

XEROX®

Phaser® 7700/7750/7760



color laser printer

PhaserMatch^{and} PhaserCal Version 4.0 User Guide

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A Glossary

B Introduction to Color Management

1 Introduction

PhaserMatch Software, Version 4.0

PhaserMatch 4.0 is a color management application for the Phaser 7760, 7750, and 7700 printers. The PhaserMatch software includes both color management and color calibration functionality. This application creates, edits, and manages TekColor corrections that are used with these color laser printers. Using PhaserMatch software, a user can modify the color output from these printers to more closely match a different output device, such as a copy device or printing press. PhaserMatch can edit device link profiles provided with the PhaserMatch installation or create entirely new TekColor corrections from industry-standard ICC profiles. PhaserMatch can manage the TekColor corrections stored on a Phaser 7760 or a Phaser 7750 printer's internal hard drive.

PhaserMatch can also calibrate Phaser 7760, 7750, and 7700 printers. Color calibration is used to maintain consistent print results. Color laser printers must be periodically calibrated to eliminate changes in printed colors caused by environmental conditions, such as temperature and humidity, and normal wear on printer supplies, such as toner cartridges and imaging units.

Note: When you are using the PhaserMatch software, click the **Help** (?) button in the upper right hand corner of the screen to view detailed help about each screen.

PhaserCal Software, Version 4.0

PhaserCal 4.0 is a color calibration application for the Phaser 7760, 7750, or 7700 printers. If you have installed the PhaserMatch software, you do not need to install the PhaserCal software. Color calibration is used to maintain consistent print results. Color laser printers must be periodically calibrated to eliminate changes in printed colors caused by environmental conditions, such as temperature and humidity, and normal wear on printer supplies, such as toner cartridges and imaging units.

Note: The calibration procedures are not intended to provide color matching from the printer to another output device; the full version of PhaserMatch should be used for this purpose.

Users of PhaserCal software who need to create or edit TekColor corrections for their printers should purchase the full version of PhaserMatch software.

Requirements

PhaserMatch 4.0 and PhaserCal 4.0 software is available for computers running:

- Apple Macintosh OS X, version 10.2 and later operating systems (For detailed system requirements, see [Macintosh System Requirements](#) on page 7-1.)
- Microsoft Windows 2000, Windows XP, and later operating systems (For detailed system requirements, see [Windows System Requirements](#) on page 7-1.)

This software supports the Phaser 7760, 7750, and 7700 color laser printers. Other printers by Xerox and other vendors are not supported.

Installing PhaserMatch/PhaserCal Software

The installer application does not delete existing installations of PhaserMatch. If you do not want to use a previous version of PhaserMatch, delete the previous versions of PhaserMatch before installing PhaserMatch 4.0.

Note: You will only need PhaserMatch 3.0 if you are using the scanner-based color profile creation tool. You can use both versions of PhaserMatch on your system.

Before installing and using PhaserMatch or PhaserCal you should install the appropriate Xerox-supplied Phaser 7760, 7750 and 7700 PostScript printer drivers on your computer.

If you have both the PhaserMatch and PhaserCal CD-ROMs, you only need to install the PhaserMatch software. The PhaserMatch software includes the same calibration functionality as the PhaserCal software. If you install PhaserMatch after you install PhaserCal, only PhaserMatch is available for use. The installer for PhaserCal does not install PhaserCal if you have already installed PhaserMatch.

Installing on Macintosh Systems

1. Insert the PhaserMatch or PhaserCal CD-ROM into your computer's CD-ROM drive.
2. Double-click the Installer icon.
3. Click **Continue**.
4. Read the license agreement and click **Accept** to continue.
5. Follow the prompts in the installer to finish the installation.

Installing on Windows Systems

1. Insert the PhaserMatch or PhaserCal CD-ROM into your computer's CD-ROM drive. The CD-ROM automatically runs the installer.
2. Read the license agreement and click **Accept** to continue.

Note: To install additional profiles, select **Custom**, and then select the profiles that you want to install.

3. Follow the prompts in the installer to finish the installation.

Next Recommended Reading

- For an introduction to using PhaserMatch or PhaserCal to calibrate your Phaser 7760, 7750, or 7700 printer, go to [Calibrating a Printer](#) on page 1-3.
- For an introduction to creating a custom TekColor correction, go to [Creating Custom TekColor Corrections](#) on page 1-4.
- For an introduction to printing using custom TekColor corrections, go to [Printing with Custom TekColor Corrections](#) on page 1-6.

Typical Uses of PhaserMatch Software

Calibrating a Printer

Color calibration is one of the most important things you can do if you want to obtain optimal color output from your printer. Color laser printers must be periodically calibrated to eliminate changes in printed colors caused by environmental conditions, such as temperature and humidity, and normal wear on printer consumables, such as toner cartridges and imaging units. Calibration may also be necessary if the printer has been used for long extended print runs or after extended periods of inactivity.

Calibration can be done using one of the following two methods.

- Method 1 is a spectrophotometer-based calibration done within PhaserMatch/PhaserCal software.

This is the recommended method for calibration as it provides the most consistent calibration method for your printer. If you do not have a spectrophotometer, it is suggested that you consider purchasing one because a spectrophotometer can be a valuable color tool for your business.
- Method 2 is a visual calibration done using the control panel of the printer.

Calibration should be performed after the printer is warmed up.

For more information on color calibration, see [Printer Calibration](#) on page 2-1.

Creating Custom TekColor Corrections

Your Phaser printer has a number of TekColor corrections built into the printer. Try these color corrections before using PhaserMatch. Using the existing color corrections saves you time since you do not have to create new color corrections for your printer to get the output you want. For information on using the built-in color corrections, see the User Guide on the Xerox website at www.xerox.com/office/support.

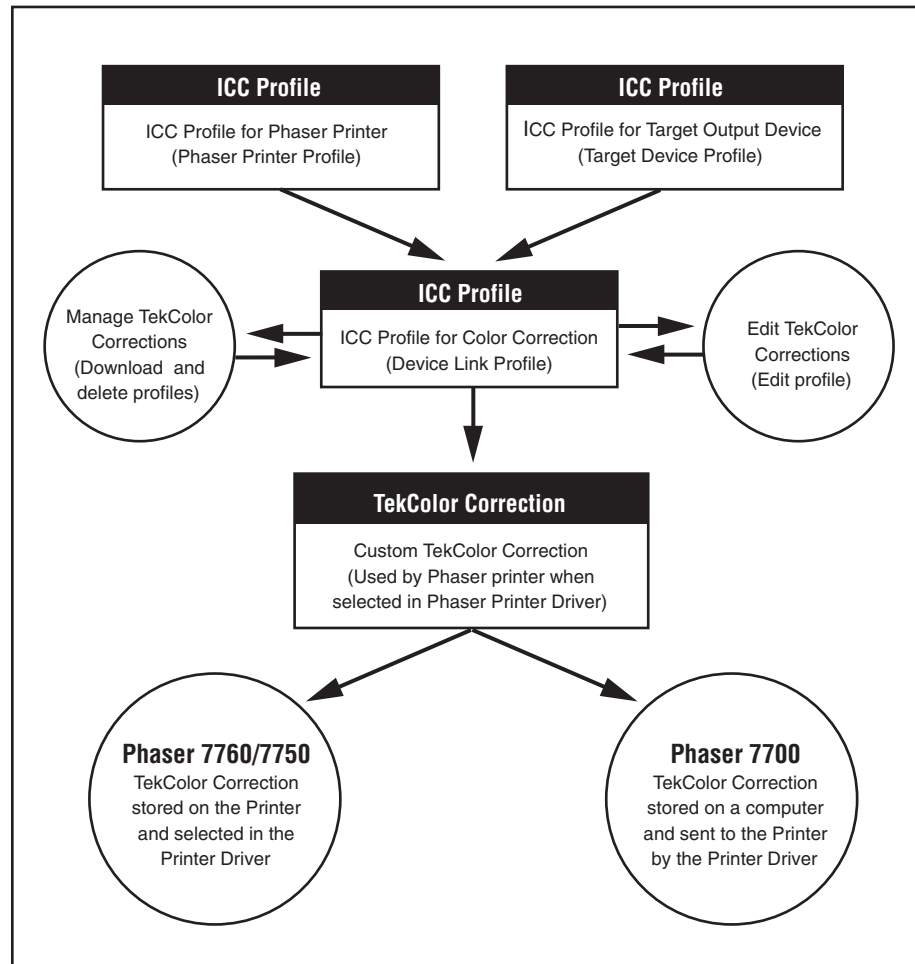
If none of the TekColor corrections built into the printer meet your needs, you can generate new TekColor corrections using PhaserMatch. Creating new TekColor corrections can be accomplished in several ways. The simplest way to create a new TekColor correction is to start from existing ICC profiles. You can:

- use an existing ICC device link profile to create a TekColor correction, and then download it to a Phaser 7760 or Phaser 7750 printer or update the Phaser 7700 printer driver.
- edit an existing ICC device link profile, and then download it to a Phaser 7760 or Phaser 7750 printer or update the Phaser 7700 printer driver.
- create a new device link profile by linking a Phaser printer ICC profile and the ICC profile of another device, and then download it to a Phaser 7760 or Phaser 7750 printer or update the Phaser 7700 printer driver.

If an existing ICC device link profile meets your needs, you can use the "Download Profiles" and "Edit Profiles" functionality. Editing or downloading TekColor corrections can save time because you do not have to create new device link profiles.

If you do not want to use the ICC profiles provided by the PhaserMatch software, you can create your own ICC profiles by purchasing ICC profile creation software and instruments from a third party vendor.

The following diagram shows the color matching elements of the software and the flow of the software.



Creating New Device Link Profiles

In order to obtain the best results from PhaserMatch custom color corrections, a Phaser printer and target device ICC profile should be created on fully calibrated devices. In PhaserMatch, the ICC profiles for Phaser printers are called “Phaser printer profiles”. In PhaserMatch, the ICC profiles for other devices you wish to emulate are called “target device profiles”.

You can use the Phaser printer profiles and target device profiles supplied with the printer and/or PhaserMatch. If you use the custom installation, you can select to install additional target device profiles and profiles that simulate some of the printer’s built-in Phaser TekColor corrections. Use these ICC profiles to create device link profiles, and then you can modify these device link profiles. When you need to create a new TekColor correction, you need to create a device link profile.

Creating ICC Profiles

You can use the target device profiles supplied with the printer. To create a new ICC profile, you will need a third-party profile creation tool. Create new profiles when one of the following conditions exists:

- The Phaser printer profile does not meet your needs.
- You do not have an ICC profile for the device you want the printer to match.
- The colors produced by the target device have changed due to environmental or other conditions.
- The ICC profiles supplied by the device's manufacturer do not meet your needs.

Printing with Custom TekColor Corrections

Printing to a Phaser 7760 or Phaser 7750 Printer

Once a custom TekColor correction is created by PhaserMatch, you can download it to the hard drive on a Phaser 7760 or Phaser 7750 printer. Each Phaser 7760 and Phaser 7750 can store up to 10 new TekColor corrections created by PhaserMatch. These new custom TekColor corrections are then selected in the printer's PostScript Printer Driver. The custom TekColor corrections work just like the TekColor corrections that are already built-into the printer, such as SWOP Press and Euroscale Press. You can also use PhaserMatch to delete the custom TekColor corrections from the hard drive.

For more information on printing with custom TekColor corrections on a Phaser 7760 or Phaser 7750 printer, see [Printing to a Phaser 7760 or Phaser 7750 Printer](#) on page 4-1 or click the **Help (?)** button in the PhaserMatch application.

Printing to a Phaser 7700 Printer

PhaserMatch adds new TekColor corrections to the PostScript printer driver associated with a Phaser 7700 printer. PhaserMatch modifies the printer driver files to make the new TekColor corrections available in the driver on the computer being used. The custom TekColor corrections work just like the TekColor corrections, such as SWOP Press and Euroscale Press, built into the printer.

For more information on printing with custom TekColor corrections on a Phaser 7700 printer, see [Printing to a Phaser 7700 Printer](#) on page 4-3 or click the **Help (?)** button in the PhaserMatch application.

Next Recommended Reading

For more information about:

- making minor changes to TekColor corrections, go to [Editing Custom TekColor Corrections Overview](#) on page 5-1.
- creating a custom TekColor correction, go to [Creating Custom TekColor Corrections](#) on page 3-2.

- printing using a custom Tekcolor correction, go to [Printing to a Phaser 7760 or Phaser 7750 Printer](#) on page 4-1 or [Printing to a Phaser 7700 Printer](#) on page 4-3.
- managing TekColor corrections, go to [Managing TekColor Corrections on a Phaser 7760 or Phaser 7750 Printer](#) on page 6-1 or [Managing TekColor Corrections on a Phaser 7700 Printer](#) on page 6-1.

2 Printer Calibration

Spectrophotometer-Based Calibration

There are two methods provided for entering the calibration data values measured by a spectrophotometer. The first method allows you to use PhaserMatch or PhaserCal software to control and communicate with a spectrophotometer that is connected to your computer. The second method allows you to manually import LAB measured data.

The spectrophotometers that can be controlled by PhaserMatch or PhaserCal software are:

- GretagMacbeth Spectrolino/SpectroScan
- GretagMacbeth Eye-One System
- X-Rite DTP-41
- X-Rite DTP-70
- X-Rite PULSE
- X-Rite Digital Swatchbook
- SpectroStar SpectroCam

Note: PhaserMatch and PhaserCal software do not support any densitometers for performing a color calibration procedure.

PhaserMatch and PhaserCal software walks you through a series of steps that generate and download the calibration data to a printer.

To perform a spectrophotometer-based calibration:

1. Launch the PhaserMatch or PhaserCal application.
2. Click the **Calibrate Printer** button in the main screen.
3. Click the **Spectrophotometer-Based Calibration** button in the main **Calibrate Printer** screen
4. Select a device from the list of supported spectrophotometers or select **Manually Enter Data**.
5. Select a printer, print quality, and paper type you use to do the calibration procedure.

6. Measure the color swatches.

Note: The instructions explaining how to manually measure the calibration data and create the needed data file are in section [Spectrophotometer Calibration Data File](#) on page 7-1.

7. View the measurement data.
8. Send the calibration data to the printer.

For more information on how to use these screens, click the **Help (?)** button in the application.

Visual Color Calibration

The printer contains a set of instructions that describe how to calibrate the printer visually. These instructions can be printed from the control panel, PhaserMatch, or PhaserCal. The printed color-balancing tutorial explains how to perform a visual color calibration.

Note: Using a spectrophotometer to do color calibration gives you the optimal printed colors on your Phaser printer.

3 Creating Custom TekColor Corrections

The Phaser printer should have been calibrated using one of the methods mentioned previously in this document before creating new TekColor corrections. When the printer has been color calibrated you can create and use custom TekColor corrections.

To create a TekColor correction using a Phaser printer ICC profile and a target device ICC profile:

1. Launch the PhaserMatch application.
2. Click the **Create Profile** button in the main PhaserMatch screen.
3. Create a device link profile, see [Creating Device Link Profiles](#) on page 3-1.
4. Create a new custom TekColor correction; see [Creating Custom TekColor Corrections](#) on page 3-2.

Creating Device Link Profiles

PhaserMatch software enables you to perform color matching between two devices: your Phaser color printer and another output device such as a printing press or another printer. It does this through the creation of a Device Link Profile (DLP). A device link profile is an ICC profile that combines the color information about the printer and the target device into one file. Creating device link profiles enables you to alter the colors printed by your Phaser printer so they more closely match the colors produced by the output device of your choice.

PhaserMatch works with the following types of profiles.

- Phaser printer ICC profiles that get installed as part of the standard installation.
- Phaser printer ICC profiles that get installed as part of the optional software install. These are ICC profiles that simulate the TekColor corrections that are already in the printer such as Commercial Press and SWOP Press.
- Target device ICC profiles that get installed with the standard installation.
- Target device ICC profiles that get installed with the optional software installation.
- ICC Profiles created in a third-party profile creation software.

Device link profiles are used by PhaserMatch to create TekColor corrections. The TekColor corrections can be sent to a Phaser printer or saved in the driver for the Phaser printer.

Note: When creating Phaser printer profiles using a third party ICC profile creation application, you should make sure the print to be measured is made with no color correction (Select None for the TekColor correction in the Phaser printer's PostScript driver). The print Quality and Media Type selected from the Phaser printer's PostScript driver will need to be noted because these settings are required for use with the final custom TekColor correction that you create.

Selecting a Phaser Printer Profile

To select a Phaser printer profile, click the **Select Profile** button under the heading **Select a Phaser Printer Profile**, in the main **Create Profile** screen. If a new Phaser printer ICC profile was created by a third party, the profile must be copied into the following folders:

- Apple Macintosh OS X: Library, ColorSync, Profiles
- Microsoft Windows 2000/XP: C:\WINNT\system32\spool\drivers\color

Selecting a Target Device Profile

To select a target device profile, click the **Select Profile** button under the heading **Select a Target Device Profile**, in the main Create Profile.

Note: Target profiles describe the device that you want to emulate using your Phaser printer. Two types of ICC profiles can be used as target profiles.

The ICC profiles most often used as target profiles specify CMYK colors for the device space. In addition, applications, such as Adobe Photoshop can be configured to use CMYK colors. If your files use this color mode, use your third party ICC profile creation tool to create CMYK to Profile Connection Space (PCS) ICC profiles.

When working with RGB colors as part of Adobe Photoshop or applications, such as Microsoft PowerPoint, use RGB to PCS ICC profiles.

Creating Custom TekColor Corrections

After selecting a Phaser printer profile and a target device profile, continue the process of generating a new TekColor correction by clicking the **Next** button in the main **Create Profile** screen. The **Next** button is not active until a Phaser printer profile and a target device profile are selected in this screen.

Device Link Profile Options Screen

The **Device Link Profile Options** screen has two check boxes. The check boxes are:

- **Pure Black Enhancement**
- **Preserve Paper Color**

Checking **Pure Black Enhancement** prevents colors specified by your prints as 100% black from being converted into a combination of cyan, magenta, and yellow colors. When checked, 100% black prints using only black toner. Generally, this improves the sharpness of black fine lines and text. This can reduce the darkness of large fills done with 100% black. This selection affects both images and text.

Note: **Pure Black Enhancement** can make text appear sharper but it can also make text appear lighter on some prints. When unchecked, PhaserMatch does undercolor color removal on 100% CMY values only. It does not change equal CMY values of < 100%.

Checking **Preserve Paper Color** modifies the background colors of the prints. It tries to print the background of the print in the color of the paper used when the target device swatches were created.

Note: **Preserve Paper Color** can change the background color of the prints to make them simulate the paper that was used when creating the target device profile but it can also change the users' perceptions of other colors in the print.

Saving Device Link Profile Screen

The **Save Device Link** screen is used to specify a detailed description and a short name for the TekColor correction. When the **Save Profile** button is clicked, the TekColor correction is saved as a device link profile.

Note: The printer driver uses the short name entered in this screen as the name of the TekColor correction.

Sending a Custom TekColor Correction to the Printer Screen

Phaser 7760/7750 Printer

When you are creating a custom TekColor correction for a Phaser 7760 or Phaser 7750 printer, the final screen in this process enables you to select the printer to which you want to send the TekColor correction. This screen is not shown when using a Phaser 7700 printer. The Phaser 7760 and Phaser 7750 printer can store up to 10 custom TekColor corrections.

The **Printers** selection shows the Phaser 7760 and Phaser 7750 printers installed on your computer and enables you to save to file. Selecting **Save to File** allows PhaserMatch to save the custom TekColor correction as a printable PostScript file. The file then could be sent to another system using the **File Download** functionality within CentreWare Internet Services to send the file to a printer that is not installed on your computer.

The **Custom TekColor Corrections** selection shows the 10 custom TekColor correction slots that can be used to store the color corrections. When the printer selected is connected to the computer using TCP/IP, PhaserMatch also shows the **Short Name** and other information about the TekColor correction.

Target profiles can be either CMYK profiles or RGB profiles. Typically, applications, such as Adobe Photoshop, use CMYK color mode. If you are using this color mode with your Phaser printer, then the target profile used should be a CMYK target profile. Other applications, such as Microsoft PowerPoint, use RGB colors. If you are printing from these applications use a RGB target profile.

Note: You can use the **Delete Profile** button to delete profiles from your printer.

For more information about this screen, click the **Help (?)** button in the PhaserMatch application.

Phaser 7700 Printer

PhaserMatch adds new color corrections to the printer driver when it is used with a Phaser 7700 printer. The application updates the driver files to make the new TekColor custom color corrections available in the driver on the computer where PhaserMatch is installed. There is no method provided within PhaserMatch to update the drivers on remote computers so PhaserMatch should be installed on each computer that is going to be using the new color corrections. You can print CMYK color images from your driver using the new color corrections. You must have color management turned off in your application when using TekColor corrections.

A printer setup wizard should have helped you create a printer driver. Only this printer driver contains the TekColor tab that allows you to select the link profiles you create using PhaserMatch.

4 Printing with Custom TekColor Corrections

Printing to a Phaser 7760 or Phaser 7750 Printer

Macintosh OS X

The TekColor corrections created by PhaserMatch work with applications that generate CMYK or RGB color values when printing.

Computers with TCP/IP Connections to the Printer

When using a computer with a TCP/IP connection to the printer, the driver lists the TekColor corrections using the short name of the correction. To select a custom TekColor correction:

1. In the **Print** screen, from the **Copies & Pages** pop-up menu, select **Image Quality**.
2. Click on the **Color Correction** pop-up menu.
3. Click on the short name of the desired color correction.

Note: AppleTalk, EtherTalk, and USB connections are not TCP/IP connections.

Computers without TCP/IP Connections to the Printer

When using a computer without TCP/IP connection to the printer, the driver lists the custom TekColor correction selections as **Custom Color 1**, **Custom Color 2**, through **Custom Color 10**. To select a custom TekColor correction:

1. In the **Print** screen, from the **Copies & Pages** menu, select **Image Quality**.
2. Click on the **Color Correction** pop-up menu.
3. Click on the name **Custom Color 1**, **Custom Color 2**, through **Custom Color 10**.

Note: The Custom Color number should be the same one you used when you downloaded the color correction to the printer.

Note: AppleTalk, EtherTalk, and USB connections are not TCP/IP connections.

Windows 2000 and Windows XP

The TekColor corrections created by PhaserMatch work with applications that generate CMYK or RGB color values when printing.

Computers with TCP/IP Connections to the Printer

When using a computer with a TCP/IP connection to the printer, the driver lists the TekColor corrections using the short name of the correction.

To select a custom TekColor correction for the Phaser 7760 printer:

1. In the **Print** screen, click the **Properties** button.
2. Select the **TekColor** tab.
3. For CMYK profiles, click the **Press Match** radio button, and then from the **Press Match** field, select the color correction you want to use for printing.
4. For RGB profiles, click the **Office Color** radio button, and then from the **Office Color** field, select the color correction you want to use for printing.
5. Click on the short name for the desired color mode.
6. Click the **Paper/Quality** tab.
7. Select a print-quality mode.

Note: The printer driver's settings for paper and print quality must match the paper type and print quality selected when creating the device link profile and the calibration should have been done using this same print quality and paper type.

8. Ensure the paper in the printer matches the profile you selected.
9. Click **OK**.

To select a custom TekColor correction for the Phaser 7750 printer:

1. In the **Print** screen, click the **Properties** button.
2. Select the **TekColor** tab.
3. Click the **Press Match** radio button, and then from the **Press Match** field, select the color correction you want to use for printing.

Note: CMYK and RGB color profiles appear in the **Press Match** field. Click on the short name for the desired color mode.

4. Click on the short name for the desired color mode.
5. Click the **Paper/Quality** tab.
6. Select a print-quality mode.

Note: The printer driver's settings for paper and print quality must match the paper type and print quality selected when creating the device link profile and the calibration should have been done using this same print quality and paper type.

7. Ensure the paper in the printer matches the profile you selected.
8. Click **OK**.

Note: USB, NetWare, and NetBEUI are not TCP/IP connections.

Computers without TCP/IP Connections to the Printer

When using a computer without TCP/IP connection to the printer, the driver lists the custom TekColor correction selections as **Custom Color 1**, **Custom Color 2**, through **Custom Color 10**. To select a custom TekColor correction:

1. In the **Print** screen box, click the **Properties** button.
2. Select the **TekColor** tab.
3. Click the **Press Match** radio button, and then from the **Press Match** field, select the color correction you want to use for printing.
4. Click on the name **Custom Color 1**, **Custom Color 2**, through **Custom Color 10**.

Note: The Custom Color number should be the same one you used when you downloaded the color correction to the printer.

5. Click the **Paper/Quality** tab.
6. Select a print-quality mode.

Note: The printer driver's settings for paper and print quality must match the paper type and print quality selected when creating the device link profile and the calibration should have been done using this same print quality and paper type.

7. Ensure the paper in the printer matches the profile you selected.
8. Click **OK**.

Note: USB, NetWare, NetBEUI, and AppleTalk are not TCP/IP connections.

Printing to a Phaser 7700 Printer

Macintosh OS X

The TekColor corrections created by PhaserMatch work with applications that generate CMYK color values when printing. Applications, such as Adobe PhotoShop and Illustrator, are a couple of applications that can be set up to do this. Other applications, such as Microsoft Word for Macintosh OS X, generate CIE color values that are not affected by the TekColor corrections or generate RGB colors that are not supported by the custom color corrections that you have created.

The printer driver supplied for this OS lists the custom TekColor correction selections using the short name of the correction. To select a custom TekColor correction:

1. In the **Print** screen box, from the **Copies & Pages** menu, select **Image Quality**.
2. Click on the **Color Correction** pop-up menu, and then click on the short name of the desired color correction.

Windows 2000 and Windows XP

The TekColor corrections created by PhaserMatch work with applications that generate CMYK color values when printing.

The printer driver supplied for this operating system lists the custom TekColor corrections using the short name of the correction. To select a custom TekColor correction:

1. In the **Print** screen, click the **Properties** button.
2. Select the **TekColor** tab.
3. Click on the **Press Match Color** selection.
4. Click on the short name for the desired color mode.

5 Editing Custom TekColor Corrections

Editing Custom TekColor Corrections Overview

Use Edit Profile to make minor color changes in a PhaserMatch custom Device Link Profile. The edited version of the device link profile will become a custom TekColor correction once it is downloaded to the printer.

To begin editing:

1. Launch the PhaserMatch application.
2. Click on the **Edit Profile** button in the main screen.

Note: See [Creating Device Link Profiles](#) on page 3-1 for information about device link profiles.

3. You can either use the default preview image or select a different CMYK or RGB tiff image.

Note: The preview image is used in the editing screen to show the changes you are making to the color correction being edited.

After selecting a device link profile and a preview image, continue the process of generating a new custom TekColor correction by clicking the **Next** button. After you are done with each subsequent editing step in this process, click the **Next** button to have PhaserMatch walk you through the steps needed to create custom TekColor corrections.

Editing Hints

Editing is best done in a series of small steps. While editing, you can make a small change and print the results. Then continue by repeating this operation until you get the desired results. Finally after making incremental changes, if the results are satisfactory, click the **Next** button in the application to save the results and create a new custom TekColor correction. If the results do not meet your needs, click the **Close** button in the edit window and start again.

The PhaserMatch editor provides buttons to edit the device link profile. The buttons are shown in the following figure.



Output Gamma Curves Editing Tool Button



Fine Tune Tool

Use the Output Gamma Curves Editing Tool to make changes in the output lookup tables. The changes you make when using this tool are shown in the preview image and should model what you expect to see when printing.

The screenshot shows the 'Output Curves' dialog box. At the top, there are four checked checkboxes for 'C' (cyan), 'M' (magenta), 'Y' (yellow), and 'K' (black). Below these are two input fields: 'Input Level' set to 41.90 % and 'Output Level' set to 58.20 %. The main area is a graph with a grid, showing four curves: cyan, magenta, yellow, and black. The magenta curve is highlighted with a thick line and a small square marker. At the bottom of the graph, there are two buttons: 'Reset' and 'Apply'. Red lines with text annotations point to various elements: the checkboxes, the input/output level fields, the magenta curve, the 'Reset' button, and the 'Apply' button.

These check boxes select the color curves that are displayed in the graph below.

The input and output level for the curve selected below.

In this example, the magenta curve is the selected curve.

Returns all gamma curve values to the linear values.

Updates the Device Link Profile with the changes you just made.

Note: For a Windows operating system, you must press the **Apply** button after pressing the **Reset** button to see the image change.

Use the **Fine Tune Tool** to make small changes to a specific color or range of colors. When you use this tool, you edit the device color space so you may be editing CMYK or RGB color spaces.

To create a new color edit:

1. Click the **Fine Tune** icon.

A warning message indicating that you should use the Fine Tune tool after finishing all other edits may appear. Select the check box to eliminate this error.

2. If the warning message appears, click **OK** to continue.

The **Fine Tune** screen appears.

3. Click **New** to create a new color edit.

The **Choose a Color** screen appears.

4. On the picture on the right side of the screen, click on the color that you want to edit.

Note: The eyedropper tool is automatically enabled when you enter the Destination Space section of the preview screen.

5. In the **Name** field, enter the name of this color edit.

6. Click **OK**.

The **Fine Tune** screen with the selected color appears.

7. If you want to change the range of color affected by the edit, move the **Color Range** slider to a lesser or greater color range.

8. If you want to mask the area of the image that is not affected by the edit, click the **Show range mask in preview** check box.

9. On a Windows operating system, click **Apply** to apply the changes to the color.

The **Reset** button resets the colors to the original colors.

6 Managing Custom TekColor Corrections

Use Download Profile to manage the custom color corrections associated with a Phaser 7760, Phaser 7750, or Phaser 7700 printer.

Managing TekColor Corrections on a Phaser 7760 or Phaser 7750 Printer

When using a Phaser 7760 or 7750 printer, the Download Profile button is used to download the custom TekColor corrections to the printer. This functionality can create new custom TekColor corrections from existing device link profiles. After selecting a device link profile, PhaserMatch displays the Send a Color Correction to the Printer screen. For more information, see [Sending a Custom TekColor Correction to the Printer Screen](#) on page 3-3. This screen is used to send a custom TekColor correction to the printer. You can also delete custom TekColor corrections created in PhaserMatch 4.0.

Managing TekColor Corrections on a Phaser 7700 Printer

When using a Phaser 7700 printer under a Macintosh operating system, the Download Profile button is used to manage the custom TekColor corrections associated with a printer driver. This functionality can be used to generate new color corrections from existing device link profiles. After selecting a device link profile, PhaserMatch displays the Send a Color Correction to the Driver screen. This screen is used to add a new custom color correction to the printer driver or to delete a custom color correction from the driver installed on the particular computer being used. You can also delete custom TekColor corrections created in PhaserMatch 4.0.

7 Troubleshooting

Macintosh System Requirements

- Apple Power Macintosh computer
- Macintosh OS X, version 10.2 (version 10.2.3 recommended) operating system
- 128 MB RAM required, 256 MB RAM recommended
- 600 x 800 dpi resolution color monitor with the ability to display thousands of colors
- Xerox Phaser 7760, 7750, or 7700 color laser printers only
- Installation of the Xerox Phaser 7760, 7750, or 7700 Macintosh printer driver (This driver must be used in order to use PhaserMatch 4.0 TekColor corrections.)

Windows System Requirements

- Intel Pentium III computer or better
- Windows 2000 or Windows XP
- 128 MB RAM required, 256 MB RAM recommended
- 600 x 800 dpi resolution color monitor with the ability to display thousands of colors
- Xerox Phaser 7760, 7750, or 7700 color laser printers only
- Installation of the Xerox Phaser 7760, the Phaser 7750, or the Phaser 7700 Windows printer driver (This driver must be used in order to use PhaserMatch 4.0 TekColor corrections.)

Spectrophotometer Calibration Data File

When using "Manually Enter Data" in the spectrophotometer-based calibration procedure you need to create a measurement file and import it into PhaserMatch. When creating a calibration measurement file you need to set up your measurement device as follows:

- Set the device so it is measuring CIE Lab color.
- Set the device to use a D50 2° light source.
- Set the device up so that it is generating data with three decimal places of accuracy.

Once the instrument is set up correctly, measure the set of printed color swatches in sequence from top to bottom, reading down each column before moving to the next column on the right. When you complete the measurements, save the measured data as a "space-delimited" ASCII text file. The format of the ASCII text file to be imported is as follows:

```
PHASER_CAL_PATCH_HEADER
VERSION
■ 3
DEVICE_NAME
■ "X-RITE DTP 41"
DEVICE_ID
■ 4
COLOR_SPACE_NAME
■ "CMYK"
COLOR_SPACE_ID
■ 101
PATCH_COUNT
■ 140
IS_LINEAR
■ 1
IS_SCRAMBLED
■ 0
FULL_PATCH_SET
■ 1
PATCH_DATA
■ 89.92■ 0.05■ -0.32
■ 89.87■ -0.43■ 3.07
■ 16.29■ 0.28■ -1.04
```

Your measurement device name

The highlighted text should not be changed.

Your measurement data

The ■ symbol above indicates a single space. You must have one single space in place of the box and only one single space.

If you are using a Microsoft Excel file:

- In the **Save as type** field, select **Formatted Text (Space delimited) (*.prn)**.
- In the **File name** field, type the name as "filename.mpd" or "filename.txt". You must use the quotation marks in the file name.

Additional Information

Resource	Link
For automated printer diagnostics and troubleshooting using your web browser, go to the PhaserSMART website:	www.phasersmart.com
For general support, go to the Xerox support website:	www.xerox.com/office/support
For Xerox Phaser printer information, go to the Xerox Office website:	www.xerox.com/office

A Glossary

Calibration	The checking, adjusting or standardizing of a device. See also <i>Printer Color Calibration</i> .
CIE	The Commission Internationale de l'Eclairage. The main international organization concerned with color appearance and color measurement.
CIE Lab	The CIE L*, a*, b* color space where: L* represents lightness a* represents redness/greenness b* represents yellowness/blueness This is one of the most popular device independent color spaces.
CMYK Color Values	The numerical color values for the primaries Cyan, Magenta, Yellow, and Black which are used by printers and other output devices. These colors are referred to as device dependent colors. These colors are typically generated by applications, such as Adobe Photoshop.
Color Appearance	The perception of the color or colors of an object or image. This can be described in terms of hue, saturation, chroma, and lightness. There are a large number of human perception factors and color reproduction factors that determine the color appearance of a printed page.
Color Management	The process of managing color reproduction. This often involves doing color matching between various devices, such as scanners, monitors, printers and presses.
Color Patches	See <i>Printed Color Swatches</i> .
Color Swatches	See <i>Printed Color Swatches</i> .
Color Transform	This refers to the portion of an ICC profile that is the mapping of colors from CIE Lab color values to and from CMYK color values.
ColorSync	Apple's implementation of ICC-based color management.

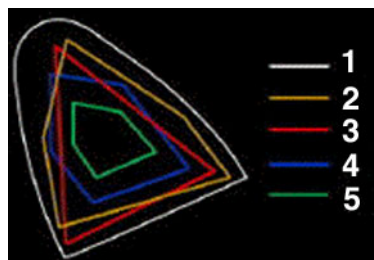
ColorSync Profiles	See <i>ICC Profiles</i> .
Densitometer	A device that measures the density of colors or images. PhaserMatch does not support any densitometer.
Device Link Profiles	ICC profiles that describe the color behavior of two CMYK devices: your Xerox Phaser printer and a target device, such as a printing press or a proofing device. These two profiles are combined together into a single file. Creating link profiles or editing existing link profiles lets you alter the colors printed by your Xerox printer so they more closely match the colors produced by the output device of your choice.
DLP	See <i>Device Link Profile</i> .
Download	Send data from a computer to the printer, for example, download calibration data to the printer or download TekColor correction to the printer.
Download Profile	This is the name of a button in PhaserMatch that is used to use the "manage custom TekColor corrections" functionality within PhaserMatch. PhaserMatch can download TekColor corrections to the hard drive on a Phaser 7750 or 7760 printer. PhaserMatch can add TekColor corrections to the PostScript printer driver associated with a Phaser 7700 printer.
D50	The CIE standard illuminant. This color temperature is often used for color measurements, color matching and viewing colors in light booths.
ICC	See <i>International Color Consortium</i> .
ICC Profiles	Device characterizations that are implemented per the ICC standard, these are sometimes referred as color profiles or device profiles.
ICM	Microsoft Windows Color Management System and the file extension for ICC profiles.
International Color Consortium	Established in 1993 by eight industry vendors for the purpose of creating, promoting, and encouraging the standardization and evolution of an open, vendor-neutral, cross-platform color management system architecture and components. The outcome of this co-operation was the development of the ICC profile specification. The intent of the International Color Consortium (R) profile format is to provide a cross-platform device profile format. Device profiles can be used to translate color data created on one device into another device's native color space. The acceptance of this format by operating system vendors allows end users to transparently move profiles and images with embedded profiles between different operating systems. This permits tremendous flexibility to both users and vendors. For example, it allows users to be sure that their image retains its color fidelity when moved between systems and applications. Furthermore, it allows a printer manufacturer to create a single profile for multiple operating systems. (Quoted from the http://www.color.org)

Lookup Table	ICC Profiles contain an input lookup table and an output lookup table. These tables are used to implement color transformations per the ICC Profile specification for look up tables.
LUT	This is an abbreviation for Lookup Table.
Patches	See <i>Printed Color Swatches</i> .
PhaserCal	Name for the limited version of PhaserMatch (calibration only functionality).
PhaserMatch	Name for the color matching software.
Phaser Printer Profiles	Phaser Printer Profiles are standard ICC profiles that describe the Phaser 7760, 7750, and 7700 printers. A printer profile is a file describing to the computer operating system's color management software how the printer describes the colors it prints.
Printed Color Swatches	Refers to the color swatches used to create ICC profiles and calibration data.
Printer Color Calibration	The checking and adjusting of the colors of the printer to standardize the device to a known condition.
RGB Color Values	The numerical color values for the primaries Red, Green, and Blue that are used by some output devices. These colors are referred to as device dependent colors. The color values are typically generated Office applications, such as Microsoft PowerPoint.
Spectrophotometer	Color measurement device; no support is provided for a densitometer (a density meter).
Swatches	See <i>Printed Color Swatches</i> .
Target Device Profiles	Standard ICC profiles that describe the color capabilities of output devices such as printing presses or proofing devices. These files are used by PhaserMatch to create link profiles. While the target device profiles created by PhaserMatch are readable by any ICC-compatible application or operating system, they are only intended for use by PhaserMatch.
TekColor Corrections	TekColor corrections are the color technology built into Xerox Phaser printers. TekColor corrections give you the option of selecting from a number of built-in color matching options, such as SWOP Press, Euroscale Press, Commercial Press, and Fuji Press, as well as others. New color corrections can be created with PhaserMatch.

B Introduction to Color Management

Color management is based on color spaces. The range of colors, or gamut, perceived by the human eye, captured on film, displayed on a computer monitor, and rendered by a printer vary significantly. Each has its own color space, a mathematical means of describing its colors. RGB is an additive color space that combines red, green, and blue light to create all other colors. Monitors, digital cameras, and scanners typically use RGB colors. CMYK color, on the other hand, is a subtractive color space using cyan, magenta, yellow, and black inks on paper to absorb red, green, and blue light. The remaining reflected light is the color perceived by the viewer.

Both RGB and CMYK color are device dependent color spaces; the colors they render depend on the device that produces the colors. Additionally, converting an image from RGB to CMYK compresses the colors into a smaller gamut. To complicate matters more, the CMYK color space of one printer can vary significantly from the CMYK color space of another printer. As the graphic below shows, the colors reproducible by different mediums can vary significantly.



1. Color visible to the human eye
2. Color film
3. Color monitor
4. Printer offset press on coated paper
5. Offset press on newsprint

The publishing industry has settled on a system of color management developed by the International Color Consortium (ICC). ICC-based color management relies on two things: device profiles called ICC profiles, which characterize how individual devices produce color, and a color engine (also called a color matching module or CMM), which reads those profiles and translates and corrects colors between devices.

ICC-based color management relies on a device independent color space. One of the common color spaces specified for use is CIE L*a*b* (CIE Lab, LAB). This color space provides a link between device dependent color spaces specific to various devices. LAB color space is based on the way the human eye perceives color and is device-independent. A LAB color engine can translate RGB, and CMYK values to and from LAB values. This translation acts as an interpreter between the color spaces. ColorSync, a color-management software for the Macintosh operating system, currently supports CMM color engines from vendors, such as

Heidelberg. These other vendors can use different algorithms to perform its color conversions. Image Color Management System (ICM), a color management system for the Windows operating system, also supports color engines from other vendors. When using PhaserMatch with Macintosh, make sure the default CMM is the Apple CMM. When using PhaserMatch with Windows, PhaserMatch is using its own CMM; the selection of CMM at the OS is not used.

When you create an image using an application that uses ColorSync or ICM, a profile can be embedded in the image file. The Phaser 7760, 7750, and 7700 printer work with applications that produce CMYK and RGB colors and will ignore embedded profiles.

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