output device.

- Spot colors/Named colors: If you specify your colors in a certain standard (e.g. PANTONE, Trumatch), you will have to choose the corresponding spot color Profile.

Imported Pictures

The high resolution TIFF color images you import into your document are in a certain color space. They can be in the scanner RGB color space, a monitor RGB color space or a certain CMYK output color space.

You should choose the default Profiles that will be used when you import RGB or CMYK images. If an imported image is not in the default color space, you can change the Profile for that specific image.

- **Source RGB:** The default source color space for imported RGB images.

- **Source CMYK:** The default source color space for imported CMYK images.

FotoTune Defaults

Under FotoTune Defaults, you specify the default Profiles for the output devices in your configuration.

"Correct colors on Monitor" activates the soft proofing option. The colors of the preview images and spot colors in your document will be converted into the monitor color space. This option allows accurate viewing of all the elements in your document but slows down the application.

Under Destination you choose the Profile for the final output device. All the colors in your document will be converted from the source color space to the destination color space, guaranteeing optimal color reproductions.

Under Proofing you choose the Profile for the proofing device you are using. If you choose Proofing, the colors will be converted from the source color space to the destination color space (you want to simulate the final output device) and will then be mapped on the color space of the proofing device. This allows accurate digital proofing.

Document Preferences

If the system preferences do not match the requirements of a certain document, you can change the defaults as described above in the document preferences. The dialog box and functionality are the same as for the system preferences.

```
                    Fototune Document Preferences

  Quark Colors:                      Imported Pictures:

  Source RGB :    [MYMONITR    ▼]    Source RGB :    [MYMONITR    ▼]

  Source CMYK :   [MYPRINT     ▼]    Source CMYK :   [MYPRINT     ▼]

              [   SpotColors   ]


  FotoTune Defaults:

      ☒ Correct colors on Monitor:    [MYMONITR    ▼]

         Destination :                [MYPRESS     ▼]

         Proofing :                   [MYPRINT     ▼]


      [    Save    ]              [   Cancel   ]
```

How to Use FotoTune in QuarkXPress?

Get Picture

Profile Usage

Change Profile

Proof Print

Final Print

❖ Remark: When you use Profiles in the QuarkXTension, the XTension will calculate the conversion from one device to another (Dynamic Linking). Once the ColorLink is generated, the XTension will store it in encrypted format in the directory called "tlinks" "tlinks" contained within the ...\ fotoflow \ clinks directory.
Generating the ColorLink will take a while the first time; however, on the next occasions the ColorLink will no longer have to be generated physically, but it will be retrieved from the directory "tlinks".

Get Picture

When you import an image, you use Get Picture. You will notice that the standard Get Picture dialog box is extended with a pop-up menu where you can specify the source Profile for the picture you are importing. The default Profile that shows up is the default defined in the Document Preferences.
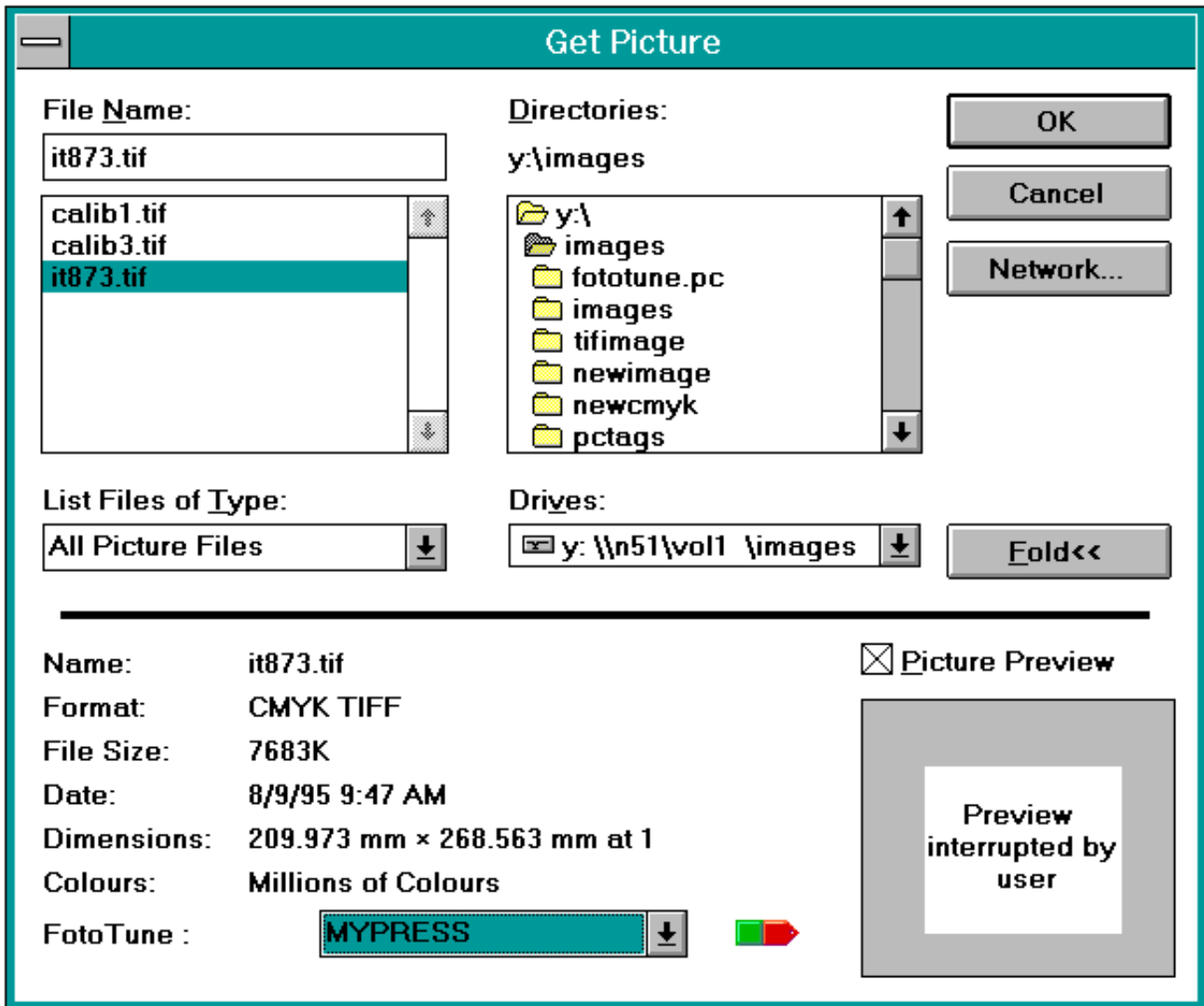
When you import the file, the default Profile or the Profile you selected for that particular image will be attached to that image. For every element in the document, you can use a different Profile.

If you do not want to attach a Profile to the image (e.g. you do not intend to proof print the document and that specific image is already in the output color space) you should choose None from the Profile list.

Profile Usage

The Profile Usage function is similar to the Picture Usage feature in QuarkXPress. It will list all pictures in the current document. For each picture, the attached Profile is displayed (None if no Profile is attached).

Profile Usage

Name	Type	Avail	Source	Type	Device	Mode	Medium
window.jpg	JPEG	Yes	mymonitr	RGB	mymonitr	R:2; G:2; B:2	6500K
hopcmyk.tif	TIFF	Yes	mypress	CMYK	eurhdp02		
it873.tif	TIFF	Yes	mypress	CMYK	eurhdp02		

Source : MYPRESS ▼   ■▶   [Info ?] [Show Me]   [Cancel]   [Done]

- ■ Name: the name of the imported file.

- ■ File Type: the file format of the imported file.

- ■ Avail: indicates whether the specified Profile is available on the system where the document is opened.

- ■ Source: the Profile for the selected picture.

- ■ Type: the color space of the Profile for the selected picture.

- ■ Device: the device name for which the Profile was made.

- ■ Mode: indicates whether the Profile is for reflective or transparent media.

- ■ Medium: the consumable used on the device for which the Profile was made.

- ■ Show me: the selected picture will be displayed in the upper left corner of the document window.

- ■ Info?: when you click the 'Info?' button, you will get more detailed information on the selected Profile than the basic information in the Profile Usage dialog box.

Profile Information

Device:	eurhdp
Color Space:	CMYK
Medium:	
Version:	2.0D
Date:	Fri Oct 06 14:06:44 1995
Comment:	
Modification	Skeleton
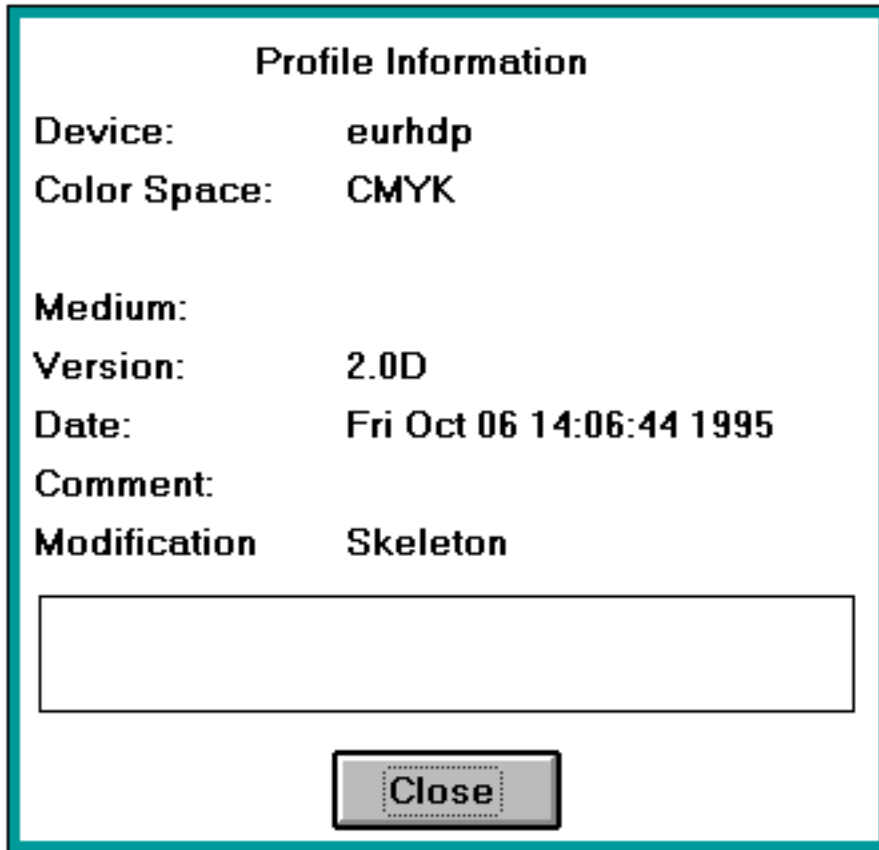
Close

- Source: this pop-up menu displays the Profile selected when importing the picture. If you want to change the Profile of the selected image, you can choose another Profile from the list.

- Cancel: closes the Profile Usage dialog box without applying any changes.

- Done: closes the Picture Usage dialog box and saves the changes you made.

Change Profile

If you want to change the Profile attached to a certain picture box, you select the picture box by clicking on the box once.

1. Choose Change Profile from the FotoTune menu.

    The Change Profile dialog box displays the currently attached Profile.

Change Profile

Graphic Name :   window.jpg

FotoTune :   MYMONITR

OK   Cancel
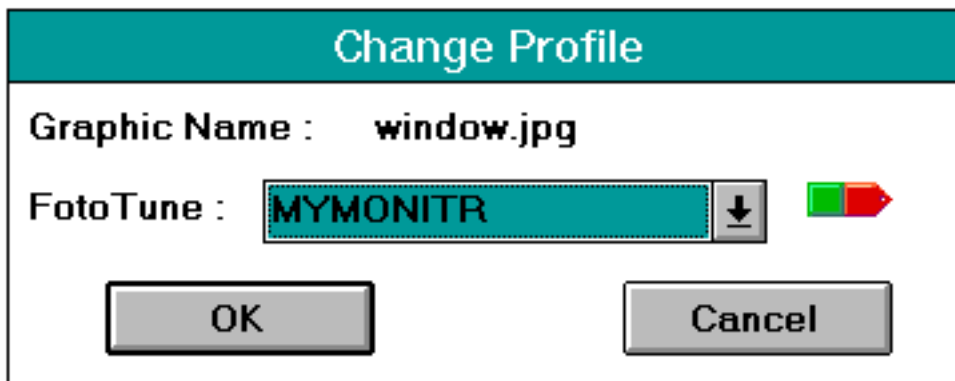
2. Change the Profile.

   To change the Profile, you choose another Profile from the Profile pop-up menu and click OK.

Proof Print

When you want to proof print your document, choose Proof Print from the FotoTune pull-down menu. The colors in your document will be printed on your proofing device as if they were printed on the final output device.

Make sure your proof printer has a larger printable gamut than the final output device if you want accurate color proofs. A high-end dye sublimation printer can print more colors (larger printable gamut) than an offset printer can. You can simulate offset printing on the dye sublimation printer.

1. Choose Proof Print from the FotoTune pull-down menu.

   The Proof Print function will be marked.

2. Choose the Print command under 'File' in QuarkXPress.

3. Print the document.

Final Print

When your document is ready and you want to print it, choose 'Final Print' from the FotoTune pull-down menu. The colors in your document will all be converted to the color space of the selected output device resulting in color matching prints.

1. Choose Final Print from the FotoTune Pull-down menu.

   The Final Print function will be marked.

2. Choose the Print command under 'File' in QuarkXPress.

3. Print the document.

Chapter 4 — Using FotoTune With PostScript Level 2

This chapter explains all you need to know about using FotoTune together with PostScript Level 2. It describes how to download Profiles to the printer.

Using the PostScript Level 2 Color Model

When using PostScript Level 2 with a Color Rendering mechanism, the final color transformation towards the output drive is executed in the RIP itself. The main advantage of this approach is that the color management transformations are executed at the end of the process, thereby providing more flexibility and device independency.

Colors Specified in RGB

RGB image data is processed via a Color Space Array (CSA) and a Color Rendering Dictionary (CRD).

The color space array specifies the color conversion between the RGB-space used in the scanned image data and the XYZ-color space used for the CRD. Such a color space array must be embedded in your color image format (see Input Considerations).

The color rendering dictionary is based on an Output Profile created with Agfa's FotoTune color management software, and specifies the conversion from XYZ-color space to the CMYK output color space.

Colors Specified in CMYK

CMYK (pre-separated) image data is not processed via a color space array and color rendering dictionary, and will not be changed.

Downloading a Color Rendering Dictionary

You need to download a Color Rendering Dictionary to the PostScript Level 2 RIP with a PostScript tool such as AgfaSet.

Input Considerations

To obtain the best results, it is important that the following rules are observed:

■ Use FotoTune to characterize your scanner.

■ Convert the data from scanner to monitor color space.

■ Adobe Photoshop 3.0 uses the Monitor Setup to specify the color space array that will be needed during printing or saving in EPS format. For this reason, you should set the Preferences for Gamma, White Point, and Phosphors to the same values as specified in the Monitor Profile. This can be verified by selecting "Open Profile" from the FotoTune menu bar.

■ Although RGB TIFF images do not embed a color space array in their image format, the image data sent directly from Adobe Photoshop 2.5 or higher will be output correctly. Other application/driver combinations may or may not generate the appropriate PostScript Level 2 code.

Chapter 5 — Using FotoTune With ICC Profiles

This chapter explains all you need to know about using FotoTune together with ICC Profiles, and describes how to save FotoTune Profiles as ICC Profiles.

Exporting FotoTune Profiles to ICC Format

Using the Apple ColorSync Profile format as a starting point, the International Color Consortium (ICC) defined a high-quality, extendible, and interchangeable color Profile format. This Profile format is simple enough to be supported at different operating system (OS) levels, in order to meet the needs of high-end CMS vendors to accomplish color matching as a standard OS function. Such a cross-platform device Profile format can be used to translate color data created on one device into another device's native color space.

The further implementation and acceptance of this standard by OS vendors allows:

■ end users to transparently move Profiles and images with embedded Profiles between different locations, operating systems, and applications.

■ device manufacturers to create a single color Profile for multiple operating systems.

As the founding member of the International Color Consortium, Agfa fully supports the ICC device Profile format specifications for input, monitor, and output devices. This section describes how to export FotoTune Color Profiles to an ICC device Profile format.

Exporting FotoTune Color Profiles to ICC Device Profiles

FotoTune fully supports the ICC device Profile format for input, monitor and output devices.

1. Open the FotoTune Color Profile you want to export.

2. Choose File->Export->ICC...
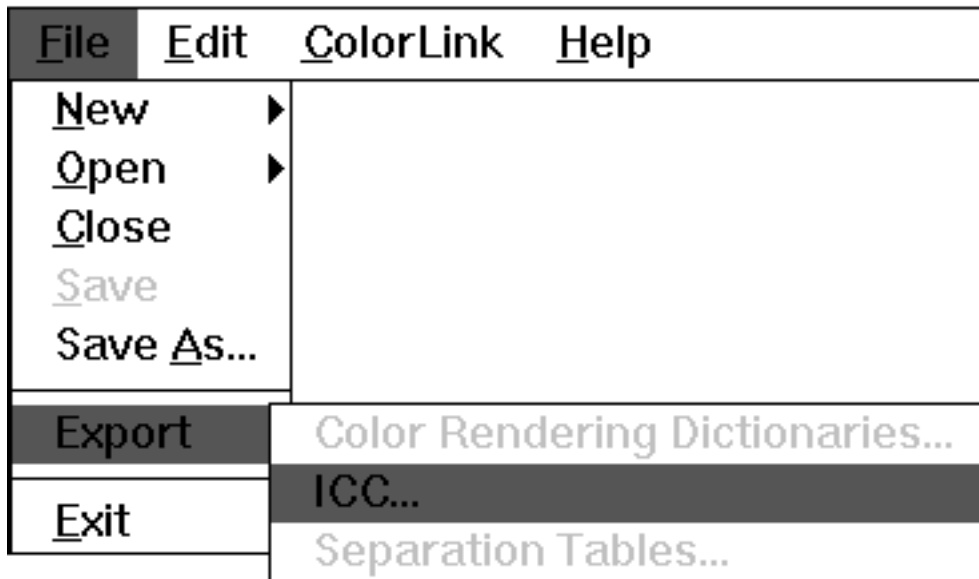
The Export International Color Consortium Profile dialog box appears.
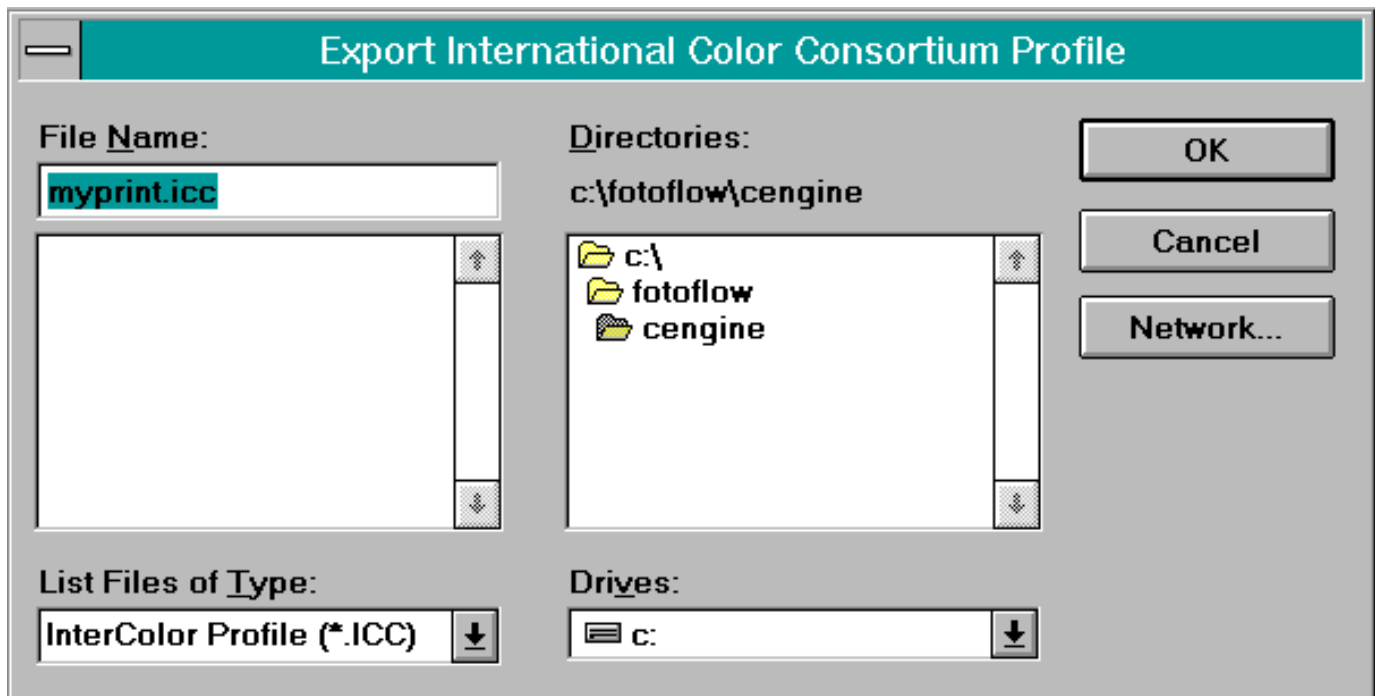
3. Enter a file name for the ICC version of the color Profile and click OK.

    FotoTune converts the Profile to the correct format, and saves it with the new name. More information on the use of ICC Profiles will be made available as soon as ICC compliant operating systems, and third party software or applications become available.

Chapter 6 — Integrating FotoTune With Your Work Flow

This chapter explains how you should plan your work flow prior to initiating a job.

Defining Your Objectives

Managing colors requires a precise understanding of your work flow. To assure quality color you need to keep your final output in mind while tracing the flow of your work through various devices and applications. On the basis of the flow of your image file, you assign Profiles so that FotoTune can adjust color between the source and the destination.

Whether the file produced by a certain device, or the device itself, functions as input or output depends on its place and function in the prepress process. A CMYK separation produced by a drum scanner, for instance, can be regarded as scanner output but also as printer input. The monitor on which these CMYK separations are viewed functions as the output device for the scanner, but as the input device for the printer. If the monitor is also used to preview the file as it will be printed, then the monitor acts as the output device for the printer input. An accurate understanding of the flow of a file between devices is therefore indispensable to assigning correct Profiles.

We recommend that you chart the progress of your image before starting your work in order to establish meaningful links between color devices. To compose such a chart, you need to ask yourself:

- What tools do I use to what end?
- What do I need to do first?

FotoTune in Scanner / Scanner driver

Scanner

Scan

scanner RGB

Scanner
driver

acquire

Output CMYK

Monitor — Photoshop

print

save

Output CMYK

TIFF
CMYK

Get Picture

Quark
XPress

print

Output CMYK

Output

FotoTune in Scanner/ Scanner driver
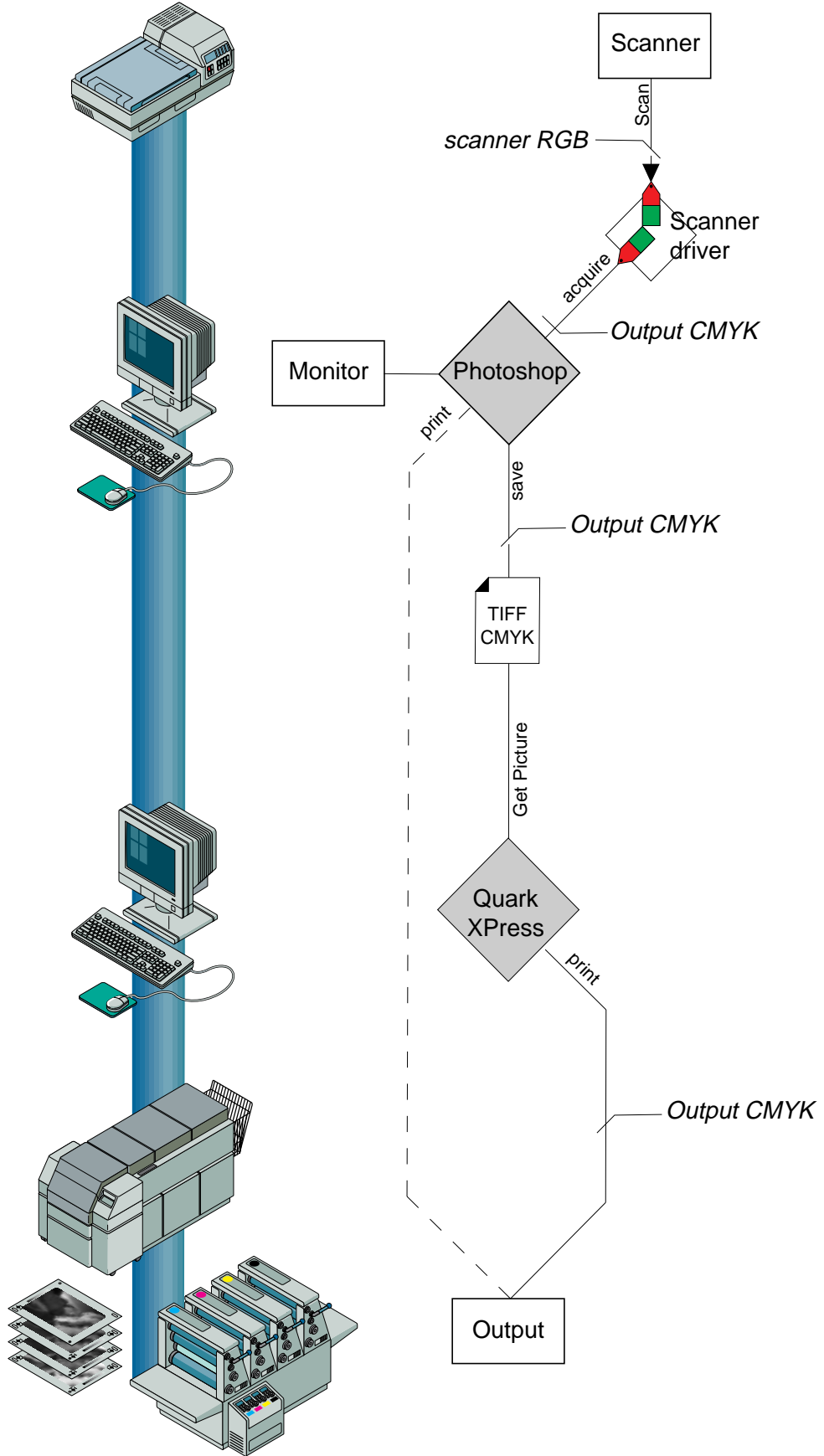
CMS Preparations

■ You will need a FotoTune compatible scanner application or plug-in scanner driver. Refer to the work flow "FotoTune in Photoshop, Matching using Filters & Exporters" if your scanner driver is not FotoTune compatible.

■ You will need FotoTune ColorLinks from:

☐ Scanner Profiles for reflective and transparency scans

☐ Output Profile for the output device or technology that will be used e.g. a CMYK color printer

■ You will need Photoshop Monitor Setup to be set according to the monitor type used. In case of CMYK output, a representative separation setup for the color printer or technology used must be selected. The visualization will only be approximate.

CMS Procedure

In Photoshop 3.0

■ Under File->Acquire, choose the scanner driver plug-in.

In the scanner driver:

☐ Set the scan setup comparable to the scan setup that you used for making the Scanner Profile.

☐ Make sure to Choose the proper ColorLink for a reflective or transparency scan, and then scan the original.

■ Check the monitor image for an approximative CMYK visualization.

■ If necessary, edit the image in Photoshop.

■ Under File->Save, save the image as a TIFF CMYK file.
Optionally, under File->Print, print the image on your CMYK printer.

In QuarkXPress 3.3

■ Under File->Get Picture, merge the TIFF CMYK file in your document.

■ Under File->Print, print the document on your CMYK printer.

❖ Note: Since the essential CMS steps are done in the scanner driver, be sure the FotoTune QuarkXtension is turned off.

FotoTune in Photoshop - Matching using Filters and Exporters

Scanner

scanner RGB — Scan

Scanner
driver

scanner RGB — acquire

scanner RGB

filter

Monitor — Photoshop

ColorMatcher
Filter

monitor RGB

export

monitor RGB

ColorMatcher
Exporter

save

TIFF
CMYK

Get Picture

Quark
XPress

print

output CMYK

Output

FotoTune in Photoshop, Matching Using Filters and Exporters

CMS Preparations

■ You will need Profiles:

　□ Scanner Profiles for reflective and transparency scans

　□ Monitor Profile

　□ Output Profile for the output device or technology that will be used. e.g. a CMYK color printer

■ Calibrated Photoshop Monitor

■ Monitor setup corresponding to the monitor setup that was used for the Monitor Profile, for matching visualizations

CMS Procedure

In Photoshop 3.0

■ Under File->Acquire, choose the scanner driver plug-in.

In the scanner driver:

　□ Set the scan setup comparable to the scan setup that you used for making the Scanner Profile.

　□ Scan the original.

■ Under Filter->FotoTune->ColorMatcher, filter the scanned image using the applicable scanner and Monitor Profiles.

❖ Note that FotoTune compatible scanner drivers can perform this step while scanning, using a Monitor ColorLink to give greater precision.

■ Check the monitor image for a matching visualization.

■ If necessary, edit the image in Photoshop.

■ Under File->Export->ColorMatcher, export the image using the applicable Monitor and Output Profile and save the image as a TIFF CMYK file.

In QuarkXPress 3.3

■ Under File->Get Picture, merge the TIFF CMYK file in your document.

■ Under File->Print, output the document to your CMYK printer.

❖ Note: Since the essential CMS steps were done in Photoshop, be sure the FotoTune QuarkXTension is turned off.

FotoTune in Photoshop: Proofing Using Filters and Exporters

Scanner

scanner RGB — Scan

Scanner driver

open — acquire

scanner RGB

Monitor — Photoshop — filter

ColorProofer Filter

monitor RGB

print — export

ColorProofer Exporter

TIFF CMYK

output CMYK

Output

FotoTune in Photoshop, Proofing Using Filters and Exporters

CMS Preparations

■ You will need Profiles:

□ Scanner Profiles for reflective and transparency scans

□ Monitor Profile

□ Output Profiles for the hard copy proofing device and the output device or technology that will be used. e.g. a CMYK dye sublimation printer to simulate Euro Offset Printing

■ Calibrated Photoshop Monitor

■ Monitor setup corresponding to the monitor setup that was used for the Monitor Profile, for matching visualizations

CMS Procedure

In Photoshop 3.0
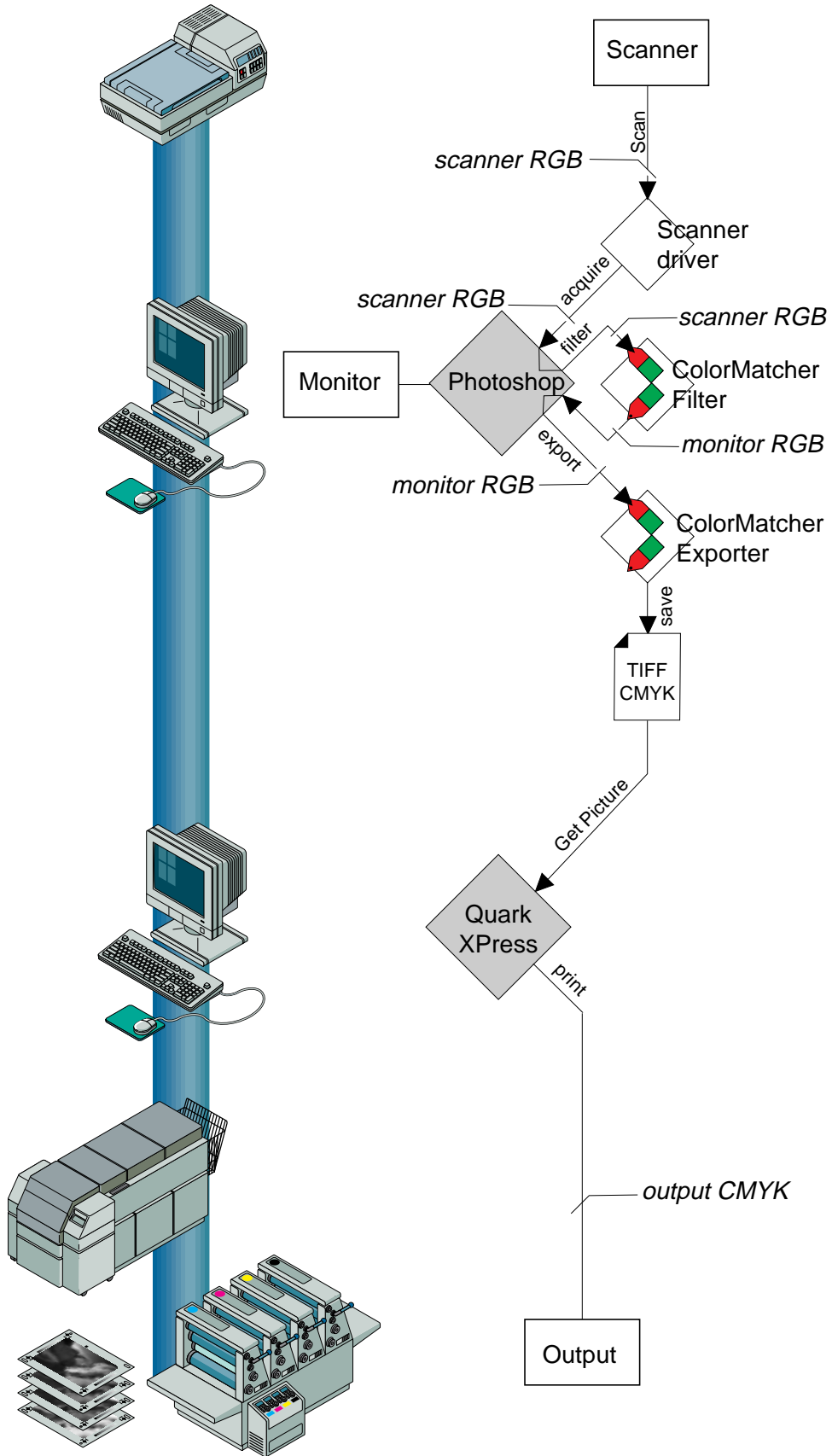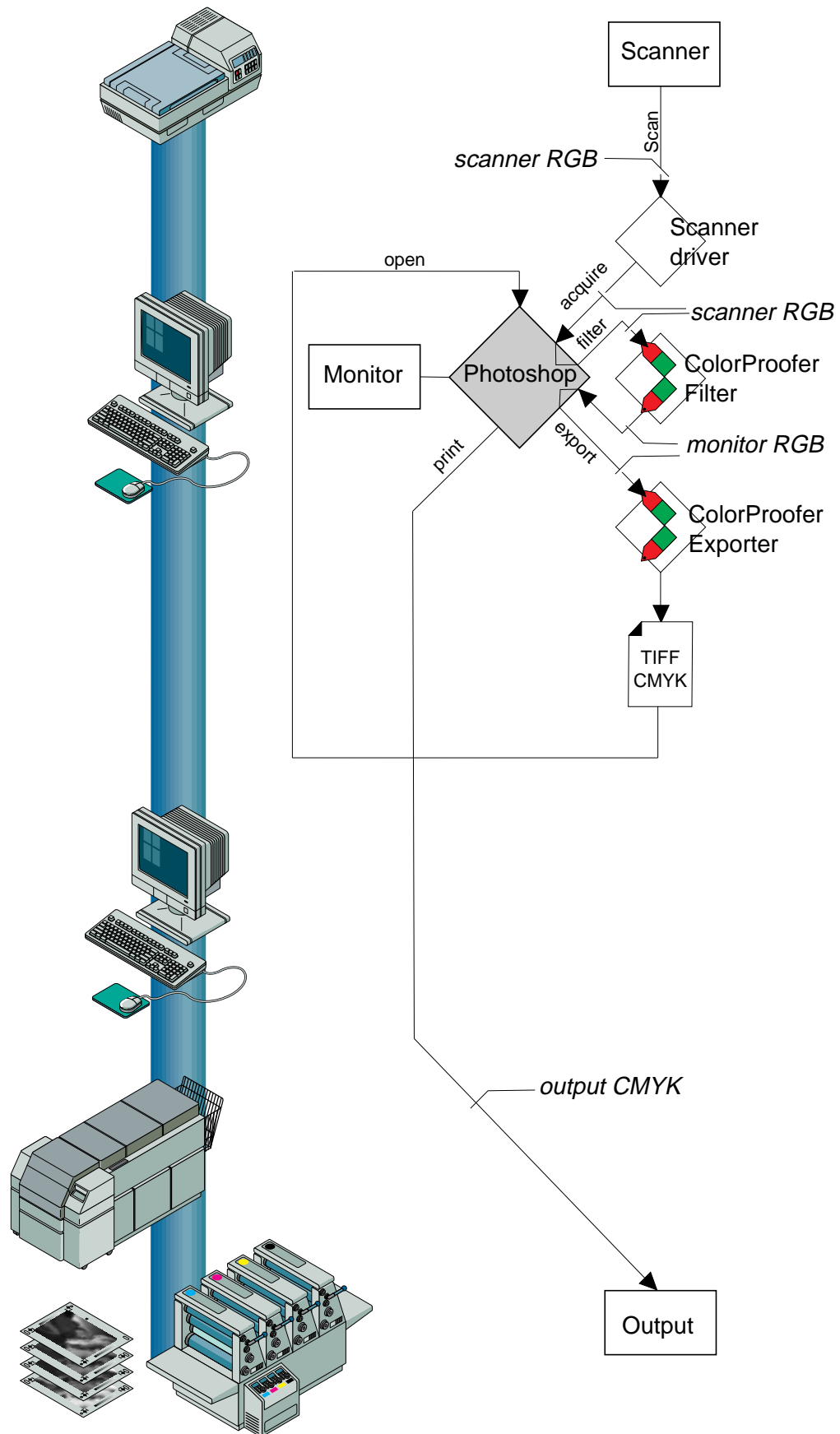
■ Under File->Acquire, choose the scanner driver plug-in.

In the scanner driver:

□ Set the scan setup comparable to the scan setup that you used for making the Scanner Profile.

□ Scan the original.

■ Under Filter->FotoTune->SoftProof, filter the monitor image using the applicable scanner and Monitor Profiles.

❖ Note: FotoTune compatible scanner drivers can perform this step while scanning using a Monitor ColorLink to give greater precision.

■ Check the monitor image for a matching visualization.

■ If necessary, edit the image in Photoshop.

■ Under File->Export->Hard Copy Proof, export the image using the applicable monitor, output and destination Profiles as a TIFF CMYK proof file.

■ Under File->Open, open the TIFF CMYK proof file, then File->Print to print a proof on your CMYK printer, simulating the Euro-Offset printing process.

FotoTune in Photoshop - Proofing using Filters and Separation Tables

Scanner

scanner RGB Scan

Scanner driver

scanner RGB acquire

Photoshop filter *scanner RGB*

Monitor

ColorMatcher Filter

monitor RGB

Monitor Settings
Mode Change
Separation Table

printer CMYK

print

TIFF CMYK

Get Picture

Quark XPress

output CMYK

print

output CMYK

Output
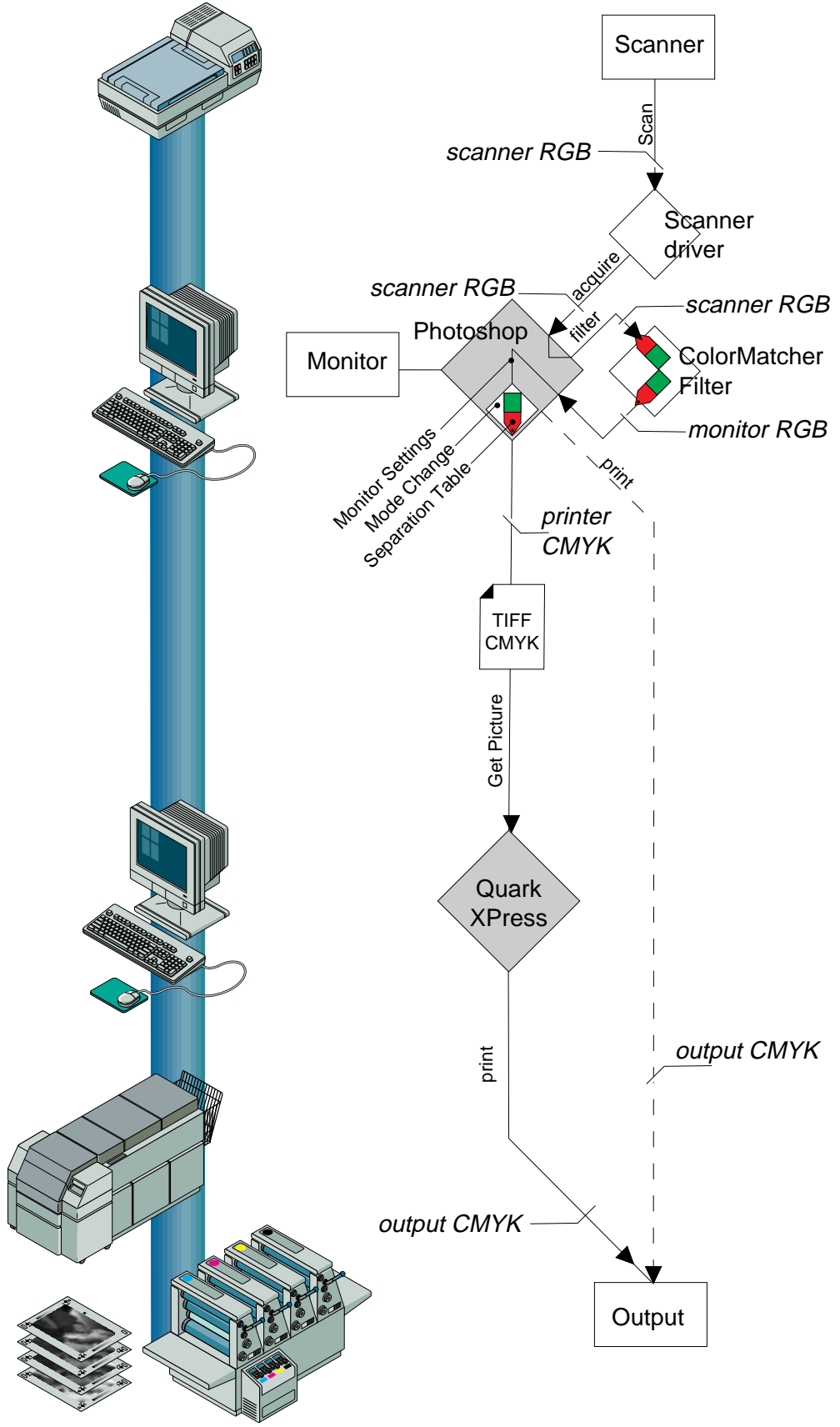
FotoTune in Photoshop, Matching Using Filters and Separation Tables

CMS Preparations

- Scanner Profiles for reflective and transparency scans - Monitor Profile - Separation Table - Calibrated Photoshop Monitor

- Monitor setup corresponding with the Monitor Profile used, for matching visualizations. Be aware that the monitor setup will influence the color mode changes relative to the separation table loaded.

CMS Procedure

In Photoshop 3.0

- Under File->Acquire, choose the scanner driver plug-in.

In the scanner driver:

- □ Set the scan setup comparable to the scan setup that you used for making the Scanner Profile, and scan the original

- □ Under Filter->FotoTune->ColorMatcher, filter the monitor image using the applicable scanner and Monitor Profiles.

- ❖ Note that FotoTune compatible scanner drivers can perform this step while scanning using a Monitor ColorLink to give greater precision.

- Check the monitor image for a matching visualization. For image verifications, use the Photoshop Info Tool to reflect the final CMYK levels.

- If necessary, edit the image in Photoshop.

- Under Image->Change Mode, change the image mode to a CMYK color model.

  Use the FotoTune separation tables. For more information, refer to "Work Flow for Using Separation Tables"

- Under File->Save, save the image as a TIFF CMYK file. Optionally, under File->Print, print a CMYK image on your printer.

In QuarkXPress 3.3

- Under File->Get Picture, merge the TIFF CMYK file in your document.

- Under File->Print, print the document on your CMYK printer. Note that since the essential CMS steps were done in Photoshop, be sure the FotoTune QuarkXTension is turned off.

FotoTune in Quark XPress

Scanner   Scanner   Scanner

Scan   *scanner RGB*   Scan   *scanner RGB*   Scan   *scanner RGB*

Scanner driver   Scanner driver   Scanner driver

acquire *scanner RGB*   **acquire** *monitor RGB*   **acquire** *printer CMYK*

Photoshop   Photoshop   Photoshop

save   save   save

TIFF RGB   TIFF RGB   TIFF CMYK

scanner RGB   *monitor RGB*   *printer CMYK*

Pantone ©

Document set-up

Get Picture

Quark XPress

Profile Usage / Default

FotoTune Quark XTension

printer CMYK

print

output CMYK

Output

FotoTune in QuarkXPress

CMS Preparations

- TIFF RGB, CMYK image files from different sources
- Source Profiles
  - ☐ Scanner Profiles for reflective and/or transparency scans
  - ☐ Monitor Profile
  - ☐ CMYK printer Profile
- Output CMYK Profile
- PANTONE Color Profiles
- Layout with PANTONE Color specifications

Caution: Be sure the EFI Color XTension is turned off

CMS Procedure

In QuarkXPress 3.3

- Set the FotoTune XTension defaults and destination CMYK Profile.
- Under File->Document Setup:

  Relate the PANTONE specified color to the applicable PANTONE Profile.
- Under File->Get Picture:

  Choose the applicable source Color Profile for the TIFF file in the Get Picture dialog box.
- Merge the TIFF file into your document.
- Under FotoTune->Profile Usage, check for proper tagging of each item in your QuarkXPress document.
- Under File->Print, print the document on your CMYK printer.

FotoTune in PostScript Level 2 - Color Rendering Dictionaries

Scanner

scanner RGB — Scan

Scanner driver

monitor RGB — acquire

monitor settings — Photoshop

print

Select CRD

save as EPS

PS level 2 Colorspace array embedded

EPS RGB

Get Picture

Quark XPress or Pagemaker

print

download Tools / CRD

PostScript level 2 RIP

printer CMYK

output
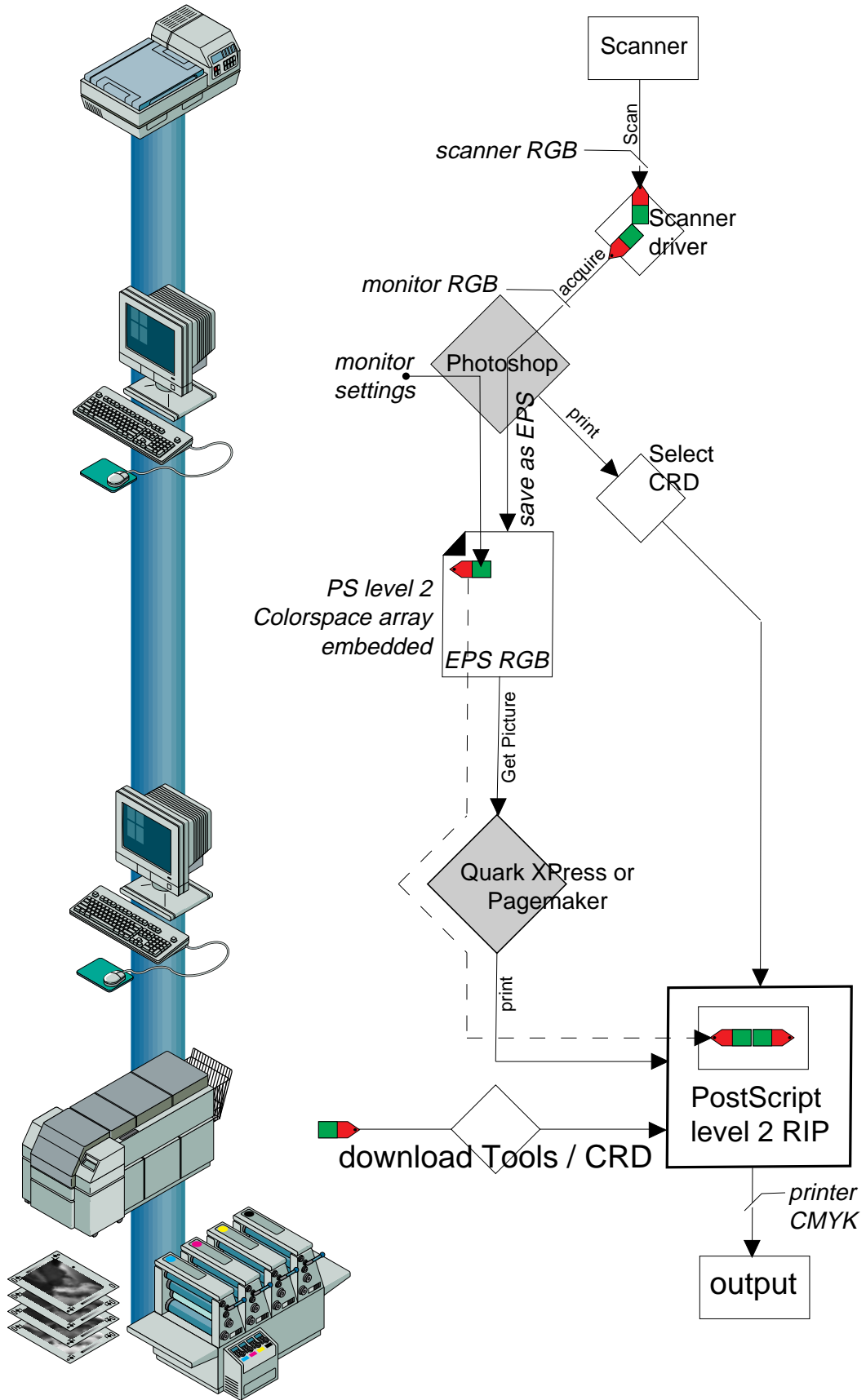
FotoTune in PostScript Level 2 - Color Rendering Dictionaries

CMS Preparations

■ Scanner ColorLinks based on

 ☐ Scanner Profiles for reflective and transparency scans

 ☐ Monitor Profile

■ Color Rendering Dictionary and tools downloaded in the PostScript Level 2 RIP

■ PPD updated for CRD usage, optionally CRD defaulted in the RIP

■ Monitor setup corresponding with the Monitor Profile used, for matching visualizations.

■ Use of a PostScript Level 2 compatible printer driver is required such as Adobe PostScript Printer Driver version 3.0.1.

CMS Procedure

In Photoshop 3.0

■ Under File->Acquire, choose the scanner driver plug-in.

In the scanner driver:

 ☐ Set the scan setup comparable to the scan setup that you used for making the Scanner Profile.

 ☐ Be sure to choose the applicable monitor ColorLink.

 ☐ Scan the original.

■ Check the monitor image for a matching visualization.

■ If necessary, edit the image in Photoshop.

■ Under File->Save, save the image as an EPS RGB file.

■ Optional, under File->Print, choose the applicable Color Rendering Dictionary and print the CMYK image on your printer.

❖ Note: If the image is printed directly from Photoshop, Color Rendering Dictionaries can also be used for output of Photoshop 3.0 TIFF RGB files.

In QuarkXPress

■ Under File->Get Picture, merge the EPS RGB file into your document.

 ❖ Note that since the essential CMS steps will be done in the PostScript RIP, be sure the FotoTune QuarkXTension is turned off.

In PageMaker

■ Under File->Place, merge the EPS RGB file into your document.

In QuarkXPress or PageMaker

■ Under File->Print, choose the applicable Color Rendering Dictionary and print the RGB image on your CMYK printer.

Where to Go From Here?

For more information on specific topics, please consult the following chapters:

- If you need installation instructions:

  Refer to the "Installing FotoTune" booklet.

- If you want to characterize your monitor:

  Refer to Chapter 1, "Characterizing Monitors" and Chapter 3, "Working with Profiles" in the "Characterizing Monitors and Input Devices" booklet.

- If you want to characterize your input device:

  Refer to Chapter 2, "Characterizing Input Devices" and Chapter 3, "Working with Profiles" in the "Characterizing Monitors and Input Devices" booklet.

Glossary

This glossary explains a number of terms that are commonly used in this user's guide.

additive primaries

Red, green and blue are the primary colors of light from which all other colors can be made.

bit

Binary digit. The smallest unit of information in a computer, a 1 or a 0. It can define two conditions (on or off).

bitmap

A digitized image stored in computer memory and displayed on a monitor. The image is mapped into a grid of pixels. The density or color intensity of each pixel is expressed in binary digits or bits.

byte

A measurement unit equal to 8 bits of digital information. The standard measurement of file size.

calibration

The adjustment of a device by measuring its deviation from standard values and then, during operation of the device, applying values to compensate for the deviation. In prepress, in particular, calibration is the fine-tuning of scanners, monitors, printers, imagesetters, and slidemakers in order to increase the accuracy of their output.

calibration bar

On a film, proof or print, a strip of tones used to check printing quality.

calibration curve

During the calibration, a curve established by measuring the degree in which the printed densities differ from the required densities. The curve is plotted by measuring this deviation on a number of density levels. See also transfer function.

chroma

The attribute of color perception that express the degree of departure from a gray of the same lightness.

CIE (Commission Internationale de l'Eclairage)

An international group that developed a set of color definition standards.

CIELab

A uniform color space proposed by the CIE for use in the measurement of small color differences.

CMS (Color Management System)

This ensures colors uniformity across input and output devices so that final printed result match originals. The characteristics or Profiles of devices are normally established by reference to standard IT8 color targets.

CMYK

Cyan, magenta, yellow and black are the based colors used in printing processes. CMY are the primary colorants of the subtractive color model.

color balance

In a subtractive color model, the amount of cyan, magenta, and yellow printing that is needed to produce a good reproduction with gray balance and satisfactory overprint colors.

colorimeter

A light-sensitive device for measuring colors by filtering their red, green and blue components, as in the human eye. See also spectrophotometer.

color cast

An original, an image, or a reproduction has a color cast when its overall appearance inaccurately tends to one hue. Especially in the case of transparent originals, a color cast can impede good reproduction.

color correction

The adjustment of color to obtain an accurate image. Color correction may be necessary because of the impurities of process inks, imperfections of color separations, or because of a color cast.

color proof

A printed or simulated printed image of each process color using inks, pigments, or dyes to give a visual impression of the final reproduction.

color rendering dictionary (CRD)

PostScript level II Color Dictionary that specifies the output device color capabilities in a CIE color notation.

color separation

The separation of a color image into four layers corresponding to the four inks (CMY+K) used in process printing. Each layer is a halftone image in itself.

color space array

Color space description that specifies the source color characteristics as embedded in PostScript level II EPS files.

continuous tone

An original is continuous tone (or "contone") when, instead of being composed of halftone dots, the transitions from color to color are continuous and invisible. For instance, a photograph is a continuous-tone original.

contone

See continuous tone.

densitometer

A device sensitive to the intensity of light passing through film or reflected by paper. A densitometer works in two modes: integral mode measure density on a logarithmic scale from 0 to about 4; dot percent mode measure density on a linear scale from 0 to 100.

density

A measure of the darkness of an image on paper or film. In the case of paper, which is reflective, the less light reflected, the higher the density. In the case of film, which is transparent, the less light showing through, the higher the density. Paper has an integral density range from about 0 to 2; photographic film from about 0.2 to 4.0.

density range

The difference in density between the brightest highlights and darkest shadows of an image.

dithering

Simulating more gray levels or colors than an output device can actually render. Dithering is the electronic way of creating halftone images. Dithering uses patterns of dots. It is similar to a halftone except that the dots have a fixed size while in a halftone they have a variable size.

Dmax

The highest level of density in an original or image. Image information at a density higher than this is not available in the image or original.

Dmin

The lowest level of density in an original or image. Image information at a density lower than this is not available in the image or original.

dot gain (press gain)

An imperfection of printing that causes halftone dots to print larger than they should. This imperfection is mainly caused by the absorption of ink by the paper (comparable to what happens when you drop ink on blotting paper.) The reproduction thus becomes darker than it should. Calibration can remedy this through a calibration curve. Dot gain is most noticeable in the midtones.

dpi/dpcm

Dots per inch/dots per centimeter—a commonly used measure for the resolution of scanners, monitors, printers, and imagesetters. However, the term is slightly misleading because of the apparent, but non-existent relation with dots in a halftone. More accurate measures of resolutions are ppi (pixels per inch) for scanners and rpi (rels per inch) for imagesetters or printers.

dye sublimation

A printing process using small heating elements to evaporate pigments from a carrier film, depositing these smoothly onto a substrate.

dynamic linking

In opposite to precalculate ColorLinks, an on the fly method of ColorLink calculation based on source and destination Color Profiles.

exposure

The duration or intensity of light that is used for photography, scanning or slide making. The higher the exposure, the darker a photograph and the brighter a scanned image.

flatbed scanner

Any scanning device that incorporates a flat transparent plate, on which original images are placed for scanning. The scanning process is linear rather than rotational.

gamma correction

Adjusting images, using gamma curves. Because of the characteristics of a gamma curve, gamma correction does not affect the density range of an image, but rather the distribution of its density. The brightening (with gamma > 1) or darkening (with gamma < 1) occurs mainly in the midtones.

With gamma > 1, highlights are compressed and shadows are expanded; with gamma < 1, highlights are expanded and shadows are compressed. Gamma correction is often used to smoothly expand details in the shadows. This is often required with transparent originals. Monitors also require gamma correction.

gamma curve

A particular type of tone curve. When the value of a gamma curve is 1, the curve is at a 45° angle and straight, leaving the input and output densities the same. A gamma higher than 1 brightens the output; a gamma lower than 1 darkens the output. The further the gamma is from 1, the more the curve bulges. Gamma curves are used for gamma correction.

gray balance

In process printing, indicates the proportions of cyan, magenta, and yellow (in slide-making, the proportions of red, green, and blue) to obtain a neutral gray, that is, a gray with no apparent color cast.

gray component replacement (GCR)

A color separation technique that substitutes black ink for calculated amounts of cyan, magenta, and yellow ink. GCR economizes on inks because one ink (black) does the job of three (cyan, magenta, and yellow). It also economizes on time because only one ink has to dry. Good printing requires economical use of all ink to avoid exceeding the capacity of the paper to absorb it. Using black ink brings out better detail and contrast in an image.

gray levels

Discrete tonal steps in a continuous tone image, inherent to digital data. Most contones images will contain 256 gray levels per color.

gray scale

A range of grays with regular density intervals from white to black. A gray-scale image is an image that contains various levels (or shades) of gray.

halftone

A technique used to reproduce a continuous-tone original, such as a photograph. The printing press prints a matrix of miniature dots of varying size, or lines of varying thickness. A limited set of inks (only black ink or CMY+K inks) can thus give the naked eye an illusion of many shades of gray or many colors. See also halftone cell, and halftone screen.

halftone cell

The grid composed of raster elements (rels) that form the halftone dot.

halftone screen

Refers to the screen (a glass plate ruled with crossing opaque lines) through which an original is photographed to make a halftone image.

hard copy proof

In general an image or document oriented proofing or verification method based on a color printer output.

highlights

The brightest areas in an original or an image, represented in a halftone by the smallest dots or the absence of dots. The dot area of highlights ranges from 0% to about 20%. Compare with shadows.

hue

Color, the main attribute of a color that distinguishes it from other colors.

image

The bitmapped result of scanning an original. Compare with original and reproduction.

imagesetter

A device used to output a computer image or page composition at high resolution onto photographic paper or film.

input resolution

The resolution at which a scanner scanned an image, expressed in pixels per inch. See also ppi.

International Color Consortium (ICC)

An international consortium that defines the Color Profile format or standards for a multi - vendor - multi platform application.

IT8

Industry standard color reference target used to calibrate input and output devices.

Lab

The CIE 1976 L*a*b* is a uniform color space proposed by the CIE for use in the measurement of small color differences. The lightness L* and the color parameters a*, b*, define a color completely.

laser printer

Although a number of devices employ laser technology to print images, this normally refers to black-and-white desktop printers, which use the dry toner, xerographic printing process.

linearization

A procedure to normalize a device behavior to obtain a linear input to output response.

lpi

Lines per inch—the measure of frequency (the spacing) of the lines in a halftone screen, usually ranging from 55 to 200. The higher the frequency, the smaller the halftone dots, and the higher the quality.

midtone

The middle range of tones in an image.

neutral gray

An area of an image is neutral gray when it does not have any apparent color.

original

The pictorial source in its original form, for example, artwork or a photograph. Compare with image and reproduction.

Photoshop Plug-in

A software package that interfaces to the Photoshop application and that allows to extend the Photoshop functionality.

pixel

Picture element—a square dot that is the smallest unit of a bitmapped image. A scanner creates a bitmap by sampling the original and storing each sample in a pixel. The higher the resolution of a scanner, the smaller the pixels will be. The resolution of a scanner should be expressed in pixels per inch (ppi).

pixel depth

A measure of the amount of gray levels or colors that the pixels in a bitmap can contain. Pixel depth is a binary unit of measurement. If the pixel depth is 1, the image can contain only two gray levels or colors (for example, a black-and-white image); pixel depth 8 allows 256 gray levels or colors; pixel depth 24 allows about 16 million colors.

PANTONE MATCHING SYSTEM

A commonly used system for identifying specific ink colors.

PostScript

A language for describing graphic and typographic elements. The elements described in PostScript can be displayed or printed regardless of the output resolution of the monitor, printer, imagesetter or slide maker. This independence from resolution is achieved by describing the elements as a collection of vendors with specific shapes.

Printer description files are in either the Windows System directory or a special directory with your application. They are provided by the printer manufactures or come with applications.

ppi/ppcm

Pixels per inch/pixels per centimeter—a measure of the resolution of a scanner indicating the number of pixels that the scanner records over 1 inch/centimeter of the original.

press gain

See dot gain.

primary color

A base color that is used to compose other colors.

Profile

The color characteristics of an input or output device, used by a CMS to ensure color fidelity

proof

A single reproduction of an image to verify its density or its color without actually having to print it on a printing press.

QuarkXTension

A software package that interfaces to the QuarkXPress application and that allows to extend or increase the QuarkXPress functionality.

recorder gain

A defect of the writing engine of an imagesetter by which dots print larger than intended, causing darker tones.

reflective original

An original that is printed on an opaque layer. Compare with transparent original.

rel

Raster element—the smallest element that a printer or imagesetter can write to film or paper. A grid of rels builds the halftone cell. The resolution of a printer or imagesetter is expressed in rels per inch (rpi). The larger a rel, the lower the resolution.

reproduction

The result of printing many copies of a single image. Compare with original and image.

resolution

A measure of the fineness of spatial detail that a device can record or produce. The higher the resolution, the finer the detail. Resolution is expressed in elements per unit, for example, pixels per inch (ppi) for scanners and monitors, and rels per inch (rpi) for printers and imagesetters. Monitors have the lowest resolution (±70 ppi); laser printers have resolutions ranging from 300 to 600 rpi; imagesetters have resolutions ranging from 1200 to 3600 rpi.

RGB

Red, Green, Blue—the primary colors in the additive color model. The RGB model is used in color televisions, monitors, and scanners.

rpi

Rels per inch or raster elements per inch—A measure of the resolution of a printer or an imagesetter. Often confused with dots per inch (dpi).

saturation

A measure of the amount of gray in a color in the HSL and HSV color models. The less gray in a color, the higher the saturation. High saturation corresponds to an intense, vivid color; low saturation to a quiet, dull grayish color.

screen angle

The angle at which lines in a halftone screen are printed. For gray-scale reproductions, an angle of 45º is common; for color reproductions, each CMY+K halftone has a carefully chosen angle to avoid moiré.

screen frequency (screen ruling)

The spacing of the lines in a halftone image, usually measured in lines per inch (lpi). Each line is composed of a number of halftone dots.

secondary color

Color obtained by mixing two primary colors. Although known as primary colorants, C, M and Y are the secondary colors of light. Red plus green produce yellow for example.

separation tables

A color model transformation table that converts RGB color model to a CMYK color model.

shadows

The darkest areas in an original or an image, represented in a halftone by the largest dots. The dot area of shadows ranges from about 80% to 100%. Compare with highlights.

skeleton black generation

A color separation technique that substitutes black ink for calculated amounts of cyan, magenta, and yellow ink. Using black ink gives more depth in the reproduction, corrects a color cast in the shadows and results in a better gray neutrality.

slide maker

An RGB device used to output a computer image or page composition onto photographic film.

soft proof

In general an image proofing or verification method based on a video monitor display.

spectrophotometer

The instrument used to measure the special transmittance or reflectance of specimens.

tag

See Profile

threshold

The gray level above which a scanner records white pixels. In order to obtain an image with only black or white pixels from an original with many gray levels, you should set the threshold. The threshold setting will determine which range of gray levels are recorded as white pixels and which as black.

TIFF

Tagged Image File Format—a file format for exchanging bitmapped images (usually scanned) between applications or between computer platforms.

tone curve

A curve that plots the modification of densities in an image. A $45°$ straight tone curve leaves the image intact. Changing the shape of the curve modifies the image.

transfer function

A mathematical function that can be represented by a curve and that transforms density levels on input to density levels on output. See also calibration curve.

transmission density

The optical density of a transmission material as determined by a transmission densitometer.

transmission densitometer

A device used to measure the coverage of exposed film.

transparent original

An original that is printed on a light-sensitive support through which light can pass. A slide is a transparent original. Compare with reflective original.