DisplayMaker Legacy ColorMark+

User Guide

Part Number 0706133 Rev C

Revision Log

See the accompanying *Release Notes* for specific changes to the software and hardware between releases of the manual.

Date	Description
May 1999	Initial release.
Aug 1999	Revised for version 1.1. Chapter 2 documents extensive changes to the Profile Creation Wizard, and new support for the ColorMark Calibrator.
Sep 2000	Revised for version 2.0. Chapters 2 and 4 replaced with new procedures. Chapter 5 updated with new features that were added to version 1.5.
Dec 2001	Revised for version 3.0. Chapter 2 adds screen diagrams for revised dialog boxes. Chapter 3 adds information on FTP transfer of color profiles, adds details on ICC workflows, adds table of compatible applications. Chapter 4 explains the redesigned profile editing process. Chapter 5 adds screen diagrams for revised dialog boxes.

About This Manual

This manual explains how to use the ColorMark+ Advanced Color Management System. ColorMark+ enables you to create custom color profiles and manipulate properties in ColorSpan RIP Saver files. ColorMark+ is a suite of software applications that enhances the standard ColorMark Color Management System and ColorSpan Print Server Software.

◆ **Chapter 1, Getting Started,** provides software installation instructions and an overview of the product.

◆ **Chapter 2, Creating Color Profiles,** shows you how to create custom color profiles.

◆ **Chapter 3, Applying Color Profiles,** shows you how to use the profiles you create.

◆ **Chapter 4, Editing Color Profiles,** shows you how to adjust the curves of a profile and view its color gamut.

◆ **Chapter 5, Manipulating RIP Saver Files,** shows you how to use the Post-RIP Manipulation Tool to adjust the color properties of RIP Saver files.

◆ **Appendix A, Troubleshooting,** explains how to contact ColorSpan Technical Support.

◆ **Appendix B, Glossary,** provides definitions to special color management terms.

◆ **Appendix C, Configuring TCP/IP,** provides information to help you configure your server and workstation for TCP/IP communications, which is necessary to transfer files from the server to your workstation or to other servers.

Related Documentation   This manual is a supplement to the *System Control User Guide,* which shows you how to use the ColorSpan print server, and the ColorSpan *Printing Tools User Guide,* which show you how to print to ColorSpan printers.

The following related technical support documents are available from the MacDermid ColorSpan Technical Support web site at www.colorspan.com:

◆ LaserLine 2514, *Configuring Macintosh OS Computers for FTP to ColorMark Servers*

◆ LaserLine 2515, *Configuring Microsoft Windows Computers for FTP to ColorMark Servers*

◆ LaserLine 2801, *Working With ColorMark+ and ICC Profiles*

For further information on ICC workflows, and color management in general, refer to the following resources. Any hardware device that supports ICC profiles may also include specific technical information about using ICC profiles with that device.

◆ The International Color Consortium, www.color.org

◆ Apple ColorSync, www.apple.com/colorsync

◆ *The Color Guide and Glossary,* and *a Guide to Understanding Color Communication,* X-Rite, available for free download at www.xrite.com/support

◆ *The GATF Practical Guide to Color Management*, www.gatf.org

◆ *Fundamentals of Large-Format Color Management,* Roy Bohnen and Sean O'Leary, International Reprographic Association, www.irga.com

Conventions

This manual uses the following informational conventions:

	Note	A Note is a special technique or information that may help you perform a task or understand a process.

	Caution	A Caution alerts you to something that has the potential to cause damage to hardware, software, or data.

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CHAPTER 1

Getting Started

This chapter explains:

◆   Installing ColorMark+ - includes system requirements, supported server hardware and external devices, and supported printers (page 1-2)

◆   What is ColorMark+? (page 1-6)

◆   Color Management Overview - you should understand this information to effectively use the ColorMark+ software (page 1-8)

Installing ColorMark+

The ColorMark+™ Advanced Color Management System software is an enhancement to the ColorSpan® Print Server Software. To install the ColorMark+ software, you will need these parts from the ColorMark+ product kit:

◆ ColorMark Key — this device enables the ColorMark+ software. During the installation, you will enable the server's parallel port so the ColorMark Key can be detected.

◆ ColorMark+ Software CD-ROM

◆ ColorMark CMS Software CD-ROM — contains factory-created profiles for ColorSpan media and ink.

The ColorMark+ software runs on the following **hardware platforms:**

◆ ColorMark Pro 1.5G, RIPStation 1G

◆ ColorMark Pro 1G/8000, RIPStation 700/800

◆ ColorMark Pro 4000, RIPStation 400

◆ ColorMark Pro 7000/5000, RIPStation 500

The ColorMark+ software works with the following **external devices** for reading color characterization patches:

◆ GretagMacbeth Spectrolino spectrophotometer and SpectroScan x/y table

◆ X-Rite DTP41 or DTP41T auto-scanning spectrophotometer

◆ The onboard photodiode on the ColorSpan DisplayMaker® Mach 12 printer, and the onboard CCD camera on the ColorSpan DisplayMaker Esprit and Series XII printers

◆ ColorMark Calibrator

You can use the ColorMark+ software to create profiles for the following printers:

◆ DisplayMaker Mach 12

◆ DisplayMaker Series XII

◆ DisplayMaker FabriJet XII

◆ DisplayMaker Esprit

You must use ColorMark+ version 1.5 to create profiles for other ColorSpan printers, including the DisplayMaker HiRes 8-Color Series and the Giclée PrintMakerFA.

Unless otherwise specified, this manual refers to version 3.0 or later. For further information about ColorMark+ version 1.5, refer to the *User Guide* that accompanies the software.

To install the ColorMark+ software:

1. **Install the electronic ColorMark Key on the print server.**

   The electronic ColorMark key identifies the server as having the ColorMark+ software installed. Securely attach the ColorMark Key to the parallel port of the print server. It will only fit on the correct port.

2. **Power on the ColorSpan server and access the BIOS setup program.**

   If you are using a ColorMark Pro 1.5G, 1G, or 8000, or RIPStation 700/800 or 1G, go to Step 5.

   The parallel port must be Enabled and set to LPT1, I/O Address 378, IRQ 7. The location of this setting varies with BIOS version (see table). Access the BIOS setup program by entering the following key sequence as the system boots:

Server	Key Sequence	BIOS Setting
ColorMark Pro 4000, RIPStation 400	When the ColorSpan logo appears, press the Esc key. When the console (text screen) appears, press the F2 key.	Peripheral Configuration - Parallel port
ColorMark Pro 7000/ 5000, RIPStation 500	No setup needed, the parallel port is enabled by default.	Not applicable.

3. **When you have finished changing the BIOS settings, press the Esc key.**
4. **Select "Exit and Save Changes," and confirm your choice.**
5. **When the System Control interface appears, ensure that no jobs are RIPing or printing.**
6. **Set the print server's display adapter.**

   The print server's display adapter must be set to 65,536 colors (sometimes referred to as 16-bit color). To access this setting, from the System Control Preferences setting, click Color..., then click the Settings tab. Under Color Palette, select "65536 colors" from the drop-down list. Then save the change and exit the settings dialog box.

7. **Load the ColorMark+ CD-ROM into the print server's CD-ROM drive.**
8. **From the System menu of the System Control interface, select Update...**

   This starts the installation process. Follow the prompts to install the software.

9. **Install the external device.**

   If you are using an external input device, connect it to the serial port on the ColorSpan print server otherwise used for the ColorMark Calibrator. Refer to the *Quick Start Guide* that accompanies the server for specific location. Connect the device to power as described in its accompanying manual. If the server does not detect the device, try disconnecting the power supply plug from the device, then reconnecting it.

   Refer to the manual accompanying the device for detailed operating instructions.

What is ColorMark+?

ColorMark+ is a suite of software applications that enhances the standard ColorMark Color Management System and ColorSpan Print Server Software. ColorMark+ enables you to:

◆ **Create and edit custom color profiles** — profiles measure, or characterize, the color properties of a specific media and ink combination to ensure accurate and consistent color matching. When you create a profile, it is automatically saved in both ColorSpan (.CX) and ICC (.ICM) formats.

◆ **Adjust the color properties in ColorSpan RIP Saver files** — the Color Adjustment Tool enables you to interactively adjust the color properties of a document and print it again without re-RIPing the file.

ColorMark Profiles

ColorMark+ enables you to adjust the profile for a given ink and media combination, or create a new profile for a third-party (non-ColorSpan) media. These profiles can be shared with other servers running the same version of the ColorMark+ software.

ICC Profiles

The ICC profiles generated by the ColorMark+ software are used by applications on a client workstation. You can use ICC profiles on workstations that meet the following requirements:

◆ **Application Program** - the application program used to print with an ICC profile must be able to use ICC profiles and generate color separations.

Macintosh OS Workstations

◆ **Operating System** -Macintosh OS version 8.5 or greater

◆ **Apple LaserWriter 8.65 or later** (may be downloaded from http://www.apple.com/)

◆ **Apple ColorSync** — ColorSync is required to use ICC profiles with Macintosh applications, and is included with the Macintosh OS. ColorSpan recommends that you install the latest release of ColorSync, which is available from the Apple web site at http://www.apple.com/colorsync. This site also contains extensive background information to help you establish an ICC workflow from scanner to monitor to printer.

◆ **Macintosh Formatting** - The Apple ColorSync software requires that ICC profiles have a particular type and creator before it will display them as an available color profile. Macromedia Freehand for Macintosh also has special header information it requires for ICC support. The Macintosh utility Prepare ICC Profile, included with ColorMark+, makes the necessary changes automatically. See "Macintosh File Format" on page 3-5 for instructions.

Windows Workstations

◆ **Operating System** - one of the following:

  ◆ Microsoft Windows 95 version 4.00.95B (also known as OEM Service Release 2 or 2.1)

  ◆ Microsoft Windows 95 version 4.00.95C (also known as OEM Service Release 2.5)

  ◆ Microsoft Windows 98

  ◆ Microsoft Windows NT 4.0 or greater with a third-party color management system (Windows NT does not provide native support for color management)

  ◆ Microsoft Windows 2000

  ◆ Microsoft Windows Millennium Edition

  ◆ Microsoft Windows XP

◆ **Adobe PostScript driver** - the Adobe PostScript printer driver is required to print separations with ICC profiles. ColorSpan recommends that you install the latest release of the driver, which is available from the Adobe web site at http://www.adobe.com/.

Post-RIP Manipulation Tool

The Post-RIP Manipulation Tool enables you to interactively adjust the color and other properties of a RIPSaver document and print it again without re-RIPing the file. You can:

◆ Adjust the color balance in the shadows, midtones, and highlights in the image

◆ Scale, flip, and crop the image

See Chapter 5, Using the Post-RIP Manipulation Tool, for instructions.

Color Management Overview

To take full advantage of the ColorMark+ software, you should understand the following concepts:

◆ How Color is Defined

◆ Why Color Management is Needed

◆ How Color Management Works

Each of these topics is introduced on the following pages. The entire scope of color management issues as they relate to digital imagery and wide format output is beyond the scope of this manual. For further information, refer to the publications listed on page v.

How Color is Defined

The ability to precisely measure and define colors is essential in the reproduction of images. All visible colors can be defined by three characteristics:

◆ **Hue** - the property of color that is determined by the wave-lengths of light coming from an object. It is the property we refer to when we call a color by its name, such as red, purple, or bluish green.

◆ **Saturation** (chroma, purity, intensity, vividness) - the clarity of a color, the extent to which it is not dulled or grayed.

◆ **Lightness** (luminance, brightness, value, darkness) - indicates how light or dark a color is, how close it is to black.

Other frequently used terms for these three characteristics are HSV (hue, saturation, value), HSL (hue, saturation, lightness), and HVC (hue, value, chroma).

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

Colors on your monitor need to be reproduced by printing ink on paper. Spot colors are reproduced with pre-mixed inks, while process colors, such as the Standard Web Offset Press set (SWOP), are reproduced with cyan, magenta, yellow, and black inks (CMYK). Spot color inks (for example, the PANTONE Matching System) provide a much larger color gamut than CMYK process inks used by ink jet printers and offset presses. To extend the CMYK gamut, ColorSpan inks are available in extended process color sets (CMYK plus orange, green, blue, red).

The CIE Yxy Color Model

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

Another space to represent colors is the CIE Yxy color model. In this model, all colors having the same lightness lie on a roughly triangular flat plane. This is the color space shown on the Edit Profiles dialog box (see "Editing Profiles" on page 4-3).

The CIE L*a*b* Color Model

The non-linear CIE Yxy color model was mathematically transformed in 1976 to the uniform CIE L*a*b* model, in which distances between colors more closely match those perceived. All colors of the same lightness lie on a circular flat plane, across which are the a* and b* axes. Positive a* values are reddish, negative a* values are greenish, positive b* values are yellowish and negative b* values are bluish. Lightness varies in the vertical direction.
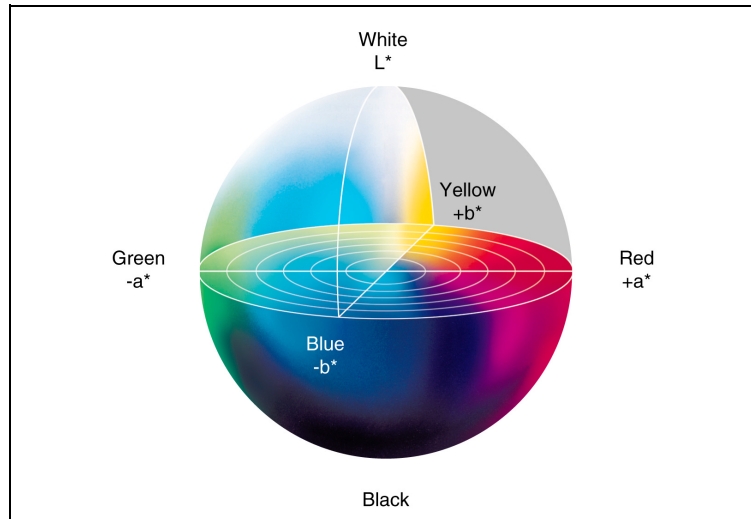
Fig. 1-1. The CIE L*a*b* color space

The ColorMark+ software allows you to adjust the hue, saturation, lightness, and contrast in RIP Saver files. This saves you from having to adjust the original file in the application program, and re-RIP the file.

Why Color Management is Needed

To match colors in printed output to those in scanned originals is not a simple task because of a number of variable factors in the reproduction chain:

◆ Different image-capturing devices generate different output values when reading the same original.

◆ Adjustments to monitor controls cause wide color variations.

◆ Gamut differences between monitors and printing processes mean that unprintable colors can be introduced during image retouching.

- The conversion of scanned RGB data to CMYK separations differs from one program to another.

- Proofing devices vary widely in color rendering (i.e. the way they visualize colors) due to pigment and substrate characteristics.

- Viewing proofs and printed matter under non-standard lighting conditions introduces errors of judgment.

- Ink-based press adjustments permit wide variations in ink densities.

- Alternative ink sets and paper types affect color rendering.

- Paper coating and texture affect dot gain, which modifies colors.

How Color Management Works

Attempting to compensate for all these color variations by trial and error is too expensive in time and materials. Color Management Systems (CMS) solve the color mismatch between input and output devices. The CMS translates colors from the color gamut of one device into a device-independent color model, and then maps that color information to another device's color gamut.

Color profiles are electronic files that contain the necessary information for the CMS to:

- Convert color data between native device color spaces and device-independent color spaces

- Ensure that the printer will not deliver more ink than the media can absorb

- Ensure that varying ink densities are printed in a consistent (linear) manner

On the ColorMark CMS CD-ROM, ColorSpan supplies a large number of ColorMark format output profiles for ColorSpan media and ink combinations. With the ColorMark+ software and supported input hardware, you can adjust or create the output profiles yourself for ColorSpan or third-party media. To characterize an ink and media combination, you print and read a reference target. The target contains CMYK color patches (the number depends on the size of the color set). ColorMark+ uses the measured values to create a unique color profile.

The ColorMark+ software always saves the profile in two formats: ColorMark (.CX) and ICC (.ICM).

ColorMark Profiles

ColorMark format (.CX) profiles are stored on the ColorSpan print server, and can be copied between ColorSpan servers. Once created and stored, they are used by the ColorMark CMS, and can be edited using the ColorMark+ software.
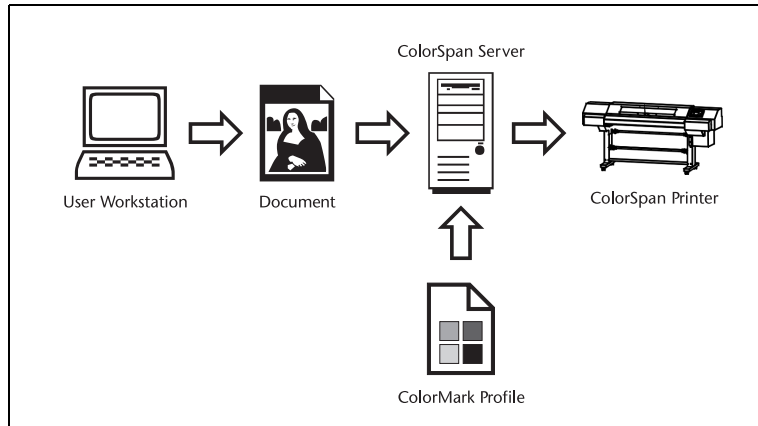

Fig. 1-2. ColorMark Profiles are applied at the server

ICC Profiles

The International Color Consortium (ICC) has defined a high-quality, extendible, and interchangeable color profile format. The format is based on the Apple ColorSync 1.0 profile format.

The ICC color profiles are described in a platform-independent format and can be used to translate color data created on one device into another device's native color space.

The latest implementations and the acceptance of the ICC color profile standard allow the following:

◆ End users can transparently move profiles and images with embedded profiles across different locations, operating systems, and applications

◆ Device manufacturers can create a single color profile for multiple operating systems

The ICC specification uses three basic profile types:

◆ **Input profiles,** associated with input devices such as scanners

◆ **Display profiles,** associated with display devices such as monitors

◆ **Output profiles,** associated with output devices such as printers
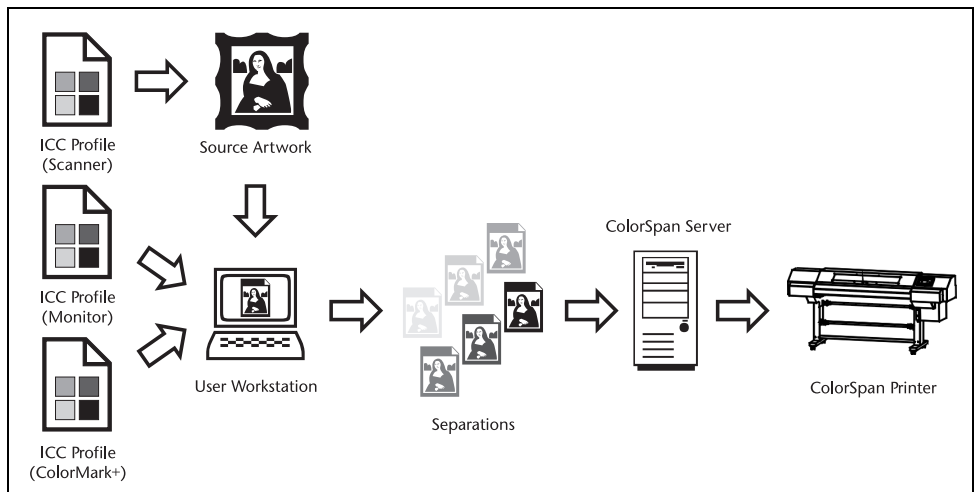
Fig. 1-3. ICC profiles are applied throughout the workflow
prior to reaching the server

Once created by ColorMark+, the ICC (.ICM) output profile is copied to the user's workstation, where it is used by applications that support ICC profiles. The user's application sends color-corrected output to the ColorSpan print server in the form of grass-like separations (one for each process color). In this case, no color correction is performed at the server (although calibration is performed on the server).

For further information about input and display profiles, refer to the documentation that accompanies your input and display hardware, and the related documentation listed on page v of this manual.

CHAPTER 2

Creating Profiles

This chapter explains how to create a color profile. The profile creation process yields one ColorSpan format profile and one ICC profile. Refer to Chapter 3, Applying Profiles, for instructions on using these different profiles.

Creating Profiles

The profile creation process involves the following steps:

1. Preparation

◆ Perform an AutoSet calibration (for DisplayMaker, except FabriJet). Getting the cartridges properly aligned and jets mapped as needed is essential to creating an accurate profile.

◆ Calibrate the external input device (spectrophotometer) according to the manufacturer's instructions.

2. Select Ink and Media

◆ Select the color set for the profile. Each color set has a different profile target.

◆ Select a maximum ink level by printing and inspecting the maximum ink level patches, and selecting the patch with the maximum ink coverage without bleeding, pooling, or hazing. This ensures that the printer will not deliver more ink than the media can absorb.

3. Linearize

◆ Print and read the linearization patches. This ensures that varying ink densities are printed in a consistent (linear) manner. Then save the linearization data.

4. Read the Color Characterization Target

◆ Print and read the characterization target. This involves reading from 300 to nearly 4000 color patches printed by the ColorSpan printer with a specific ink and media combination. (The number of patches required depends on the ink set, maximum ink level, and quality level selected.) Profile creation is performed only once per ink saturation level and media combination.

5. Save the Profile to Disk

◆ Save the profile to the server hard disk. The profile is automatically saved in ColorMark (.CX) and ICC (.ICM) formats.

Preparation	1.	Load the combination of media and ink that you want to profile.
	2.	Perform an AutoSet calibration (for DisplayMaker, except FabriJet). Getting the cartridges properly aligned and jets mapped as needed is essential to creating an accurate profile.

Refer to the printer's *User Manual* for instructions.

3. Calibrate the DTP41 or DTP41T. (The GretagMacBeth Spectrolino does not need calibration.)

4. From the System Control interface on the server, right-click a printer icon to open the icon menu.

5. From the printer icon menu, select Create...

The ColorMark+ software launches. The Select Ink Type dialog box appears. It displays the ink set(s) detected in the printer.
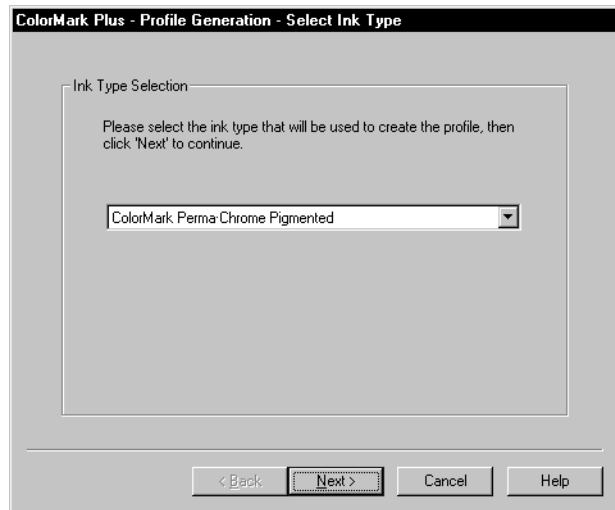

Fig. 2-1. Select Ink Type

Select Ink and Media

6. From the Select Ink Type dialog box:

◆ Click Next to accept the ink shown, or

◆ Select the other ink type from the drop-down list, or

◆ Click Cancel to exit and load a different ink type in the printer.

The Select Color Set dialog box appears.
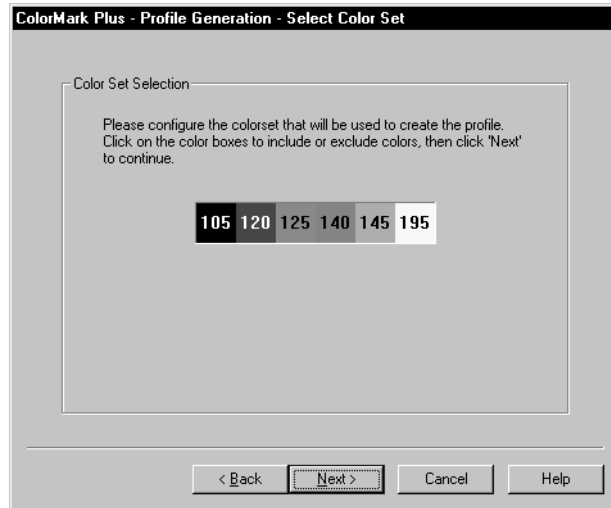
Fig. 2-2. Select Color Set

7. **From the Select Color Set dialog box:**

   ◆ Click Next to accept the color set shown, or

   ◆ Click a color to eliminate it from the profile (a minimum of CMYK must be selected), then click Next

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Note ColorMark+ creates profiles with CMYK (including medium and light densities of cyan and magenta), plus zero or two or more Gamut+ colors (red, green, blue, orange).

To create a profile consisting of CMYK plus one Gamut+ color, first create a profile consisting of CMYK plus two Gamut+ colors (for example, Red and Blue). Then edit the profile so that the extra Gamut+ color (for example, Blue) is ignored during printing. See page 4-8 for instructions.

The Select Media dialog box appears.
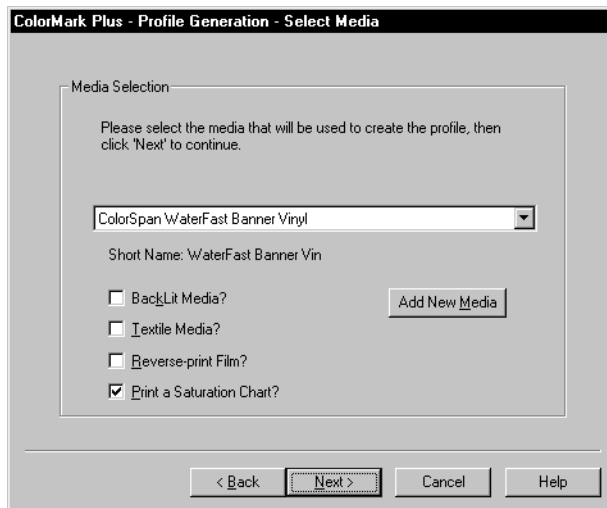
Fig. 2-3. Select Media

8. **From the Select Media dialog box:**

   ◆ Select a media name from the list, or click **Add New Media** to enter a custom media name.

   ◆ Check the **Backlit Media?** checkbox if the media is a translucent film (supported only with the DTP 41-T). Be sure to set the switch on the DTP41-T device to "TW" for backlit media.

   ◆ Check the **Textile Media?** checkbox for fabric and soft signage media. (Checked by default for FabriJet)

   ◆ Check the **Reverse-print Film?** checkbox if you will be printing on film in reverse for viewing from the unprinted side.

   ◆ Check the **Print a Saturation Chart?** checkbox to print an ink saturation chart, or uncheck the box to continue the process without printing the chart. (This checkbox does not appear when creating a profile for multidensity black inks.)

   ◆ Click **Next**.

The Choose Saturation Level dialog box appears.

ColorMark Plus - Profile Generation - Choose Saturation Level
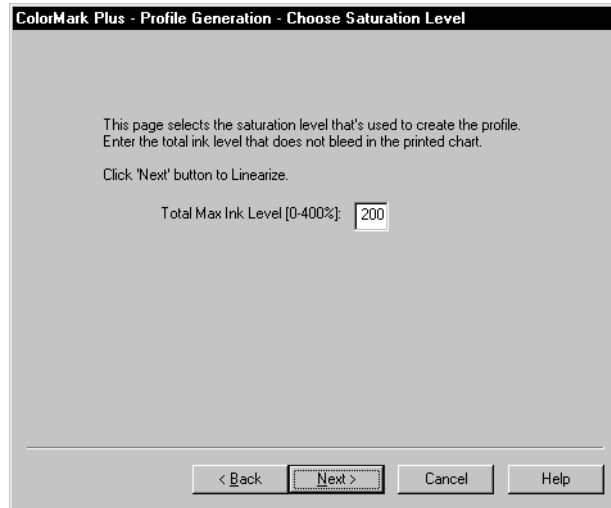
This page selects the saturation level that's used to create the profile.
Enter the total ink level that does not bleed in the printed chart.

Click 'Next' button to Linearize.

Total Max Ink Level [0-400%]: 200

< <u>B</u>ack   <u>N</u>ext >   Cancel   Help

Fig. 2-4. Choose Saturation Level

9. From the Choose Saturation Level dialog box, enter a new Maximum Ink Level, or click Next to accept the default shown.

The software searches for an external device or printer's on-board device.

Linearize   **10. Choose whether to use the external device, onboard device (camera), or file for linearization.**

◆ If you choose the external device, both the external and onboard device will be used, so that either device can be used later to Calibrate the profile (unless Skip Camera is selected, below).

◆ If you choose Camera, only the onboard device will be used. (This is an option only if the software does not detect an external device.) Backlit media must be read with the DTP41-T device; the onboard device cannot be used.

◆ If you choose file, you can read in linearization data from a file, even from a device not otherwise supported by ColorMark+.

11. **Check the Skip Camera checkbox if you do not want to print and read the onboard device linearization target.**

If you choose Skip Camera, linearization will finish faster, but you will not be able to Calibrate the profile with the onboard device.

12. **Check the Skip Printing check box if you want to skip printing the linearization targets and use previously-printed onboard and external device targets, or files with onboard and external device density data.**

If you check Skip Printing, enter the number of linearization patches per row on the onboard and external device targets, or any number if you are reading onboard and external device data files.

13. **Click OK to continue.**

The printer prints and reads the camera linearization target (unless Skip Camera or Skip Printing was selected). The Camera Input window displays. Alternatively, you can input camera linearization data by selecting File - Open from the menu.
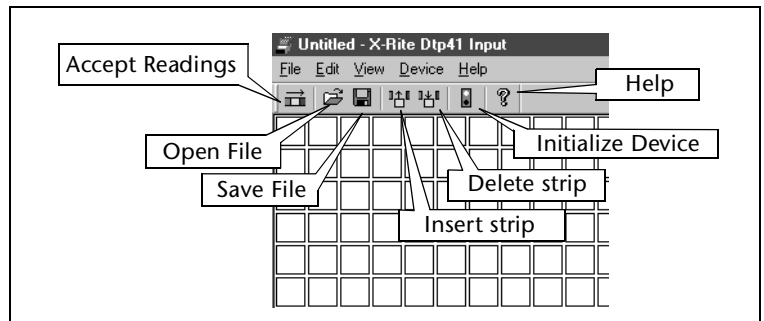
Fig. 2-5. Camera or external device input buttons

14. **Click the Accept Readings button to accept the camera data.**

15. **Click Initialize Device, or open a file.**

The external device reads the linearization target, unless you chose Skip Printing or there is no external device detected. After the target (or file) has been read by the external device, the software prompts you to click Accept Readings.

16. **Click the Accept Readings button. The software displays this message:**

Linearization done. Click 'Next' button for targeting.

Read the Color Characterization Target

17. **Select a target quality. Best reads the most targets and is the most accurate, but it takes the longest to complete.**

18. **Click Next.**

    The software searches for an external device or printer's on-board device (camera). Profiles with up to six colors (CMYK plus two Gamut+ colors) can be generated by the camera or external device. Profiles with more than two Gamut+ colors require an external device.

19. **Check the Skip Printing check box if you want to skip printing the color target and use a previously-printed target or a file with colorimetric data instead.**

    If you check Skip Printing and will be reading a preprinted target, enter the number of color patches per row on the target.

20. **Click OK to continue.**

21. **Click Initialize Device, or open a file to begin.**

    The targets print, unless Skip Printing was selected. After the targets (or file) have been read, the software prompts you to click Accept Readings. It's a good idea to periodically save the patch readings while reading is underway (select File - Save from the menu).

Note   The DTP41-T should be black calibrated about once a week. To black calibrate this device, select Device - Black Calibration from the menu and use the target supplied with the device.

22. **Click Accept Readings. The software displays this message:**

    Target done. Click 'Finish' button.

23. **Click the Finish button to continue.**
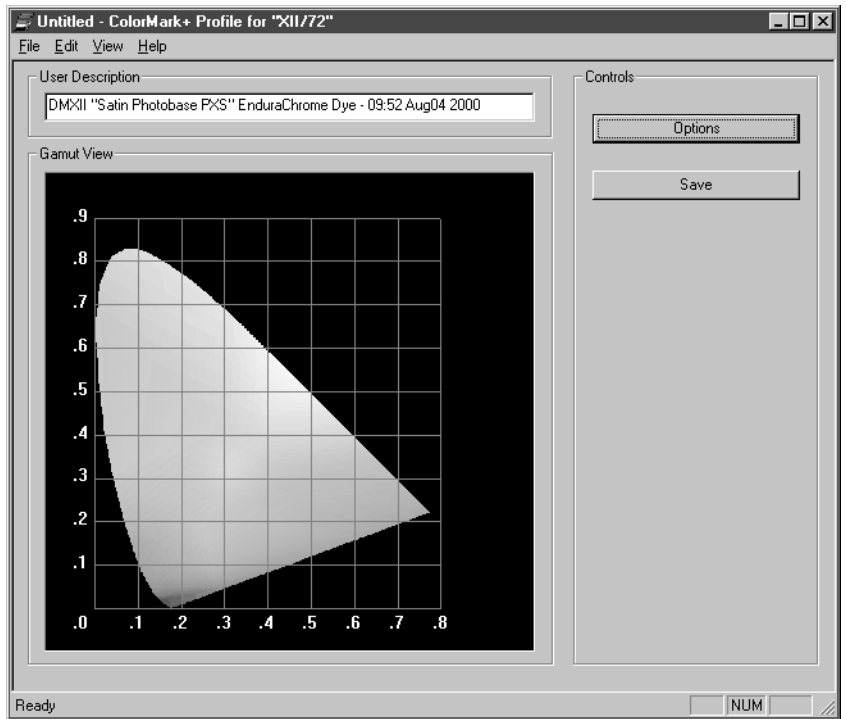
24. **The Edit Profile window displays.**

Fig. 2-6. Edit Profile

Save the Profile to Disk

25. If you wish, edit the profile.

Refer to Chapter 4, Editing Profiles, for instructions.

26. Click Save to save the profile to disk.

A dialog box appears, informing you that the profile needs to be completed.

27. Enter a file name for the profile, and click Save.

The Edit Profile window reappears, with the gamut of the profile shown as a black outline over the picture of the CIE color space.

The software saves the profile in two formats, in two separate files: a ColorSpan proprietary format (.CX) and an ICC (.ICM) format. The time to generate the profiles varies with the number of ink colors selected and the speed of the ColorSpan Print Server hardware, but it generally takes between one and five minutes.

28. Click the Yes button to proceed.

This causes the software to finish building the profile. When this is complete, the Save dialog box appears.

If You Make a Mistake

If you make a mistake while reading target strips (or patches using the ColorMark Calibrator), you can overwrite, insert, or delete readings at any time before you click the Accept Readings button.
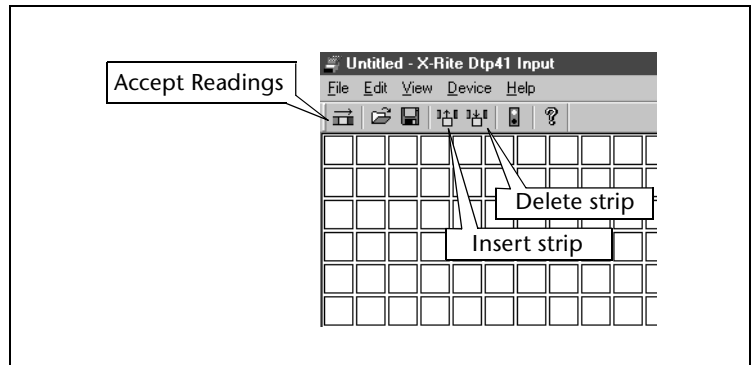
Fig. 2-7. Inserting or deleting strips

To overwrite a strip:

1. **Click the Insert button.**

    The cursor changes to the Insert symbol.

2. **Click once on the strip you want to overwrite.**

3. **Read the strip.**

    The readings are inserted at the location you selected.

To insert a strip:

1. **Click the Insert button.**

    The cursor changes to the Insert symbol.

2. **Double-click an existing strip.**

3. **A blank strip is inserted before the existing strip you selected.**

4. **Read (or re-read) the target patches.**

    The readings are inserted at the location you selected.

To delete a strip:

1. **Click the Delete button.**

    The cursor changes to the Delete symbol.

2. **Double-click an existing strip.**

    The existing strip you selected is deleted.

CHAPTER 3

Applying Profiles

This chapter shows you how to use a profile you created by following the instructions in Chapter 2, Creating Profiles.

The profile creation process yields one ColorSpan format profile and one ICC profile. This chapter shows you how to use these different profiles.

Copying a Profile to Another Server or Workstation

Once you have created a **ColorSpan (.CX) profile,** you can begin using it immediately on the server on which it was created. ColorSpan profiles can also be copied between ColorSpan servers that are running the same version of the ColorMark+ software.

To install an **ICC profile** on a client workstation, copy the file from the server into the folder that is appropriate for your operating system. Some applications may require ICC profiles to be installed in special locations. Refer to your application documentation for instructions.

ColorSpan print servers include a **file transfer protocol (FTP)** server to help you transfer profiles between servers or workstations over your Ethernet local area network. Both the server and the workstation must be properly configured to use this method. For further technical information, refer to Appendix C, Configuring TCP/IP.

Subsequent sections in this chapter show how to use color profiles in a ColorSpan workflow and an ICC workflow.

General FTP Instructions

1. **Launch your FTP client software (such as a web browser or specialized FTP client) or operating system command line.**

2. **Open the FTP server on the ColorSpan print server by entering the server's IP address (preceded by "ftp://" if required by your FTP software).**

3. **When the server responds with a user name prompt, enter "anonymous."**

4. **When the server responds with a password prompt, enter "anonymous."**

5. **When the FTP directory is displayed, navigate to the sub-directory that corresponds to the printer you are using.**

   From this point you can download ("get") individual color profiles to your workstation, and upload ("put") them from your workstation to the server.

ColorSpan Workflow

Once you have created a ColorSpan (.CX) profile, you can begin using it immediately on the server on which it was created. ColorMark profiles can also be copied between ColorSpan servers that are running the same version of the ColorMark+ software. ColorSpan profiles do not use any files on the client workstations.

Selecting a ColorMark Profile

The profile you specify determines the color and calibration data applied to each document. Documents sent as *unseparated* jobs are color corrected by the ColorMark Color Management System, using the color and calibration data in the profile. Documents sent as *separated* jobs are adjusted using the calibration data in the profile, but no color correction is applied, since an ICC profile was applied at the client workstation.

You can view, and in some cases select, a ColorMark profile at the following points in the System Control interface:

◆ At the **Port Configuration** dialog box, all incoming print jobs use the profile specified in this dialog box

◆ From the **Document Details** dialog box, accessible from an Input or Output queue (including the Attention queues), you can change the profile applied to the job. If you change the profile from an Output queue, the new profile is applied without re-RIPing the job.
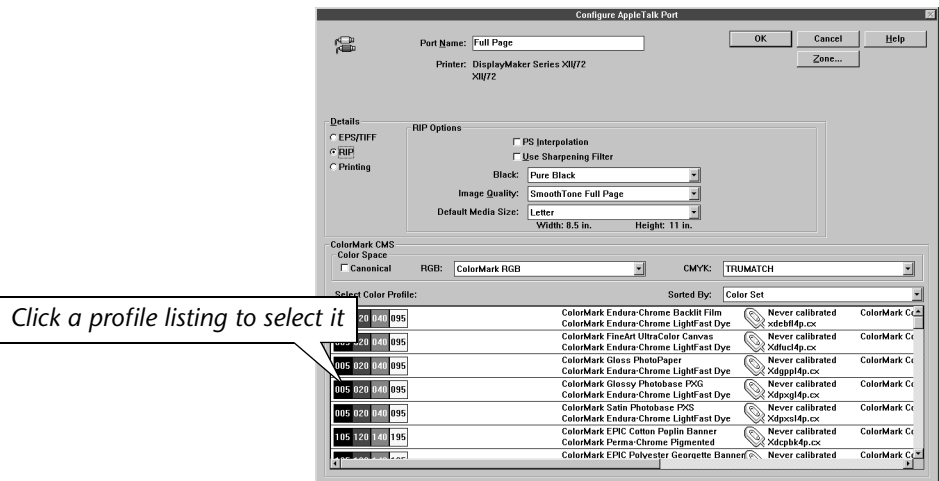

Click a profile listing to select it

Fig. 3-1. Selecting a profile (Port Configuration shown)

◆ From the **Manage Profiles** dialog box, you can view the profiles that apply to the current printer, and reset the calibration data for any profile. If you select a profile here and click Default, the software asks you whether you want to apply the profile to all ports routed to the printer. If not, no changes are made.
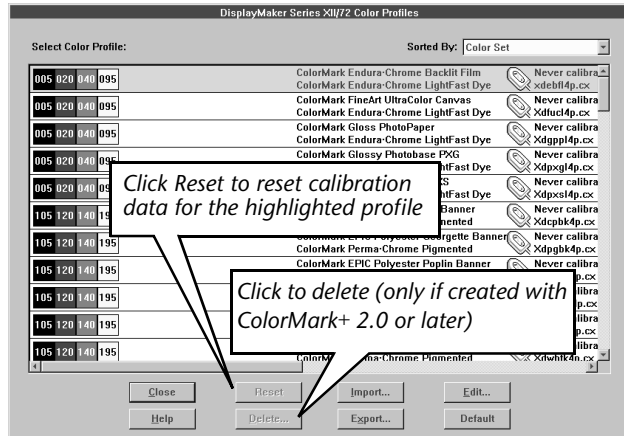

Fig. 3-2. Manage Profiles

◆ The Document Details dialog box opened from the **Tracking Log** shows the profile that was applied to the completed print job.

The server software verifies that the profile you specified for a print job is compatible with the ink and media loaded in the printer. It does this by reading the ink profilers installed in the printer, and checking the media specified in the Printer Configuration dialog box. If there is a mismatch, the job is sent to the Attention Queue. If this happens, either change the profile to match the media and ink loaded in the printer, or change the media and ink loaded in the printer to match the profile applied in the print job.

Calibrate the new profile if it produces inaccurate color.

ICC Workflow

Once created on the ColorSpan print server, the ICC profile must be copied to a client workstation, where it is used by a supported application to create color-corrected output.

When copying ICC profiles to another ColorSpan print server, be sure to also copy the corresponding ColorSpan (.CX) profile. The server *always* needs the .CX profile to properly RIP and print files.

To use an ICC profile, follow these steps:

◆ Create, then copy and install the profile from the server to your Macintosh OS or Microsoft Windows based workstation

◆ Create and set up a document for separated output using an application that supports ICC profiles — for detailed instructions and tips for specific applications, see LaserLine 2801, *Working With ColorMark+ and ICC Profiles,* available at www.colorspan.com

◆ Print the document as separations to the ColorSpan server

> **Note** You cannot create a MediaSaver document from files sent as separations (created with an ICC profile).

Installing an ICC Profile

To install an ICC profile, download it via FTP from the ColorSpan print server to your workstation. The location on your workstation for profiles varies by operating system:

Operating System	Location
Macintosh	System Folder : ColorSync Profiles
Microsoft Windows 95/98/Me	WINDOWS\SYSTEM\COLOR
Microsoft Windows NT 4/2000	WINNT\SYSTEM32\COLOR
Microsoft Windows XP	WINDOWS\SYSTEM32\COLOR

Macintosh File Format

The Apple ColorSync software requires that ICC profiles have a particular type and creator before it will display them as an available color profile. Macromedia Freehand for Macintosh also has special header information it requires for ICC support.

The file "macdrop.hqx" on the ColorMark+ CD-ROM will decompress into Prepare ICC Profile, a drag-and-drop utility that prepares these profiles for use with ColorSync and Free-

hand. Copy it to your Macintosh and uncompress it with Aladdin/Stuffit Expander or MindVision MindExpander.

(You can also download this utility from the ColorSpan print server at ftp://[address]/colormark/mac_icc/, where [address] is the IP address of the server. For more information about the print server's built-in FTP server, see "Copying a Profile to Another Server or Workstation" on page 3-2.)

To prepare a new ICC profile (.ICM file) for use on the Macintosh, drag it to the Prepare ICC Profile icon. This prepares the file and copies it to the System Folder : ColorSync Profiles folder. The original file remains in its original location, and can be transferred to other Macintosh computers without "preparing" it again.

Supported Applications

The following table shows which software applications have been tested and found to be compatible with the ColorMark+ software in an ICC workflow, and the number of colors (4, 6, or 8) that are supported in these applications:

Application	Windows 95/ 98	Windows ME	Windows NT 4.0, SP 6	Windows 2000, SP 1	Macintosh OS 9
Adobe Illustrator 9	—	—	—	—	—
Adobe InDesign 1.5	—	—	—	—	—
Adobe PageMaker* 6.5	4, 6	4, 6, 8	4, 6, 8	4, 6	4, 6, 8
Adobe Photoshop 5.5	—	—	—	—	—
CorelDRAW! 9	—	—	4	—	—
Macromedia Freehand 8	4, 6	4, 6	4, 6	4, 6	—
Quark XPress** 4.01	$4^{\dagger}$, $6^{\dagger}$	$4^{\dagger}$, $6^{\dagger}$	4, 6	—	4, 6

—   ICC workflow not supported

*   Requires Kodak Precision Color Management System, included with product

**   Hexachrome colors only

[†]   Requires Adobe PostScript driver, available from Adobe Systems

Laying Out a Document   Since you will be printing separated output to the ColorSpan server, it is important that no unsupported spot colors are specified within the document or within any graphic files that are imported into or linked to the main document. If spot colors do exist in, for example, various imported EPS graphics, the separated output will consist of one for each process color *plus* one for each spot color. In this case, the server will route the job to the Attention queue with a disposition of Ink Mismatch, if the job specifies ink colors not supported by the printer.

For detailed instructions and tips for specific applications, see LaserLine 2801, *Working With ColorMark+ and ICC Profiles,* available at www.colorspan.com

Printing Separations   Most applications allow you to create separated output as an option within the Print or Print Setup dialog boxes. Refer to your application documentation for instructions. This method should yield a multi-page single print job, rather than each color plane in its own separate job.

There is no standard order in which applications output separation planes. The ColorSpan server determines which separation it is receiving by looking for the following PostScript language comment:

   %%PlateColor: [Color Name]

where [Color Name] is the ink color name.

The current versions of the most common applications do insert this comment into separated output.

When printing a job using ICC profiles, configure an Input Port in System Control to use the ColorMark profile that corresponds to the ICC profile you are using. This enables the linearization data contained in the ColorMark profile to be applied to the print job. Then print to this port. Once a job has been received by the server, its profile cannot be changed from the profile specified in the Port Configuration dialog box.

ICC and ColorMark profiles you create with the ColorMark+ software have the same file name, but different extensions:

◆   Sample ICC profile file name: CustomProfile.ICM

◆   Sample ColorMark profile file name: CustomProfile.CX

In the Apple LaserWriter 8 setup dialog box, leave the Print Color as "Color/Grayscale." When creating color separations, which are required for ICC output, this setting causes the application (rather than the LaserWriter driver) to apply color correction and create the separations.
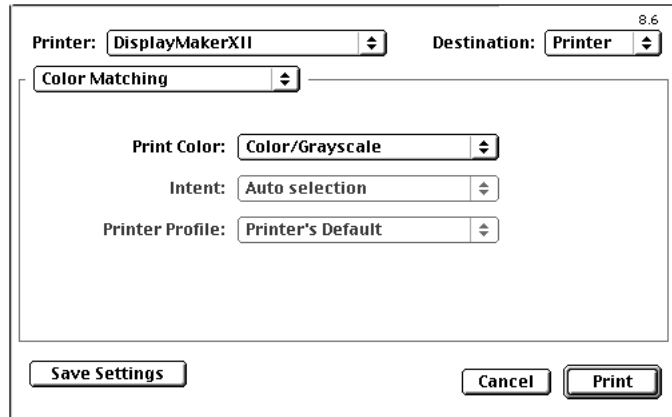

Fig. 3-3. LaserWriter 8 setup for ICC output

Working with ICC Workflow Jobs on the ColorSpan Print Server

Once the ICC workflow print job has arrived on your ColorSpan print server, it will generally behave like a ColorSpan workflow print job. There are several exceptions, however:

◆ The full-screen preview will show only the color separations as grayscale images. To scroll through the plates, press the PageUp and PageDown keys on the computer keyboard.

◆ MediaSaver is not available for ICC workflow print jobs.

◆ The Post-RIP Color Adjust feature of ColorMark+ is not available for ICC workflow jobs.

◆ You will not be able to change the ColorMark ink and media transform for ICC workflow jobs. That is, a job that has been processed for Endura•Chrome ink on Satin Photobase, for example, cannot be reconfigured for a different ink type or media type. If you need to print an ICC workflow job with a different ink and media combination, reconfigure the input port for the desired combination, then resend the print job from your workstation. Giclée PrintMakerFA users can change print quality modes (high speed, high quality, film quality) for the same ink and media combination.

Server Errors You May Encounter

The following are several error conditions that can occur when sending ICC-workflow color separated jobs to the ColorSpan server. In each case, the print job falls into an Attention Queue on the server and the error message is displayed next to the job.

◆ **ColorMark Mismatch** — the print server Input Port was configured for an ink and media that does not match the ink and media described in the ICC Color Profile. Verify that you have configured the Input Port correctly and that the ICC Color Profile selected on the workstation matches the Port configuration, then resend the job from the application on your workstation.

◆ **Missing Process Color** — the ink colors in the printer (as reported to the server by the ink profilers) do not match the ink colors specified in the print job. Either reconfigure the printer ink layout to match the colors specified in the job, or reconfigure the application on your workstation to print only the process colors on the printer.

◆ **Unknown Ink Color** — the print job contains a color plate for a process color that is unknown to the server. Similar to "Missing Process Color" described above; however, the only recourse is to reconfigure the application on your workstation and resend the job to the server.

Tips for Printing with Gamut+ Inks

Images printed to extended process color ink sets (such as HiFi CMYKOG) on offset presses are often saved in Lab color space. For best results on ColorSpan printers, always save images in RGB color space. This will produce the largest gamut and least number of color space conversions.

Inside the normal CMYK gamut, most colors will be reproduced using the CMY inks even in the ROGB (Gamut+) hue areas. The ROGB ink usage starts at 60-95% of the distance out of the CMYK gamut, depending on the maximum ink saturation of the CMYK inks. With more ink saturation of the CMYK inks, the usage of the ROGB colors will decrease.

The multi-density ink sets that use two or three shades of cyan and magenta produce a larger gamut than the sets with single shades of cyan and magenta. Multi-density ink sets will require less of the ROGB inks than single-density sets to reach the most saturated regions.

When using the Orange process color in combination with the Red process color, there will be significantly less Orange usage because the two colors are calorimetrically close to each other.

The maximum usage of the ROGB inks will be around the following Lab values:

◆ Red – 44, 75, 23

◆ Orange – 68, 55, 113

◆ Green – 49, -73, 27

◆ Blue – 27, 31, -78

Edit the profile's Red, Orange, Green, and Blue curves to alter how these inks are used. See Chapter 4, Editing Profiles, for instructions.

CHAPTER 4

Editing Profiles

This section explains how you can edit output profiles. This section deals with the following:

◆ How the Color Curves Affect Printing (page 4-2)

◆ Editing Profiles (page 4-3)

How the Color Curves Affect Printing

When you alter a color profile, you are determining when and how the various inks will be used to print certain colors. You are *not* globally altering the appearance of colors in the printed output. To do this for individual images, use the Color Adjustment Tool (see Chapter 5, Manipulating RIP Saver Files, for instructions).

You can edit the curves in a profile to accomplish these objectives:

◆ **Primary Colors** — allows you to adjust the Maximum Lightness and Minimum Lightness parameters for Cyan, Magenta, and Yellow.

◆ **UCR Black** — allows you to adjust the under color replacement (UCR) handling and the grayscale smoothing curve, and specify the maximum amount of Black ink.

◆ **Gamut Boundary** — allows you to reshape the boundary surface of the gamut.

◆ **Rendering Intent** — allows you to adjust the color accuracy and transitions in ICC profiles.

◆ **Non-Primary Colors** (for profiles with ink colors in addition to CMYK) — allows you to adjust how non-primary colors (for example, Blue, Orange, Red, Green) are applied.

Editing Profiles

You can edit profiles that you created with ColorMark+, or edit certain ColorSpan-created profiles and save them with a different file name.

(i)

Note   You cannot use ColorMark+ 3.0 to edit profiles created with previous versions of ColorMark+.

1. **From the System Control interface on the server, right-click a printer icon to open the icon menu.**

2. **From the printer icon menu, select Manage Profiles...**

   The Manage Profiles dialog box appears.

3. **Highlight a profile listing, then click the Edit...button.**
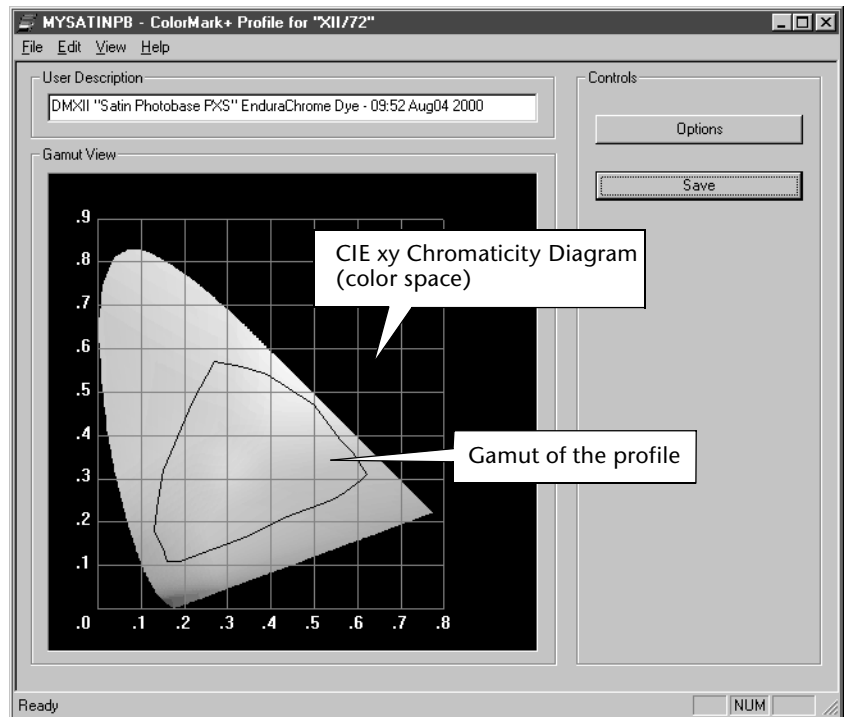
   The ColorMark+ Edit Profile window appears.

Fig. 4-1. Edit Profile

4. **Click the Options button.**

   The Options dialog box appears.

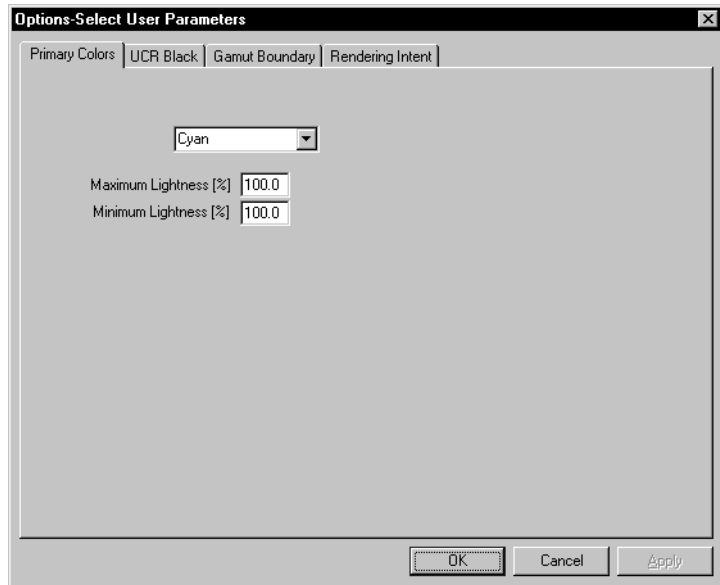5. **Set the Primary Colors properties.**

Fig. 4-2. Primary Colors properties

Use the Primary Colors control to specify where you want Cyan, Yellow, and Magenta used along the lightness (L) axis of the L*a*b* color space, as a percentage of the distance from the bottom (black) to the top (white) of the axis. Changing these parameters can eliminate the appearance of contrasting dots of color in lighter areas.

6. **Set the UCR Black properties.**
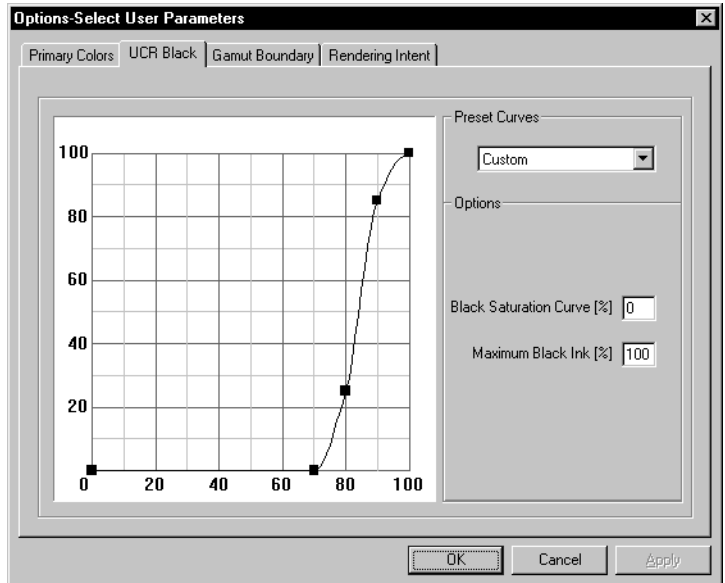

Fig. 4-3. UCR Black properties

This dialog box allows you to select a preset UCR curve, or select Custom and adjust:

◆ **Black Level Curve** — the smoothness of gradations between gray tones; a higher percentage yields smoother gradations

◆ **Maximum Black Ink** — the amount of black ink used for a given percentage of black called for in the image

Black and gray hues are created by printing with either Black or a combination of Cyan, Magenta, and Yellow inks. You can reduce total ink usage by a combination of creating black with Black ink (a technique known as Under Color Removal or UCR), and creating gray tones with Black ink (Gray Component Replacement or GCR).
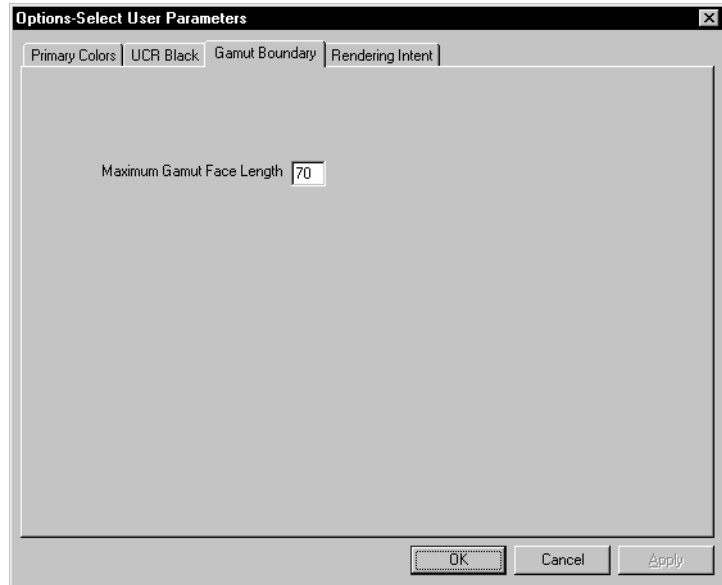
7. Set the Gamut Boundary.

Fig. 4-4. Gamut Boundary properties

For ColorMark format (.CX) profiles, this option allows you to change the shape of the boundary surface of the gamut. This parameter affects the transitions between adjacent colors in the gamut, as well as between high chroma and low chroma values within hues. By lowering the gamut face length, you can eliminate the presence of "hard dots" of one color in an adjacent color. If you lower this number too much, however, you could reduce the size of the profile's gamut, which could result in inaccurate printed colors.

For ColorSpan media, the default value should work well in most situations. For third-party media, you may have to experiment with different values to get the best results.

Editing Profiles

8. Set the Rendering Intent.
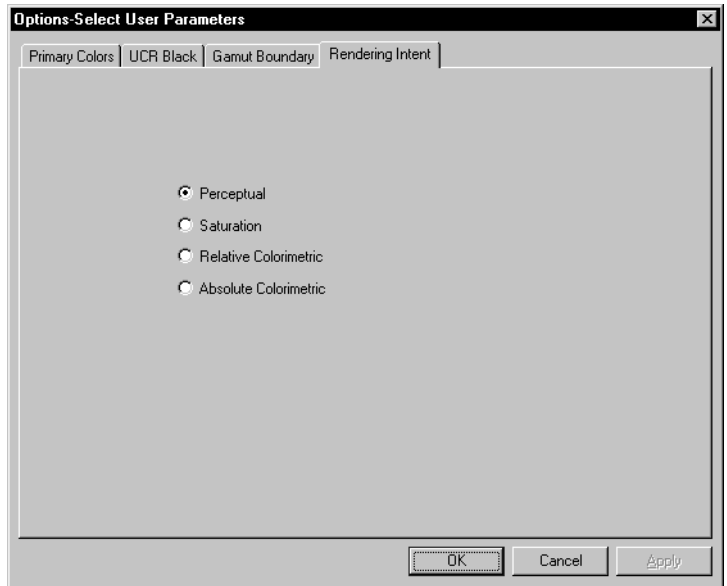

Fig. 4-5. Rendering Intent properties

◆ Render Intent - controls the render intent of the profile (not just the Black curve):

Perceptual - good for photographic images, compresses the gamut and shifts all colors into the printable gamut.

Saturation - good for charts and business graphics, maintains the original image color saturation.

Relative Colorimetric - remaps out-of-gamut colors to the closest printable color, without affecting other in-gamut colors.

Absolute Colorimetric - remaps colors while preserving image brightness.
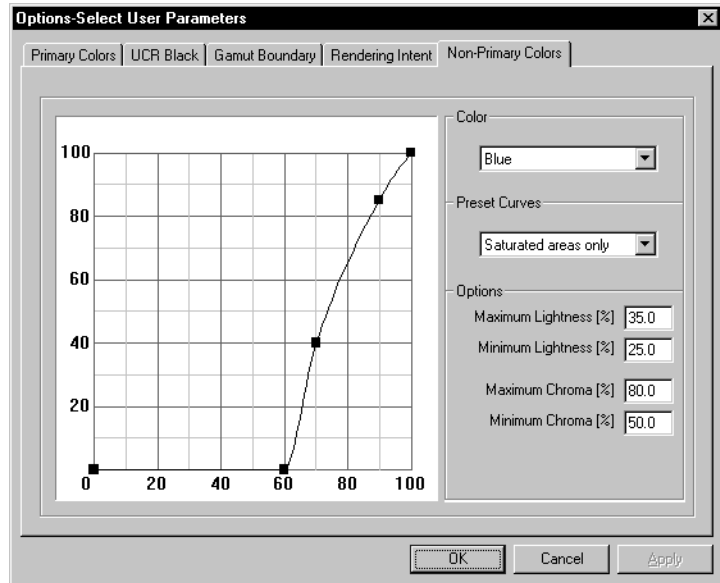
9. **Set the Non-Primary Colors.**

Fig. 4-6. Non-Primary Colors properties

These options appear only for profiles that contain Blue, Orange, Red, or Green. They are used to specify how these Gamut+ (nonprimary) colors are used.

The dialog box allows you to select a preset curve, or select Custom and adjust:

◆   **Maximum/Minimum Lightness** — shift the range downward to eliminate the appearance of contrasting dots of color in lighter areas. To eliminate the color altogether from printed output, enter zero for the Maximum and Minimum values. You can use this technique to yield, for example, a five-color profile from a six-color profile, since CMYK plus *one* Gamut+ color cannot be created automatically, but a profile with CMYK plus *two* Gamut+ colors can be created. (See page 2-4 for further information.)

◆   **Maximum/Minimum Chroma** — to eliminate the appearance of color dots in neutral (gray) areas, use a higher Maximum and Minimum Chroma values. This restricts the use of this color to the high chroma (saturated) region of the L*a*b* space.

CHAPTER 5

Manipulating RIP Saver Files

This chapter shows you how to adjust the color, positioning, and other features in RIP Saver files with the Post-RIP Manipulation Tool.

Using the Post-RIP Manipulation Tool

The Post-RIP Manipulation Tool enables you to manipulate RIP Saver files that were RIPed with ColorMark profiles, but not those sent as separations (created with ICC profiles). It also does not support ColorMark profile jobs saved with the Canonical image quality.

1. **Open the RIP Saver Permanent, or a RIP Saver Temporary queue.**

2. **Scroll to the RIP Saver file you want to adjust, and click the file listing to select it.**

3. **Click the Post-RIP Manipulation Tool button in the RIP Saver queue toolbar.**

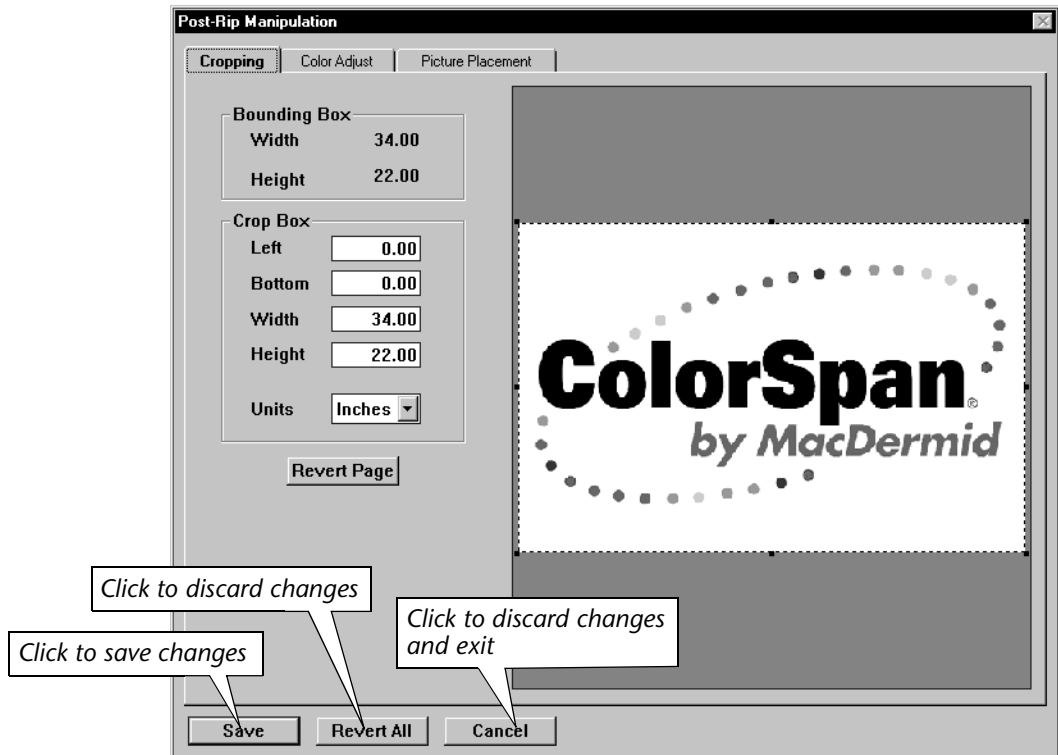   The Post-RIP Manipulation Tool dialog box appears.

Fig. 5-1. Post-RIP Manipulation Tool dialog box
(Cropping tab)

4. **To crop the image, adjust the outline in the preview image, or enter numeric values in the Crop Box section.**

To adjust the outline on this and the Picture Placement tabs, position the mouse cursor over one of the small square "handles" at the perimeter of the image, then drag the outline.

To discard all changes, click the Revert Page button.

5. **Click the Color Adjust tab to adjust the color of the image.**
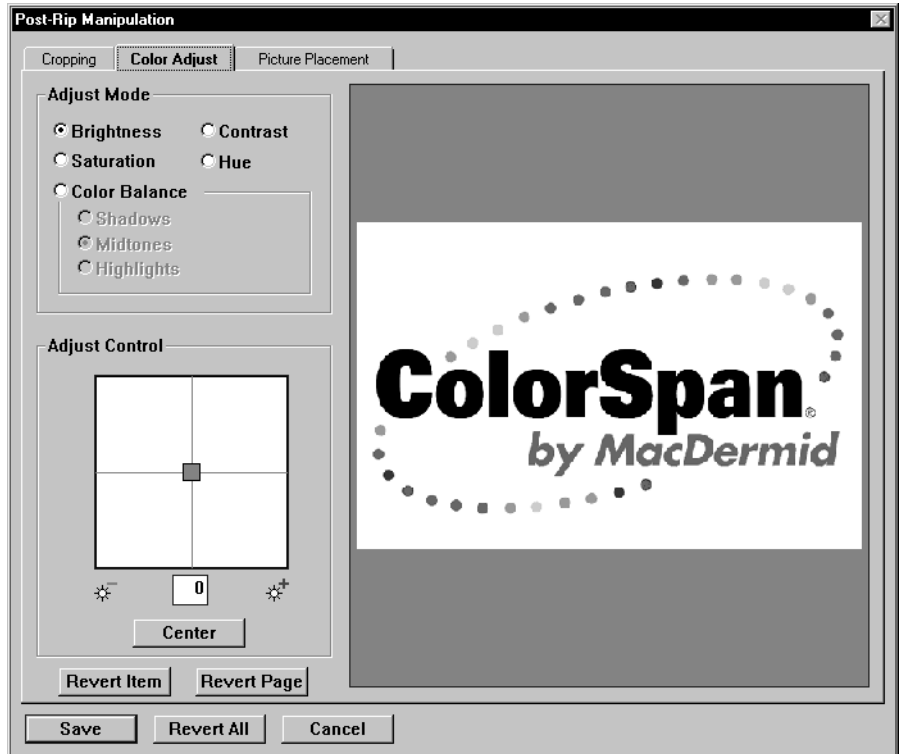

Fig. 5-2. Post-RIP Manipulation Tool dialog box
(Color Adjust tab)

After clicking one of the radio buttons, you can drag the crosshairs Adjust Control or enter a number next to the control to adjust these attributes:

◆ **Brightness**

◆ **Contrast**

◆ **Saturation** - adjusts the amount of gray in the image. The less gray, the higher the saturation. High saturation corresponds to intense, vivid colors; low saturation to quiet, dull grayish colors.

◆ **Hue** - adjusts the overall color cast of the image.

◆ **Color Balance** - adjusts the color balance in any of three areas — shadows, midtones, and highlights — along the a and/or b axis in the CIE L*a*b* color space (see "The CIE L*a*b* Color Model" on page 1-10).

The onscreen preview will closely approximate the appearance of the printed output. See Fig. 5-3 and 5-4 for examples of how the color can be adjusted.

To discard the changes for a single attribute, click the Revert Item button. To discard all changes, click the Revert All button.
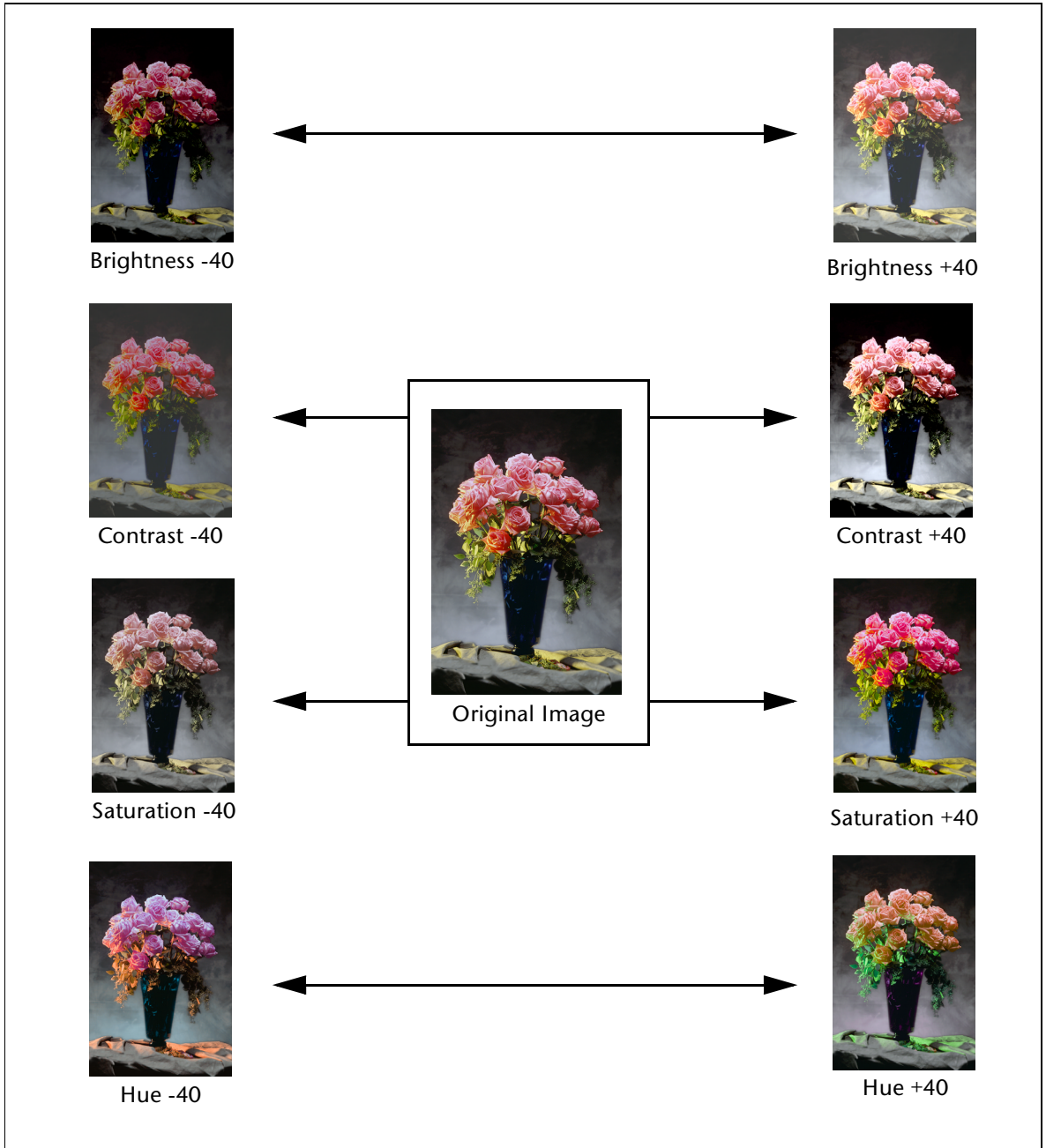
Brightness -40

Brightness +40

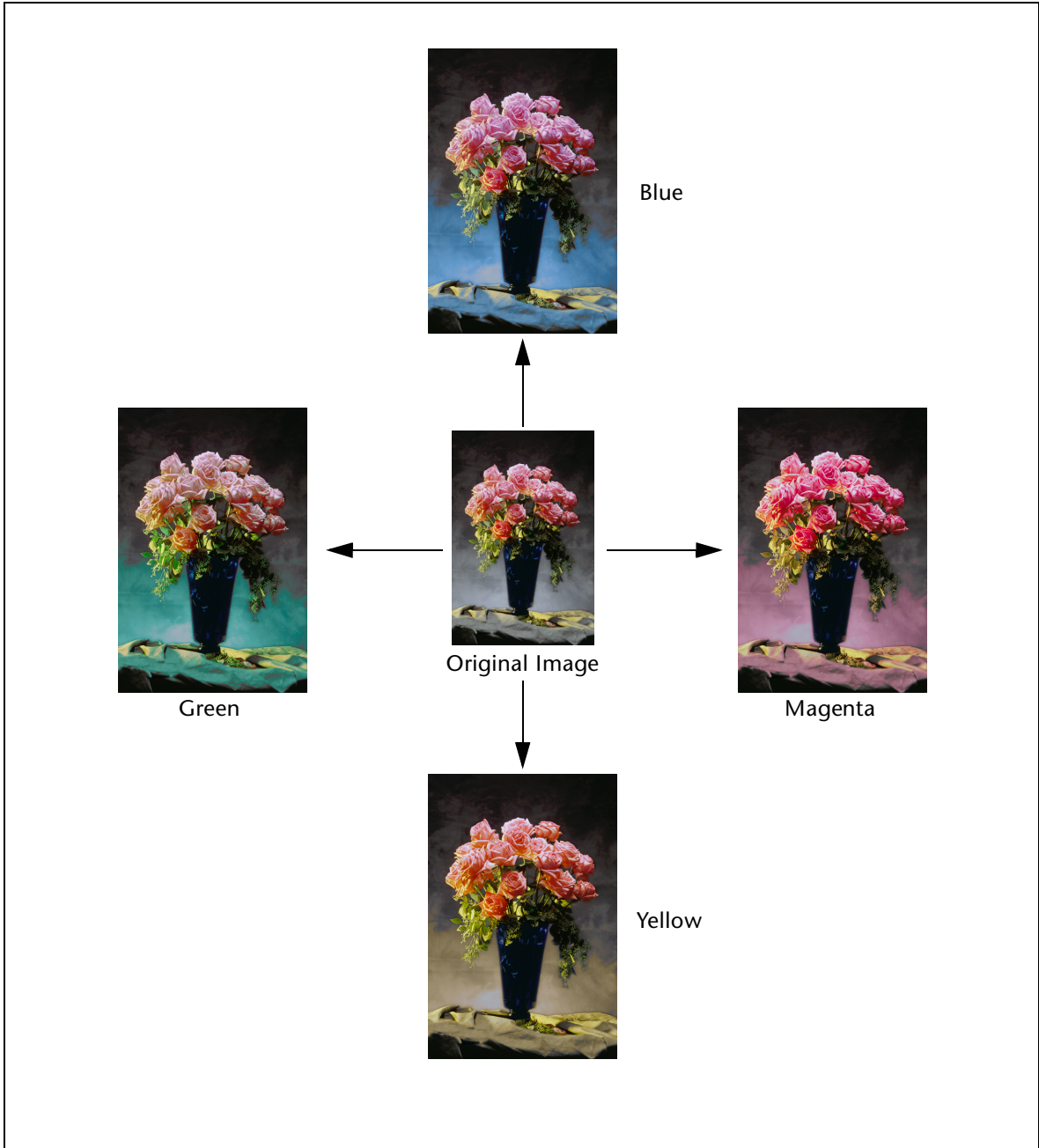Contrast -40

Original Image

Contrast +40

Saturation -40

Saturation +40

Hue -40

Hue +40

Fig. 5-3. Color adjustment examples

Fig. 5-4. Color balance adjustment examples (midtones)

Using the Post-RIP Manipulation Tool

6. **Click the Picture Placement tab to locate the image on the printed page, scale, or flip the image.**
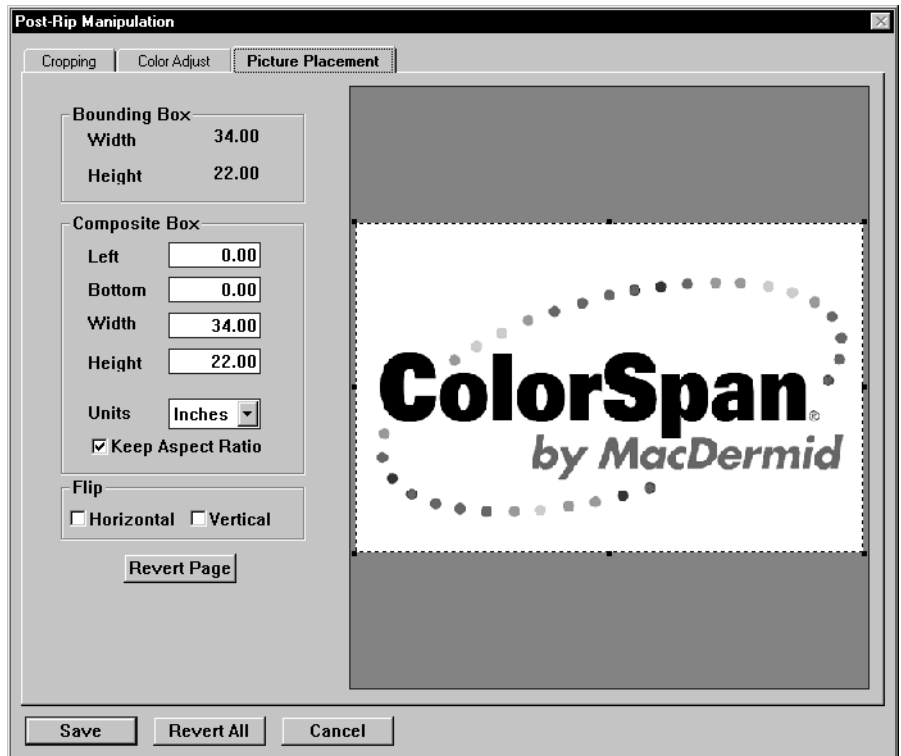

Fig. 5-5. Post-RIP Manipulation Tool dialog box
(Picture Placement tab)

◆ **Composite Box** - if the image is smaller than the page size, you can move the image anywhere within the page area. Either drag the preview image, or enter new values in the Left and Bottom fields. You can also scale the image larger or smaller, within the dimensions of the page size. Either drag the image outline or enter new values in the Height and Width fields.

◆ **Flip** - you can mirror the image in the horizontal or vertical axis (or both). This is convenient if a reverse image is needed for printing onto backlit media, but a normal image was sent and RIPed.

◆ **Keep Aspect Ratio** - when checked, preserves the original aspect ratio during scaling.

7. **Save or cancel your changes.**

   ◆ To save your changes, click the **Save** button.

   ◆ To discard your changes, click the **Revert Page** button.

   ◆ To discard your changes and exit, click the **Cancel** button.

Note The Post-RIP Manipulation Tool does not update the Preview image shown in the Document Details dialog box, which is created from color data that was current when the job was RIPed.

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8. **Drag the RIP Saver file icon to the Standard or Priority output queue.**

   This queues the file for printing.

9. **Inspect the printed image, and readjust the colors if necessary.**

APPENDIX B

Glossary

This appendix contains a glossary of special terms used in this manual. Words in *italics* are defined in this glossary.

additive primaries

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

bit

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

bit depth

The number of gray levels or colors that the *pixels* in a *bitmap* can contain. Bit depth is a binary unit of measurement. A 1-bit image can contain only two gray levels or colors (a black-and-white image); an 8-bit image allows 256 gray levels or colors; a 24-bit image allows about 16 million colors.

bitmap

A digitized image consisting of a grid of *pixels*. The *density* or color intensity of each pixel is expressed in binary digits or *bits*. See also *bit depth.*

calibration

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

calibration bar

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

calibration curve

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

chroma

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

CIE (Commision Internationale de l'Eclairage)

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

CIE L*a*b*

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

CMS (Color Management System)

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

CMYK

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

colorimeter

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

color balance

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

color cast

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

color correction

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

color proof

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

color separation

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

continuous tone

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

density

A measure of the darkness of an image on paper or film. In the case of paper, which is reflective, the less light reflected, the higher the density. In the case of film, which is transparent, the less light showing through, the higher the density.

dithering

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

dot gain (press gain)

An imperfection of printing that causes dots to print larger than they should. This imperfection is mainly caused by the absorption of ink by the paper. The *reproduction* thus becomes darker than it should. *Calibration* can remedy this through a *calibration curve*. Dot gain is most noticeable in the *midtones*.

flatbed scanner

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

gamma correction

Adjusting images, using *gamma curves*. Because of the characteristics of a gamma curve, gamma correction does not affect the

density range of an image, but rather the distribution of its density. The brightening (with gamma > 1) or darkening (with gamma < 1) occurs mainly in the *midtones*.

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

gamma curve

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

gamut

The range of colors that can be reproduced by a device, such as a printer, monitor, or offset press.

gray balance

In process printing, indicates the proportions of cyan, magenta, and yellow to obtain a neutral gray, that is, a gray with no apparent *color cast*.

gray component replacement (GCR)

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

gray levels

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

gray scale

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

halftone

A technique used to reproduce a *continuous-tone* original, such as a photograph. The printing press prints a matrix of miniature dots of varying size, or lines of varying thickness. A limited set of inks (for example, only black ink or *CMYK* inks) can thus give the naked eye an illusion of many shades of gray or many colors.

hard copy proof

Color printer output used to verify the colors and layout of an image or document.

highlights

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

hue

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

image

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

input resolution

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

International Color Consortium (ICC)

An international consortium that defines the color *profile* format or standards for a multi-vendor, multi-platform application.

Lab

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

lightness

Indicates how light or dark a color is, or how close it is to black.

linearization

A procedure to normalize device performance between that measured from an output sample and reference data from a *profile*.

lpi

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

midtone

The middle range of tones in an image.

neutral gray

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

original

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

Photoshop Plug-in

A software package that interfaces to the Adobe Photoshop application and extends application's functionality.

pixel

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

ppi/ppcm

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

press gain

See *dot gain*.

primary color

A base color that is combined with other colors to compose a wide range of *secondary colors*.

profile

The color characteristics of an input or output device — including its *gamut*, colorants, and modes of operation — used by a *CMS* to ensure color fidelity.

proof

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

Quark XTension

A software package that interfaces to the Quark XPress application that provides additional functions to the application.

reflective original

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

reproduction

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

resolution

A measure of the fineness of spatial detail that a device can record or produce. The higher the resolution, the finer the detail. Resolution is expressed in elements per unit, for example, *pixels* per inch (*ppi*) for scanners and monitors, and dots per inch (dpi) for printers. Monitors have the lowest resolution (±70 ppi); ink jet printers have resolutions ranging from 300 to apparent 1800 dpi.

RGB

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

saturation

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

screen frequency (screen ruling)

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

secondary color

Color obtained by mixing two *primary colors*.

shadows

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

softproof

An image on a computer monitor used to verify the colors and layout of an image or document.

spectrophotometer

The instrument used to measured the special transmittance or reflectance of specimens. The ColorMark Calibrator is an example of a spectrophotometer.

subtractive primaries

Cyan, yellow, and magenta are the *primary colors* of ink used by ink jet printers and offset presses. See also *CMYK*.

TIFF

Tagged Image File Format—a file format for exchanging *bitmap* images between applications or between computer platforms.

transfer function

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

transparent original

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

APPENDIX C

Configuring TCP/IP

This appendix provides an overview of the issues involved in configuring your print server, network, and workstation for TCP/IP communications. This is necessary to transfer files or send print jobs to the server over TCP/IP.

The following topics are discussed:

Configuring the Network for TCP/IP

In order to use the print server's built-in FTP server to transfer files, or send print jobs to the server via TCP/IP, your office network operating system and workstation operating systems must support the TCP/IP network protocol. The latest versions of the Macintosh OS and Microsoft Windows both support TCP/IP, as does the Unix operating system.

A World Wide Web browser or FTP client software is required to transfer files via FTP.

See your network administrator to install and configure your network software, hardware, and cabling. For further information about FTP, refer to the following articles from ColorSpan Technical Support:

◆ LaserLine 2514, *Configuring Macintosh OS Computers for FTP to ColorMark Servers*

◆ LaserLine 2515, *Configuring Microsoft Windows Computers for FTP to ColorMark Servers*

You can obtain these documents over the World Wide Web at www.colorspan.com.

Alternatively, it is possible to connect a standalone workstation directly to the print server, without connecting either device to any other device over a network. In this case, use IP addresses that are within one of the range of addresses set aside for private networks:

◆ 10.0.0.0 - 10.255.255.255

◆ 172.16.0.0 - 172.31.255.255

◆ 192.168.0.0 - 192.168.255.255

Configuring the Print Server for TCP/IP

To transfer files or to print via TCP/IP, the print server must be assigned a unique IP address. Many companies are running a TCP/IP-based network to provide Internet services to their employees. In this case, it is a relatively simple task for the network administrator to assign an IP address to the print server.

If you're already using TCP/IP:

◆ Your network administrator must assign an IP address and subnet mask to the print server, from the range of IP addresses assigned to your company.

◆ If your network uses a DNS server, your network administrator may also assign a host name to the print server.

If you are not already using TCP/IP or a local area network, you can simply connect the printer's network cable from your workstation directly to the printer's network port.

You can use the following IP address and subnet mask when your workstation is cabled directly to the print server network port, or if they are both on a local area network:

◆ IP Address: 192.168.1.10

◆ Subnet Mask: 255.255.255.0

If you add additional print servers, simply add 1 to the IP address (for example, the second could be 192.168.1.11; the third, 192,168.1.12, and so on).

Configuring Your Workstation for TCP/IP

To transfer files or send a print job via TCP/IP, your workstation (Macintosh, Microsoft Windows-based PC, or Unix workstation) must be configured as follows:

◆ Your workstation must have an Ethernet adapter (interface card), which must be properly installed and connected via Ethernet cabling to the network.

◆ You must have TCP/IP software installed and configured on your workstation.

Your workstation must have:

◆ IP address

◆ Subnet mask

◆ Default gateway (optional, used for connection to the Internet)

If your network supports DHCP, simply enable this service. DHCP automatically assigns IP addresses without user intervention.

If your network does not support DHCP, or your network administrator prefers to use static (unchanging) IP addresses, your network administrator must assign an address.

You can use the following IP address and subnet mask when your workstation is cabled directly to the print server's network port, or if they are both on a local area network:

◆ IP Address: 192.168.1.1

◆ Subnet Mask: 255.255.255.0

If you add additional workstations, simply add 1 to the IP address (for example, the second could be 192.168.1.2; the third, 192,168.1.3, and so on).

TCP/IP Glossary

DHCP - Dynamic Host Configuration Protocol, a standard that enables each client on the network to request and receive an IP address from a DHCP server. These addresses expire after a certain time so that a pool of addresses can be shared among a group of workstations. DHCP also allows static (permanent) IP addresses to coexist with the dynamically assigned addresses.

DNS - Domain Name System, a method for matching a host name to an IP address, for example: the host name www.colorspan.com translates to the IP address 204.26.120.4. A DNS server can serve a local area network or the Internet.

Ethernet - a standard for local area network hardware and cabling, on which networking protocols can operate.

host name - the unique name by which a computer is known to the network, for example: www.colorspan.com.

Internet - a worldwide network that connects computer networks to each other.

IP address - Internet Protocol address, the address used by the TCP/IP protocol to identify a host computer. It is usually written as a group of decimal numbers separated by periods (example: 204.26.120.4). The IP address can be configured statically on the client or configured dynamically through DHCP.

network - computers that share data with each other by means of software, cabling, and hardware.

protocol - a set of formal rules that describe how to transmit data, especially across a network.

server - software or a computer that provides a service -- such as file, printer or DNS services -- to other software or computers ("clients").

subnet - a local division of an organization's IP address that is not visible to the Internet, allows local network administrators to allocate IP addresses without affecting the Internet. The subnet is identified to TCP/IP by a number called the "subnet mask."

TCP/IP - Transmission Control Protocol/Internet Protocol, a standard network protocol used in local area networks and the Internet.

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