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Color Guide

About the Documentation

This manual is part of a set of Xerox EX7750 documentation that includes the following manuals for users and system administrators. Most are available as Acrobat PDF (Portable Document Format) files on the User Documentation CD.

- The *Quick Start Guide* summarizes the steps for configuring the Xerox EX7750 and printing. It also describes how to access the Adobe Acrobat PDF files on the User Documentation CD.

- The *User Software Installation Guide* describes how to install software from the User Software CD and enable users to print to the Xerox EX7750.

- The *Configuration Guide* explains basic configuration and administration of the Xerox EX7750 for the supported platforms and network environments. It also includes guidelines for setting up network servers to provide printing services to users.

- The *Printing Guide* describes the printing features of the Xerox EX7750 for users who send jobs from their computers.

- The *Color Guide* provides information on managing the color output of the Xerox EX7750. It explains how to take advantage of the ColorWise® color management system, as well as features in ColorWise Pro Tools.

- The *Fiery Color Reference* addresses concepts and issues associated with managing the color output of the Xerox EX7750. In addition, it offers information on printing color documents from popular Microsoft Windows and Apple Mac OS applications.

- The *Job Management Guide* explains the functions of the job management utilities, and how you can use them to monitor and control jobs on the Xerox EX7750. This manual is intended for a user with the necessary access privileges who monitors and manages job flow and troubleshoots problems that may arise.

- *Customer Release Notes* provide last-minute product information and workarounds for some of the problems you may encounter.

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Introduction

This manual explains how to manage color output on the Xerox EX7750, and provides information on calibration and color profiles.

This manual is part of a set of documentation that includes manuals for users and system administrators. The other manuals are available at your site—see them for a complete description of your Xerox EX7750.

NOTE: The term "EX7750" is used in this manual to refer to the Xerox EX7750. The term "printer" is used to refer to the Phaser 7750. The name "Aero" is used in illustrations to represent the EX7750. The term "Windows" is used to refer to Windows 2000 and Windows XP, wherever appropriate. Illustrations of Windows software may not necessarily reflect the version of Windows that you use.

About this manual

This manual is organized to supply you with key information about managing the color output of your EX7750.

- Chapter 1 describes the EX7750 print options and how to get the best color results.

- Chapter 2 discusses various methods of calibrating the EX7750.

- Chapter 3 describes the features of ColorWise Pro Tools. ColorWise Pro Tools include Profile Manager, used to manage color profiles on the EX7750, and Color Editor, which allows you to customize simulation and output profiles. This chapter also describes Spot-On®, which allows you to define CMYK equivalents for spot colors.

- Appendix A provides information about setting up and calibrating color measurement instruments.

- Appendix B describes the Simple ASCII File Format (SAIFF), which you can use to import toner density measurements from measurement devices.

- The *Fiery Color Reference* Glossary defines words in bold—for example, **output profile**—that appear throughout this manual. Color terms and concepts such as "color space," "spot color," "gamut," and "source profile" are used throughout this manual. If you are new to desktop color, or if any terms are unfamiliar, consult the Glossary.

Key features of ColorWise

ColorWise is the **color management system (CMS)** built into the EX7750 and designed to provide both casual and expert users with the best color output for a variety of purposes. The ColorWise default settings provide high-quality out-of-box color from many Windows and Mac OS applications. This allows casual users to achieve quality output without knowing about or changing any color settings on the EX7750.

For consistent color, calibrate the EX7750 on a regular basis. ColorWise Pro Tools includes an easy-to-use calibrator that allows you to calibrate using a **spectrophotometer** or **densitometer** (see Chapter 2).

ColorWise features allow you to modify printing results. Depending on your particular needs, you can:

- Set the behavior of **CMYK** printing to emulate **DIC**, **Euroscale**, and **SWOP** offset press standards.

- Match PANTONE and other **spot colors** for the best match when printed using four-color press conditions or when printed using presses with extra, custom plates.

- Select a **color rendering dictionary** (CRD), also called a rendering style, for **RGB** printing. CRDs allow for rich, saturated printing of **presentation graphics**; smooth, accurate printing of photographs; and relative or absolute colorimetric rendering for specialized needs.

- Define the source of incoming RGB color data for better screen matching and provide for better color conversion of RGB data with no source information.

- Define whether RGB data is converted into the full gamut of the printer or is first converted into the gamut of another device, such as a press standard. This feature is helpful for making one device behave like another. It is also useful for evaluating the appearance of the RGB file under different printing conditions without having to reprocess the RGB data each time.

ColorWise color management (ColorWise) offers an open color architecture, allowing users to customize the EX7750 to meet new printing needs as they arise. ColorWise supports **ICC profiles**, which are industry standard color profiles that describe the color behavior of a device. Downloading ICC profiles to the EX7750 enables the EX7750 to simulate a custom press (or another printer), as well as accurately print colors from a particular monitor or a scanner. In addition, you can create customized ICC profiles for the printer.

ColorWise also allows you to use any **Status T** densitometer by importing data in a standard file format (see Appendix B). In this case, it is important to note that the quality of the instrument used determines the quality of the **calibration**.

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**Chapter 1:
EX7750 Color
Management**

The following sections describe the options available from the **ColorWise** color management system and explain how to customize the color settings for your particular needs. They provide descriptions of the preset ColorWise default settings and cover additional options for users who need to customize ColorWise.

For information about **PostScript** Level 2 or 3 printer drivers, see . The section also contains information on the capabilities of printer drivers and instructions for setting color options with the PostScript drivers for Windows and Mac OS computers.

NOTE: Many of the color management options described in this chapter are only available with the PostScript driver, not the PCL driver.

Managing color on the EX7750

To modify EX7750 printing behavior, do any of the following:

• Select ColorWise options for an individual print job using menus that appear in the printer driver.

• Select most ColorWise options as server defaults from the Color Setup application in ColorWise Pro Tools (see). Defaults can also be set from EX7750 Setup, as described in the *Configuration Guide*. These defaults will apply to all subsequent print jobs unless you override them.

• Select some ColorWise options, particularly default **ICC profile** settings and calibration options, from ColorWise Pro Tools. These options include default Simulation Profile (see), CMYK Simulation Method (see), Appear in Driver as (see), default Source Profile (see), RGB Separation (see), and associated calibration set (see).

Applications can generate color data for the EX7750 in many different **color spaces**. The most common type of color data produced from **office applications** is RGB, while prepress applications generally produce **CMYK** data. Desktop applications can also generate **spot colors**, such as PANTONE colors. To complicate matters, a single page may contain a mix of RGB, CMYK, and spot colors. The EX7750 allows users to

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control the printing of these mixed-color documents with features that apply specifically to RGB, CMYK, or spot color data. EX7750 color management generates CMYK data to be sent to the printer.

The following diagram illustrates the print options in the EX7750 color management process that affect color data conversions. You can access these print options when you send a print job to the EX7750. Most of these options and settings are described in subsequent sections of this chapter.

RGB data ⇨	**RGB Source Profile**
	    Gamma
	    Phosphors
	    White Point
	
	Rendering Style (CRD)
	Black Overprint
	Brightness
	Pure Black Text/Graphics
	RGB Separation
	Output profile	

CMYK data ⇨	**CMYK Simulation Profile** **CMYK Simulation Method** **Black Overprint** **Brightness** **Pure Black Text/Graphics** **Combine Separations** **Output profile**	
Spot color data ⇨	**Spot Color Matching**	

⇨ **EX7750 color processor** ⇨ **Color data sent to printer**

RGB **Source Profile** is the only color option that applies strictly to RGB color data. The other options that affect RGB color also affect the more rarely used Lab, XYZ, and other calibrated color spaces.

NOTE: For users who are familiar with PostScript 3 color, RGB Source Profile affects all CIEBasedABC color spaces (if the source space is RGB). If you send CMYK data to the EX7750 in CIEBasedDEFG format, for example, by choosing PostScript Color Management in Adobe Photoshop, the EX7750 Rendering Style selection—which normally affects only RGB data—will also affect this CMYK data.

You can specify settings for the following options by selecting print options when you send a job to the EX7750. Some can also be set as defaults by the administrator during EX7750 Setup or using ColorWise Pro Tools. Settings specified using print options override the defaults.

EX7750 color print option	What it does
Brightness 85% Lightest to 115% Darkest	Performs a color adjustment on all **color channels** to make the printed output lighter or darker.
Color Mode (Mac OS) CMYK/Grayscale or **Print Mode (Windows, PS driver)** Standard Color/Expert Color/Grayscale or **Print Mode (Windows, PCL driver)** CMYK/Grayscale	Specifies the output color space of the job. Select CMYK, Standard Color, or Expert Color for a full-color document.
Rendering Style Photographic/Presentation/Relative Colorimetric/Absolute Colorimetric (Default set at Setup or with ColorWise Pro Tools)	Applies a EX7750 **color rendering dictionary** (CRD) to **RGB** data (see page 1-6), or to any incoming data with a PostScript **source color space** definition, including CMYK. The rendering styles associated with the PCL driver do not match those associated with the PostScript driver.
Pure Black Text/Graphics On/Off (Default set at Setup or with ColorWise Pro Tools)	The On setting optimizes the quality of black text and line art output (see page 1-7). This option is only available with the PostScript driver.
Black Overprint Off/Text/Text & Graphics (Default set at Setup or with ColorWise Pro Tools)	Specifies whether to overprint black text or black text and graphics placed on colored backgrounds. Overprinting colored backgrounds eliminates white gaps and reduces halo effects or misregistration of colors (see page 1-8). This option is only available with the PostScript driver.
Spot Color Matching On/Off (Default set at Setup or with ColorWise Pro Tools)	The On setting enables EX7750-defined matching of spot colors to their best CMYK equivalents.You can use Spot-On to manage and edit these spot color matches (see page 3-19). Off instructs the EX7750 to match color output to a CMYK combination specified by the source application for the document (see page 1-9). This option is only available with the PostScript driver.

EX7750 color print option	What it does
RGB Source Profile EFIRGB/sRGB (PC) /Apple Standard/Other/ Source 1-10/Off (Default set at Setup or with ColorWise Pro Tools)	Applies an RGB source space definition to RGB data (see page 1-11). If you choose the Other setting, you must also specify particular settings for Gamma, Phosphors, and White Point. See the corresponding options in this table. This option, along with Gamma, Phosphors, and White Point, only affects DeviceRGB or calibrated RGB color spaces. This option is only available with the PostScript driver.
(Other) Gamma 1.0/1.2/1.4/1.6/1.8/2.0/2.2/2.4/2.6/2.8/3.0 (Default set at Setup or with ColorWise Pro Tools)	Applies the specified **gamma** value to the RGB source space definition (see page 1-11). To use this print option, you must choose Other as the RGB Source Profile setting. This option is only available with the PostScript driver.
(Other) White Point 5000 K (D50)/5500 K/6500 K (D65)/ 7500 K/9300 K (Default set at Setup or with ColorWise Pro Tools)	Applies the specified **white point** value to the RGB source color space definition (see page 1-11). To use this print option, you must choose Other as the RGB Source Profile setting. This option is only available with the PostScript driver.
(Other) Phosphors Hitachi EBU/Hitachi-Ikegami/NTSC/ Radius Pivot/SMPTE/Trinitron (Default set at Setup or with ColorWise Pro Tools)	Applies the specified **phosphor** (monitor type) information to the RGB source space definition (see page 1-11). To use this print option, you must choose Other as the RGB Source Profile setting. This option is only available with the PostScript driver.
CMYK Simulation Profile SWOP-Coated/DIC/Euroscale/ Simulation 1-10/Match Copy/None (Default set at Setup or with ColorWise Pro Tools)	Adjusts CMYK color data to simulate an offset press standard or a custom color **gamut** defined at your site. Choosing None bypasses simulation (see page 1-12). This option is only available with the PostScript driver.
CMYK Simulation Method Quick/Full (Source GCR)/Full (Output GCR) (Default set at Setup or with ColorWise Pro Tools)	Quick simulation applies one-dimensional transfer curves that adjust output density only. The Full simulations apply colorimetric transformations that adjust hue as well as output density (see page 1-14). This option is only available with the PostScript driver.

EX7750 color print option	What it does
RGB Separation Output/Simulation (Default set at Setup or with ColorWise Pro Tools)	Determines which CMYK **color space** your original RGB data will be separated into—CMYK for the printer (Output) or CMYK for a specified simulation (Simulation). For more information, see page 1-15. This option is only available with the PostScript driver. **NOTE:** When RGB Separation is set to Simulation, RGB colors are affected by CMYK Simulation Profile and CMYK Simulation Method.
Output Profile Use Media Defined Profiles/Output 1-10 (Default set at Setup or with ColorWise Pro Tools)	The **output profile** is applied to all data in the print job (see page 1-16). Select Use Media Defined Profiles to automatically use the output profiles predefined for the media types you have chosen. The Use Media Defined Profiles setting here overrides a similar setting in ColorWise Pro Tools. User-defined output profiles can be downloaded to the EX7750 using ColorWise Pro Tools. For more information about using ColorWise Pro Tools, see Chapter 3. This option is only available with the PostScript driver.
Combine Separations On/Off	Specifies whether to print separated CMYK data as a single, four-color composite document (see page 1-17). With Spot-On, you can combine an unlimited number of spot **color separations** along with the CMYK separations.
Screen Switching On/Off	If you choose Off, all objects on the page use a low-frequency screen. If you choose On, text uses a high-frequency screen, and graphics and image objects use a low-frequency screen.
Image Smoothing Automatic/Off/On/Below 90–300 ppi	The On setting enhances the print quality of low-resolution images.
Black Detection On/Off	If your job consists of black-only text pages combined with a significant number of color pages, set this option to Off.
Copier Mode Photo/Map	Select Photo if the file is a photograph; select Map if the file is a combination of text and photographs.
Auto Trapping On/Off	Specifies whether the job should automatically trap text and graphics independently of the application used to create it.

Detailed explanations of how these and other settings affect your print jobs are provided in subsequent sections of this chapter.

Rendering Style

The Rendering Style option specifies a CRD for color conversions. To control the appearance of images, such as prints from office applications or RGB photographs from Photoshop, select the appropriate Rendering Style. The EX7750 allows you to select from the four rendering styles currently found in industry standard ICC profiles.

EX7750 rendering style	Best used for	Equivalent ICC rendering style
Photographic—Typically results in less saturated output than presentation rendering when printing out-of-gamut colors. It preserves tonal relationships in images.	Photographs, including scans and images from stock photography CDs and digital camera images.	**Image**, **Contrast**, and **Perceptual**
Presentation—Creates saturated colors but does not match printed colors precisely to displayed colors. In-gamut colors such as flesh tones are rendered well; similar to the Photographic rendering style.	Artwork and graphs in presentations. In many cases, it can be used for mixed pages that contain both presentation graphics and photographs.	**Saturation**, **Graphics**
Relative Colorimetric—Provides white-point transformation between the source and destination white points. For example, the bluish gray color of a monitor will map to neutral gray. You may prefer this style to avoid visible borders when *not* printing full-bleed.	Advanced use when color matching is important, but you prefer white colors in the document to print as paper white. It may also be used with PostScript color management to affect CMYK data for simulation purposes.	**Relative Colorimetric**
Absolute Colorimetric—Provides *no* white point transformation between the source and destination white points. For example, the bluish gray of a monitor will map to a bluish gray.	Situations when exact colors are needed and visible borders are not distracting. It may also be used with PostScript color management to affect CMYK data for simulation purposes.	**Absolute Colorimetric**

NOTE: The rendering styles associated with the PCL driver do not match those associated with the PostScript driver.

Pure Black Text/Graphics

The Pure Black Text/Graphics option affects the printout for black text and **vector graphics** on a page. Under most circumstances, leave this option set to On. When Pure Black Text/Graphics is on, black colors generated by applications (for example, RGB = 0, 0, 0; CMYK = 0%, 0%, 0%, 100%; or K = 100%) are printed using the maximum amount of black toner allowed by the calibration curve. This means the black text and line art will not exhibit halftone **artifacts** (as long as the printer is calibrated correctly) and will not be misregistered, since there is only one toner used. In addition, this setting eliminates **blasting**.

For some jobs, it is preferable to clear this option, for example, if the page includes **gradient** fills that use black. The following table describes the behavior of the Pure Black Text/Graphics option with black data defined in different color spaces.

NOTE: Use the Pure Black Text/Graphics option only when printing composites, not when printing separations.

Input black color	Pure Black Text/Graphics	
	On	**Off**
RGB	Prints 100% black	With the default profile, prints a rich black using all toners.
CMYK		Prints only with black toner, because CMYK simulations preserve the black channel. The actual amount of toner used depends on the current simulation and the calibration state of the printer.
Spot		Prints only with black toner, because spot color simulations preserve the black channel. The actual amount of toner used depends on the current simulation and the calibration state of the printer.

NOTE: PostScript applications (such as QuarkXPress) may convert elements defined as RGB = 0, 0, 0 to four-color CMYK black before sending the job to the EX7750. These elements are not affected by the Pure Black Text/Graphics option. For details, see the *Fiery Color Reference*. Also, black text and line art defined as RGB = 0, 0, 0 in office applications (such as Microsoft Word) are converted to single-color black (CMYK = 0%, 0%, 0%, 100%) by the Microsoft PostScript Level 3 driver for Windows 2000/XP. To print this single-color black at the maximum toner density of the printer, set the Pure Black Text/Graphics option to On.

NOTE: This feature is not available with the PCL driver.

Black Overprint

The Black Overprint option allows you to specify whether or not black text or text/graphics, defined as RGB = 0, 0, 0, or as CMYK = 0%, 0%, 0%, 100%, overprints colored backgrounds.

- **Text**—Black text overprints colored backgrounds, eliminating white gaps and reducing halo effects or misregistration of colors.

- **Text & Graphics**—Black text and graphics overprint colored backgrounds, eliminating white gaps and reducing halo effects or misregistration of colors.

- **Off**—Black text or text/graphics knocks out colored backgrounds.

NOTE: PostScript applications may perform their own black overprint conversions before sending the print job to the EX7750.

One example of how you might use this setting is with a page that contains black text on a light blue background. The background blue color is CMYK = 40%, 30%, 0%, 0% and the black text is CMYK = 0%, 0%, 0%, 100%.

- With Black Overprint set to Text or Text/Graphics, the final text or text/graphic portions of the page are overprinted, or combined with the underlying colors. Black colors generated by applications (for example, RGB = 0%, 0%, 0%; CMYK = 0%, 0%, 0%, 100%) are printed using the maximum amount of black toner allowed by the calibration curve. This means that black text and line art will not exhibit halftone artifacts (as long as the printer is calibrated correctly). There is no transition in the cyan and magenta toners, and the quality of the output is improved since it will not show artifacts near the edges of the text or text/graphics. The option also works with text defined in the RGB color space, that is RGB = 0, 0, 0.

- With Black Overprint Off, the border of the text or text/graphics is on an edge that has cyan and magenta toners on one side (outside the text) and black toner on the other side (inside the text). This transition may cause visible artifacts because of the practical limitations of the printer.

NOTE: This feature is not available with the PCL driver.

Spot Color Matching

The Spot Color Matching option provides automatic matching of spot colors with their best CMYK equivalents.

- **On**—The EX7750 uses a built-in table to generate the closest CMYK matches of spot colors your printer can produce. (New tables are generated when you add new output profiles.)The EX7750 uses the CMYK matches determined through Spot-On (see).

- **Off**—The EX7750 uses CMYK equivalents defined by the spot color manufacturer, such as PANTONE. These are the same CMYK equivalents used by applications that include spot color libraries.

For jobs that include spot colors, set Spot Color Matching to On unless you are printing press simulations. In that case, set Spot Color Matching to Off and choose the appropriate CMYK Simulation setting (see page 1-12).

For PDF jobs that include spot colors and where the spot colors are not included in the built-in table, setting Spot Color Matching to On retains the spot color originally specified. The EX7750 references the built-in table to generate the closest CMYK matches of the original spot color.

NOTE: Use the Spot Color Matching option only when printing composites, not when printing separations.

Spot Color Matching and the PANTONE Coated Color Reference

The PANTONE Coated Color Reference (described in the *Fiery Color Reference*) prints differently depending on the Spot Color Matching setting.

- **On**—The EX7750 uses a built-in table or the Spot-On color dictionaries (see page 3-19) to generate the best matches of the PANTONE colors that your printer can produce. The PANTONE number is printed below each swatch.

- **Off**—The EX7750 prints swatches using the CMYK values recommended by Pantone, Inc. (and used by applications that provide PANTONE color libraries). The CMYK values used to generate the color, as well as the PANTONE number of the color, are printed below each swatch. These CMYK values are printed through the selected CMYK Simulation and Output Profile settings.

NOTE: This feature is not available with the PCL driver.

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RGB Source Profile

The RGB **source profile** setting allows you to define the characteristics of the RGB data in your document so the appropriate color conversion can occur on the EX7750. Commonly used monitor color spaces are available from the printer driver and from the ColorWise Pro Tools Profile Manager. For special needs, use ColorWise Pro Tools to download custom monitor or scanner profiles.

When you specify a setting other than None for the RGB Source Profile, the EX7750 overrides **source color space** definitions or profiles that other color management systems may have specified. For example, if you specified a ColorSync System Profile on your Mac OS computer, the RGB Source Profile setting overrides it. In cases where you do *not* want this setting to override another specified source color space, choose the None setting.

When you specify a setting other than None for the RGB Source Profile—since the color space definitions are overridden—the output from the EX7750 is consistent across platforms. The EX7750 RGB Source Profile options are:

- **EFIRGB** specifies an EFI-defined color space recommended for users who have no detailed information about their RGB data.

- **sRGB (PC)** specifies the industry standard definition for a generic Windows computer monitor.

- **Apple Standard** specifies the definition of all standard Mac OS computer monitors.

- **Other** allows you to specify custom RGB source settings. If you choose Other as the RGB Source Profile setting, you must choose settings for the Gamma, Phosphors, and White Point options.

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• **Sources 1-10** specify the definitions you download as RGB source profiles. For more information about downloading RGB source profiles, see page 3-5.

  If you are printing with the PostScript driver from a Windows computer and have Two-Way Communication enabled, the name of each downloaded profile is represented in the RGB Source Profile setting menu. If you are printing with the AdobePS driver from a Mac OS computer, downloaded profiles appear as Source-1 through Source-10. For more information about Two-Way Communication, see the *User Software Installation Guide*.

• **None** instructs the EX7750 to allow the RGB sources you defined elsewhere, such as in the application, to be used. When you set RGB Source to None, the appearance of colors will *not* be independent of the file type. For example, RGB EPS files will look different from RGB TIFF files.

  With RGB Source set to None, PostScript RGB data that contains a source color space definition is converted using the CRD specified by the Rendering Style option (see page 1-6). Non-PostScript RGB data and PostScript RGB data that does not contain a source color space definition are converted using a general **undercolor removal (UCR)** conversion method.

NOTE: This feature is not available with the PCL driver.

CMYK Simulation Profile

The CMYK Simulation Profile print option allows you to print press proofs or simulations. This setting specifies the offset press standard or other color printing device that you want to simulate. This option affects CMYK data only.

With the Windows printer drivers, you can also view an unlimited number of custom Full simulations created using ColorWise Pro Tools. On Mac OS computers, you can view up to 10 Full custom simulations. The number of custom simulations is limited by the disk space on the EX7750.

If you are printing with the PostScript driver from a Windows computer and have Two-Way Communication enabled, the name of each downloaded or custom profile is represented in the CMYK Simulation Profile setting menu. If you are printing with the AdobePS driver from a Mac OS computer, downloaded or custom profiles appear as Simulation-1 through Simulation-10. For more information about Two-Way Communication, see the *User Software Installation Guide*.

The None setting sends your original CMYK data to the printer in its calibrated state, without conversions to simulate another printer. This setting is not generally recommended, unless you want to bypass the conversion by ColorWise and use another color management system.

The CMYK Simulation Profile setting you specify depends on the press standard for which the CMYK data was separated.

- For images that were separated using a custom separation (such as a separation produced with an ICC profile), choose the corresponding profile on the EX7750 with the CMYK Simulation Profile setting.

- For images that were separated for **SWOP**, choose SWOP as the CMYK Simulation Profile setting.

NOTE: To properly simulate a printed image that was separated through the use of an ICC profile, the same profile must be present on the EX7750. For more information about downloading ICC profiles to the EX7750, see "Downloading profiles" on page 3-5.

NOTE: This feature is not available with the PCL driver.

CMYK Simulation Method

The CMYK Simulation Method allows you to define your preferred CMYK-to-CMYK conversion technique.

- **Quick** applies one-dimensional transfer curves to adjust output densities in the cyan, magenta, yellow, and black channels. This technique leads to pleasant color output from your printer because pure primary colors are not "contaminated" by other **colorants**. While it is the fastest simulation method and perfect for drafts, avoid using it for final documents that will be used as press proofs. Other techniques offer more color simulation accuracy, which is expected by proofing applications.

- **Full (Source GCR)** provides a complete and accurate simulation based on colorimetric transformations. Hues are preserved, even for primary colors. The **Gray Component Replacement** (GCR) level that was specified in the original (source) document is also preserved. Full (Source GCR) is therefore an excellent simulation technique for the highest quality press proofing applications.

- **Full (Output GCR)** is also a complete and accurate simulation method based on colorimetric transformations. Hues are preserved, even for primary colors. With this method, the Gray Component Replacement (GCR) level that was specified in the original document is not preserved. Instead, all CMYK data is reseparated using the GCR level specified by the Output Profile. This simulation technique is similar to traditional ICC color matching methods and is appropriate for most documents designed for the press, but reproduced on your printer.

NOTE: When you specify On for Pure Black Text/Graphics, and specify Full (Output GCR) for CMYK Simulation Method, the black text and graphics in your document are printed with 100% black-only toner.

NOTE: This feature is not available with the PCL driver.

RGB Separation

The RGB Separation option determines how RGB colors (as well as Lab and XYZ colors) are converted to CMYK. The name of this option is meant to be descriptive, since the option defines the color spaces that will be used by the EX7750 to "separate" the RGB data into CMYK values.

The two choices available for this option determine whether RGB data is converted into the full gamut of the printer (**output**) or is first converted into the gamut of another digital printer or press standard (**simulation**). This feature is helpful for making one device behave like another for RGB data. For example, if a high-quality ICC profile is available for another print device, the printer can simulate the behavior of that device.

RGB Separation is also useful for prepress applications. For example, it allows you to experiment with the appearance of an RGB scan under different press printing conditions, without having to convert the RGB data to CMYK data for each condition. When the desired printing condition is found, convert the file to CMYK, using the same CMYK simulation profile you used during the experimentation.

NOTE: The RGB Separation print option should be used in conjunction with the Output Profile or CMYK Simulation Profile print options.

- **Output** converts all RGB colors into the CMYK color space of your printer (when set to the printer's default), or a customized CMYK color space for your printer (when set to Output 1-10).

- **Simulation** converts all RGB colors into the CMYK color space for a specified simulation (select the desired simulation with the CMYK Simulation Profile print option).

NOTE: This feature is not available with the PCL driver.

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Image Smoothing

The Image Smoothing option prevents low-resolution images from appearing "jaggy" or "blocky." This option uses an image interpolation technique that averages the color of individual pixels based on their neighbors. The Image Smoothing option only affects images and supports all image file formats.

NOTE: The Image Smoothing option is not applied to print jobs created with Adobe Photoshop 6 when an EPS image is saved with the Image Interpolation option set.

Output Profile

An output profile consists of a profile for your printer, describing its color characteristics. You can set a default output profile to be applied to all print jobs, or you can have output profiles predefined for the media types in your print jobs automatically applied (see "Using media-defined output profiles" on page 3-4).

In certain cases, you may want to customize the default output profile using the ColorWise Pro Tools Color Editor to achieve particular color effects (see page 3-11). If you do so, the new customized output profile is applied to all data in the print job. Changing the output profile does not affect its associated calibration target (since the target is based on a printer model). You can edit D-Max values of the calibration target separately (see page 3-11).

Use the ColorWise Pro Tools Profile Manager to download your own output profile to the EX7750 (see page 3-5). Downloaded output profiles are at first associated with the calibration target that is tied to the default output profile. You can edit calibration target D-Max values separately.

If you are printing with the PostScript driver from a Windows computer and have enabled Two-Way Communication, the name of each downloaded or custom profile is represented in the Output Profile setting menu. If you are printing with the AdobePS driver from a Mac OS computer, downloaded or custom profiles appear as Output-1 through Output-10. For more information about Two-Way Communication, see the *User Software Installation Guide*.

NOTE: This feature is not available with the PCL driver.

Combine Separations

The Combine Separations setting specifies how to print separated CMYK data. With Spot-On, you can combine an unlimited number of spot color separations along with the CMYK separations.The Combine Separations options are:

- **Off** prints each separation individually.

- **On** combines separations as a single, composite-color document and automatically makes these settings for the following print options: Color Mode (CMYK), Rendering Style (None), Pure Black Text/Graphics (Off), Spot Color Matching (Off), or Black Overprint (Off).

For information about using the Combine Separations option with applications such as Photoshop, see the *Fiery Color Reference*.

PostScript printer driver for Windows and Mac OS

To access the printer driver options described in this section, choose Start>Settings>Printers (Windows 2000) or Printers and Faxes (Windows XP), right-click the appropriate printer (**PPD)** name, and choose Printing Preferences from the menu that appears. To access the Mac OS driver options, choose Print from the File menu of your application. These settings are also accessible from the Print Setup or Page Setup dialog boxes of most applications.

For Windows computers, the EX7750 driver interface allows you to save combinations of settings for later access. Additionally, you can choose different settings for individual jobs from the applications you use.

The printer driver writes a PostScript file containing the instructions generated by your application and the EX7750 print options you chose. The printer driver sends the PostScript file to the EX7750. The EX7750 then performs PostScript processing and color conversions and sends raster color data to the print device.

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NOTE: The following illustrations and instructions do not apply to all applications. Many applications, such as Adobe PageMaker, Photoshop, Adobe Illustrator, QuarkXPress, and CorelDRAW, have other color management options in addition to those presented in the printer driver. For information about specific applications, see the *Fiery Color Reference*.

Setting color management print options for Windows

This section explains how to set EX7750 color print options with the Adobe PostScript Printer Driver for Windows. This driver is a PostScript 3 printer driver that takes full advantage of the color features of the EX7750. Before you proceed, complete the following procedures:
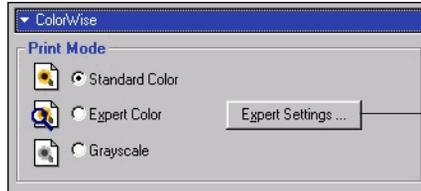
- Install the PostScript Printer Driver and the EX7750 PPD (see the *User Software Installation Guide*).

- Set up the EX7750 for printing (see the *Configuration Guide*).

- Install the ICC output profile for the EX7750 on your Windows computer (see the *User Software Installation Guide*).

TO SET PRINT OPTIONS FOR WINDOWS

1. **Access the printer driver options, as described on page 1-17.**

2. **Click the Fiery Printing tab and choose settings from the ColorWise menu for the print options described on page 1-3.**

Choose ColorWise

| |
|---|
| ▶ Paper Source |
| ▶ Destination |
| ▶ Layout |
| ▶ Finishing |
| ▶ ColorWise |
| ▶ Owner Information |
| ▶ Image Quality |
| ▶ FreeForm |

3. Click Expert Settings.

The Expert Color Settings flowchart appears. This window displays additional color settings for the EX7750. Each option includes a menu from which you select settings for your specific job.

4. Click Update to display the current EX7750 settings.

If Update does not appear, make sure that Two-Way Communication is set up as described in the *User Software Installation Guide*.

5. To specify custom RGB source settings, select Other for the RGB Source Profile and click Custom Setup.

The Custom Setup dialog box allows you to specify custom RGB source settings (see page 1-11).
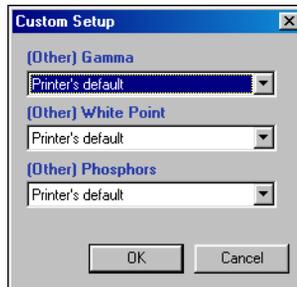
For most users, the default settings provide the right level of color control. For more information about individual print options, see page 1-3.

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Adobe PostScript printer driver for Mac OS

This section explains how to set color management print options with the AdobePS printer driver for Mac OS, a PostScript 3 driver that takes full advantage of the color features of the EX7750 and allows you to save a set of print option settings.

Before you continue, complete the following procedures, as described in the *User Software Installation Guide*:

• Install the AdobePS printer driver and the EX7750 PPD.

• Select the EX7750 in the Chooser and set it up with the EX7750 PPD.

• Install the ICC output profile for the EX7750 on your Mac OS computer.

NOTE: The following illustrations and instructions do not apply to all applications. Many applications, such as Adobe PageMaker, Photoshop, Adobe Illustrator, QuarkXPress, and CorelDRAW, have other color management options in addition to those presented in the printer driver. For information about specific applications, see the *Fiery Color Reference*.

Setting color management print options

Choose settings for color print options from the various panes of the AdobePS driver dialog box. To access the initial AdobePS dialog box, choose Print from the File menu of your application.

NOTE: The term "pane" is used to describe the different pages that appear in the driver dialog box when you make selections from the menu at the upper-left corner of the dialog box. Each pane presents a particular set of print options.

The AdobePS driver includes the following Color Matching options.

• **Color/Grayscale**—When this setting is used to print to the EX7750, ColorWise provides all color conversions on the EX7750. Typically, use this option when printing to the EX7750.

• **PostScript Color Matching**—Can be used with PostScript devices, such as the EX7750. It provides for color conversion using a color rendering dictionary (CRD) that is downloaded with the print job. This method requires that the file is saved as an EPS with PostScript Color Management selected.

NOTE: If you use the PostScript Color Matching option, the driver may, depending on the application in use, attach a CMYK source definition to the CMYK data in your document. In such a case, the CMYK data in the document is reseparated using a EX7750 CRD. The destination color space for the CRD is determined by the RGB Separation print option. When RGB Separation is set to Simulation, CMYK data is printed according to all specified CMYK Simulation Profile and CMYK Simulation Method settings. When RGB Separation is set to Output, CMYK data is converted to the selected output profile's CMYK color space.

• **ColorSync Color Matching**—Provides for color conversion *on the host computer*. This option can be used with PostScript devices such as the EX7750, but it is intended for use with PostScript Level 1 devices. If you use this option, you must specify the EX7750 ICC profile as the Printer Profile. ColorSync Color Matching is not a suggested color matching method because it does not work in conjunction with all applications and requires that you disable features of ColorWise on the EX7750.
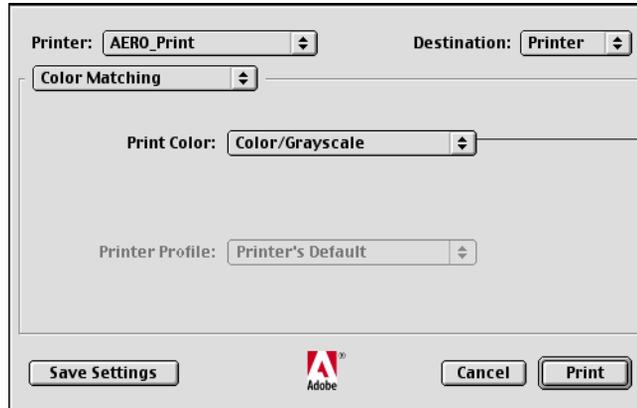
TO SET EX7750 COLOR MANAGEMENT OPTIONS

1. **In the AdobePS Print dialog box, choose Color Matching from the menu.**

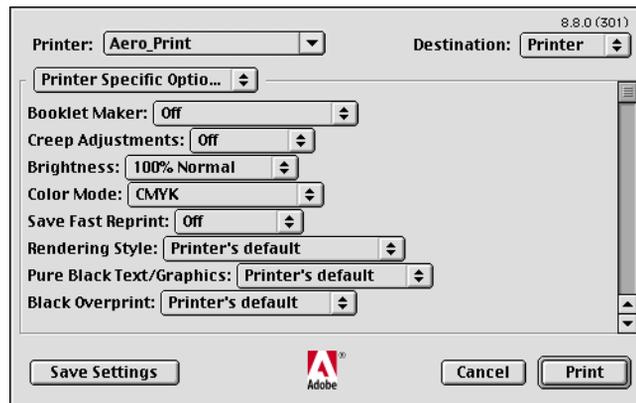**Choose Color Matching from this menu**
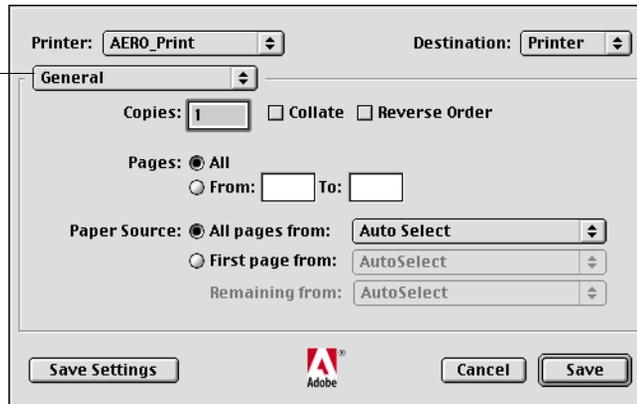
2. Choose Color/Grayscale from the Print Color menu.

Choose Color/Grayscale

3. In the Printer Specific Options menu, choose settings for the print options described on page 1-3. If these settings are used regularly, click Save Settings to save them for subsequent jobs.
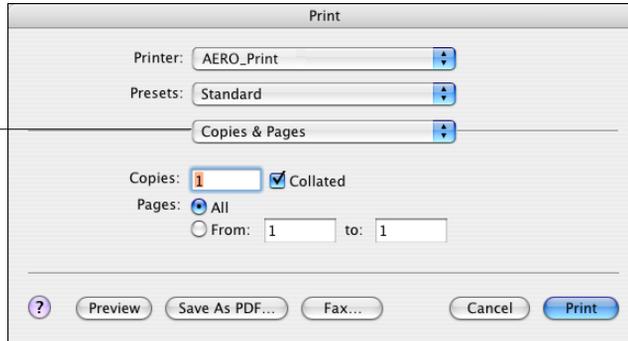
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1. **In the Print dialog box, choose Printer Features.**

Choose Printer Features from this menu

2. **In the Printer Features area, choose settings for the print options described on page 1-3.**

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Chapter 2: Color Calibration

Calibrating the EX7750 ensures consistent, reliable color output. This chapter explains how **calibration** works and provides instructions for all calibration procedures.

NOTE: This chapter describes calibrating the EX7750. You must also calibrate the Phaser 7750. For instructions, see the documentation that accompanies your printer. We recommend that you calibrate the Phaser 7750 first, and then the EX7750.

Calibrate the EX7750 using ColorWise Pro Tools in combination with any of the following color measurement instruments:

• EFI Spectrometer ES-1000 hand-held spectrometer

• X-Rite DTP41 automatic scanning spectrophotometer

• X-Rite DTP32 or DTP32HS automatic scanning densitometer

By connecting one of these instruments to a serial or USB port on your computer, you can quickly measure calibration color patches and download measurements to the EX7750.

NOTE: To use the ES-1000 with a Mac OS computer, you must connect the instrument to a USB port. For more information, contact your service technician/representative. For information about setting up and operating the DTP41 and DTP32, see Appendix A.

Another calibration method, VisualCal™, is run from the Control Panel on the EX7750. Calibrating from the Control Panel with VisualCal is described on .

When choosing a calibration method, keep in mind that methods using a color measurement instrument such as the ES-1000, DTP41, or DTP32/DTP32HS are generally the best. We recommend using the ES-1000 because it captures measurements very accurately and quickly, can be used to calibrate and profile printers using pages with randomized patches, and can be used to measure and adjust individual spot colors.

For information about the advanced calibration and simulation features available with ColorWise Pro Tools, such as editing profiles and creating custom profiles, see Chapter 3. A format for inputting color measurements from other **densitometers** is described in Appendix B.

NOTE: The procedures described in this chapter are fundamentally the same for Windows and Mac OS computers. The main differences are the interface cable and the port used to connect to the measurement instrument. The illustrations in this chapter describe the Windows version.

NOTE: The term "computer" is used to refer to any computer running ColorWise Pro Tools.

An overview of calibration

Calibration generates curves that adjust for the difference between the actual toner densities (measurements) and the response expected by the output profile.

• Measurements represent the actual color behavior of the printer.

• Calibration sets are sets of measurements.

• Each output profile contains a calibration target that describes the expected behavior of the printer.

After you calibrate the EX7750, a calibration set is stored. This calibration set is used when it is associated with an output profile. Every output profile has an associated calibration set. If you have not specified one, the calibration set associated with the default output profile is used.

If you change the calibration after a saved job has been processed (RIPped), you do not need to reprocess (reRIP) the job. The new calibration settings are in effect for the job.

NOTE: Changing calibration has the potential to affect *all* jobs for *all* users, so consider limiting the number of people authorized to perform calibration. Set an Administrator password in EX7750 Setup to control access to calibration (see the *Configuration Guide*).

Understanding calibration

Although the default calibration set meets most users' needs, the EX7750 allows you to choose a calibration set to customize calibration for specialized jobs.

Calibration allows you to:

• Maximize the color reproduction capabilities of the EX7750.

• Ensure consistent color quality over time.

• Produce consistent output across EX7750 servers.

• Achieve better color matches when reproducing **spot colors**, such as PANTONE colors or other **named color** systems.

• Optimize the EX7750 for using ColorWise rendering styles (CRDs) and CMYK simulations, and for using ICC profiles.

How calibration works

Success in obtaining satisfactory print quality from the EX7750 depends on many factors. Among the most important are establishing and maintaining optimal toner densities. The **density** is the measure of the light absorbed by a surface. By carefully regulating toner densities, you obtain consistent printed color.

Even with a calibrated system, toner density is affected by service settings, humidity, and temperature. Density also tends to drift over time. Regular measurement detects day-to-day variations in densities, and calibration corrects for them.

Calibration works by creating calibration curves on the EX7750 that compensate for the difference between actual (measured) and desired (target) density values. These calibration curves are the graphic equivalent of transfer functions, which are mathematical descriptions of changes that will be made to the initial data. Transfer functions are often graphed as input or output curves.

The EX7750 generates calibration curves after comparing measured values to the final target values for each of the four toner colors. The target values are based on the output profile you specify.

Measurements

Measurement files contain numerical values that correspond to the toner density produced by the printer when it prints solid cyan, magenta, yellow, and black, and graduated tints of those colors.

To create a measurement file, print a page of color patches and then measure the patches using a color measurement instrument connected to a computer on the network. The new measurements are automatically downloaded to the EX7750.

Output profiles and calibration sets

Output profiles and calibration sets define desired calibration results. One or more output profiles and calibration sets are provided with the EX7750. When you calibrate the EX7750, select the calibration set that corresponds to the typical printing jobs at your site. This same calibration set can be associated with one or more output profiles. For more information about output profiles, see .

Scheduling calibration

In general, you should calibrate the EX7750 at least once a day, depending on the volume of print jobs. If it is very important to maintain consistent color, or if the printer is subject to wide fluctuations in temperature or humidity, calibrate every few hours. For optimal performance, calibrate whenever there is a noticeable change in print quality.

If you must split a print job into two or more batches to be printed at different times, it is especially important to calibrate before you print each batch. You should also calibrate the EX7750 after printer maintenance.

NOTE: Because printed output from the printer is very sensitive to changes in temperature and humidity, the printer should *not* be installed near a window, in direct sunlight, near a heater, or near an air conditioner. Paper is also sensitive to climate changes. Store paper in a cool, dry, stable environment, and keep reams sealed until they are needed.

To monitor print quality, print the following color reference pages:

- Color Charts from the Control Panel (see the *Configuration Guide*)

- Color Charts from Command WorkStation/Command WorkStation LE
  (see the *Job Management Guide*)

- Color reference pages included with the user software (see the *User Software Installation Guide*)

All these pages include fully saturated color patches and pale tints of cyan, magenta, yellow, and black. Images with skin tones offer a very good basis for comparison. Save and compare pages you printed at different times. If there is a noticeable change in appearance, calibrate the EX7750.

When you examine the color reference pages, all color patches should be visible, even though they may be very faint in the five percent and two percent range. Each color's patch set should show uniform gradation from patch to patch as the color lightens from 100 percent to zero percent.

If the solid density patches (100% cyan, magenta, yellow, or black) appear less saturated with time, show the pages to your printer service technician to determine whether adjusting the printer can improve output.

Checking calibration status

To verify whether the EX7750 is calibrated, which calibration set and output profile were used, and when the printer was last calibrated:

- Print a Configuration page or Test Page from the Control Panel or Command WorkStation/Command WorkStation LE.

- Select a calibration set in Calibrator (available from ColorWise Pro Tools).
  The date of the last calibration and the user who performed it are displayed.

Using Calibrator

ColorWise Pro Tools Calibrator allows you to calibrate the EX7750 using the measurement method of your choice.

Changing the calibration has the potential to affect *all* jobs for *all* users, so consider limiting the number of people authorized to perform calibration. Set an Administrator password to control access to calibration (see the *Configuration Guide*).

NOTE: Multiple users can be connected to one EX7750 with ColorWise Pro Tools, but only one user at a time can use Calibrator. An error message appears if you try to calibrate when another user is using ColorWise Pro Tools to calibrate.

Starting Calibrator

Start Calibrator from the ColorWise Pro Tools main window.

TO CALIBRATE THE EX7750 USING CALIBRATOR

1. **Start ColorWise Pro Tools and connect to the EX7750.**

For instructions on configuring the connection to the EX7750, see the *User Software Installation Guide*.

NOTE: If the connection to the EX7750 from Command WorkStation/Command WorkStation LE (which also allows for access to ColorWise Pro Tools) is not established, you can start ColorWise Pro Tools independently of Command WorkStation/Command WorkStation LE.

2. **Click Calibrator.**

3. **Use the Calibrator window to perform the calibration method of your choice.**

   Procedures for each calibration method are described in subsequent sections of this chapter.
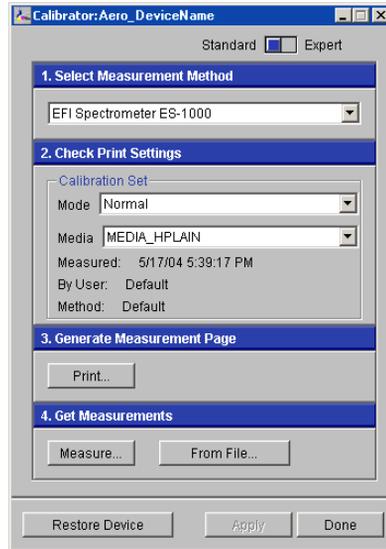
Expert Mode

Calibrator provides two modes: Standard Mode and Expert Mode. You can perform all essential calibration tasks while in Standard Mode. Expert Mode offers two additional options: Print Pages and View Measurements.
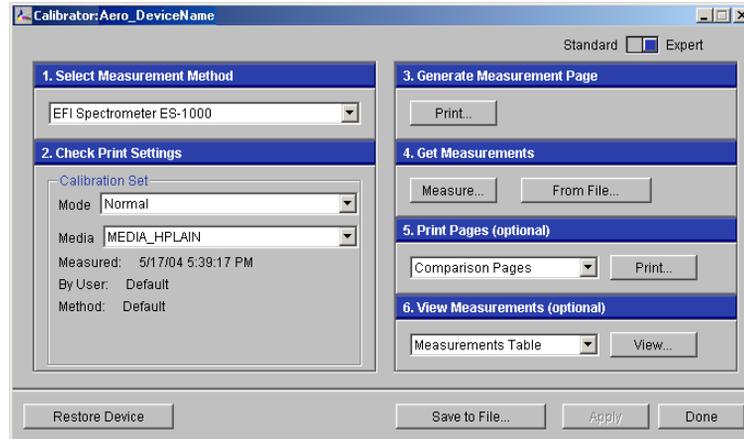

With the Print Pages option, print a calibration Comparison Page showing the results of the new measurements with any profile associated with the currently selected calibration set. You can also create a custom Comparison Page and save it as a PostScript or Encapsulated PostScript (EPS) file called CALIB.PS. Print the file to the Hold queue of the EX7750 from your application, or download it to the Hold queue with Fiery Downloader. An additional way to create the CALIB.PS file is to rename any job in the Hold queue using Command WorkStation/Command WorkStation LE (see the *Job Management Guide*).

The View Measurements option allows you to view the current set of measurements as a table or graph that shows both the measurements and the target curves.
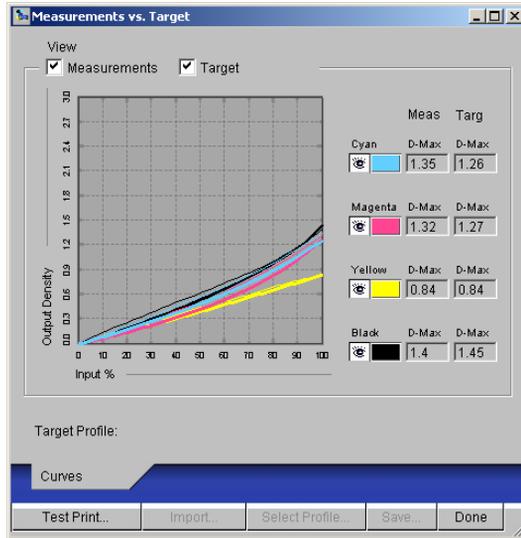

When more than one profile uses the same target, an additional menu called Plot Against appears in the upper-right corner of the dialog box. It lists all output profiles that use that same calibration set. Selecting an output profile from this menu displays the target curves associated with that profile. If each output profile contains a unique calibration target, the curves displayed also change when you switch profiles.

Restoring default calibration measurements

The EX7750 is shipped with default calibration measurements. You can use these measurements to achieve acceptable color without calibration, depending on the printer you use. If the measurement device you use does not produce acceptable color, you can easily return to the default measurements.

TO RESTORE DEFAULT CALIBRATION MEASUREMENTS

1. Click Restore Device in the main Calibrator window.

2. Click OK to restore the preset default calibration set.
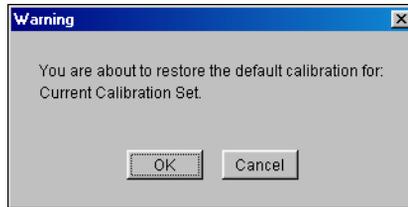
NOTE: Restore Device applies only to the currently selected calibration set.

Calibrating the EX7750 with the ES-1000

You can use ColorWise Pro Tools in conjunction with the ES-1000 spectrometer to calibrate the EX7750.

NOTE: Before using ColorWise Pro Tools and the ES-1000 to calibrate the EX7750, follow the instructions on page A-1 for setting up and calibrating the ES-1000 spectrometer.

ColorWise Pro Tools uses an audible signal (a beep) to guide you through the calibration procedure. If the computer running ColorWise Pro Tools does not have a sound card and speaker, you must configure the computer to generate a visual signal when ColorWise Pro Tools outputs a beep. (Note that the EX7750 does not have a speaker.) The following procedure is for Windows XP. The procedure is similar for other Windows versions.

TO CONFIGURE WINDOWS XP TO GENERATE A VISUAL SIGNAL FOR A BEEP

1. **Click Start.**

2. **Choose Control Panel.**

3. **Double-click the Accessibility Options icon.**

4. **Click the Sound tab.**

5. **Select Use SoundSentr, and set the visual warning to Flash Desktop.**

6. **Click OK to save the setting.**

7. **Close the Control Panel.**

TO CALIBRATE THE EX7750 USING THE ES-1000 SPECTROMETER

1. **Start Calibrator.**

   For instructions on starting Calibrator, see page 2-6.

2. **Choose EFI Spectrometer ES-1000 as the measurement method.**

3. **In the Check Print Settings pane, choose the desired calibration set.**

   Choose the appropriate calibration set for the mode and type of media that are needed for calibration.

   NOTE: For this calibration to take effect, the calibration set must be associated with one or more output profiles. You do not need to make any new associations for the default calibration set, since it is already associated with the default output profile.

4. **In the Generate Measurement Page pane, click Print.**

   The Print Options dialog box appears.

5. Choose the appropriate options and click Print.
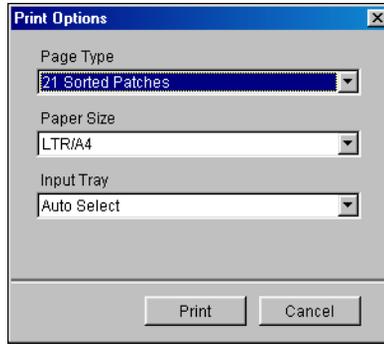
For Page Type, choose 21 or 34 Sorted Patches, or 21 or 34 Randomized Patches. Sorted patches are printed on the page in the order of their hue and saturation levels. Randomized patches are printed on the page in random order, to help compensate for density inconsistencies on different areas of the page.

Page Size is automatically set to LTR (if the EX7750 is set up for US standards) or A4 (if the EX7750 is set up for metric standards) for 21 patches, or 11x17 (US) or A3 (metric) for 34 patches.

Input Tray is automatically set to Auto Select.

6. Retrieve the printed measurement page from the printer.

7. Click Measure in the Get Measurements pane.

The Measurement Options dialog box appears.
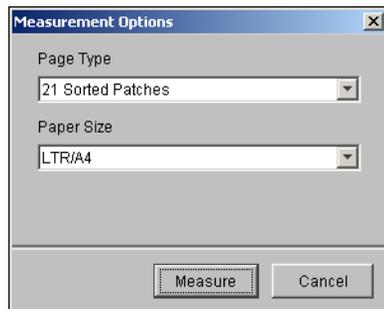
Page Type is automatically set to the type that you selected in step 5.

8. **Check the settings and click Measure.**

    The Information dialog box appears.
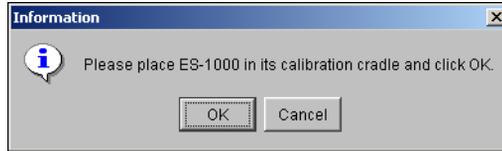
9. **Place the ES-1000 spectrometer in the calibration cradle.**

    When you place the ES-1000 spectrometer in the calibration cradle, white point calibration is used to calibrate the spectrometer and to compensate for gradual drifts in the instrument. Make sure that the sample aperture is in full contact with the white tile on the calibration cradle. If you do not place it correctly in the calibration cradle, the spectrometer will not return accurate measurements.

10. **Click OK.**

    The EFI Spectrometer Measurements dialog box appears. Directions for measuring the strips appear in the Status field.
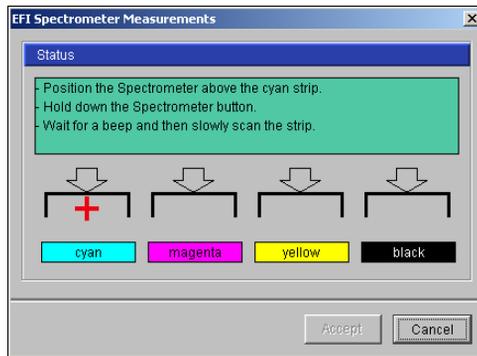
11. **For a more accurate measurement, place several sheets of plain white paper beneath the Measurement Page.**

    The extra sheets block underlying colors from being read by the instrument.

12. **Orient the Measurement Page so that the strips are horizontal and the scan direction (indicated by the arrows at the beginning of each strip) is left to right.**

13. **Hold the ES-1000 with its length perpendicular to the scan direction, and place the sample aperture in the white space at the start of the specified color.**

14. **Press and hold the measure button and wait for a beep.**

    NOTE: To hear a beep with a Windows compatible computer, you must install a sound card and speaker(s). You might need to turn up the volume on your computer to hear the beep. Alternatively, you can configure the computer to display a visual signal for a beep. Follow the procedure on page 2-11.

15. **After you hear a beep, slide the ES-1000 at a slow but consistent pace across the strip.**

    Take about 5 seconds to slide the length of the strip.

16. **Release the button when all the patches in the strip have been measured, and you have reached the white space at the end of the strip.**

    When a strip is measured successfully, the cross hair moves to the next color. If the strip is not measured successfully, a message directs you to try again.

17. **Repeat step 13 through step 16 until all the strips have been measured.**

    NOTE: You must take the measurements in the order outlined in the Status field.

18. **When all the patches have been read successfully, click Accept.**

19. **Click Apply in the Calibrator window to implement the new calibration measurement.**

20. **Click OK in the Information dialog box.**

This completes the EX7750 calibration process.

Calibrating the EX7750 with the DTP41

Using the ColorWise Pro Tools Calibrator and the DTP41 spectrophotometer, you can quickly measure color patches generated by the printer and automatically download these measurements to the EX7750.

NOTE: Before using ColorWise Pro Tools and the DTP41 to calibrate the EX7750, follow the instructions on page A-6 for calibrating the DTP41 spectrophotometer.

TO CALIBRATE THE EX7750 USING THE DTP41

1. Start Calibrator.

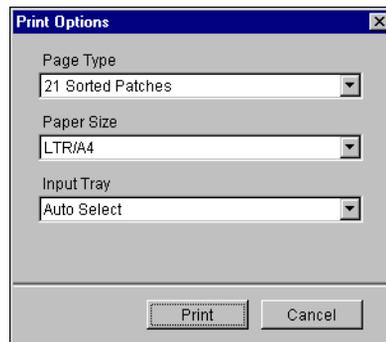For instructions on starting Calibrator, see page 2-6.

2. Choose X-Rite DTP41 as the measurement method.

3. In the Check Print Settings pane, choose the desired calibration set.

Choose the appropriate calibration set for the mode and type of media that you use most often.

NOTE: For this calibration to take effect, the calibration set must be associated with one or more output profiles. You do not need to make any new associations for the default calibration set, since it is already associated with the default output profile.

4. In the Generate Measurement Page pane, click Print.

The Print Options dialog box appears.

5. Choose the appropriate options, and click Print.

For Page Type, choose 21 or 34 Sorted Patches.

Paper Size is automatically set to LTR/A4 for 21 Sorted Patches, or 11x17/A3 for 34 Sorted Patches.

For Input Tray, choose the paper source for printing the measurement page.

6. Retrieve the measurement page from the printer.

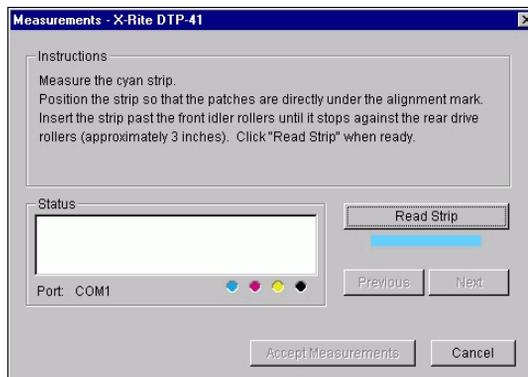7. **Click Measure in the Get Measurements pane.**

   The Measurement Options dialog box displays the specified Page Type and Paper Size options.

8. **Click Measure.**

9. **If necessary, choose the appropriate COM port for the DTP41 from the Available Ports menu. Click Start Measurements.**
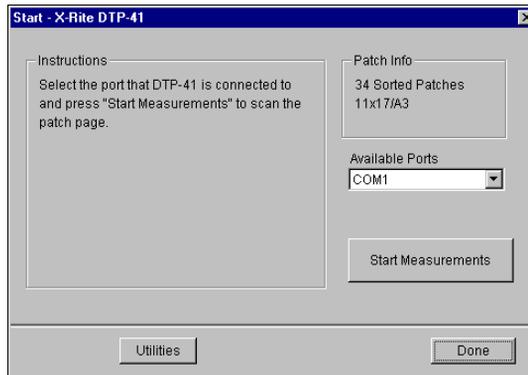
10. **Insert the measurement page into the DTP41, starting with the cyan strip.**
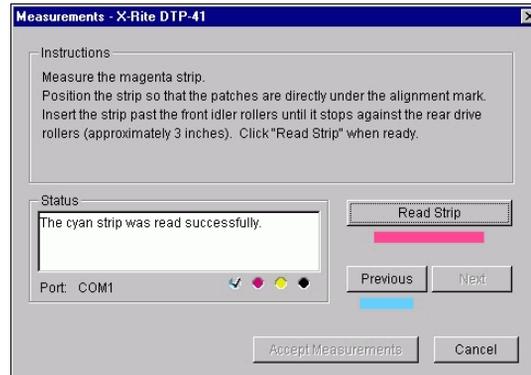

   Follow the on-screen instructions to align the page properly.

11. **Click Read Strip.**

    The DTP41 pulls the measurement page through automatically.

    After the measurement page is read, Calibrator instructs you to insert and align the page again for the next color.

12. **Repeat the measurement process for the magenta, yellow, and black strips.**

    A check mark appears on the circle of the color just read, and the Status field indicates the color was measured successfully.

    Click Previous and Next to reverse or advance to another step in the measurement sequence.

13. **When the Status field indicates that all four color strips have been read successfully, click Accept Measurements.**

14. **Click OK in the Measure dialog box.**

15. **Click Apply in the Calibrator window to implement the new calibration set.**

16. **Click OK in the Information dialog box.**

    This completes the EX7750 calibration process.

Calibrating the EX7750 with the DTP32 or DTP32HS

Using the DTP32 or DTP32HS, you can quickly measure color patches and download these measurements to the EX7750 using ColorWise Pro Tools Calibrator.

NOTE: Before using ColorWise Pro Tools and the DTP32 to calibrate the EX7750, follow the instructions on page A-12 for calibrating the DTP32 densitometer.

TO CALIBRATE THE EX7750 USING THE DTP32 OR DTP32HS

1. Start Calibrator.

For instructions on starting Calibrator, see page 2-6.

2. In the Select Measurement Method pane, choose X-Rite DTP32.

3. In the Check Print Settings pane, choose the desired calibration set.

Choose the appropriate calibration set for the mode and type of media that you will use most often.

NOTE: For this calibration to take effect, the calibration set must be associated with one or more output profiles. The default calibration set is already associated with the default output profile. You do not need to make any new associations.

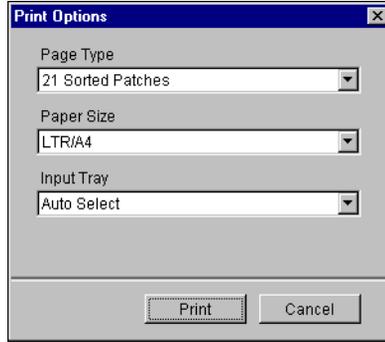**4. Click Print in the Generate Measurement Page pane.**

The Print Options dialog box appears.

5. Choose the appropriate options and click Print.

For Page Type, choose 21 or 34 Sorted Patches

Paper Size is automatically set to LTR/A4 for 21 Sorted Patches, or 11x17/A3 for 34 Sorted Patches.

For Input Tray, specify the paper source.

6. **Retrieve the measurement page from the printer.**

7. **Click Measure in the Get Measurements pane.**

   The Measurement Options dialog box displays the specified Page Type and Paper Size options.

8. **Click Measure.**

   In the dialog box that appears, follow the directions for feeding the measurement page through the DTP32 or DTP32HS.

   NOTE: For the DTP32HS, disregard any instruction regarding the page guide. The DTP32HS does not have an edge guide for the page. Instead, position the page so that the strip to be measured is lined up directly under the alignment mark.

   The Status field displays instructions for selecting the port and feeding the measurement page through the DTP32 four times, once for each color strip.
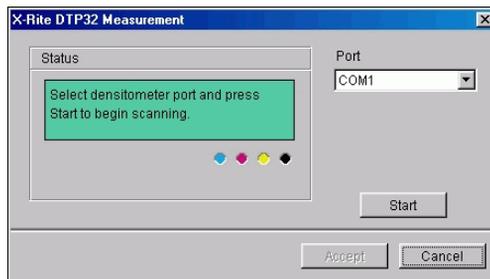
9. **When the Status field indicates that the measurements were read successfully, click Accept.**

10. **Click OK in the Measure dialog box.**

11. **Click Apply in the Calibrator window to implement the new calibration set.**

12. **Click OK in the Information dialog box.**

This completes the EX7750 calibration process.

Calibrating from the Control Panel using VisualCal

VisualCal is a calibration method that allows you to calibrate your printer to a color output standard defined by the manufacturer. The calibration calculations performed by the controller software are based on a series of values entered on the Control Panel. The values used in the calculations are determined by evaluating toner densities and color combinations produced on two specially designed calibration pages printed from the Control Panel.

Limits and 30% Match

The first VisualCal page, "Limits and 30% Match," provides the basis for calculating the most acceptable luminosity (brightness) of the toners. This page consists of rows of CMYK dots in a graduated range of toner densities.

The variables needed to recalculate the *density* of the colored toners are determined by identifying the leftmost dots that can be fully distinguished against their fields in each row, and sequentially entering their corresponding numeric values on the Control Panel. The variable needed to recalculate the *luminosity* of the toners is determined in a slightly different way—you identify the black dot that best matches a 30% dot gain field. When all values have been entered, the printer's toner density and luminosity settings are recalculated.

Gray Balance

The second VisualCal page, "Gray Balance," provides the basis for calculating a "neutral gray balance," that is, a CMY gray that as closely as possible matches a pure K (blacK) gray produced by the printer's engine. This page consists of rows of CMY gray patches on a field of gray produced solely from black. The variables needed to calculate the printer's most neutral gray balance are determined by identifying the CMY patch that best matches this field, and entering its row and column location on the Control Panel. When the values have been entered, the printer's gray balance is recalculated.

TO PERFORM VISUALCAL CALIBRATION

1. **At the Idle screen, press the Menu button to enter the Functions menu.**

2. **Choose Calibration, and then choose Set Up Calibration.**

   If a password is set on the EX7750, enter it and press OK.

3. **For Calibration Mode, select Standard or Expert.**

   Expert Mode adds the option to print a Comparison Page (see page 2-8).

4. **At the main calibration screen, select Calibrate.**

5. **For Media, choose the media type for the calibration.**

6. **Select Yes to print the Limits and 30% Match page.**

   To reset the printer's toner density and luminosity settings, follow the instructions provided on the Limits and 30% Match page. Use the touch screen to change numbers. Do not use the numerical keypad.

   NOTE: Zero (0) and 9 are unacceptable values for color calibration. If you select 0 for any of the colors, the resulting calibration is inaccurate. If you select 9, the Limits and 30% Match page is reprinted automatically with the densities shifted to enable you to enter a number less than 9. Re-enter values for all color rows starting with Black Start.

   When you finish entering all values, the PRINT GRAYS screen appears.

7. **Select Yes to print the Gray Balance page.**

   To reset the printer's gray balance, follow the instructions provided on the Gray Balance page. When you finish entering all values, the PRINT COLOR TEST screen appears (Expert Mode only).

   NOTE: If the Gray Balance page is printed after the Limits calculations have been made, the gray field on which the CMY patches appear on the Limits page uses the new density and luminosity calibration settings.

8. **(Expert Mode only) Select Yes to print a color test page that uses the original values (CURRENT COLOR TEST PAGE) and a Color test that uses the new values (NEW COLOR TEST PAGE). Press Enter to print the pages.**

9. **If you are satisfied with the printer's calibration based on the new values, select YES from the APPLY CHANGES screen that appears, and press OK to calibrate the printer based on the previously entered values.**

10. **Choose Exit Calibration to return to the Functions menu.**

    Use the following suggestions for adjusting VisualCal for your specific preferences:

    • If your prints seem to be color balanced but too dark, enter a lower value for the 30% Match entry on the Limits and 30% Match page, last row.

    • If your prints seem too light, enter a higher value.

    • If light areas on your prints have a color cast, enter a lower value in the Start row for that toner.

    • If dark areas on your prints have a color cast, enter a higher value in the End row for that toner.

2

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1. **From the EX7750 Control Panel, access the Calibration menu as described on page 2-21.**

2. **Choose Remove Calibration.**

3. **Select the Media type.**

4. **When prompted, verify that you want to proceed with removing calibration.**

   The current measurements are removed and a default calibration is restored.

This page is intentionally blank.

3

Chapter 3: ColorWise Pro Tools

Designed to give you flexible control of color printing, ColorWise Pro Tools include the following color management tools:

- Calibrator (see Chapter 2)

- Color Editor

- Profile Manager

- Spot-On

- Color Setup

ColorWise Pro Tools for Windows and Mac OS computers are fundamentally the same; differences are noted in this chapter. The windows and dialog boxes illustrated are Windows versions. For information about installing and configuring a connection to ColorWise Pro Tools, see the *User Software Installation Guide*.

NOTE: If the connection to the EX7750 from Command WorkStation/Command WorkStation LE (which also allows for access to ColorWise Pro Tools) is not established, you can start ColorWise Pro Tools independently of Command WorkStation/Command WorkStation LE.

Profile Manager

Profile Manager allows you to manage and edit ICC profiles. In the case of the EX7750, these profiles are divided into RGB Source, Simulation, and Output profiles:

- **RGB Source** contains all monitor profiles resident on the EX7750. RGB Source profiles are used to define the source color space for RGB colors processed by the EX7750.

    NOTE: If you use Photoshop 5.x, 6.x, or 7.x, you can upload the profile for your selected working space to the EX7750 and choose that as your RGB Source Profile. For more information, see the *Fiery Color Reference*.

- **Simulation** contains printer profiles used to simulate another device on the EX7750.

- **Output** contains printer profiles that describe the printer. For more information about output profiles, see page 1-16.

NOTE: Changing the EX7750 default profiles affects *all* jobs for *all* users. Consider limiting the number of people authorized to use ColorWise Pro Tools by setting an Administrator password.

The following profiles are provided with the EX7750.

RGB Source:

- Apple Standard—standard source color space for Mac OS computer monitors with older versions of ColorSync

- sRGB (PC)—source color space for a generic Windows computer monitor

- EFIRGB—preset default setting for a EX7750

Simulation:

- DIC—Japanese press standard

- Euroscale—European press standard

- SWOP-Coated—United States press standard

In addition, one or more output profiles are provided with the EX7750. For information about output profiles, see page 1-16.

Setting default profiles

Use Profile Manager to set a default RGB source profile, simulation profile, and output profile. The default RGB source and simulation profiles that you set are applied to all print jobs sent to the EX7750, unless you override them using print options. The same is true of the default output profile that you set, unless you select the Use Media Defined Profile option.

The Use Media Defined Profile option indicates whether or not the output profiles predefined for the media types in your print jobs are applied automatically. For more information, see "Using media-defined output profiles" on page 3-4.

TO SPECIFY A DEFAULT PROFILE

1. **Start ColorWise Pro Tools and click Profile Manager.**
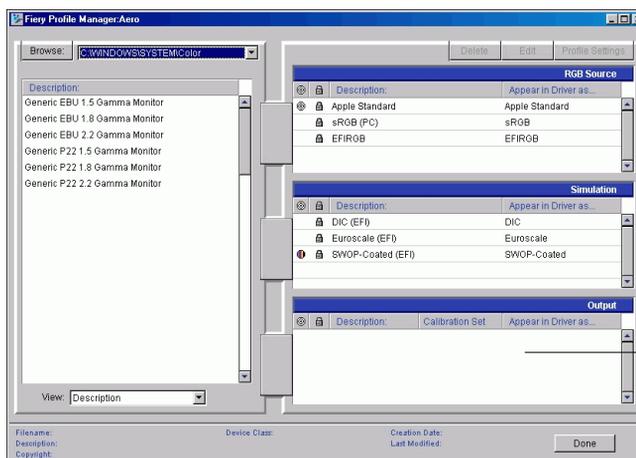
Output profiles appear here

The left side of the main Profile Manager window lists the ICC profiles in the default directory of your computer. The right side lists the three profiles on the EX7750.

The Lock icon (🔒) to the left of a profile name indicates that the profile cannot be deleted and can be edited only if saved under a new name. Only Simulation and Output profiles can be edited.

A small icon to the left of a profile name indicates the default profile for each category (RGB Source, Simulation, and Output). If you designate a different profile as the default, the icon appears next to your designated profile. The icon indicating the

default RGB Source and Output profiles looks like a target (⊚). The icon indicating the default Simulation profile changes in appearance depending on whether the default RGB Separation setting is set to Simulation (🔶) or Output (▮).

2. Select the profile you want as the default for a profile type and click Profile Settings.

3. In the Profile Settings dialog box, click Default and click Apply.

4. Click OK.

In the main Profile Manager window, the target icon appears next to the new default profile you specified.

5. Repeat steps 2 through 4 for each type of profile.

If no default is set for RGB Source, the RGB Source print option is set to None. If no default profile is set for Simulation, the CMYK Simulation print option is set to None. For more information about print options, see Chapter 1.

The Output profile always has a default profile. To change the Output default, select a preset profile you want as the default and click Profile Settings. Or create a new default under a new name by selecting a preset profile and specifying your choice of the calibration set in the Use Calibration Set menu and a new name in the Profile Description menu.

Using media-defined output profiles

Instead of having Profile Manager apply a default output profile to all your print jobs, select the Use Media Defined Profile option. This option automatically applies the output profile predefined for the media type in your print job. If your job contains mixed media, this option applies different output profiles predefined for the different types of media.

The Use Media Defined Profile option in Profile Manager is selected by default. It is applied to all print jobs sent to the EX7750, unless a user overrides it for an individual job by changing settings in the printer driver.

1. **Start ColorWise Pro Tools and click Profile Manager.**

2. **Select Use Media Defined Profile in the Output bar of Profile Manager.**

   Changing the setting for the Use Media Defined Profile option in Profile Manager automatically changes the same setting in Color Setup. For more information, see "Color Setup" on page 3-35.

Downloading profiles

The EX7750 includes default profiles. You can download additional profiles from any computer connected to the EX7750.

1. **Start ColorWise Pro Tools and click Profile Manager.**

   The left side of the main Profile Manager windows lists the ICC profiles in the default location on your computer.

   - **Windows 2000**—Winnt\System32\Spool\Drivers\Color

   - **Windows XP**—Windows\System32\Spool\Drivers\Color

   - **Mac OS 9**—System Folder:Preferences:ColorSync Profiles for ColorSync 2.0, and System Folder:ColorSync Profiles for ColorSync 2.5 or later

   - **Mac OS X**—System:Library:ColorSync:Profiles

2. **If the desired profile does not appear, click Browse to go to a different directory. Browse to the directory containing the profile you want to download and click OK.**

3. When the profile you want to download appears in the list in the main Profile Manager window, select it.

If the profile is compatible with the EX7750, a green arrow indicates that the profile is available for downloading. Only output device profiles are downloadable to Simulation and Output. Only input device profiles are downloadable to RGB Source.

NOTE: On Windows computers, the profiles must have an extension of .icc or .icm to be listed. On Mac OS computers, the profiles must have a file type of "profile."

All ICC profiles in the selected directory on your computer are displayed in the list in the main Profile Manager window. However, because a profile is listed does not necessarily mean it can be downloaded to the EX7750.

Simulation profiles should be profiles only for those devices you want the EX7750 to match in terms of color output characteristics. Output profiles should be profiles only for the printer to which you print. Although you can download CMYK printer profiles as Simulation or Output, consider how they will be used. If you want the EX7750 prints to look like another printer, download that profile as a Simulation. If you have a custom profile of the printer you print to, download that profile as an Output profile.

4. Click the arrow to download the profile and click OK when the download is complete.

The new profile now appears in the list of profiles on the right side of the Profile Manager main window.

For Mac OS computers, this profile must be associated with one of the predefined names (Source-1 through Source-10 for RGB Source, Simulation-1 through Simulation-10 for Simulation, or Output-1 through Output-10 for Output) or set as the default before it can be used. For Windows computers, all profiles can appear in the printer driver by their profile descriptions (see "Defining profiles" on page 3-8).

NOTE: When an output profile is downloaded, it inherits the calibration target of the current default output profile.

Editing profiles

Customize the profiles on the EX7750 to meet your specific needs and the characteristics of your printer using Color Editor, either directly or through Profile Manager. For more information about editing profiles, see "Color Editor" on page 3-11.

Managing profiles

Profile Manager allows you to back up profiles to ensure that no custom profiles are lost when the EX7750 software is updated. You can also upload a copy of a built-in EX7750 profile to your workstation in order to use it with an ICC-aware application, such as Photoshop. Profile Manager also allows you to delete unwanted profiles.

NOTE: You can back up and delete only those profiles that appear in the main Profile Manager window *without* a Lock icon next to them. Locked profiles cannot be deleted, but most can be backed up.

TO BACK UP PROFILES

1. **Start ColorWise Pro Tools and click Profile Manager.**

2. **Select the profile on the EX7750 to upload.**

   The arrow in the middle of the Profile Manager window turns green and points to the left, indicating the profile is available for upload.

3. **Click the green arrow, choose a name and location for the profile, and click Save.**

   The name will be the file name of the profile, but the profile description will be the original description, or the one you entered in the Profile Settings dialog box.

   NOTE: When saving the profile on a Windows computer, include the extension .icm. If the extension is not included, additional dialog boxes appear.

4. **Click OK when you are notified that the profile was successfully uploaded.**

   Delete profiles to ensure that the wrong profiles are not used, and to free up disk space on the EX7750 (although profiles do not take up much space).

1. **Start ColorWise Pro Tools and click Profile Manager.**

2. **Select the profile you want to delete and click Delete.**

   A Warning dialog box asks you to confirm the deletion.

   NOTE: You cannot delete preset profiles, profiles that are currently set as default, or profiles that are linked to any of the predefined custom names, for example Simulation-1.

3. **Click Yes to delete the profile.**

4. **To delete a profile currently set as the default or associated with a custom name, click Profile Settings and clear the default option.**

Defining profiles

For Mac OS computers, before you apply any downloaded or edited profile to a print job, that profile must be linked to one of the predefined custom names, or you can set the profile as the default for all print jobs (see "Setting default profiles" on page 3-3). Ten names are available for custom profiles—Source-1 through Source-10 for RGB Source, Simulation-1 through Simulation-10 for Simulation, or Output-1 through Output-10 for Output.

For Windows computers, all profiles appear by their actual names in the printer driver. These fixed names are used in the printer driver. You can select profiles per job even if your driver does not have the capability to obtain an updated list from the EX7750.

NOTE: A custom simulation profile is used to illustrate this procedure. The same steps apply for defining output profiles.

TO DEFINE A CUSTOM SIMULATION PROFILE

1. Start ColorWise Pro Tools and click Profile Manager.
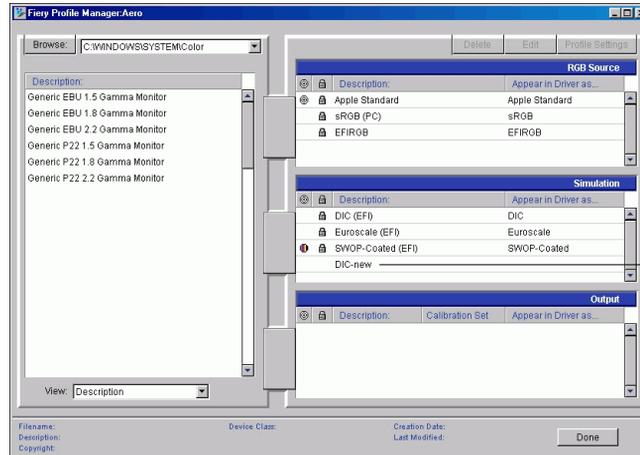
**Custom profile
created with
Color Editor**

For the purposes of this example, assume DIC-new is a custom simulation profile
created with Color Editor and, as such, no information is displayed for DIC-new
under the heading "Appear in Driver as."

NOTE: You can define custom profiles only. Default profiles are predefined and cannot
be changed.

**2. Select DIC-new in the Simulation list, and click Profile Settings or double-click
DIC-new.**

**3. Select the "Appear in Driver as" option, choose one of the predefined custom
simulation names (Simulation-1 through Simulation-10) from the menu, and then
click Apply.**

NOTE: Choose a name that is not already linked with another simulation. You cannot
define two profiles with the same name.

NOTE: Although you cannot delete a preset profile, you can use the name of a preset profile for your edited profile when you select the "Appear in Driver as" option. This replaces the preset profile with your own profile.
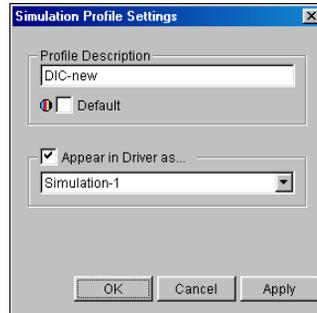
In Profile Settings, you can also change profile descriptions for all non-locked profiles.

4. Click OK.

DIC-new will appear in driver as Simulation-1
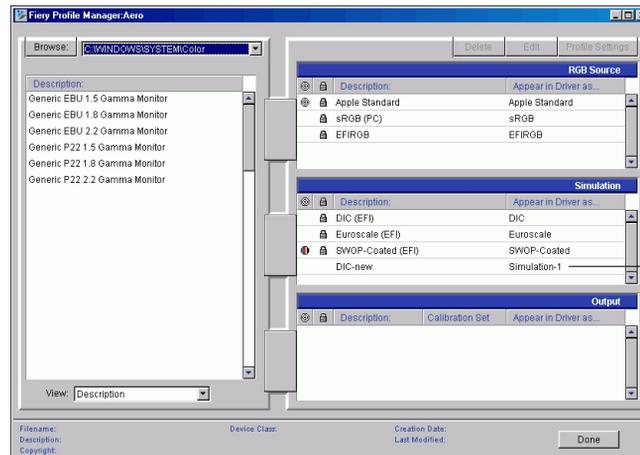
Simulation-1 now appears under the "Appear in Driver as" column for DIC-new. Choosing Simulation-1 from the CMYK Simulation option of the printer driver applies the DIC-new simulation to the print job.

If you do not define a custom simulation profile, your job prints with CMYK Simulation Profile set to None. If you do not define a custom RGB Source or Output profile, the default profile is used.

Considerations for defining Output Profiles

The procedure for defining Output Profiles is similar to the preceding example for defining Simulations profiles. However, note these differences:

- For output profiles, the predefined custom names are Output-1 through Output-10.

- When you choose Profile Settings for an output profile, the Use Calibration Set options also appear. You must calibrate the EX7750 with this calibration set before this option has any effect. If you have never measured for this calibration set, default measurements are used. For more information about calibration sets, see page 2-3.

Color Editor

Color Editor allows you to customize simulation and output profiles. Access Color Editor directly by clicking its icon in the ColorWise Pro Tools main window, or indirectly, through the Profile Manager.

Editing profiles

Color Editor allows you to create custom profiles by editing existing simulation or output profiles and saving the changes as a new profile. Use Color Editor to fine-tune a profile on your EX7750 to meet your exact specifications. For example, you can create a custom profile for printing to a specific media type.

NOTE: You cannot edit source profiles; only simulation and output profiles can be customized.

Color Editor has two Edit Modes for editing output profiles:

- **Custom**—Edit output profiles and save customized versions of them.

- **% Density**—View the calibration target, which is one component of the output profile. You can make changes to the calibration D-max target in this window, and you can import a new target (see page 2-3).

Color Editor also has several Edit Modes for editing simulations:

- **Master**—Create a custom *master* simulation that affects all print jobs to which it is applied, unless a linked simulation exists for the selected combination of simulation profile, simulation method, and output profile.

- **Quick**, **Full (Source GCR)**, or **Full (Output GCR)**—Create custom *linked* simulations. Linked simulations affect the print job only if the corresponding simulation profile, simulation method, and output profile are selected. If you choose an output profile and simulation method for which you have created a custom linked simulation, that simulation is applied automatically to the job. If you choose a simulation method or output profile for which there is no custom linked simulation, the master simulation is automatically applied. For detailed information about simulation methods, see .

NOTE: If you made edits to a master simulation after you created a linked simulation, the edits are not applied to the linked simulation.

TO EDIT A SIMULATION PROFILE IN MASTER MODE OR AN OUTPUT PROFILE IN CUSTOM MODE

1. **Start ColorWise Pro Tools and click Color Editor.**

2. **Choose Simulation or Output from the View menu.**

   Simulation lists the simulation profiles resident on the EX7750, and Output lists the output profiles resident on the EX7750.
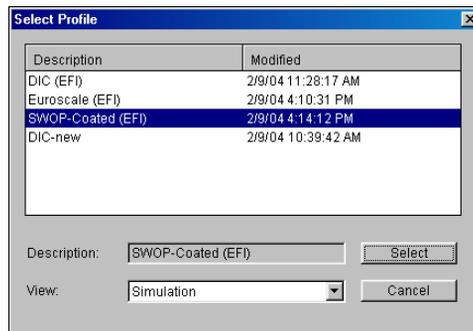
3. **Choose a profile to edit and click Select.**

   Another method is to open the Profile Manager, select a profile, and then click Edit.

4. **For a simulation profile, choose Master from the Edit Mode menu. For an output profile, choose Custom from the Edit Mode menu.**

   For instructions for using Quick, Full (Source GCR), or Full (Output GCR) mode, see page 3-17.
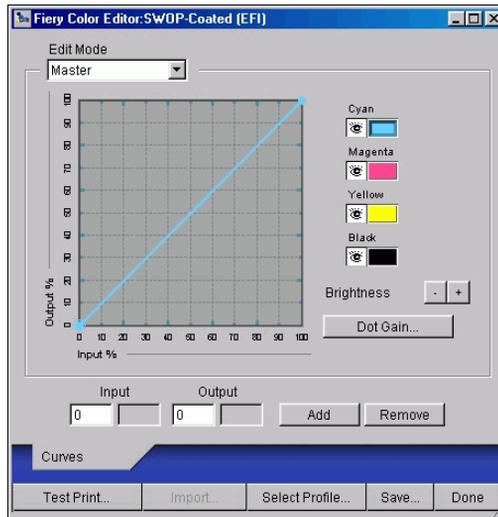
Use this dialog box to view or edit profiles. The graph allows you to view and manipulate color output values.

NOTE: When you edit an output profile in Custom mode, clicking Import at the bottom of the Color Editor window allows you to import a calibration target file (.trg) created on another EX7750 using the previous version of ColorWise. The current version of ColorWise does not allow you to save a target separately; rather, it saves the target in conjunction with an output profile.

5. Select the colors that you want to edit by turning colors off and on.

The Eye icon to the left of each color indicates whether that color is visible on the graph and will be affected by changes to the curves, brightness, and dot gain controls. You can view and edit all four colors (cyan, magenta, yellow, and black) at once, or in any combination. Working with only one or two colors at a time allows you to fine-tune your adjustments. To turn off a color, click its Eye icon. In the following example, cyan and magenta are visible and can be edited.
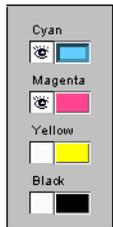
6. To adjust the dot gain value for simulating press output, click Dot Gain.
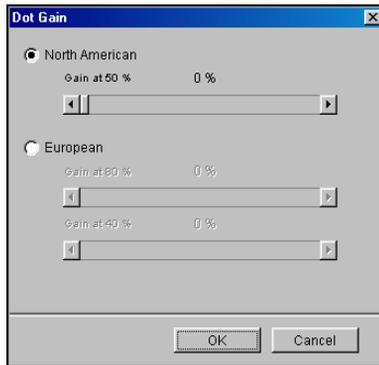
Choose either the North American or European standard. Use the sliders to adjust to the desired Dot Gain:

• The range of values for North American at 50% input are from 0% to 50% gain on output.

• The range of values for European at 40% input are from 0% to 59% gain on output. The range of values for European at 80% input are from 0% to 20% gain on output.

If you use Dot Gain values, apply the settings first, so that the curves are deflected from their straight-line positions. Then make edits to the new curves. When you adjust Dot Gain values, all existing points on the curve are removed. A warning dialog box allows you to cancel Dot Gain settings before they are applied.

7. Use the plus and minus buttons to adjust brightness.

Changes to the brightness are reflected in the curve(s).

8. To adjust the curves directly, click and drag points on the curve or enter numbers into the input and output boxes.

The graph maps the input percentage to the output percentage. (These percentages refer to the size of the CMYK halftone dots.) The curve you selected appears, and points along the curve are marked so you can adjust them.

A curve with this shape makes a color appear lighter by reducing density in the midtones.
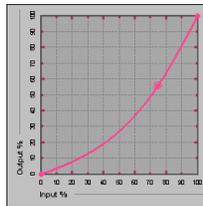
A curve with this shape makes a color appear darker by adding density in the midtones.
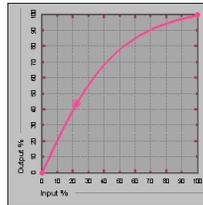
A curve with this shape increases contrast.
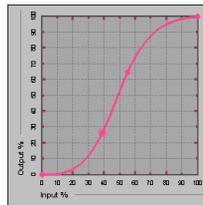
NOTE: Adjust points in this way only *after* you have entered the Dot Gain and Brightness values.

For greater precision, type percentages in the Input and Output fields or use the arrow keys on the keyboard to adjust the curve. To use the arrow keys, you must first click the curve to establish an anchor point that serves as a reference.

9. For an output profile, set maximum densities of the C, M, Y, and K channels.

Enter the maximum densities, called D-Max values, of individual colors for profiles that support density settings. D-Max settings are not available when you edit Simulation profiles in Master mode.

10. When you are finished, click Save and enter a name for the new profile.

The new custom profile is saved to the EX7750 with the new name. If you edit one of the press standard targets (for example, SWOP-Coated, DIC, or Euroscale), consider including the original name as part of the new target name (for example, DIC-new) to help you remember the source of the new target.

NOTE: Preset default profiles are locked and *must* be saved with a new name.

For Mac OS computers, custom profiles must be linked to one of the 10 predefined custom profile names (Simulation-1 through Simulation-10 for Simulation, or Output-1 through Output-10 for Output) to be accessible from the printer driver. Create as many custom profiles as you want, but a maximum of 10 are available from the printer driver at any one time. For information about linking custom profiles to the predefined custom profile names, see "Defining profiles" on page 3-8. If you are using the printer driver for Windows computers, custom profiles will appear in the driver window without being associated with a predefined profile name.

If you set a custom profile as the default, you can access it from the printer driver *without* linking it to one of the predefined custom names. Select Printer's default from the printer driver.

1. **Start ColorWise Pro Tools and click Color Editor.**

2. **Choose Simulation from the View menu, select the simulation profile to edit, and then click Select.**

   Another method is to open the Profile Manager, select a simulation profile, and click Edit.

3. **Choose Quick, Full (Source GCR), or Full (Output GCR) from the Edit Mode menu, and choose an output profile with which your edited simulation will be linked from the Link with menu.**

   The edited simulation will be linked with the output profile you choose from the "Link with" menu.
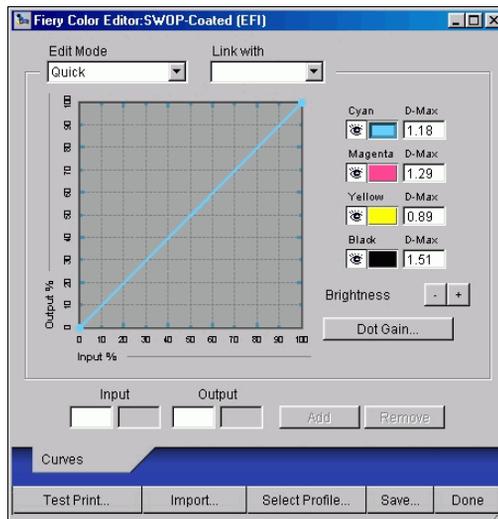
   NOTE: When editing a simulation profile in Quick mode, clicking Import at the bottom of the Color Editor window allows you to import a custom Quick Simulation created on another EX7750 using the previous version of ColorWise. The current version of ColorWise does not allow you to save custom CMYK Quick, Full (Source GCR) or Full (Output GCR) Simulations independently. They are saved as components of the same profile.

4. **Edit and save the simulation, as described in steps 5 through 10 of the procedure starting on page 3-14.**

For this new simulation to be automatically applied to a print job, the CMYK Simulation, Simulation Method, and Output Profile settings must be the same as those used when you edited the profile. If the Simulation Method is different or a different output profile is selected, the Master simulation is applied.

NOTE: A CMYK Simulation Profile can have a custom Master and one or more custom links—up to three links (Quick mode and the two Full modes) for each output profile on the system. For the CMYK Simulation Profile option in the printer driver, note that if you select a custom profile for which the output ink percentage is greater than 0 and the input ink percentage is 0, the Use Master print option has no effect.

Undoing CMYK simulation edits

Undo the changes you made to CMYK simulations (master and linked) in the following ways:

- If you have not yet saved your edits, click Done on the Color Editor menu bar and do not save the changes.
- If you saved your edits under a new CMYK simulation name and want to delete all edits to the simulation in Master, Quick, and Full (Source GCR) or Full (Output GCR) modes, see page 3-8.

Checking edited profiles

To view a printed sample of a profile before you save it to the EX7750, print one of the following:

- Comparison Page provided with ColorWise Pro Tools, which shows a comparison of images and colored patches with and without edits
- User-defined CALIB.PS in the Hold queue

You can create a custom comparison page and save it as a PostScript or Encapsulated PostScript (EPS) file called CALIB.PS. Print the file to the Hold queue of the EX7750 from your application, or download it to the Hold queue with Fiery Downloader (see page 2-8).

1. Click Test Print at the bottom of the Color Editor window.

Output profile names appear here
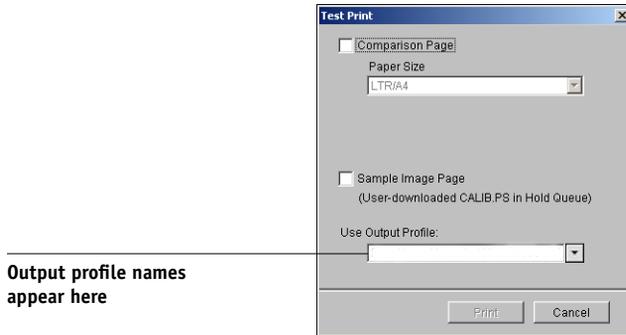
2. Select a page to print. If you selected Comparison Page, choose a paper size. If you selected Sample Image Page, choose an output profile. Then click Print.

Using Spot-On

The ColorWise Spot Color Matching option automatically matches spot colors with their best CMYK equivalents so that spot colors can be simulated using the CMYK toner of the printer. However, you may want to adjust the default CMYK equivalents to achieve a better match for your specific printing conditions.

Spot-On allows you to adjust and manage lists of spot colors and their CMYK equivalents. The matching lists of spot colors and CMYK values are known as Spot Color Dictionaries. Spot-On allows you to maintain multiple Spot Color Dictionaries (one for each output profile on the EX7750).

NOTE: To use Spot-On CMYK equivalents, you must enable the Spot Color Matching option (see page 1-9).

Starting Spot-On

You can start Spot-On from ColorWise Pro Tools. To use Spot-On, you must first specify the output profile associated with the Spot Color Dictionary that you want to edit. However, you may switch to a different output profile at any time while working with Spot-On.

NOTE: The EX7750 allows only one user connection through Spot-On at a time.

TO START SPOT-ON

1. **Start ColorWise Pro Tools and click Spot-On.**

2. **Choose the desired output profile and click OK.**

Output profile names appear here
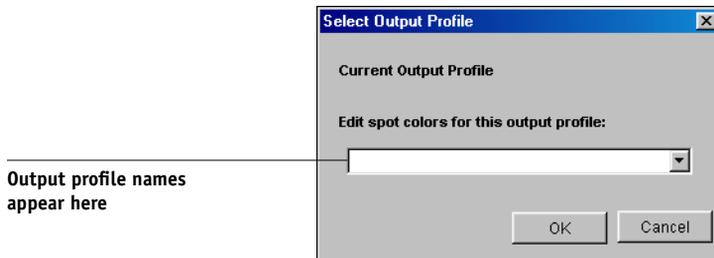
The Spot-On main window appears. The CMYK values you see in the window are calculated with respect to the specified profile.

Using the Spot-On main window

The Spot-On main window displays a list of color groups that represent libraries of spot colors on the EX7750. Tool icons for working with colors appear at the top of the window.
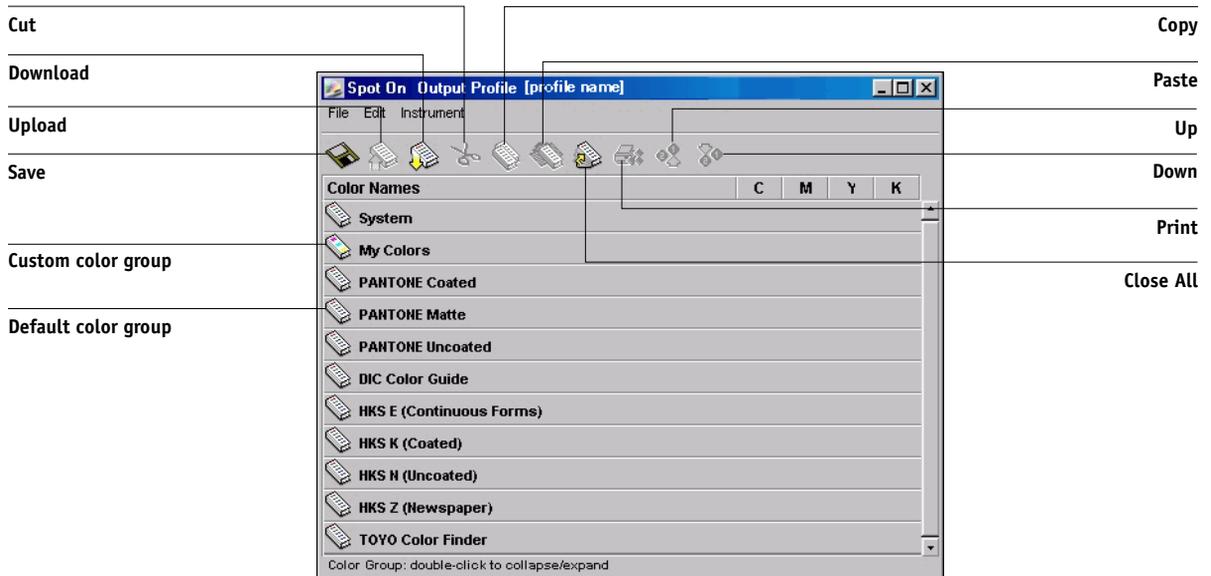
By default, the EX7750 includes several PANTONE libraries along with a System library. The DIC, HKS, and TOYO libraries are available with Spot-On. These factory default libraries appear marked with the default group icon (🖹).

You can also add custom color groups and colors to the Spot-On window (see page 3-24). Added groups appear marked with the custom group icon (🖹). Both default and custom groups can be opened to display their included colors.

1.   **To open a color group, click the icon to the left of the group name.**

     You can also open a group by double-clicking the blank area to the right of the group name.

     When you open a group, all colors in the group are displayed, and the group icon changes appearance.
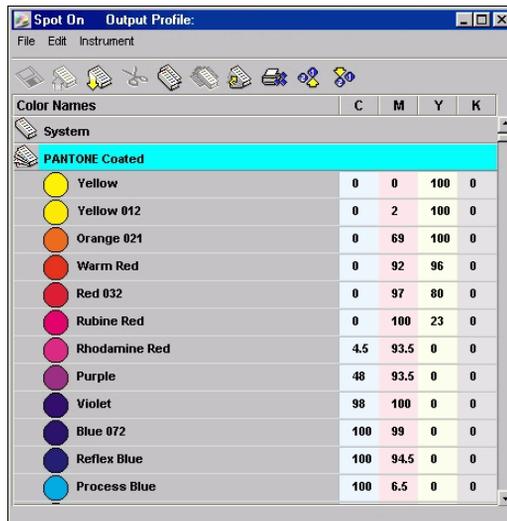
2.   **To close a color group, click the icon to the left of the group name, or double-click the blank area to the right of the name.**

3.   **To close all color groups in the list, choose Close All from the Edit menu.**

     You can also close all color groups by clicking the Close All icon above the color list.

Working with existing colors

With Spot-On, you can view and manage existing groups of colors on the EX7750.
You can also search for a particular color in the Spot-On list.

Color groups in the Spot-On window appear in order of their priority. Highest priority
is given to color groups at the top of the list. For instance, if two colors from two
different color groups have the same name, the EX7750 uses the color from the higher
group and disregards the other color. By managing the priority of colors in this way,
you can maintain several CMYK variants for the same spot color.

TO REARRANGE THE PRIORITY OF COLORS

1. **To rearrange an entire color group, select the desired color group.**

   To rearrange an individual color, select the desired color.

   Individual spot colors are marked with circular color icons.

2. **To move the selection up or down in the list, click the Up or Down icon in the toolbar.**

3. **To paste the selection in a different location in the list, click the Cut or Copy icon in the toolbar.**

   NOTE: The Cut operation is only available for custom colors.

4. **Click the location in the list where you want to paste the cut or copied selection, and click the Paste icon in the toolbar.**

   When you paste a default color group or color, a warning message may appear asking
   you to rename the selection. Use the menus to choose the desired prefix and suffix for
   the new name, and click OK. The pasted selection becomes a custom color group or
   color with the specified name.

1. **Choose Find from the Edit menu.**

    The Find dialog box appears.

2. **Enter the name of the color you want to find and click OK.**

    Spot-On searches for the specified color, starting from the top of the color list.
    The located color appears selected in the color list.

3. **To find additional colors based on the same search criteria, choose Find Again from the Edit menu.**

Creating custom colors

Spot-On provides a number of default color groups, such as PANTONE and DIC, in the color list. You can add your own custom spot colors and groups to the list.

1. **Select the line in the group or color list where your addition is intended.**

2. **Choose New Group from the Edit menu to insert a new group or choose New Color to insert a new color.**

    A new color group entry or color entry appears as Untitled.

1. **Select the Color Name or specific color you want to edit.**
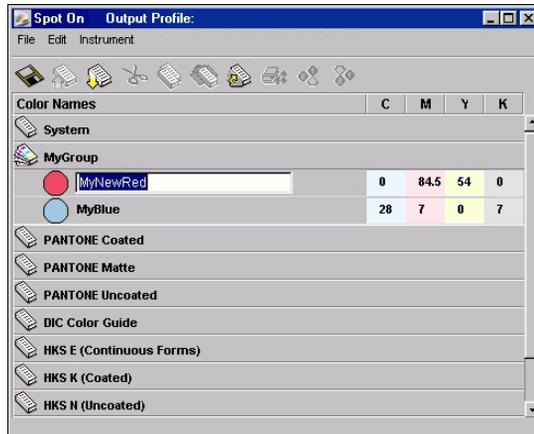
2. **Type the new name exactly as it appears in the print job documents, including uppercase and lowercase characters and spaces, as necessary.**

   NOTE: Default groups or colors, such as PANTONE, cannot be renamed.

Downloading custom color groups

You can download custom color groups from your computer to the EX7750. Downloaded groups are added as custom groups to the Spot-On color list and are enabled immediately for use on the EX7750.

TO DOWNLOAD CUSTOM COLOR GROUPS

1. **Select the line in the color list where you want to add the downloaded group.**

2. **Choose Download from the File menu.**

   The Select file dialog box appears.
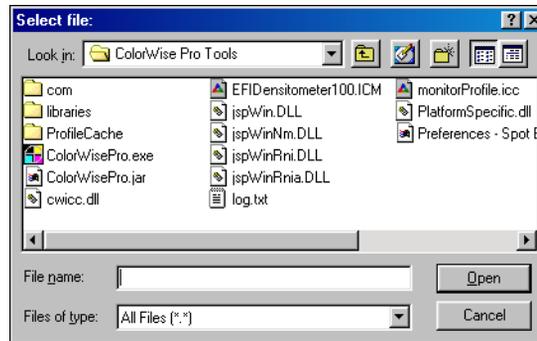
3. **Locate and select the desired color group, and click Open.**

   The downloaded group is added to the specified location in the Spot-On list. If you did not specify a location, the group is added to the top of the list.

   If the downloaded group has the same name as an existing group in the list, you are prompted to rename the downloaded group.

Uploading custom color groups

Upload custom color groups from the EX7750 to your computer as ICC files.
The upload feature allows you to share a group by creating a local copy that can be
downloaded to another EX7750.

Before you can upload a color group to your computer, it must be saved to the
EX7750. To upload a factory default group, copy and paste the group as a new custom
group. You can then upload the group as desired.

TO UPLOAD CUSTOM COLOR GROUPS

1. **Select the name of the color group that you want to upload.**

2. **Choose Upload from the File menu.**

    The Save As dialog box appears.
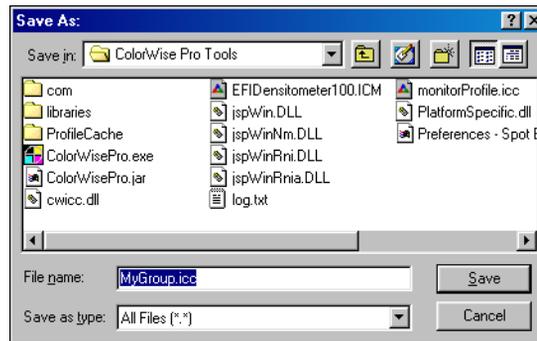
3. **Browse to the location where you want to save the file, name the file, and then
    click Save.**

Editing color values

The Spot-On Color Search targets the exact CMYK toner equivalents required to simulate a desired spot color on the printer. If an existing spot color is not printing as desired, you can modify the color values as needed to achieve your intended result. Beginning with an approximate color, you can adjust the hue, saturation, and lightness of the color until you achieve a desirable match.

TO TARGET A COLOR USING SPOT-ON COLOR SEARCH

1. **Select a color icon from a color group and choose Color Search from the Edit menu.**

   The Spot-On Color Search window appears. You can also display this window by double-clicking a color icon in the color list.

   The current color appears in the center patch of the window.

Center patch

3
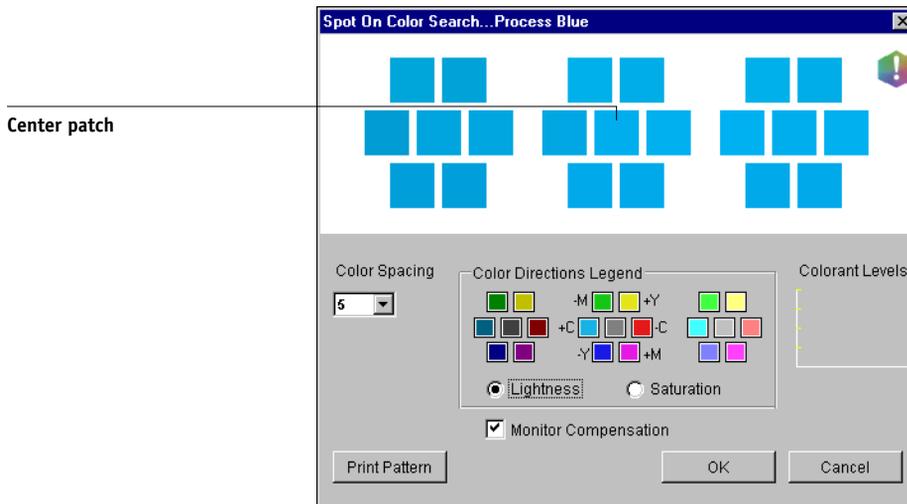
2. **To update the center patch to a neighboring color that more closely matches the target, click the corresponding neighbor patch.**

   Neighboring patches represent variations from the center patch and can be selected if they offer a closer match to the desired color. Clicking one of these patches updates the center patch to the new color and provides a new selection of neighboring colors. These patches are either lightness or saturation neighbors, depending on the option you choose in the following step.

   NOTE: When you select certain colors, an exclamation point icon may appear in the upper-right corner of the window. This icon indicates that the center patch color lies at the edge of the printer's printable gamut and may not be reproducible. In such cases, we recommend that you use an approximate target that lies within the gamut, rather than the out-of-gamut color.

   You can also click the center patch to enter CMYK values directly. For more information, see the procedure on .

3. **Use the following techniques to control how neighboring color patches are generated:**

   Select either Lightness or Saturation in the Color Directions Legend.

   Lightness generates neighbor patches based on darker to lighter shades of the original color. This variation is displayed from left to right, with the original color remaining in the center of the middle group.

   Saturation generates neighbor patches based on less saturated to more saturated variations of the original color. This variation is displayed from left to right, with the original color remaining in the center of the middle group.

   Choose a setting from the Color Spacing menu to control the closeness of the neighbor patches.

   A higher setting generates neighbor patches that differ more noticeably from the center color. As you get closer to your target color, reduce the color spacing to a smaller value.

Select Monitor Compensation to simulate how all the on-screen color patches will appear when printed on paper.

This simulation depends on the monitor profile that has been configured for the display. To specify the monitor profile, choose Preferences from the Edit menu in the Spot-On main menu.

If you use the monitor that is part of the Fiery Advanced Controller Interface (FACI) option, select the monitor profile that is installed with the option. If you use another monitor, select a profile customized to describe the characteristics of that monitor.

4. **Continue adjusting the color patch controls and clicking neighbor patches until the desired color appears in the center patch. Click Print Pattern.**

5. **Choose Output Style, Paper Size, and Paper Tray options.**
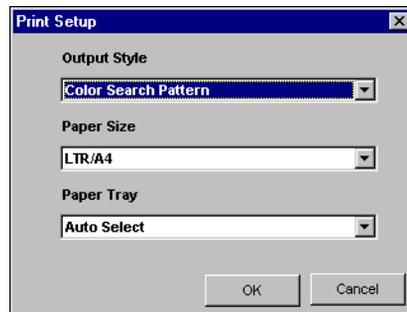
For Output Style, choose between Color Search Pattern and Color Neighbor Pattern. Color Search Pattern prints patches with the same pattern as displayed in the Color Search window. Color Neighbor Pattern prints patches in a three column by eight row format.

For Paper Size, choose the size of the paper you want to use for printing the patches.

For Paper Tray, specify the input tray for the paper you want to use.

6. **Click OK to print the patches.**

   The Print Pattern test page prints the following information:

   - Center patch color CMYK value

   - Color spacing

   - Lightness or Saturation neighbors selected

   - Output profile selected

   The goal of the Spot-On Color Search is to find the color values that make a printed color patch match a target, not the screen simulation of it. Printing a Print Pattern of the neighbor color patches allows you to compare the printed patches to the color target. Once you compare the printed patches and find the one that matches most closely, you can then select the corresponding patch on the screen.

7. **When you have selected the desired target color in the Spot-On Color Search window, click OK.**

   The edited color appears in the color list of the main Spot-On window.

1. Click the center patch in the Spot-On Color Search window.

The Set Center Patch Color dialog box appears.
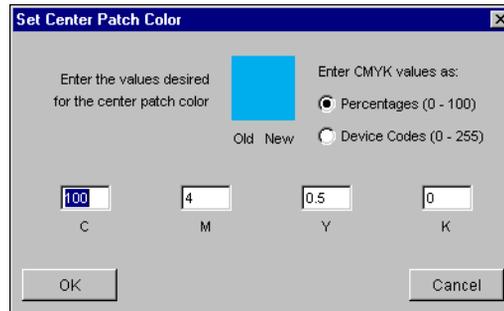
2. Select how you want to enter the CMYK values.

The Percentages option allows you to enter color values between 0 and 100%, in increments of 0.5. Values out of this range are rounded to the nearest whole or half percentage.

The Device Codes option allows you to enter color values between 0 and 255. This option reflects the full range of color values that the EX7750 can actually reproduce, and provides finer gradations of color than are possible with Percentages.

3. Enter the C, M, Y, and K values of your specific color in the appropriate fields.

Use the Tab key to move from field to field. As you enter each new value, the preview patch updates to reflect the old and new colors.

4. Click OK.

The new color appears as the center patch in the Spot-On Color Search window.

Using a measurement instrument to target colors

If you use the EFI Spectrometer ES-1000, you can import measured color values directly into Spot-On. This feature allows you to target matches based on the actual colors of immediate objects, such as the red of a printed logo or the yellow of a packaging envelope.

For best results, download and save any measurement data you have gathered with the ES-1000 in its offline state. Spot-On automatically clears stored data when it establishes a connection with the instrument. For information about downloading stored data from the ES-1000, see the documentation that accompanies the instrument.

TO IMPORT COLOR MEASUREMENTS INTO SPOT-ON

1. **Install and set up the ES-1000 for use with your computer.**

    For installation and setup instructions, see the documentation that accompanies the instrument.

2. **Choose Start from the Instrument menu.**

    The Choose Port dialog box appears.

3. **For Instrument, choose the instrument you will use to take measurements. For Port, choose the serial port connection of the instrument. Click OK.**

    The indicator light on the instrument flashes for a few moments as the connection to Spot-On is established. When the flashing stops, the instrument is ready to read measurements.

4. **Place the ES-1000 over the target color, making sure to center the sample aperture over the color. Press Measure to take the measurement.**

The measured CMYK values are imported into Spot-On as follows:

- If an individual color is selected in the color list, it updates to the measured color.

- If a group is selected in the color list, a new color with the measured values is created within the group.

- If the Spot-On Color Search window is open, the center patch updates with the measured values, and the neighbor patches update accordingly.

- If the Set Center Patch Color dialog box is open, the measured values are imported into the CMYK entry fields.

5. **When you finish taking color measurements, choose Stop from the Instrument menu.**

Spot-On closes the connection to the instrument.

Saving changes and exiting Spot-On

To enable your spot color matches for use on the EX7750, you must save your edits before exiting Spot-On. This action ensures that all your changes to Spot-On color definitions are stored on the EX7750 and available for use when printing documents that contain spot colors.

The following edits do not require saving to take effect:

- Rearranging the priority level of a color group

- Downloading a color group

- Clearing or deleting a color group

TO SAVE THE SPOT-ON COLOR LIST

1. **Choose Save from the File menu.**

2. **Click Close in the upper-right corner of the Spot-On main window to exit the utility.**

Color Setup

Use Color Setup to set the default ColorWise settings for the EX7750. To access Color Setup, click its icon in the ColorWise Pro Tools main window.

Setting default ColorWise options

Color Setup allows you to configure the default color management settings for the EX7750. These settings are applied to all print jobs sent to the EX7750, unless a user overrides them for an individual job by changing settings in the printer driver. These default settings can also be overridden using Command WorkStation/Command WorkStation LE or Fiery Spooler. Color Setup maintains a connection to the EX7750, so changes made in Profile Manager appear automatically. In addition, the defaults set in Color Setup are automatically reflected in other EX7750 tools that list default settings.

The options in Color Setup are arranged in a pattern representing the flow of color processing that takes place on the EX7750. To reset the EX7750 to its factory default settings, click Factory Default in the lower-left corner of the Color Setup window.

3
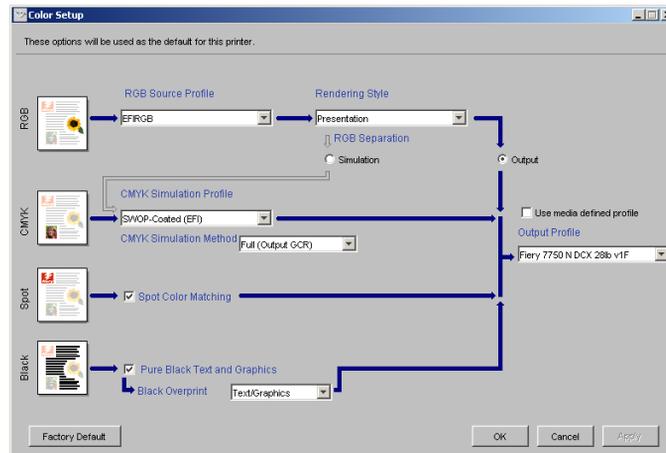
For those color options that offer multiple choices, make your selection from the menu that appears. For RGB Separation, use the radio button next to the option name. For other options, use the check box next to the option name.

Once you make your changes, you must click OK or Apply for the changes to take effect. Clicking OK sets the new defaults and closes the Color Setup window. Clicking Apply sets the new defaults and keeps the Color Setup window open. Clicking Cancel closes the Color Setup window without applying any changes to the default settings. For most users, the factory defaults result in optimal color output.

Appendix A: Color Measurement Instruments

This appendix explains how to set up and calibrate the following color measurement instruments:

• EFI Spectrometer ES-1000 hand-held spectrometer

• X-Rite DTP41 automatic scanning spectrophotometer

• X-Rite DTP32 automatic scanning densitometer

Using the EFI Spectrometer ES-1000

The EFI Spectrometer ES-1000 is a hand-held **spectrophotometer** that measures the **spectral light** reflected from printed output and other colored materials, as well as the **density** of printed ink and toner. It uses the density measurements to effectively calibrate the EX7750.

Setting up the ES-1000

To use the ES-1000 for calibration, you must first set it up for use with your computer. Follow the instructions that accompany the ES-1000, and connect the ES-1000 to your Windows or Mac OS computer by connecting the USB cable to a free USB port, or to a USB hub that features a separate power supply.

Because of its power requirements, the ES-1000 will not work if it is plugged into the USB port on your keyboard.

The following illustration shows the different parts of the ES-1000.

Measure button

Sample aperture

White tile reference

Calibration cradle
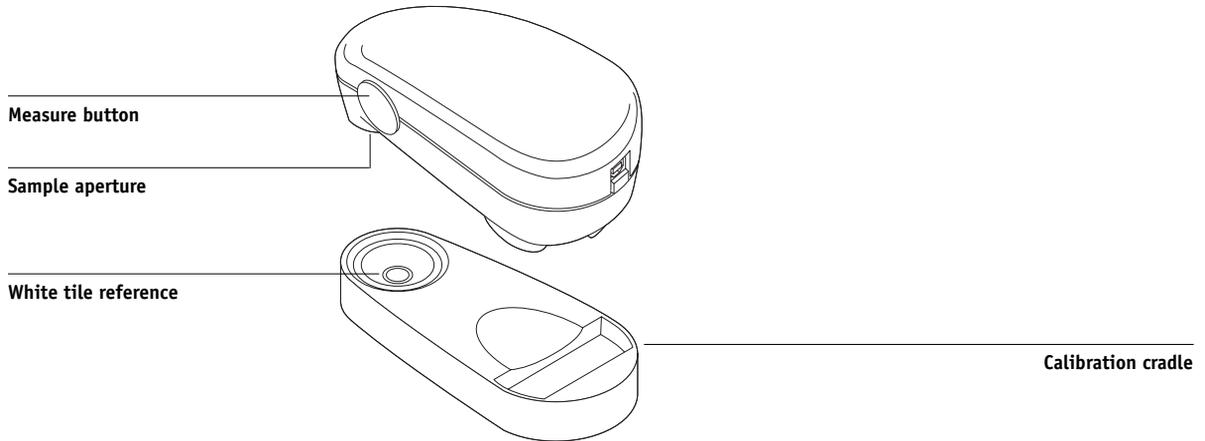
Calibrating the ES-1000

When you place the ES-1000 in the calibration cradle, white point calibration is used to calibrate the spectrometer. Make sure the sample aperture is in full contact with the white tile on the calibration cradle.

Using the X-Rite DTP41 spectrophotometer

ColorWise Pro Tools Calibrator supports the X-Rite DTP41 spectrophotometer, a device that measures density and color data. The DTP41 communicates directly with the Calibrator application in ColorWise Pro Tools, sending measurements to the EX7750 automatically.

Setting up the DTP41

Before you calibrate the EX7750, you must connect, configure, and calibrate the spectrophotometer to prepare for measuring the printed patches. For additional information about setting up and using the DTP41, see the documentation that accompanies the instrument.

A

To connect the X-Rite DTP41 to the computer

1. **Turn off the computer.**

2. **Unpack the X-Rite DTP41 and remove the spacer from the measurement page slot.**

3. **Plug the square end of the interface cable (looks like a modular phone plug) into the serial interface connection on the side of the X-Rite DTP41.**
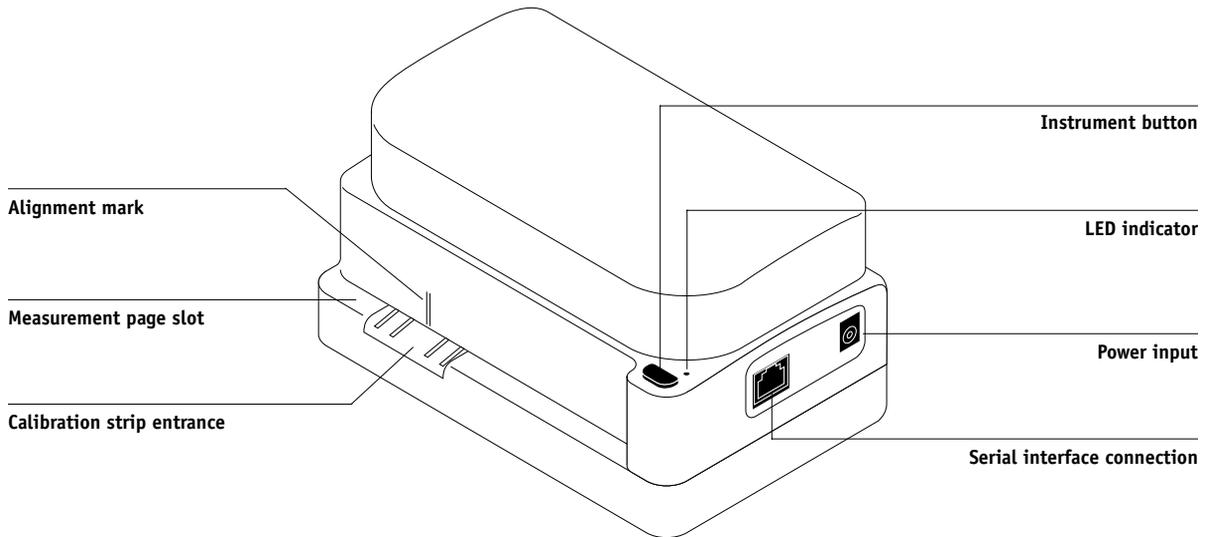
Instrument button

Alignment mark

LED indicator

Measurement page slot

Power input

Calibration strip entrance

Serial interface connection

4. Attach the connector to the computer.

For a Windows computer, insert the 8-pin mini-DIN end of the interface cable into the 9-pin DB9 Connector cable adapter. Insert the 9-pin end into the COM1 or COM2 port on the computer and tighten the screws. If the available port on your computer is 25-pin, you must use the 8-pin-to-25-pin adapter.

Unused connector

Connect to computer

Connect to adapter

Square connector

Interface cable

For a Mac OS computer, connect the 8-pin mini-DIN plug directly into the serial port of the computer.

Unused connector
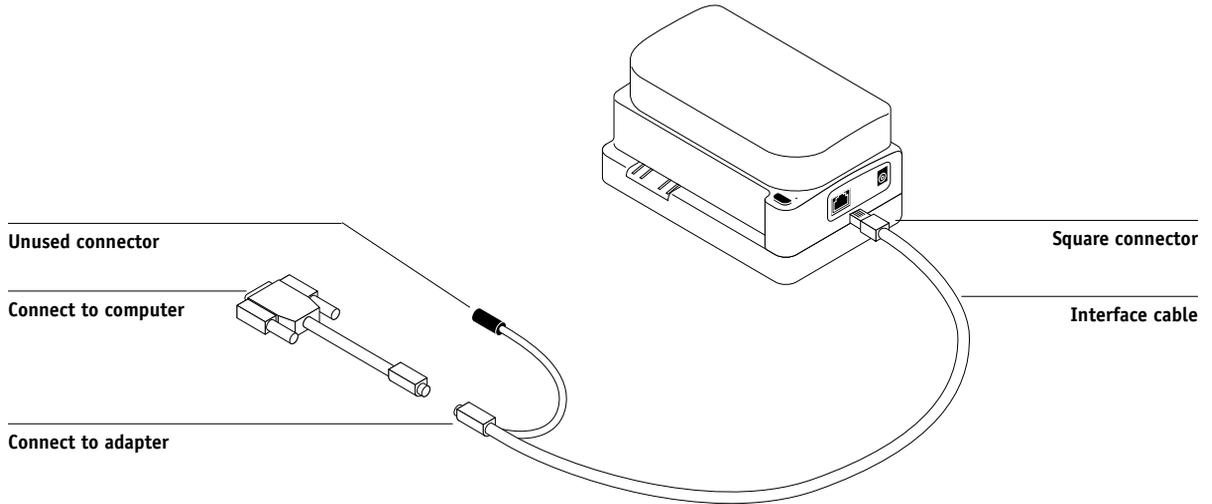
Connect to serial port

NOTE: For Mac OS computers with a USB port (for example, an iMac), you need an adapter to connect the DTP41 to your computer. For information about supported adapters, see the X-Rite, Inc. web site (www.x-rite.com).

5. Use the AC adapter to provide power.

Plug the small connector on the adapter cable into the power input of the X-Rite DTP41 and plug the AC adapter into the power cord. Plug the power cord into a wall outlet.

AC adapter

Power cord

Small connector
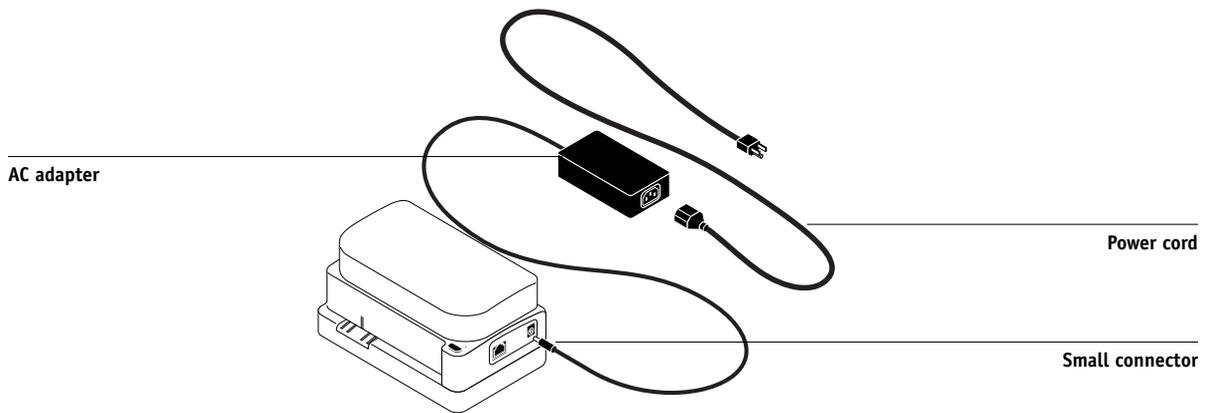
6. Turn on the computer.

7. Calibrate the X-Rite DTP41 using ColorWise Pro Tools (see the following section).

8. Calibrate the EX7750 using ColorWise Pro Tools and the DTP41 (see page 2-14).

Calibrating the DTP41

For the best color accuracy, calibrate the X-Rite DTP41 spectrophotometer every time you calibrate the EX7750. You can initiate the calibration sequence in ColorWise Pro Tools Calibrator as part of the process of EX7750 calibration. The computer may also prompt you that it is necessary to calibrate the spectrophotometer.

Alternatively, you can initiate the DTP41 calibration process using the Instrument button on the DTP41. For more information about this method, see the documentation that accompanies the X-Rite DTP41.

Multiple users can be connected to one EX7750 with ColorWise Pro Tools, but only one user at a time can use the Calibrator module. An error message appears if you try to calibrate when another user is already using ColorWise Pro Tools to calibrate.

You will need the Color Reflection Reference strip that is included with the spectrophotometer. Remove the strip from its protective envelope, handling it by the edges only. Keep the strip free of dust and smudges and always store it in the protective envelope.

TO CALIBRATE THE X-RITE DTP41

1. **Connect the spectrophotometer to the computer and turn on power (see page A-3).**

2. **Start Calibrator.**

   For instructions on starting Calibrator, see page 2-6.

3. **Choose DTP41 as the measurement method.**

4. **In the Get Measurements pane, click Measure.**

5. **In the Measurement Options dialog box, click Measure.**
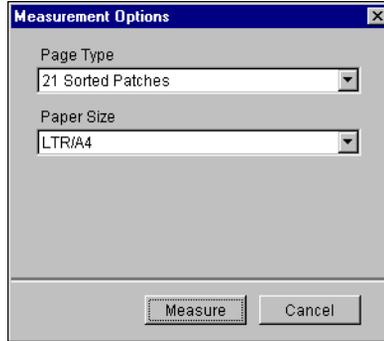
6. **Choose the appropriate COM port for the DTP41 from the Available Ports menu.**

   The Instructions area displays instructions for selecting the port.

A
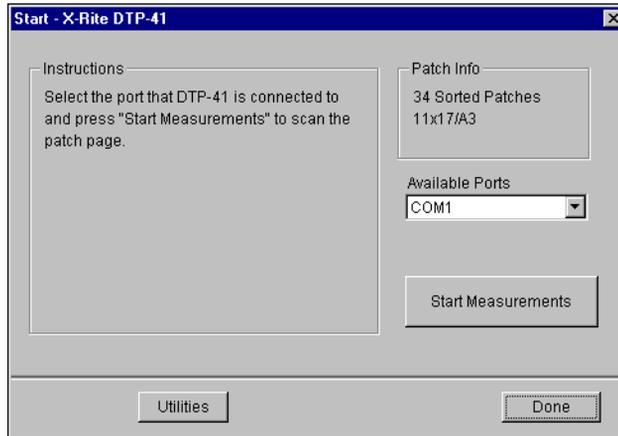
7. **Click Utilities.**

   The Utilities dialog box appears.
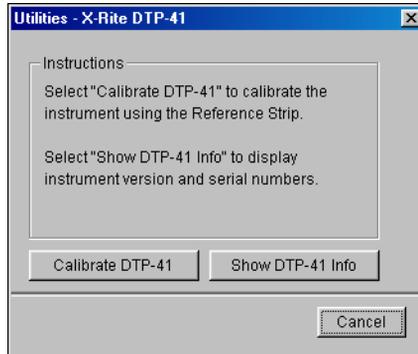
   To view version and serial number information, click Show DTP-41 Info, and then click Done when you are finished.

8. **Click Calibrate DTP-41.**

   The Instrument Calibration dialog box appears.
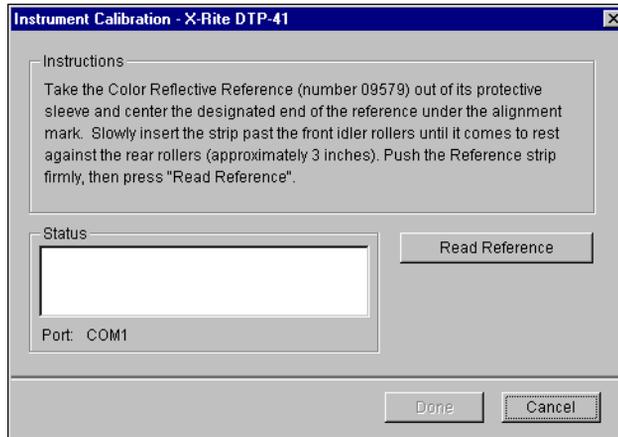
9. **If you have not already done so, remove the shipping spacer from the measurement page slot.**

10. **Insert the end of the Color Reflection Reference strip into the calibration strip entrance on the DTP41. Center the arrow on the strip below the alignment mark (see the diagram on page A-3), and slide the strip into the DTP41 until you feel the resistance of the feed mechanism.**

11. **Click Read Reference in the Instrument Calibration dialog box.**

    The DTP41 pulls the calibration strip through automatically.

    A message appears in the Status area when the calibration is finished.

12. **Click Done.**

13. **Close the Utilities window.**

    This completes DTP41 calibration.

    When the DTP41 requires calibration, your computer prompts you. When the prompt message appears, click Calibrate Now and follow the instructions, starting with step 8 on page A-8.

    After calibrating the DTP41, calibrate the EX7750 (see page 2-14).

Using the X-Rite DTP32 densitometer

ColorWise Pro Tools are designed to work with the X-Rite DTP32 reflection densitometer, which feeds color measurements to the EX7750 automatically.

NOTE: Measurements from other densitometers can be input using a simple ASCII file format (see Appendix B).

Setting up the DTP32

Before you calibrate the EX7750 using the X-Rite DTP32, you need to connect, configure, and calibrate the densitometer to prepare for measuring the printed patches (see "Calibrating the DTP32" on page A-12). For additional information about setting up and using the DTP32, see the documentation that accompanies the densitometer.

TO CONNECT THE X-RITE DTP32 TO THE COMPUTER

1. **Turn off the computer.**

2. **Plug the square end of the interface cable (looks like a modular phone plug) into the I/O port on the side of the X-Rite DTP32.**
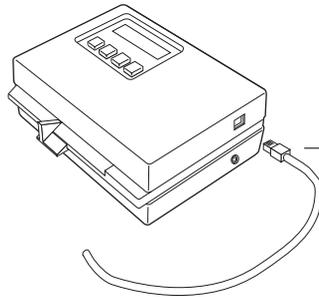
Square connector

3. **Attach the connector to the computer.**

For a Windows computer, insert the 8-pin mini-DIN end of the interface cable into the 9-pin DB9 Connector cable adapter. Insert the 9-pin end into the COM1 or COM2 port on the computer and tighten the screws. If the available port on your computer is 25-pin, you must use the 8-pin-to-25-pin adapter.

Unused connector

Connect to computer
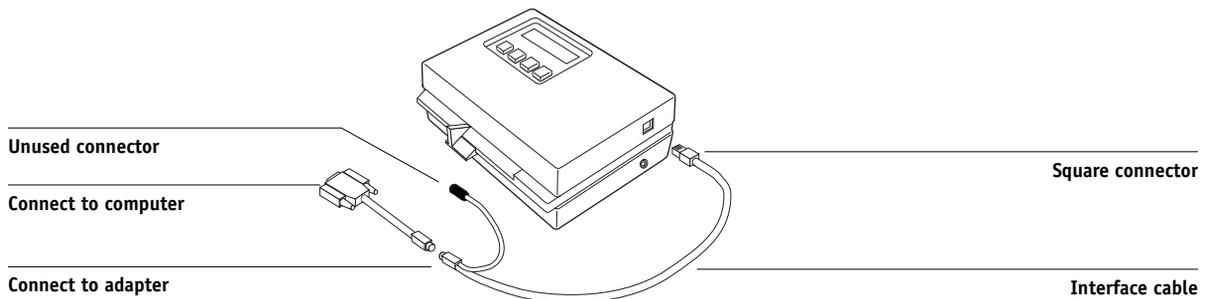
Connect to adapter

Square connector

Interface cable

For a Mac OS computer, connect the 8-pin mini-DIN plug directly into the serial port of the computer.

Unused connector

Connect to serial port

NOTE: For Mac OS computers with a USB port (for example, an iMac), you need an adapter to connect the DTP32 to your computer. For information about supported adapters, see the X-Rite, Inc. web site (www.x-rite.com).

4. **Plug the small connector on the adapter cable into the side of the X-Rite DTP32 and plug the AC adapter into a wall outlet.**

Small connector

AC adapter
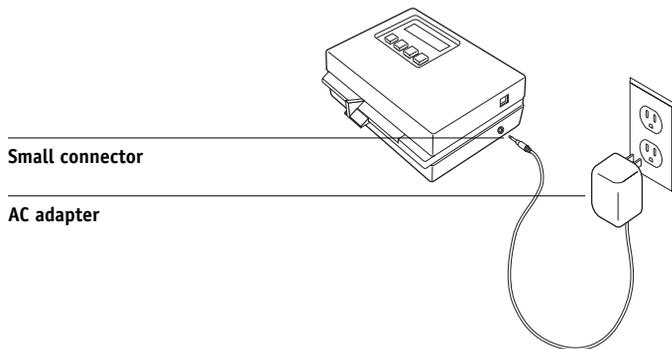
5. **Turn on the computer.**

6. **Calibrate the DTP32 (see the following section).**

7. **Calibrate the EX7750 using ColorWise Pro Tools and the DTP32 (see page 2-18).**

Calibrating the DTP32

You will need the black-and-white X-Rite Auto-Cal Strip included with the densitometer. Calibrating the densitometer does not require ColorWise Pro Tools.

TO CALIBRATE THE X-RITE DTP32

1. **Connect the densitometer to the computer and supply power (see page A-10).**

2. **From the Main Menu on the X-Rite DTP32 display, press the p1 key once to reach p2.**

3. **Press the cal key.**

   Calibrating motor speed is displayed, followed by the words INSERT CAL STRIP.

4. **Insert the X-Rite Auto-Cal Strip into the 35mm slot on the front of the X-Rite DTP32, arrow end first, until it stops or the densitometer starts pulling the strip.**

   Reading appears momentarily, followed by the density values and CALIBRATION OK. The densitometer automatically returns to the MAIN MENU.

   If UNRECOGNIZABLE STRIP appears, repeat the process or try cleaning the strip (see the X-Rite DTP32 Operating Manual).

   Recalibrate the DTP32 at least once per month. For critical color, calibrate the densitometer every time you calibrate the EX7750. The DTP32 may also warn periodically that it requires calibration.

B

Appendix B: Importing Density Measurements

This appendix describes Simple ASCII File Format, which can be used to import density measurements from measurement devices. To use your own measurement data from an alternate measurement instrument, record your individual readings in a text file and structure it as follows.

Simple ASCII Import File Format (SAIFF)

This format describes **Status T** measurement data for import into the ColorWise Pro Tools Calibrator. The three possible file formats are:

• 1D Status T density for EFI 34 patch page

• 1D Status T density for EFI 21 patch page

• 1D Status T density for other pages (maximum of 256 patches per ink)

The file format is ASCII and has no tabs. A single space or multiple spaces are used as delimiters. Blank lines are not allowed. Each line in the file represents four patches (C, M, Y, K) of a specific ink value. Comments may be on any line in the file, and these lines start with a pound sign (#) followed by a space. A line with a pound sign followed by any character other than a space has been reserved. Comments must be on an entire line by themselves.

Each line of data contains five values. The first number is the sequential patch number (for EFI 34 and EFI 21 pages) or the ink value percentage (for other pages). The four values that follow are the density values of C, M, Y, and K of the corresponding patch. Lines are ordered either by increasing sequential patch numbers, or by increasing the ink percentage.

For Windows computers, the file extension must be .cm1. For Mac OS computers, the file type must be 'TEXT'.

Measurement data in EFI 34 and EFI 21 are paper-relative. For other pages, if the first line corresponds to zero ink value, the Calibrator assumes that the measurement data is absolute and adjusts it to become paper-relative by subtracting the density values of the first line from the remaining patches.

Example of 1D Status T density for EFI 34 patch page

This file format is used to specify the Status T density measurements of the EFI 34 patch page. The value in the first column is the patch number. The first patch must be 1 and the last must be 34.

```
#!EFI 3
# EFI ColorWise 2.0 Data
type: 1DST34
# Cyan   Magent Yellow Black
1 0.0300 0.0400 0.0200 0.0400
2 0.0600 0.0700 0.0800 0.0700
3 0.1000 0.1000 0.1000 0.1000
(…more data…)
33 1.6700 1.3400 0.8900 1.6700
34 1.7200 1.4300 0.9300 1.7500
```

Example of 1D Status T density for EFI 21 patch page

This file format is used to specify the Status T density measurements of the EFI 21 patch page. The value in the first column is the patch number. The first patch must be 1 and the last must be 21.

```
#!EFI 3
# EFI ColorWise 2.0 Data
type: 1DST21
# Cyan   Magent Yellow Black
1 0.0300 0.0400 0.0200 0.0400
2 0.0600 0.0700 0.0800 0.0700
3 0.1000 0.1000 0.1000 0.1000
(…more data…)
20 1.6700 1.3400 0.8900 1.6700
21 1.7200 1.4300 0.9300 1.7500
```

Example of 1D Status T density for an arbitrary page

This file format is used to specify the Status T density measurements of a user-defined patch page. The value in the first column is the ink/toner percentage of the patch. The first percentage must be 0 and the last percentage must be 100. The percentages must increase in between.

```
#!EFI 3
# EFI ColorWise 2.0 Data
type: 1DST
# percnt Cyan Magent Yellow Black
0.0000 0.0300 0.0400 0.0200 0.0400
0.3922 0.0600 0.0700 0.0800 0.0700
1.1765 0.1000 0.1000 0.1000 0.1000
(…more data…)
98.0000 1.6700 1.3400 0.8900 1.6700
100.0000 1.7200 1.4300 0.9300 1.7500
```

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