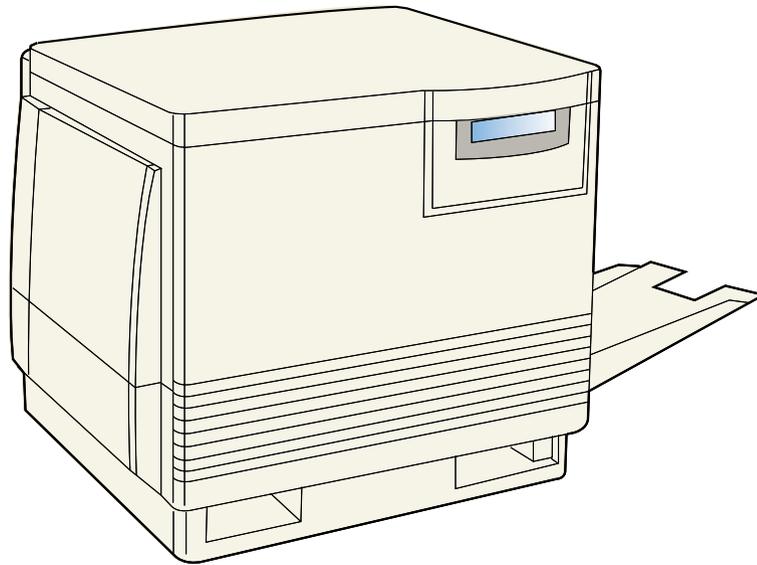# Panasonic

Color Laser Printer

Drivers and Utilities Reference Guide

Model No. **KX-P8420**

Please carefully read the Operating Instructions and the Reference Guide before operating. Keep this CD-ROM in the protective case.
Do not expose the CD-ROM to direct sunlight or extreme heat and do not scratch or smudge the surface of the CD-ROM.

The icons in this document indicate:

: Features and functionality which require an optional hard disk drive.
See "Installing a hard disk drive" in the *Setup Manual* or *Operating Instructions*.

: Features and functionality which require a minimum of 32 MB of SDRAM.
See "Installing additional memory" in the *Setup Manual* or *Operating Instructions*.

: Features and functionality available to printers operating in a networked environment.
See "Installing network cards" in the *Setup Manual* or *Operating Instructions*.

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2

Contents

Contents

Printing from Windows Computers

The following chapter describes where to set print options available using the PostScript printer driver if you are running Windows® 95[1], Windows NT 4.0[2][3], or Windows 3.1[4] operating systems.

PostScript printing

Custom print options available from the PostScript printer driver are described in "Windows print options" on page 14. For additional information on using KX-P8420 color management options, see "Chapter 5 Working with Color".

For information on installing the appropriate driver for your system and setting up the environment for parallel printing with the KX-P8420, see Chapter 4 of the *Setup Manual* or *Operating Instructions*. This manual also describes how to connect to the printer over the network, how to set up networking for all supported network types, and how to install additional KX-P8420 user software.

[1] Microsoft® Windows® 95 operating system (hereafter Windows 95)
[2] Microsoft® Windows NT® Workstation operating system, and Microsoft® Windows NT® Server network operating system Version 4.0 (hereafter Windows NT 4.0)
[3] Service Pack 3 or later version is required.
[4] Microsoft® Windows® operating system Version 3.1 (hereafter Windows 3.1)

Configuring PostScript printing options with Windows 95

This section describes configuring printing options for Windows 95 using the Adobe PostScript printer driver provided on the KX-P8420 Driver & Utility CD-ROM.

Print options are specified from the Printer Properties dialog box. This dialog can be accessed using the steps described below, or by selecting File>Print from within your application and clicking the Properties button.

To configure PostScript printing options:

1 From the Windows **Start** menu, select **Settings**>**Printers**.

2 Click the **Panasonic KX-P8420** printer icon and select **Properties** from the **File** menu.

The Printer Properties dialog box appears, with the General tab displayed.
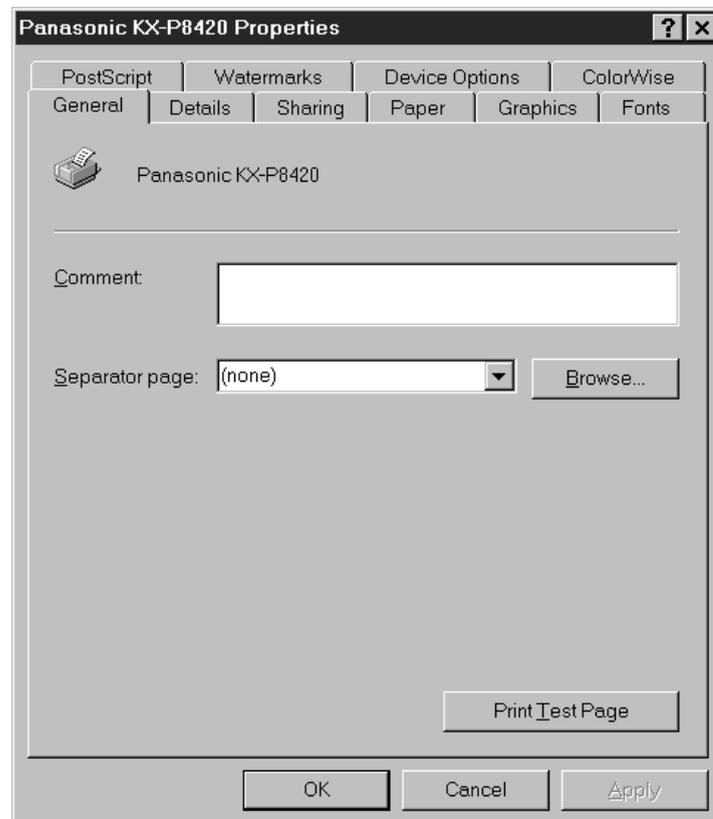
3 Click the **Paper** tab.
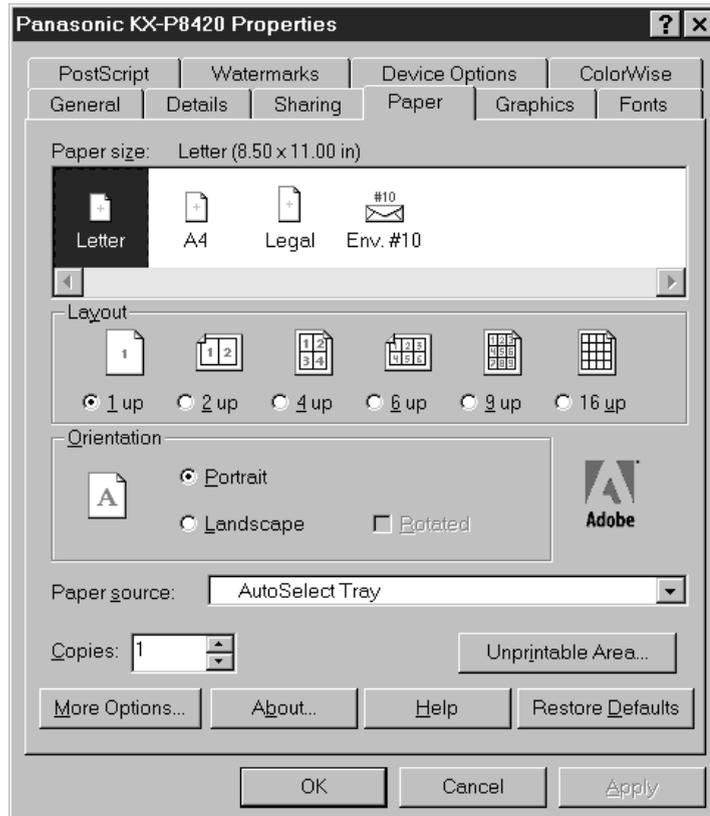
Specify paper size, paper source, number of copies, and other print options from this tab.

4 Click the **More Options** button in the **Paper** tab.

Specify whether or not to print a page border for your print job.

5 Click **OK**.

6   Click the **ColorWise** tab.

Panasonic KX-P8420 Properties

| General | Details | Sharing | Paper | Graphics | Fonts |
| PostScript | Watermarks | Device Options | ColorWise |

- ● ColorWise Business Color
- ○ ColorWise Expert Mode
- ○ ICM Profile   Options...
- ○ Grayscale
- ○ Three Color Mode

CRD

Photos:
Photographic

Text:
Presentation

Illustrations:
Presentation

Brightness ◄   ►   100% Normal

Help

OK   Cancel   Apply
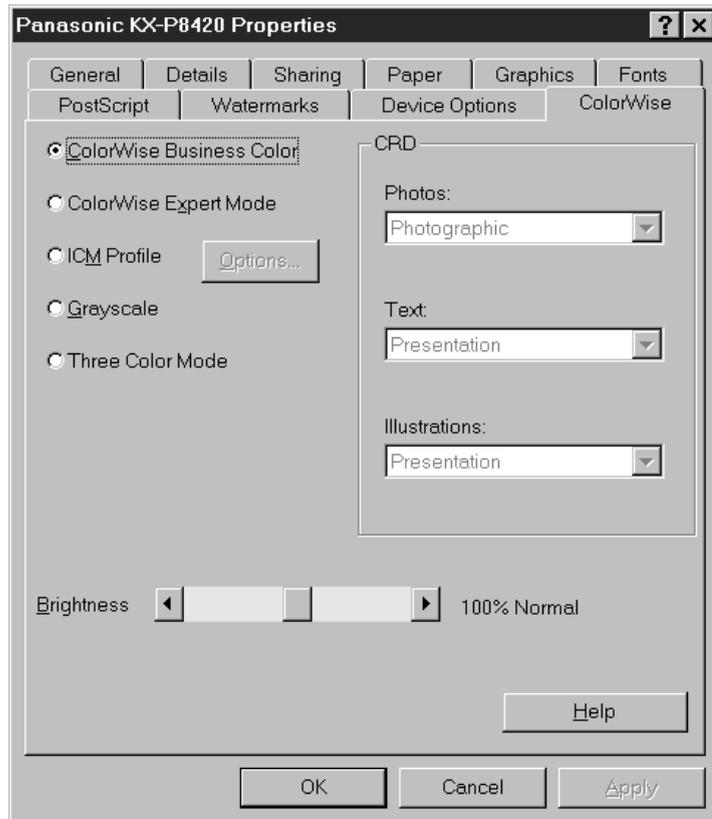
Specify color management settings from this tab. For information on the print options available in this tab, see "Windows print options" on .

7 Click the **Device Options** tab.
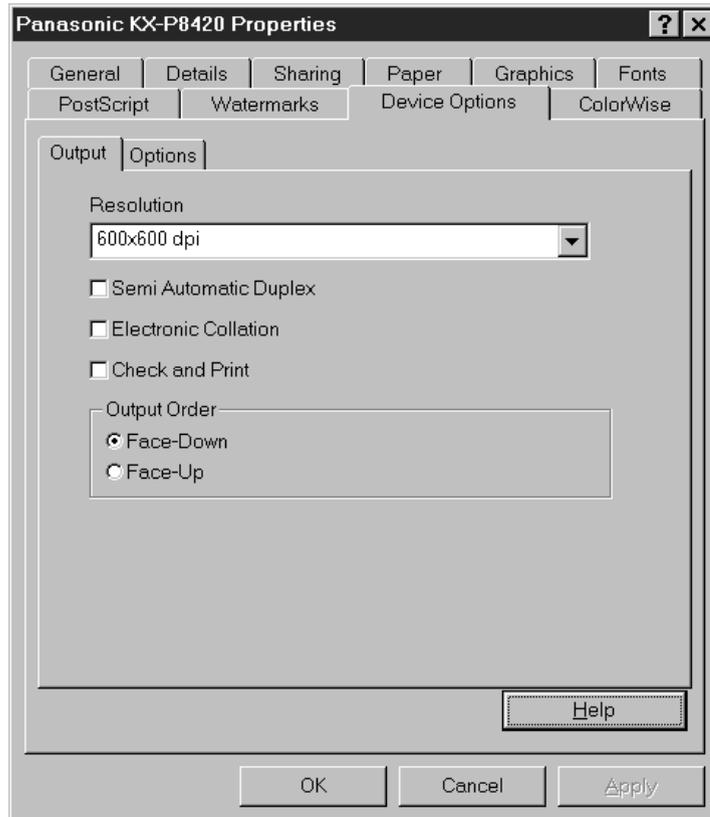
Specify settings in the Output tab. For details on print option settings you can make in this tab, see "Windows print options" on .

The Check and Print and Electronic Collation options are available only for printers with a hard disk drive.

8 Click the **Options** tab.

| Panasonic KX-P8420 Properties | ? X |

General | Details | Sharing | Paper | Graphics | Fonts
PostScript | Watermarks | Device Options | ColorWise

Output | Options

Available Options:

2nd Feeder
Hard Disk

[Add] [Remove]

Installed Options:

[Help]

[OK] [Cancel] [Apply]
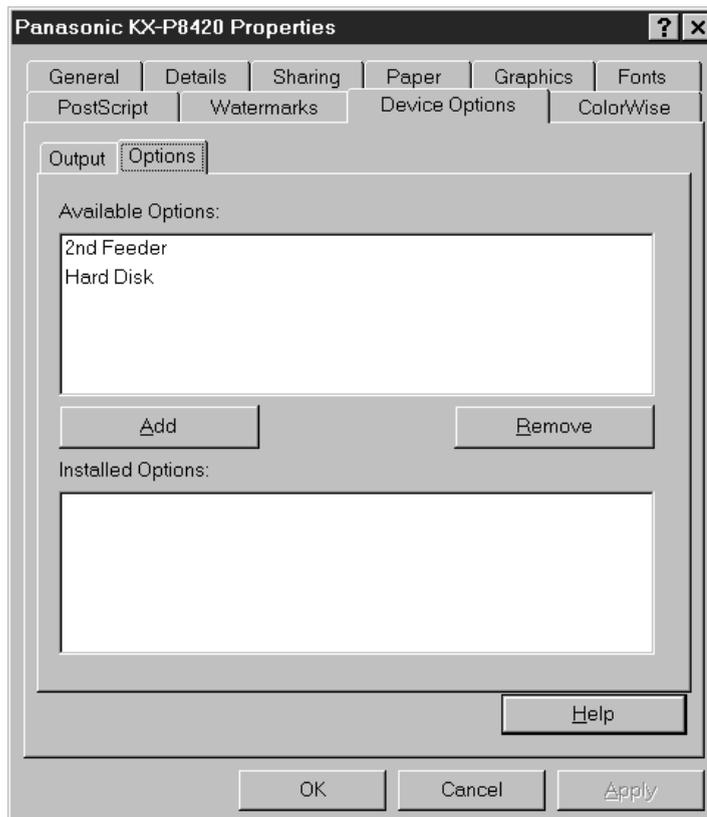
Features related to optional device, such as a Hard Disk or 2nd Feeder are enabled only when you have specified them as installed in this tab.

To add an option, select it from the Available Options area and click Add. To remove an option, select it from the Installed Options area and click Remove.

9 Click **Apply** to apply any changes you made, then click **OK**.

Configuring PostScript printing options with Windows NT 4.0

This section describes configuring printing options for Windows NT 4.0 systems. On Windows NT 4.0, PostScript printing options are set from the Printer Properties dialog box and the Default Document Properties dialog box.

To configure Postscript printing options:

1   From the **Windows NT 4.0** taskbar, select **Settings**›**Printers**.

2   Click the **Panasonic KX-P8420** printer icon, and select **Properties** from the **File** menu.

3   Click the **Device Settings** tab.
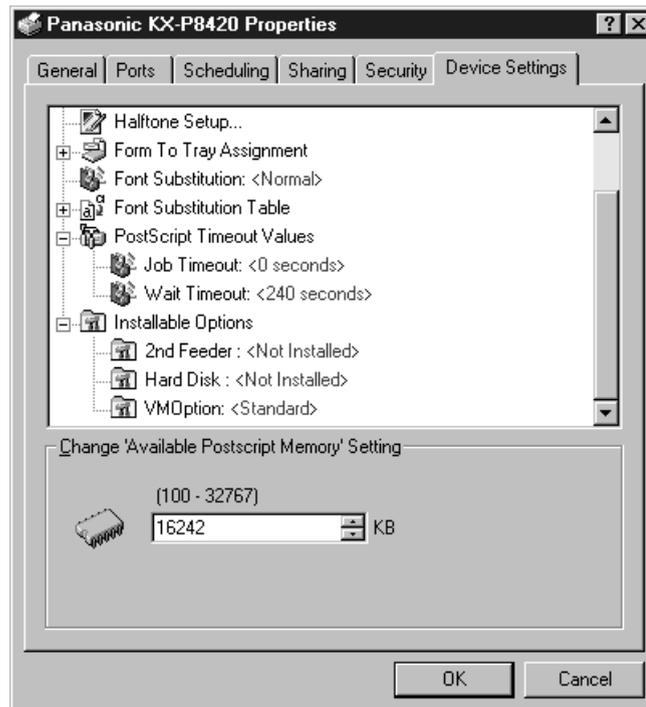
4   If the available options do not appear, double-click the **Installable Options** folder.

5   To specify which options are installed on the printer, click on the option and then select a setting in the **Change '…' Setting** area at the bottom of the dialog box.

6   Click **OK**.

7 Right-click the **Panasonic KX-P8420** printer icon in the **Printers** folder and select **Document Defaults**.

The Default Document Properties dialog box appears.

NOTE:
- When printing from applications, this dialog box appears (select Print, and then click the Properties button).

8 Click the **Advanced** tab.

```
Panasonic KX-P8420 Default Document Properties          [?][X]

 Page Setup | Advanced |

  ⊟ Paper/Output
      📄 Paper Size: <Letter>
      A Orientation: <Portrait>
      📖 Paper Source: <Automatically Select>
      📄 Copy Count: <1 Copy>
  ⊟ Graphic
      📄 Resolution: <1200>
      📄 Color Appearance: <Color>
      📄 Scaling: <100 %>
      📄 TrueType Font: <Substitute with Device Font>
  ⊞ Document Options

  Change 'Paper Size' Setting
      📄 Folio
      📄 German Legal Fanfold
      📄 German Std Fanfold
      📄 Legal
      📄 Letter

                           OK        Cancel
```
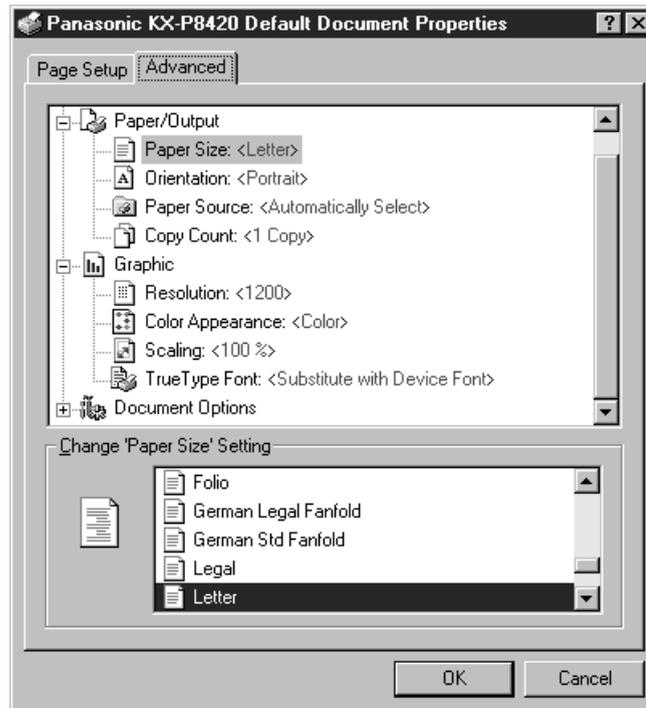
9 Specify the appropriate settings for your print job.

From this tab you can specify all print option settings. These include Paper Size and Paper Source (which can also be specified from the Page Setup tab), listed under Paper/Output, and printer-specific option settings listed under Document Options > Printer Features.

For information on valid print option settings, see "Windows print options" on .

10 Click **OK**.

Configuring PostScript printing options with Windows 3.1

This section describes configuring printing options for Windows 3.1 systems using the Adobe PostScript printer driver from the KX-P8420 Driver & Utility CD-ROM.

To configure PostScript printing options:

1 In the **Main** window, double-click the **Control Panel** icon.

2 Double-click the **Printers** icon.

3 In the **Printers** dialog box, select the **Panasonic KX-P8420 on LPT1** from the **Installed Printers** list box and click **Setup**.

The Panasonic KX-P8420 on LPT1 dialog box appears. Print options are specified from tabs in this dialog box.

For a description of print options, see "Windows print options" on . For a description of options not included in this table, refer to the driver's Help menu.

4 Click the **Features** tab.
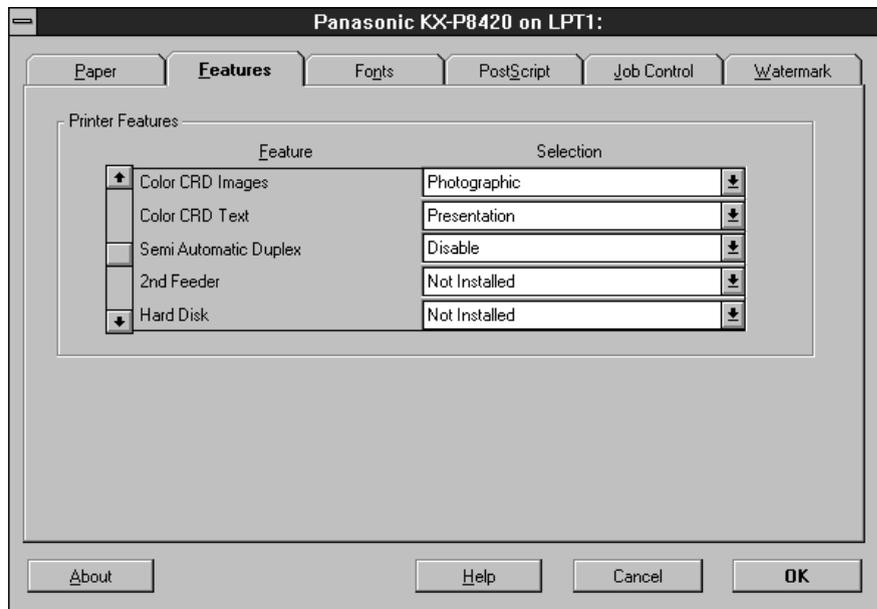
Specify devices installed on the printer to enable print options relating to those devices. Use the scroll bar to view all of the available features. To specify a setting, select it from the feature's corresponding Selection menu.

Windows print options

The printer drivers that come with your printer have been customized to provide additional print options specific to your KX-P8420 printer. Although the PostScript printer driver interfaces vary between Windows 95, Windows NT 4.0, and Windows 3.1 operating systems, the printing features available from each driver, on each platform, are virtually the same.

The following table describes print options and settings available using the PostScript printer driver with Windows 95, Windows NT 4.0, and Windows 3.1 operating systems.

NOTE:
- Print option names may vary depending on the version of Windows you are using, and some print options appear only with certain versions of Windows.

Print options below which are common in the Adobe PS driver are described in Help of the driver. For more information, see also the Readme file included on the KX-P8420 Driver & Utility CD-ROM.

1) PS error print
   Even when the "Print PostScript Error Information" option is disabled (in the PostScript tab of the Windows 95) Printer Properties dialog box for Windows 95, a PostScript error page may be printed.

2) Pure binary data
   Selecting "Pure binary data" as the data format (in the "Advanced PostScript Options" section of the PostScript tab of Printer Properties dialog box for Windows 95) might cause a printer error. Avoid using this option.

3) Print as Negative image, Print as mirror image
   Selecting these options (in the Graphics tab of the Printer Properties dialog box for Windows 95) does not always produce the correct result.

4) Halftoning
   The halftoning settings Screen angle and Screen frequency (in the Graphics tab of the Printer Properties dialog box for Windows 95) are not supported by the KX-P8420.

Print option	Description
Brightness 85% to 115% (Default: 100%)	Adjust the color production on all color channels to make the printed output lighter or darker.
Check and Print (Default: Disable)	Allows you to print a single copy of a multiple copy job that can be visually checked before printing additional copies. When the Check and Print copy has been printed, you can specify the number of additional copies of the job to print using the Check and Print screens at the printer's front panel. Check and Print is available only on printers with a hard disk drive.
CMYK Simulation SWOP-Coated/DIC/ Euroscale/None (Default: None)	CMYK Simulation settings adjust CMYK color data to simulate printing to an offset press standard. Select SWOP-Coated to simulate printing to a standard American offset press; Euroscale to simulate a European offset press, or DIC to simulate a standard Japanese offset press. For more information, see "CMYK Simulation" on page 67. ***NOTE:*** • This option is available only in ColorWise Expert Mode in Windows 95.

Print option	Description
Color CRD Text Color CRD Graphics Color CRD Images None/Photographic/ Presentation/Transparency (Defaults: Text—Presentation Graphics—Presentation Images—Photographic)	Before an RGB image can be printed, the file's color data must be converted to the printer's CMYK color space. Color rendering dictionaries apply optimal gamut mapping methods to documents that contain text, photographs and illustrations. The Photographic CRD optimizes the range of colors on the printer to produce the best results for photographic or bitmapped images. The Presentation CRD optimizes the output of pure, saturated colors such as those used in business presentations. The Transparency CRD improves the correspondence between monitor colors and printed color on transparency paper. For additional information, see "Color rendering dictionaries" on page 66. **NOTE:** • Color rendering dictionaries cannot be used with CMYK files.
Color Mode CMYK/CMY/Grayscale (Default: CMYK)	By default your printer is set to print documents in color (CMYK). Select Grayscale to print documents in grayscale or CMY to print using Cyan, Magenta and Yellow toner only. This setting allows you to print drafts of color images more quickly than in CMYK mode. The CMY option is only available when the printer's print resolution is set to 600×600 dpi. Selecting the CMY option applies the Photographic CRD to photos, and the Presentation CRD to text and illustrations. **NOTE:** • To select Grayscale for Windows NT 4.0/Windows 3.1, see "Grayscale" on page 19.

16

Print option	Description
ColorWise Business Color (Defaults: Text—Presentation Illustrations—Presentation Photos—Photographic)	Before an RGB image can be printed, the file's color data must be converted to the printer's CMYK color space. Color rendering dictionaries allow you to apply optimal gamut mapping methods for text, photographs and illustrations. ColorWise Business Color specifies the application of the Photographic color rendering dictionary to photographic objects, and the Presentation color rendering dictionary to illustration and text objects in a document. Use this option if you are printing documents created in office applications that include color charts or mixed graphic and text elements. For additional information, see "Color rendering dictionaries" on page 66. ***NOTES:*** • When ColorWise Business Color is selected, CRD settings are disabled. Color rendering dictionaries cannot be used with CMYK files. • This option is available only in Windows 95.
ColorWise Expert Mode	ColorWise Expert Mode enables CRD settings. You can select any combination of these settings to customize the printing of text graphic and illustration objects in your documents. Use this option if you are printing documents with a natural range of colors as in a continuous tone photograph. For additional information on CRDs, see "Color rendering dictionaries" on page 66. ***NOTE:*** • This option is available only in Windows 95.

Print option	Description
CRD Photos/Text/Illustrations (Defaults: Photos—Photographic Text—Presentation Illustrations—Presentation)	Before an RGB image can be printed, the file's color data must be converted to the printer's CMYK color space. Color Rendering Dictionaries (CRDs) apply optimal gamut mapping methods to documents that contain text, photographs and illustrations. The Photographic CRD optimizes the range of colors on the printer to produce the best results for photographic or bitmapped images. The Presentation CRD optimizes the output of pure, saturated colors such as those used in business presentations. The Transparency CRD improves the correspondence between monitor colors and printed color on transparencies. For additional information, see "Color rendering dictionaries" on page 66. **NOTE:** • CRDs cannot be used with CMYK files.
Device Options	Optional printer accessories installed on your printer must be specified from the printer driver to enable their related features. For example, the Check and Print and Electronic Collation features are not enabled unless a hard disk drive has been specified as a device installed on the printer. Options include: 2nd Feeder, Hard Disk.
Electronic Collation (Default: No)	If your printer has a hard disk, you can use this option to collate copies of your print job. This option allows the pages of each copy of a print job to be printed in sequence. If your printer does not have a hard disk drive or this option is set to Off, multiple copies of each page of a print job are printed in sequence. To avoid unexpected results, always specify collation using this option, and turn off any collation option that may exist in your application. Electronic Collation is available only on printers with a hard disk drive.

Print option	Description
Grayscale	By default your printer is set to print documents in color (CMYK). Select Grayscale to print documents in grayscale. ***NOTES:*** • Many applications offer black and white or grayscale printing options. Use the application's grayscale option, if available, for more efficient processing time. • To enable Grayscale in Windows 3.1, select None in all three CRD options in the Features tab. • To enable Grayscale in Windows NT 4.0, select Document Defaults from the File menu in the Printers folder, and select None in all three CRD options in the Advanced tab.
ICM Profile	The Adobe PostScript 4.2.3 driver for Windows 95 can convert RGB colors of a file to a specified CMYK device target using ICM (Image Color Matching) technology. Install the ICM profile and select this option to specify the use of an ICM device profile installed on your computer. To install the ICM profile, 1) Right-click the ICM profile **Pakx 2010.icm** in Windows\System\Color folder. 2) Click **Install In Place**. ***NOTES:*** • When printing from Microsoft Office 97 applications, make sure the KX-P8420 ICM profile is not installed in the Windows\System\Color folder. If the ICM profile is installed, JPEG, BMP, and TIFF images print incorrectly from Microsoft Office 97. • ICM is not copied if you install the KX-P8420 printer driver by using the Add Printer wizard. Copy the ICM profile manually from KX-P8420 Driver & Utility CD-ROM (English\Prntdrvr\Disk1) to Windows\System\Color folder. Install the ICM profile using the instructions above.

Print option	Description
Output Order Face-Down/Face-Up (Default: Face-Down)	Print jobs sent to the KX-P8420 can be output Face-Down or Face-Up. Face-Down printing results in a print job with the pages in sequential order, with the first page at the bottom of a stack of printed pages, face down. Face-Up printing results in a print job with the pages in sequential order, with the first page at the bottom of a stack of printed pages, face up. **NOTE:** • Face-Up printing is automatically selected when the Semi Automatic Duplex option is enabled, or when printing on transparencies or printing from the multi-purpose tray.
Paper Size	Paper and envelope sizes supported by the printer can be specified by name. Options include: Letter, A4, Legal size paper, and Envelope #10 envelopes.
Paper Source (Defaults: AutoSelect Tray/ Automatically Select/ Auto Tray Select)	Paper and paper trays can be specified by name from the Paper Source menu. Options include: AutoSelect Tray, Auto (Plain Paper), Auto (Transparency), MPT Plain Paper, MPT Transparency, MPT Label, MPT Coated Paper, MPT Envelope, MPT Paper 2nd Side. Available Paper Size options in the driver are limited by the Paper Source selection. Be sure to specify which paper source you would like to print from before selecting the size of the paper you are printing on. **NOTES:** • If the optional 2nd Feeder is installed, Upper, Middle, Lower; Paper or Transparency trays may also be selected as the paper source from the driver (see "Device Options" on page 18). • When Transparency paper is used, the Transparency CRD is automatically applied to text, illustrations and photographs in the document.

Print option	Description
Resolution (Default: 600 × 600 dpi)	Specify the print resolution for your printer. Options include: 600 × 600, 1200 × 600 or 1200 × 1200 dpi. **NOTES:** • With Windows 95, a Resolution option also appears in the Graphics tab of the Properties dialog box or Print dialog box shown by selecting print menu from application, but has no effect if set. Be sure to set the Resolution option from the Device Options tab. • A minimum of 32 MB of SDRAM is required for printing at 1200 × 600 or 1200 × 1200 dpi.
RGB Source EFIRGB/sRGB (PC)/ Apple Standard/Off (Default: EFIRGB)	RGB source profiles allow you to define the color space characteristics (such as the white point, gamma and type of phosphors) of the image's source. When a source is specified, the image's RGB data can be optimally converted to the color space and gamut of the KX-P8420 printer. The EFIRGB setting is optimal for color conversions that will be sent to the KX-P8420 printer. The sRGB (PC) setting specifies the source space of a generic Windows computer monitor. The Apple Standard setting specifies the source space of all standard Macintosh monitors. **NOTES:** • The RGB source setting overrides any source color space profile you may have specified using other color management systems. In cases where you don't want this setting to override another specified source color space, select Off. • This option is available only in ColorWise Expert Mode Windows 95 driver. For additional information on source profiles, see "RGB Source" on page 65.

Print option	Description
Semi Automatic Duplex (Default: Disable)	Print on both sides of a page using the Semi Automatic Duplex option. For details, see the procedure for using the Semi Automatic Duplex option on page 23. ***NOTE:*** • It is highly recommended to install hard disk drive (option) to use this feature effectively.
Simulation	See "CMYK Simulation" on page 15.
Three Color Mode	This option allows you to print draft color copies or three color copies of documents. When Three Color Mode is selected, the printer prints using Cyan, Magenta and Yellow toner only. This option is only available when the printer's print resolution is set to 600 × 600 dpi. This option uses only the same default combination of CRDs used for ColorWise Business Color—the Photographic CRD for photographic objects, and the Presentation CRD for illustration and text objects. For more information, see "ColorWise Business Color" on page 17.

Semi Automatic Duplex printing

The Semi Automatic Duplex option allows you to print on two sides of a single page.

The procedure for Semi Automatic Duplex printing varies depending on whether your printer has a hard disk installed. If your printer has a hard disk drive installed and the Semi Automatic Duplex option is selected, the printer spools and prints all even-numbered pages in a job and, when the Continue/Forward button is pressed at the printer, prints all odd-numbered pages in the job. If your printer does not have a hard disk drive and this option is selected, the printer prints an odd-numbered page and, when the Continue/Forward button is pressed, prints the subsequent even-numbered page in the job.

Follow the procedure outlined below to use the Semi Automatic Duplex option.

To print using the Semi Automatic Duplex option:

1 Select the **Semi Automatic Duplex** option in the KX-P8420 printer driver.

2 Print a document by selecting **Print** from the application's **File** menu.

The odd-numbered pages are printed.

3 When **Insert printed pages in MP tray, press Continue** appears in the LCD, load the printed odd pages from the job face down and bottom first in the multi-purpose tray.

4 Press the **Continue/Forward** button on the front panel to print the even-numbered pages on the opposite side of each page in the multi-purpose tray.

If the printer does not have a hard disk drive, the next odd-numbered page is printed automatically; repeat steps 3 and 4 for every even-numbered page in the print job.

NOTE:
• When the printer does not print the even-numbered pages after a press of Continue/Forward button, remove the odd-numbered pages and reload them in the multi-purpose tray.

- We strongly recommend that you follow the guidelines for normal two-sided printing.

  — Do not load more than 50 sheets in the multi-purpose tray.

  — Before loading paper in the multi-purpose tray, adjust it so that the edges of the media are lightly touching the media guides of the multi-purpose tray.

  — Use heavier paper, at least 95 to 165 g/m^2 (28 to 44 lbs. Bond) for reliable feed. Do not load a thin sheet of paper in the multi-purpose tray. It may cause a paper jam.

  — It is strongly suggested to use color laser bond paper.

  — Avoid printing photograph or graphic in solid color to prevent paper jamming. It may cause a damage to the printer.

  — Before printing on the first side, set the unprintable area [at least 15 mm (0.59") in length] on the top of paper. (See below.)

Unprintable area
[a : at least 15 mm (0.59")]

a

Pollution of World

Paper feed direction

It is strongly recommended that the sizes of photograph and graphic printed on the page are as small as possible.

Chapter 2 *Printing from Macintosh Computers*
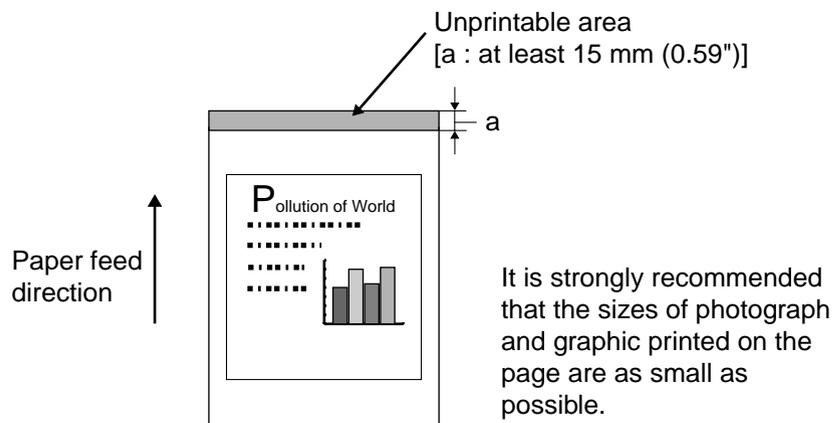
The following chapter describes setting up PostScript printing from Macintosh using the Adobe PostScript printer driver 8.5.1 provided on the KX-P8420 Driver & Utility CD-ROM. This driver has been customized to provide additional print options specific to your KX-P8420 printer. Custom print options available from PostScript printer driver are described in "Macintosh print options" on .

Setting up PostScript printing

Once you have installed the PostScript printer driver, you can print to the KX-P8420 just as you would print to any other printer. Simply specify the KX-P8420 as the current printer by clicking on its icon in the Chooser desk accessory. You will need to select the Page Setup dialog box from your application's file menu to set general printing options for your printer. Additional print options can then be specified from your application's Print dialog box.

To set up the KX-P8420 in the Chooser:

1 Select **Chooser** from the **Apple** menu.

2 Ensure AppleTalk is active.

3 Click the **AdobePS** printer icon.

4 Select the correct AppleTalk zone if necessary.

5 Select the name of your KX-P8420.

If an icon is not displayed on the left of the printer name you selected, click Create to set up the printer. See "Installing Macintosh printing software" in the *Setup Manual* or *Operating Instructions.*

6 Close the **Chooser**.

If your printer has a hard disk drive and 32 MB SDRAM installed, KX-P8420_Direct, KX-P8420_Print, and KX-P8420_Hold print connections automatically appear in the Chooser. Select KX-P8420_Direct to print to the Direct connection, KX-P8420_Print to print to the Print queue, or KX-P8420_Hold to print to the Hold queue from the printers list.

If your printer does not have a hard disk drive installed, only the KX-P8420_Direct connection appears in the list.

The first time you select the Direct connection, Print queue, or Hold queue, you will be prompted to select a PPD.

Printing from a Macintosh application

On the Macintosh, custom print options are specified in the Page Setup and Print dialog boxes.

To print from a Macintosh application:

1 Make sure that any printer description files needed by the application are installed on your Macintosh.

See Chapter 5 of the *Setup Manual* or *Operating Instructions.*

2 Open the file you want to print from within the application.

3 Select **Page Setup** from your application's **File** menu.

4 Select the **KX-P8420** from the **Format for:** pop-up menu.

```
AdobePS Page Setup                                    8.5.1
 ┌ Page Attributes          ▼ ┐
 │                                                          │
 │    ┌──────┐        Format for: │ Panasonic KH-P8420...▼ │
 │    │      │             Paper: │ Letter              ▼ │
 │    │  a   │       Orientation: [↑] [↑▷]                 │
 │    │      │            Scale:  │100│ %                  │
 │    └──────┘                                             │
 └                                                          ┘
                                        [ Cancel ] [[  OK  ]]
```
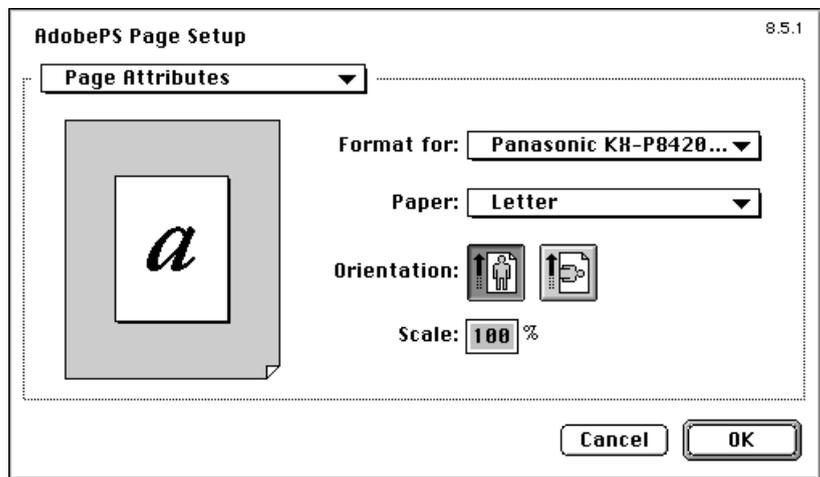
You can specify PostScript options and page attribute options from this dialog box.

5 Click **OK**.

6   Select **Print** from the application's **File** menu.

```
                                                              8.5.1
Printer:   Panasonic KX-P8420_Direct  ▼    Destination:  Printer ▼

   General                            ▼

              Copies: 1

              Pages: ● All
                     ○ From:       To:

       Paper Source: ● All pages from:   Auto Select           ▼
                     ○ First page from:  Auto (Plain Paper)    ▼
    ▲®
    Adobe              Remaining from:   Auto (Plain Paper)    ▼


   Save Settings                          Cancel      Print
```
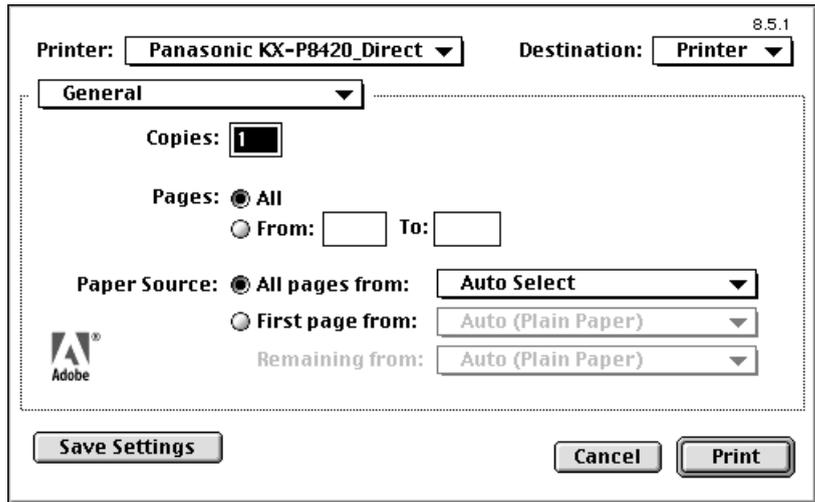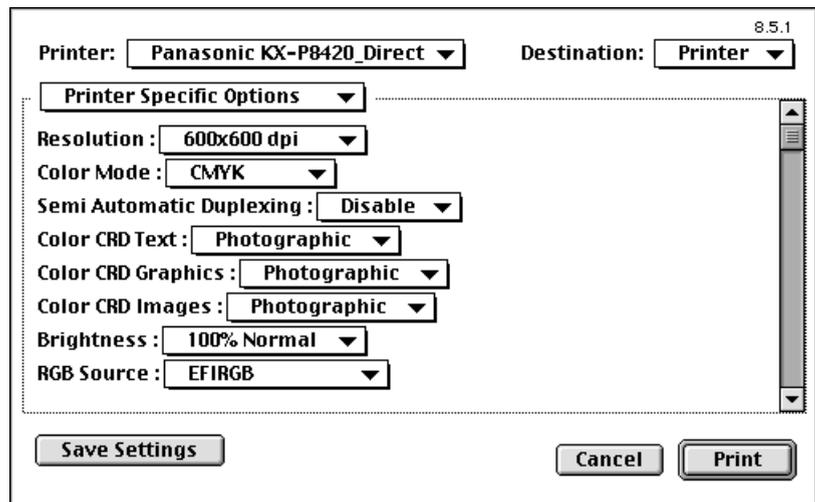
Paper source, number of copies to print, and pages to print are specified from the General pane of the Print dialog box.

7   Select **Printer Specific Options** from the pop-up menu directly below the printer name.

```
                                                              8.5.1
Printer:   Panasonic KX-P8420_Direct  ▼    Destination:  Printer ▼

   Printer Specific Options         ▼

Resolution :  600x600 dpi      ▼
Color Mode :  CMYK             ▼
Semi Automatic Duplexing :  Disable  ▼
Color CRD Text :  Photographic   ▼
Color CRD Graphics :  Photographic   ▼
Color CRD Images :  Photographic  ▼
Brightness :  100% Normal   ▼
RGB Source :  EFIRGB        ▼


   Save Settings                          Cancel      Print
```

Most print option settings are specified from the Printer Specific Options pane of the Print dialog box. Use the scrollbar to view additional options.

Each print option is described in the following section.

8   Specify the settings and click **Print**.

When you want to save the changes to the settings, click Save Settings and then OK before clicking Print. The changes you made will be the default settings until you make additional changes and click Save Settings again.

Macintosh print options

The PostScript drivers that come with your printer have been customized to provide additional print options specific to your KX-P8420 printer, as described in the following table.

Print option	Description
Brightness 85% to 115% (Default: 100%)	Adjust the color production on all color channels to make the printed output lighter or darker.
Check and Print (Default: Disable)	Allows you to print a single copy of a multiple copy job that can be visually checked before printing additional copies. When the Check and Print copy has been printed, you can specify the number of additional copies of the job to print using the Check and Print screens at the printer's front panel. You can also use Fiery WebSpooler to print remaining copies of spooled check and print jobs. Check and Print is available only on printers with a hard disk drive.
CMYK Simulation SWOP-Coated/DIC/ Euroscale/None (Default: None)	CMYK Simulation settings can be used to simulate popular offset printing press standards. Select SWOP-Coated to simulate printing to a standard American offset press; Euroscale to simulate a European offset press, or DIC to simulate a standard Japanese offset press. For more information, see "CMYK Simulation" on page 67.

Print option	Description
Color CRD Text Color CRD Graphics Color CRD Images None/Photographic/ Presentation/ Transparency (Defaults: Text—Presentation Graphics—Presentation Images—Photographic)	Before an RGB image can be printed, the file's color data must be converted to the printer's CMYK color space. Color rendering dictionaries apply optimal gamut mapping methods to documents that contain text, photographs and illustrations. The Photographic CRD optimizes the range of colors on the printer to produce the best results for photographic or bitmapped images. The Presentation CRD optimizes the output of pure, saturated colors such as those used in business presentations. The Transparency CRD improves the correspondence between monitor colors and printed color on transparency paper. For additional information, see "Color rendering dictionaries" on page 66. **NOTE:** • Color rendering dictionaries cannot be used with CMYK files. Note also that PS Color Matching must be specified in the Print dialog box to enable the use of CRDs.
Color Matching ColorSync Color Matching/PostScript Color Matching/Black and White/Color/ Grayscale	The Adobe PostScript 8.5.1 driver can convert RGB colors of a file to a specified CMYK device target using ICC technology. Select this option to specify the use of an ICC device profile installed on your computer. For information on how to install and use the KX-P8420 ICC printer profile (ColorSync profile), see "Installing the KX-P8420 ColorSync profile" in the *Setup Manual* or *Operating Instructions.*
Color Mode CMYK/CMY/Grayscale (Default: CMYK)	By default your printer is set to print documents in color (CMYK). Select Grayscale to optionally print documents in grayscale. Select CMY to print using Cyan, Magenta, and Yellow toner only. This setting allows you to print drafts of color images more quickly than in CMYK mode. The CMY setting is available only when Resolution is set to 600×600 dpi. When this setting is selected, the default settings for Color CRD Text, Color CRD Graphics, and Color CRD Images are used automatically.

Print option	Description
Electronic Collation (Default: No)	This option allows the pages of each copy of a print job to be printed in sequence. If your printer does not have a hard disk drive or this option is off, multiple copies of each page of a print job are printed in sequence. To avoid unexpected results, always select collation in the print driver and turn off any collation option that may exist in your application. Electronic Collation is available only on printers with a hard disk drive.
ICC Profiles	The Adobe PostScript 8.5.1 driver can convert RGB colors of a file to a specified CMYK device target using ICC technology. Select this option to specify the use of an ICC device profile installed on your computer. For more information on rendering styles, see "Color management on the KX-P8420" on page 64. For information on how to install and use the KX-P8420 ICC printer profile (ColorSync profile), see "Installing the KX-P8420 ColorSync profile" in the *Setup Manual* or *Operating Instructions.*
Output Order Face-Up/Face-Down (Default: Face-Down)	Print jobs sent to the KX-P8420 can optionally be output Face-Up or Face-Down. Face-Up printing results in a print job with the pages in sequential order, with the first page at the bottom of a stack of printed pages, face up. Face-Down printing results in a print job with the pages in sequential order, with the first page at the bottom of a stack of printed pages, face down. **NOTE:** • Face-Up printing is automatically selected when the Semi Automatic Duplex option is enabled, or when printing on transparencies or printing from the multi-purpose tray.
Paper (size)	When the appropriate tray has been selected, paper and envelope sizes supported by the printer can be specified by name. Options include: Letter, A4 and Legal size paper, and Envelope #10 envelopes. The Paper option is located in the Page Setup dialog box.

Print option	Description
Paper Source	Paper and paper trays can be specified by name from the Paper Source menu on the General screen of the print dialog. Options include: AutoSelect Tray, Auto (Plain Paper), Auto (Transparency), MPT Plain Paper, MPT Transparency, MPT Label, MPT Coated Paper, MPT Envelope, MPT Paper 2nd Side. **NOTES:** • If the optional 2nd Feeder has been specified as installed when the driver is setup, Upper, Middle, Lower; Paper or Transparency trays may also be selected as the paper source from the driver. • When Transparency paper is used, the Transparency CRD is automatically applied to text, illustrations, and photographs in the document.
Resolution	Specify the print resolution for your printer. Options include: 600 × 600, 1200 × 600 or 1200 × 1200 dpi. **NOTE:** • A minimum of 32 MB of SDRAM is required for printing at 1200 × 600 or 1200 × 1200 dpi.

Print option	Description
RGB Source EFIRGB/sRGB (PC)/ Apple Standard/Off (Default: EFIRGB)	RGB source profiles allow you to define the color space characteristics (such as the white point, gamma and type of phosphors) of the image's source. When a source is specified, the image's RGB data can be optimally converted to the color space and gamut of the KX-P8420 printer. The EFIRGB setting is optimal for color conversions that will be sent to the KX-P8420 printer. The sRGB (PC) setting specifies the source space of a generic Windows computer monitor. The Apple Standard setting specifies the source space of all standard Macintosh monitors. **NOTE:** • The RGB source setting overrides any source color space profile you may have specified using other color management systems. In cases where you don't want this setting to override another specified source color space, select Off. For additional information, see "RGB Source" on page 65.
Semi Automatic Duplex	Print on both sides of a page using the Semi Automatic Duplex option. For details, see the procedure for using the Semi Automatic Duplex option on page 33. **NOTE:** • It is highly recommended to install hard disk drive (option) to use this feature effectively.

Semi Automatic Duplex printing

The Semi Automatic Duplex option allows you to print on two sides of a single page.

The procedure for Semi Automatic Duplex printing varies depending on whether your printer has a hard disk installed. If your printer has a hard disk drive installed and the Semi Automatic Duplex option is selected, the printer spools and prints all odd-numbered pages in a job and, when the Continue/Forward button is pressed at the printer, prints all even-numbered pages in the job. If your printer does not have a hard disk drive and this option is selected, the printer prints an odd-numbered page and, when the Continue/Forward button is pressed, prints the subsequent even page in the job.

Follow the procedure outlined below to use the Semi Automatic Duplex option.

To print using the Semi Automatic Duplex option:

1 Select **Print** from the application's **File** menu.

2 Enable the **Semi Automatic Duplex** option from the **Printer Specific Options** panel of the **Print** dialog box.

3 When **Insert printed pages in MP tray, press Continue** appears in the LCD, load the printed odd-numbered pages from the job face down and bottom first in the multi-purpose tray.

4 Press the **Continue/Forward** button on the front panel to print the even-numbered pages on the opposite side of each page in the multi-purpose tray.

If the printer does not have a hard disk drive, the next odd-numbered page is printed automatically; repeat steps 3 and 4 for every even-numbered page in the print job.

NOTE:
- When the printer does not print the even-numbered pages after a press of Continue/Forward button, remove the odd-numbered pages and reload them in the multi-purpose tray.

Chapter 3   *Printing from UNIX Workstations*

You can print to the KX-P8420 directly from UNIX. Jobs printed to the KX-P8420 are sent to the Print queue and can be manipulated from Macintosh and PC computers on the network by using WebSpooler.

The queue name and printer name are established by your system administrator. In general, the queue name should be appended to the name of the printer, for example, KX-P8420_print.

For information on setting up the printer for TCP/IP printing, see Chapter 3 of the *Setup Manual* or *Operating Instructions.*

Printing to the KX-P8420

You can use UNIX commands to print PostScript files and text files. In general, the basic printing commands (lpr, lpq, lprm) can be used to send print jobs to the KX-P8420. See your UNIX manual pages or other documentation for information about UNIX commands.

The KX-P8420 queue name referred to in the following procedures is the name defined in the printcap file by your system administrator.

NOTE:
• Only PostScript or text files can be printed from UNIX.

To print from UNIX:

On a system running SunOS 4.1.x or another BSD-based variant, use the lpr command to send a job to the KX-P8420 as follows:

lpr -P *queuename -# copies filename*

For example, if the Print queue of your KX-P8420 is named KXP8420, your file is named Sample, and you want to print two copies, type:

lpr -P KXP8420 -# 2 Sample

34

On a system running Solaris 2.x or any System V implementation of UNIX, use the lp command to send a job to the KX-P8420 as follows:

lp -d *queuename* -n *copies filename*

For example, if the Print queue of your KX-P8420 is named KXP8420, your file is named Sample, and you want to print two copies, type:

lp -d KXP8420 -n 2 Sample

To display a list of jobs in the queue:

On a system running SunOS 4.1.x or another BSD-based variant, use the lpq command to see printer jobs in the queue as follows:

lpq -P *queuename*

For example, if the Print queue of your KX-P8420 is named KXP8420, type:

lpq -P KXP8420

Your workstation displays the contents of the queue.

On a system running Solaris 2 or any System V implementation of UNIX, use the lpstat command to see printer jobs in the queue as follows:

lpstat -o *queuename*

For example, if the Print queue of your KX-P8420 is named KXP8420, type:

lpstat -o KXP8420

Your workstation displays the contents of the queue.

To remove jobs from the queue:

NOTE:
- Unless you log in as the root user, you can remove only your own jobs.

On a system running SunOS 4.1.x or another BSD-based variant, use the lprm command to remove jobs from the queue as follows.

lprm -P *queuename jobnumber*

You can use the lpq command to check the job number.

For example, to remove job number 123 from the Print queue of your KX-P8420 named KXP8420, type:

lprm -P KXP8420 123

The lprm command reports the names of any files it removes.

On a system running Solaris 2.x or any System V implementation of UNIX, use the cancel command to remove jobs from the queue.

cancel *queuename-jobnumber*

For example, to remove job number 123 from the Print queue of your KX-P8420 named KXP8420, type:

cancel KXP8420-123

Chapter 4 *Managing Print Jobs*

Fiery WebTools allow you to manage your printer from the Internet or your company's intranet. The KX-P8420 has its own home page, from which you can select from a variety of tools.

About Fiery WebTools

You can access the Fiery WebTools over the network from a variety of platforms. The KX-P8420 functions as an Internet or intranet server, and has a home page that lets remote users view server functions and manipulate jobs. Client computers require an Internet browser that supports Java. The recommended browser versions are:

- Netscape Navigator 3.04 for Macintosh computers,

- Microsoft Internet Explorer 4.0.1 SP1 or Netscape Communicator 4.0.4 for Windows computers.

Netscape and Microsoft continue to release frequent updates to their browsers. As support cannot be guaranteed for all versions, use the versions specified above for best results.

NOTES:

- Microsoft Internet Explorer 3.x does not support the Fiery WebDownloader.

- Displaying the WebSetup window with Macintosh computer is very slow. Please set up the printer using a Windows computer which is accessible to the printer.

For information about preparing the KX-P8420 and client workstations for Fiery WebTools access, see "Setting up Fiery WebTools" in the *Setup Manual* or *Operating Instructions.*

You can access the following Fiery WebTools from the KX-P8420 home page.

WebTool	Description
Status	Shows you the jobs currently processing and printing. For information on using the Status WebTool, see page 49.
WebSpooler	Allows you to view, manipulate, reorder, reprint, and delete jobs currently spooling, processing, or printing on the KX-P8420. Allows you to print the remainder of spooled Check and Print jobs and to view, print, and delete the Job Log. For information on using Fiery WebSpooler, see page 40.
WebLink	Provides a link to another web page, provided you have a valid Internet connection. You can set the WebLink destination. For information on using WebLink, see page 50.
WebDown-loader	Allows you to download a PostScript file directly to the printer, without first opening the file in an application. For information on using Fiery WebDownloader, see page 51.
WebSetup	Allows you to view and change the printer's Setup configuration, including: System Setup options (System Setup and Password), Network Setup options (Port Setup, Protocol Setup, PServer Setup, and Service Setup), and Printer Setup options (PS Setup). For information on using Fiery WebSetup, see "Completing setup from Fiery WebSetup" of the *Setup Manual* or *Operating Instructions.*

The Fiery WebSpooler is available only on printers with a hard disk drive and a minimum of 32 MB of memory.

Accessing Fiery WebTools

To use the Fiery WebTools via the Internet or your site's intranet, you need an Internet browser and the IP address or DNS name of the KX-P8420.

To access the Fiery WebTools:

1 Start up your Internet browser application.

2 Enter the IP address or the DNS name of the KX-P8420 in the URL line of your browser.

Get the IP address or DNS name from your network administrator.

3 The Fiery WebTools home page appears.

The individual Fiery WebTools are listed on the left. To display information about a particular tool, click the question mark next to its name. To launch one of the Fiery WebTools, click its name.

Using Fiery WebSpooler

Fiery WebSpooler lets you monitor and manipulate print jobs sent to the KX-P8420. All jobs sent to the printer appear in the Fiery WebSpooler window. You can view information about jobs, or duplicate, delete, or move jobs between queues. The Fiery WebSpooler Job Log can also be printed from your browser or exported as a text file and opened in other applications.

NOTE:

• The Fiery WebTools for Macintosh and Windows computers are fundamentally the same; differences are noted in this chapter.

Print jobs can be in one of the following queues:

Print	Normal print jobs sent to the KX-P8420 appear in the Print queue. You can move and manipulate these jobs as described below.
Hold	Jobs sent to the Hold queue remain in the Hold queue until they are moved to the Print queue or deleted. If you need to print the same document frequently, you can send it to the Hold queue and move a copy of the job to the Print queue every time you need to print it. You can also print large jobs to the Hold queue and then move them to the Print queue when other users are not printing.
Printed	The jobs most recently sent to the KX-P8420 are saved in the Printed queue. You can drag these jobs back to the Print queue to print additional copies. By default the maximum number of jobs that can be saved in the Printed queue is 10. This number can be changed from Fiery WebSetup.
Check and Print	Jobs specified from the printer driver as Check and Print also appear in the Fiery WebSpooler window. These jobs can be moved to the Print queue.

Job spooling requires a printer with a hard disk drive and a minimum of 32 MB of memory. All jobs are stored on the KX-P8420 hard disk until sent to the Print queue.

You can use the Fiery WebSpooler Job Log to view information about jobs printed to the KX-P8420 for job accounting or reference purposes. The Job Log can be printed or exported as a file and viewed in other applications.

To use Fiery WebSpooler:

1   On the left side of the Fiery WebTools home page, click the **WebSpooler** button.

The Fiery WebSpooler main window appears.

Icons appear on buttons above the scroll list:

	Update	Click this button to update the information in the Fiery WebSpooler main window.
	Duplicate and Print	Drag a document onto this button or select the document and click this button to duplicate it and put the duplicate in the Print queue.
	Print	Drag a document onto this button or select the document and click this button to print it to the Print queue.
	Hold	Drag a document onto this button or select the document and click this button to save it in the Hold queue.
	Delete/ Cancel	Drag a file onto this button or select the document and click this button to delete the file, or cancel its processing or printing. To eliminate the deletion verification notice, select Preferences from the Edit menu, and turn off the "Confirm file deletion" option in the Preferences dialog box.

The window is divided into regions that correspond to the different queues.

Each job listed includes the document name, user name, page description language (PDL), and file size.

NOTE:
- The file size of documents sent to the direct connection does not appear.

The icons to the left of the job provide at a glance information about jobs in each queue:

Printing		Print icon	The job that is currently printing appears in this list. It can be deleted to cancel printing.
Waiting		Print icon	Jobs that have been processed and are waiting to be printed appear in this list. To cancel these jobs, you can delete them. They are dimmed because their settings cannot be changed. Processed jobs can't be moved or canceled.
Ripping		RIP icon	Jobs that are processing appear in the Ripping list. They are dimmed because their settings cannot be changed. Processing jobs can't be moved or canceled.
Print		Print icon	Jobs that are waiting to be printed that have not been processed appear with the Print icon. Jobs in the Print list appear in the order they will be printed.
Hold		Hold icon	Jobs in the Hold queue appear with the Hold icon. You can move a job to the Print queue to print it.
Printed		Printed icon	Jobs that have been printed are saved in the Printed queue and appear with the Printed icon. By default the number of jobs that may be stored in the Printed queue is 10. This number can be changed in WebSetup.
Printed		Alert icon	If a PostScript error occurred while a job was printing, the error appears in the Printed queue with an Alert icon next to it. You can double-click the Alert icon to display the error message.

2 Select **Preferences** from the **Edit** menu to specify how Fiery WebSpooler operates.
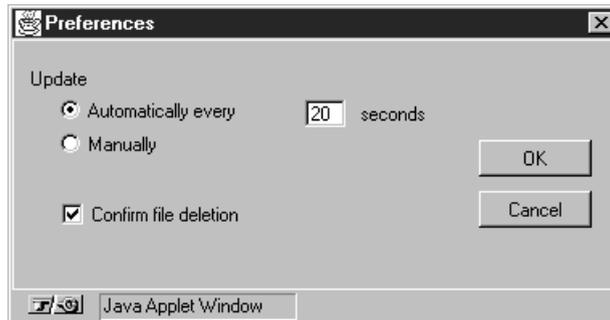
You can use this window to specify that the KX-P8420:

Update **Automatically every** *n* **seconds** or update **Manually**—This option lets you specify whether Fiery WebSpooler main window is automatically updated at a specified interval, or whether it is updated only when you select the Update command from the Window menu or click the Update icon. By default, the Fiery WebSpooler main window is updated automatically every 20 seconds.

NOTE:
● When automatic updating is on, data is coming from the KX-P8420 across the network very frequently. This data adds to the network traffic, and might slow down other network jobs. For optimal network performance, turn off automatic updating. When you want to view updated informations, select Update from the Window menu or click the Update icon.

Confirm file deletion—Check this option if you want a confirmation dialog box to appear before you delete a file.

NOTE:
● This option applies to the current session only.

Duplicating, moving, and deleting jobs

Macintosh, Windows 95, and Windows NT 4.0 users who have entered the correct Administrator password, if one has been set, can duplicate, move, delete, and configure jobs for all users, and can reorder jobs within a queue.

You can select more than one job at a time. To select multiple, adjacent jobs in the list, use Shift-click. To select multiple, nonadjacent jobs, use Ctrl-click.

■ Duplicating jobs

You can duplicate jobs in the Print, Printed, and Hold queues. When you duplicate a job, the KX-P8420 creates a reference to the original file, so duplicate files do not require the full amount of disk space on the KX-P8420. As long as one of the duplicates remain, the KX-P8420 saves the file, so you can delete all but one reference to a file.

To duplicate a job within a queue:

1 Select the job that you want to copy by clicking its name.

The selected job is highlighted.

2 Select **Duplicate** Job from the **Edit** menu.

The job appears at the bottom of the queue.

To duplicate and print a job:

1 Select the job that you want to copy by clicking its name.

The selected job is highlighted.

2 Click the **Duplicate and Print** icon, or drag the job to the **Duplicate and Print** icon.

The job appears at the bottom of the Print queue.

■ Moving jobs

You can move your jobs from the Hold queue and the Printed queue to the Print queue. If you frequently print the same file, for example a fax cover sheet, you can send it to the Hold queue and later drag a copy of the file to the Print queue.

To move a job within a queue:

1 Click the name of the job that you want to move.

The selected job is highlighted.

2 Drag the file to the new location in the queue.

To move jobs between queues:

1 Select the job that you want to move by clicking its name.

The selected job is highlighted.

2 Move the selected job to another queue by dragging it to the queue icon of your choice or to the **Hold** or **Print** section of the job list.

For example, move a job that is currently in the Hold queue to the Print queue by dragging the job to the Print queue icon.

■ Deleting jobs

To delete a job from any of the queues:

1 Select the job that you want to delete by clicking its name.

2 Drag the selected job to the **Delete** icon or click the **Delete** icon.

You can also select Delete from the Edit menu to delete a selected job.

You can delete only your own jobs; system administrators who enter the password can delete any job.

Changing print settings

You can change the copy count for only Check and Print jobs in Fiery WebSpooler main window.

You can override the copy count of a Check and Print job in the Override print settings dialog box. The settings in this dialog box override the settings in the front panel Printer Setup menu.

To change print settings for a job:

1 Double-click a **Check and Print** job or select the job and select **Override Print Settings** from the **Edit** menu.

The Override Print Settings window appears.

2 Select the new settings from the pop-up menus.

3 Click **OK**.

Using the Job Log

With the Fiery WebSpooler, you can view and print a log of all the jobs printed to the KX-P8420. You can also export the Job Log as a tab-delimited text file and import into a database, spreadsheet or word processing application for job accounting purposes. All jobs printed to queues and to the Direct connection are listed in the Job Log. Although jobs sent to the Direct connection do not appear in the Printed queue, they do appear in the Job Log.

To display, print, and save the Job Log:

1   Select **Show Job Log** from the **Window** menu.

The Job Log window displays a list of all the jobs and information about them as illustrated.

You can use the scroll bar at the bottom of the window to view all of the fields.

The text in the Status column provides information about the job:

OK	The job was printed normally.
ERROR	A PostScript error occurred while a job was processing.
CANCEL	The job was canceled before printing was completed.

NOTE:
• Some information may not be shown depending on the operating system on which a job is printed.

2 To print the Job Log, select **Print Job Log** from the **File** menu.

The information displayed in the Job Log window prints to the current KX-P8420. When you print the Job Log, totals are printed for all appropriate columns.

3 To save the Job Log as a file that you can view with a different application, select Export Job Log from the **File** menu.

4 Enter a name for the log file, add the extension **.txt** if it is not already there, and click **Save**.

The Job Log is saved as a text file, and the Job Log window reappears.

You can view the information in any application that can read a text file. Items are separated by tabs, but records are not separated by CR code. So please edit the file to view it.

Checking the printer status

You can see what jobs are currently processing and printing with the Status WebTool.

To access the Status WebTool:

On the left side of the Fiery WebTools home page, click the **Status** button.

The Status window appears in a new browser window.
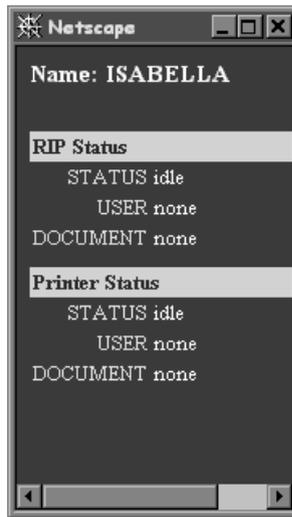
You can close other browser windows and leave the Status window open to continue checking the status of the KX-P8420. As long as you keep the Status window open, it is dynamically updated at 30-second intervals.

Linking to other Web sites

WebLink links you to the Panasonic home page (www.panasonic.co.jp/kme/ saga/color_printer/p8420_link.html), provided a valid Internet connection is available. You can change the WebLink destination by holding down the Control key and clicking the WebLink button. In the New URL field, type the new WebLink address and click OK.

Update WebLink

Current URL:

www.panasonic.co.jp/kme/saga/color_printer/p8420_lin

New URL:

OK   Cancel

Java Applet Window
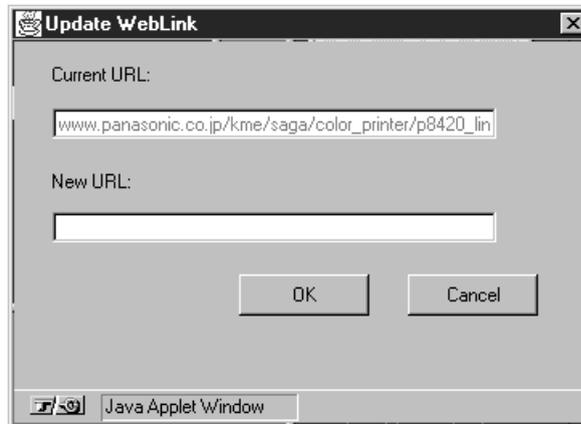
NOTE:
- Any change to the WebLink destination remains permanent until changed again.

Using Fiery WebDownloader

Using Fiery WebDownloader, you can send PostScript or text files to the KX-P8420 without first opening the file in an application.

NOTE:

• Fiery WebDownloader cannot be used on Macintosh computers.

A downloaded file can be sent to the Direct connection or to the Print or Hold queues.

NOTES:

• The Direct connection can be used on printers without a hard disk drive or additional memory; however use of the Print and Hold queues requires a printer with a hard disk drive and 32 MB of memory.

• Files sent to the Direct connection are printed as soon as the printer is free to accept a print job.

• Files sent to the Print queue are spooled to the printer's hard disk drive.

• Files sent to the Hold queue remain on the printer's hard disk drive until they are moved to the Print queue or deleted.

• PS or text files can be sent, but PCL files cannot.

• Font downloading is not available.

51

Downloading a file to the printer:

1 Specify a file to download to the printer:

Enter a path to the file you want to download to the printer in the Source File text field. Or click Browse to navigate to the file you want to download.

2 From the **Print Connection** menu, select the connection to which you want to download.

If your printer does not have an optional hard disk drive, Print and Hold Queue options are dimmed in the Print Connection menu.

3 Click the **Send file** button.

The file is downloaded to the printer.

Working with Color

This chapter introduces concepts that are basic to color theory. You will encounter some of these concepts (such as hue, saturation, and brightness) when you work with color in applications; others provide useful background information. *Color is a complex topic, so consider this a starting point for experimentation and further research.*

The properties of color

What we call "color" is really a perceptual ability unique to humans and a small number of animal species. Color theory is an attempt to systematize the properties of color perception, which by nature is relative and changeable. A color appears different depending on the other colors around it, and individuals vary in their abilities to perceive color.

The physics of color

The human eye can see electromagnetic radiation at wavelengths between 400 nanometers (purplish blue) and 700 nanometers (red). This range is called the visible spectrum of light. We see pure **spectral light** as intensely saturated or pure colors. Sunlight at midday, which we perceive as white or neutral light, is composed of light from across the visible spectrum in more or less equal proportions. Shining sunlight through a prism separates it into its spectral components, resulting in the familiar rainbow of colors.

Like the sun, most light sources we encounter in our daily environment emit a mixture of many light wavelengths, although the particular distribution of wavelengths can vary considerably. Light from a tungsten light bulb, for example, contains much less blue light than sunlight. Tungsten light appears white to the human eye which, up to a point, can adjust to the different light sources. However, color objects appear different under tungsten light than they do under sunlight because of the different spectral makeup of the two light sources.

The mixture of light wavelengths emitted by a light source is reflected selectively by different objects. Different mixtures of reflected light appear as different colors. Some of these mixtures appear as relatively saturated colors, but most appear to us as grays or impure hues of a color.

CIE color model

In the 1930s, the Commission Internationale de l'Eclairage (CIE) defined a standard **color space**, a way of defining colors in mathematical terms, to help in the communication of color information. This color space is based on research on the nature of color perception.

By mixing any two spectral colors in different proportions, we can create all the colors found between them. For example, it is possible to create the same gray by mixing blue-green and red light or by mixing yellow-green and blue-violet light. This is possible because of a phenomenon peculiar to color vision called **metamerism**. The eye does not distinguish individual wavelengths of light. Therefore, different combinations of spectral light can produce the same perceived color.

Hue, saturation, and brightness

A color can be described in terms of three varying characteristics:

- Hue, or tint (the qualitative aspect of a color—red, green, or orange)
- Saturation, or the purity of the color
- Brightness, or relative position between white and black.

Many computer applications include dialog boxes in which you select colors by manipulating hue, saturation, and brightness. For example, Photoshop uses a square Color Picker which can be reconfigured according to your preference.

Additive and subtractive color systems

Color devices used in desktop publishing and printing *simulate* the range of visible colors using a set of primary colors that are combined to create other colors. There are two methods of creating a range of colors from a set of primary colors. Computer monitors and scanners use the **additive color model**. Printing technologies, including KX-P8420 print devices and offset presses, use the **subtractive color model**.

■ Additive (RGB) color

Color devices that use the additive color model make a range of colors by combining varying amounts of red, green, and blue light. These colors are called the **additive primaries**. White is created by adding the maximum amount of red, green, and blue light available. Black occurs wherever all three colors are absent. Grays are created by adding varying amounts of all three colors together. Combining varying amounts of any two of the additive primaries creates a third, saturated hue.

A familiar device that uses this color model is the computer monitor. Monitors have red, green, and blue **phosphors** that emit varying amounts of light to display a given color. Scanners create digital representations of colors by measuring their red, green, and blue components through colored filters.

■ Subtractive (CMY and CMYK) color

The subtractive color model is used in color printing, and in color photographic prints and transparencies. While the additive color model simulates the visible spectrum of color by adding light of three primary hues, the subtractive color model uses a "white" or neutral light source containing light of many wavelengths. Inks, toners, or other **colorants** are used to selectively absorb (subtract) certain wavelengths of light that otherwise would be reflected or transmitted by the media in question.

The **subtractive primaries** are cyan, magenta, and yellow; they absorb red, green, and blue light, respectively. Combining any two subtractive primaries creates a new color that is relatively pure or saturated. For example, you can make red by combining magenta and yellow, which absorb green and blue light, respectively. White occurs when no colorant is applied. Combining all three subtractive primaries in theory yields black, but due to deficiencies of cyan, magenta, and yellow colorants, combining these three primaries actually yields a muddy brown. Black colorant is added to compensate for the deficiencies of cyan, magenta, and yellow colorants, and consequently color printing uses four **process colors**: **C**yan, **M**agenta, **Y**ellow, and blac**K** (CMYK). The use of black ink helps in producing rich solid blacks and also allows for improved rendition of black text.

Print device gamut

Different color reproduction techniques have different color capabilities, or gamuts. Color transparency films have comparatively large gamuts, as do color monitors. The color gamut that can be produced using CMYK toners on paper is smaller. This is why some colors that can be displayed on a color monitor, especially bright saturated colors, cannot be reproduced exactly by your KX-P8420 print device—nor, for that matter, can they be reproduced on press using process colors. Moreover, different print devices have different gamuts—some colors that your print device can produce cannot be reproduced on an offset press, and vice versa. The following illustration provides a graphical representation of this concept.

Color transparency film

RGB monitor

Offset press (white)
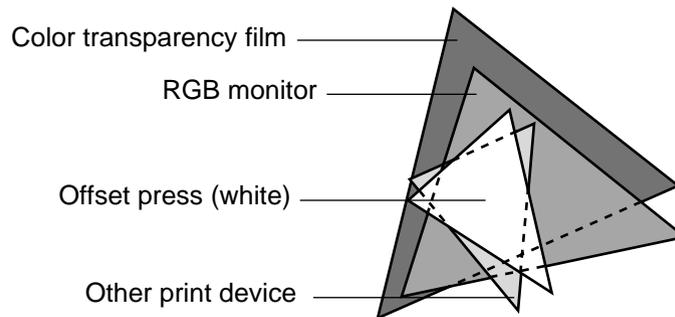
Other print device

You need to account for the gamut of your print device when designing on a color monitor. When printed, colors that fall outside the print device's gamut are "mapped" to printable colors. This process, referred to as **gamut mapping**, takes place when color data is converted or adjusted to meet the color space and gamut requirements of a print device.

The KX-P8420 Color Printer is specially designed to perform gamut mapping at high speed with high quality results. It provides these color management features automatically, using either built-in default settings or settings that you specify for a particular print job. For added flexibility, the KX-P8420 color management system can also be used in combination with color management systems on Macintosh and Windows computers.

Controlling printed color

When working with color materials, whether they be presentations, illustrations, or complicated page designs, you make aesthetic decisions about the colors you use. Once you have decided on your goal, you then need to realize it in print. Your color printing system becomes an ally in this creative process to the extent that you can get results that are *predictable*.

- If you have designed a brochure to print on the KX-P8420, you want the printed colors to match the design specification.

- If you are printing presentations on the KX-P8420, you want to preserve the vivid colors in the monitor display.

- If you are working with color that will print on press, you want the KX-P8420 output to match prepress proofs.

The type of print job and the final print device either the KX-P8420 printer or an offset press, determine the methodology you use to achieve optimal results.

No matter what your goals are, two hardware factors always impact color print output: print device consistency and the range of colors the print device can print, known as its **gamut**. These factors are covered briefly in this chapter. Creating successful color documents and presentations also requires an understanding of color management software as it is implemented by the KX-P8420 and on your desktop computer. Most of this chapter is devoted to discussing the various elements of color management that contribute to predictable color results.

Maintaining print device consistency

The factors described below affect print device consistency, as well as color fidelity and overall output quality.

Paper stock and toner

The paper and toner used by the print device can greatly affect printed color. For best results, use the consumables recommended by the manufacturer of your printer.

Maintenance

Problems such as streaking and insufficient or excessive amounts of one or more toners arise when a print device does not receive periodic maintenance. In addition to having it serviced regularly, monitor the color production of your printer by making standard test prints at regular intervals. You can do this easily by printing the KX-P8420 Test Page from the front panel. Save the prints and show them to your system or site administrator if recalibration becomes necessary.

Using color effectively

The ability to print in color can greatly increase the effectiveness of your message, whether you are printing a presentation or a newsletter, or proofing an ad concept that will later be printed on press. Some potential benefits of using color include:

- Conveying information rapidly by using color cues
- Making use of the emotive aspects of different colors
- Increasing impact and message retention

A few rules of thumb

Color can also be a source of distraction and discord if it is used poorly. This section outlines some tips and concepts that will prove useful as you approach designing color materials.

Try some of the following strategies for creating successful color materials:

- Rather than applying colors indiscriminately, use color to aid comprehension. In presentations, graphs, and charts, use color to highlight patterns and emphasize differences.
- In general, fewer colors work better than many colors.
- Use red as an accent color. Red is particularly effective when used in otherwise monochromatic materials.
- Consider the tastes of your target audience when choosing colors.
- Keep a file of printed color pieces that appeal to you or strike you as effective. Refer to it for ideas when designing your own documents.

Color wheel

A color wheel is a helpful tool for understanding the interrelation of colors. The colors on one side of the color wheel, from magenta to yellow, appear to most people to be warm colors, while those on the other side, from green to blue, appear to be cool. The distance between two colors on the color wheel can help predict how they will appear when seen side by side. Colors opposite one another on the wheel are called complements, and create a striking contrast side by side. This can be the basis for a bold graphical design, but it is an effect you should use with discretion since it can be visually fatiguing. Other bold combinations to consider are split complements (a color and the two colors adjacent to its complement) and triads (three colors evenly spaced on the color wheel). Colors adjacent to one another on the color wheel result in subtle harmonies.

The color wheel simplifies color relationships for the purpose of clarity, showing only saturated or pure colors. Adding the myriad variations of each hue to the palette (more or less saturated, darker or lighter) creates a wealth of possibilities. Taking a pair of complements from the color wheel and varying the saturation and brightness of one or both colors produces a very different result from the pure complements. Combining a light tint of a warm color with a darker shade of its cooler complement often gives pleasing results. Combining a darker shade of a warm color with a light tint of its cooler complement produces an unusual effect you may like.

Once you have mastered the concept of the color wheel, you have a good framework for experimenting with color combinations. Many books targeted at graphic designers show groups of preselected color combinations. Some are organized by themes or moods, and some are based on a custom color system such as PANTONE. The more you develop a critical facility for judging color combinations, the more you will be able to trust your own eye for color.

Color and text

It is not a coincidence that the overwhelming majority of text you see is printed in black toner on white paper. Text in black on white is highly legible and is not fatiguing to read for extended periods. For many color materials, using black text on a white background and confining color to graphic elements and headings is a good choice.

Color text can add flair to documents printed on paper when used skillfully, and is widely used in presentations. When using color text, avoid dazzling text and background combinations created from primary complements, especially red and cyan or red and blue; they are visually fatiguing and hard to read. Color text is more legible when distinguished from its background by a difference in lightness—for example, dark blue text on a light beige background. In addition, using many different colors in a string of text makes for a confused appearance and is hard to read. However, using a single highlight color is an effective way to draw the reader's eye to selected words.

When using color text, keep in mind that small font sizes typically do not print in color with the same sharpness as in black. In most applications, black text prints exclusively in black toner while color text usually prints with two or more toners. Any misregistration between the different toners on paper causes color text to lose definition. You can make test prints to find the smallest point size at which color text prints clearly. When using high-end graphics applications that allow you to specify color as percentages of cyan, magenta, yellow, and black, you can create pure cyan or pure magenta text that prints with the same sharpness as black text. (Pure yellow text is extremely hard to read on anything but a dark or complementary background.)

Raster images and vector images

Two broad categories of artwork can be printed from a personal computer to a color printer: raster and vector images.

A **raster image**, also referred to as a bitmap, is composed of a grid of **pixels**, each assigned a particular color value. The grid, when sufficiently enlarged, resembles a mosaic made from square tiles. Examples of raster images include scans and images created in painting or pixel-editing applications, such as Adobe Photoshop and Painter.

The amount of information found in a raster depends on its **resolution** and **bit depth**. The resolution of a raster describes the density of the pixels and is specified in pixels per inch (ppi). The bit depth is the number of bits of information assigned to each pixel. Black and white rasters require only one bit of information per pixel. For photographic quality color, 24 bits of RGB color information are required per pixel, yielding 256 separate levels of red, green, and blue. For CMYK images, 32 bits per pixel are required.

When printing raster artwork, the quality of the output depends on the resolution of the raster. If the raster's resolution is too low, individual pixels become visible in the printed output as small squares. This effect is sometimes called "pixelation".

In **vector images**, picture elements are defined mathematically as lines or curves between points—hence the term "vector". Picture elements can have solid, **gradient**, or patterned color fills. Vector artwork is created in illustration and drawing applications such as Adobe Illustrator and CorelDRAW. Page layout applications such as QuarkXPress also allow you to create simple vector artwork with their drawing tools. PostScript fonts are vector-based as well.

Vector artwork is resolution-independent; it can be scaled to any size without danger of pixels becoming visible in printed output.

Optimizing files for processing and printing

The following sections provide tips on how to create image files that produce the highest possible print quality while minimizing the processing time and disk space they require.

Resolution of raster images

While a 72 ppi raster image appears sharp on a monitor, the same image would likely appear pixelated when printed to the KX-P8420. Color print devices are capable of much greater detail than monitors, and require correspondingly higher resolution image files. However, high-resolution files can be large, and therefore cumbersome to transmit over a network, process for printing, store on disk, and edit.

Beyond a certain threshold, a higher image resolution greatly increases file size while having a minimal effect on output quality. The optimal image resolution depends on the resolution of the final print device. Aim for the resolution that optimizes both file size and output quality.

The resolution of a raster, along with its bit depth and physical dimensions, determine its file size. The following table shows the file sizes of color raster images at different dimensions and resolutions.

Image size	File size at			
	100 ppi	150 ppi	200 ppi	400 ppi
	RGB/CMYK	RGB/CMYK	RGB/CMYK	RGB/CMYK
3" x 4"	0.4/0.5 MB	0.8/1.0 MB	1.4/1.8 MB	5.5/7.3 MB
5" x 7"	1.0/1.3 MB	2.3/3.0 MB	4.0/5.3 MB	16.0/21.4 MB
8.5" x 11"	2.7/3.6 MB	6.0/8.0 MB	10.7/14.3 MB	42.8/57.1 MB

In this table, the shaded areas indicate that 200 ppi is typically the best trade-off between image quality and file size. However, higher resolutions (e.g., 250 to 300 ppi) may be needed for offset printing, when quality is of the utmost importance, or for images containing sharp diagonal lines.

To find the best image resolution for your purposes, make test prints of some raster artwork at different resolutions. Start with a high-resolution image (400 ppi) and save versions at progressively lower resolutions, down to 100 ppi, using a pixel-editing application such as Photoshop. Always save a copy of the original high-resolution version in case you need to revert to it. The high-resolution data cannot be recreated from a lower resolution version.

Print the files and examine the output. You will likely begin to see a marked deterioration in output quality at resolutions below 200 ppi, while above 200 ppi the improvement may be very subtle.

Image quality

100 ppi   200 ppi   300 ppi   400 ppi
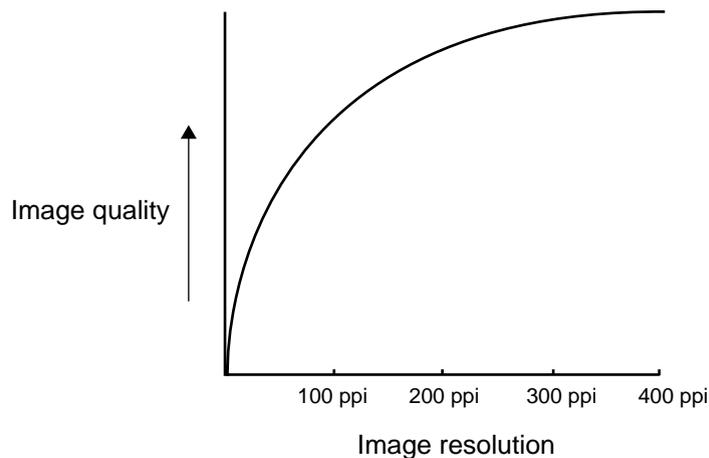
Image resolution

Raster images prepared for offset printing may need to be at higher resolutions than needed for proofing on your KX-P8420.

Scaling

Ideally, each raster image should be saved at the *actual* size it will be placed into the document and at the *optimal resolution* for the print device. If the image resolution is correct for the print device, there is no quality advantage to be gained by scaling an image down to a percentage of its actual size. If you scale a large image down to a percentage of its actual size, you incur unnecessary file transfer time because the image data for the entire large image is sent to the printer. If an image is placed multiple times at a markedly different sizes in a document, save a separate version of the image at the correct size for each placement.

If you need to place an image at greater than 100% in a document, remember that the output image resolution is affected. For example, if you scale a 200 ppi image to 200%, the image is printed at 100 ppi.

Color management on the KX-P8420

The KX-P8420 uses a simple and flexible color architecture that produces excellent color results with default settings. It also allows you to customize your color results using various color controls.

Settings for the following KX-P8420 options can be specified via print dialog box options when you send a job. Some can also be set as defaults by the administrator during KX-P8420 Setup. Settings specified via the print dialog box override any equivalent settings at the printer's front panel.

Color print option	What it does
RGB Source EFIRGB/sRGB (PC)/ Apple Standard/Off (Default: EFIRGB)	Applies an RGB source space definition to RGB data.
CRD/Color CRD Text/ Color CRD Graphics (Illustrations)/ Color CRD Images (Photos) Photographic/Presentation/ Transparency (Default: Photographs—Photographic Text—Presentation Illustrations—Presentation)	Applies a KX-P8420 color rendering dictionary (CRD) to objects (text, photographs and illustrations) in an RGB data file (see page 66). With Windows 95, the ColorWise Business Color setting assigns default CRDs automatically. For information on how various CRDs are used for different types of elements in documents, see pages 16,18 (Windows) and page 29 (Macintosh).
Brightness 85% to 115% (Default: 100%)	Performs a color adjustment on all color channels to make the printed output lighter or darker.
CMYK Simulation SWOP-Coated/DIC/ Euroscale/None (Default: None)	Adjusts CMYK color data to simulate an offset press standard or a custom color gamut defined at your site. Selecting None bypasses simulation.
ICM profiles	Allows closer color matching between monitor and printed output. Click the option button to select a color matching method, and specify a rendering intent.

Explanations of how these settings affect your print jobs are provided in the following sections.

RGB Source

The RGB Source option is used to provide a source color space definition for RGB data in your document. The setting you specify for this option overrides any source color space profiles you may have specified using other color management systems. For example, if you specified a ColorSync System Profile on the Macintosh computer, the RGB Source setting specified in the Print dialog box overrides it. In cases where you don't want this setting to override another specified source color space, select Off.

RGB Source	Description
EFIRGB	The source color space defined by this setting is optimal for color conversions that will be sent to a KX-P8420 print device. It also allows for consistent output across different operating systems.
sRGB (PC)	The sRGB (PC) setting specifies the source space of a generic Windows computer monitor.
Apple Standard	The Apple Standard setting specifies the source space of all standard Macintosh computer monitors.

PostScript RGB data is converted to CMYK data using the CRD specified by the CRD option (see page 66). This type of RGB data contains its own source color space information which is used as a reference point for the conversion.

NonPostScript RGB data is converted using a general under-color-removal conversion method. NonPostScript RGB data does not contain source color space information and so cannot be converted using a CRD.

Color rendering dictionaries

Color rendering dictionaries (CRDs) are used to perform color conversions on RGB data. The following table describes the CRDs for KX-P8420 software and provides guidelines on when to use each one. Each color rendering style uses a different gamut mapping method, such as Photographic or Presentation, designed for a particular kind of color usage.

Rendering style	Best used for
Photographic—Preserves tonal relationships in images rather than exact colors. This rendering style maps out-of-gamut RGB colors to printable colors in a way that retains differences in lightness. Color accuracy is sacrificed slightly in favor of presenting color relationships in the way the human eye perceives them. Photographic rendering typically gives less saturated output when printing out-of-gamut RGB colors than Presentation Color rendering does.	Continuous tone photographs, including scans and images from stock photography CDs
Presentation—Creates bright saturated colors. This rendering style does not try to match printed colors precisely to displayed colors but instead provides vibrant, dense colors. Photographic images, however, are treated the same way as by the Photographic rendering style.	Artwork and graphs in presentations and continuous tone photographs
Transparency— Improves the correspondence between monitor colors and printed color on transparency paper.	Artwork and graphs printed on transparency paper

NOTE:

- The rendering styles referred to in the table cannot be used when specifying a target device profile with a color management system such as ColorSync or ICM.

CMYK Simulation

If you are using the KX-P8420 to print proofs for an offset press job or to simulate another print device, select the appropriate CMYK Simulation setting. The CMYK Simulation setting specifies the offset press standard or other color gamut that you want to simulate.

The CMYK Simulation setting you should specify depends on the press standard for which the CMYK data was separated. For example, for images that were separated for SWOP-Coated paper, select SWOP-Coated as the CMYK Simulation setting. Select SWOP-Coated to simulate printing to a standard American offset press; Euroscale to simulate a European offset press, or DIC to simulate a standard Japanese offset press. For images that were separated using a custom separation (such as a device-specific separation or a separation produced with an ICC-profile), select None as the CMYK Simulation setting

Choosing colors in PostScript applications

With PostScript applications, you can create colors using any of the color models supported by the application. All PostScript applications support the CMYK model; some also support the RGB model and other color models based on monitor display values. PostScript applications also allow you to select named colors using one or more color libraries, such as PANTONE.

The important thing to remember when creating or choosing colors is that the displayed versions of those colors may not match KX-P8420 output or the output of identically defined colors from other color print devices. For this reason, you should use color matching to ensure predictable color printing results with the KX-P8420.

■ Color reference files

Two color reference files have been included on the KX-P8420 Driver & Utility CD-ROM: a CMYK color reference file, and a PANTONE color reference file.

If you install the printer driver using the installer's typical or compact installation options, the CMYK and PANTONE color reference files are automatically copied to the KX-P8420 directory on your hard disk. If the color reference files have not been installed, insert the KX-P8420 Driver & Utility CD-ROM into your CD-ROM drive and use the installer's custom option to select the reference files to copy to disk. You can also navigate to the appropriate directory, and manually copy the files to your hard disk.

■ Using the CMYK color reference page

The CMYK color reference page, included with your KX-P8420 user software, let you see how various cyan, magenta, yellow, and black combinations look when printed on your print device. Using the CMYK color reference pages, you can easily determine the CMYK values to specify to obtain the printed colors you want.

The CMYK color reference file is an 11-page, letter-size PostScript file.

To use the CMYK color reference pages, download the file using a downloader utility such as the WebDownloader. (For instructions on using the WebDownloader, see "Chapter 4 Managing Print Jobs".) The printed pages display groups of color patches in graduated combinations of yellow, magenta, and cyan, and smaller patches that include 25, 50, and 75% black. Refer to these pages to pick colors and specify process color values in your application.

■ Using the PANTONE color reference pages

The PANTONE color reference pages, included with your KX-P8420 user software, lets you determine the nearest CMYK values to match a given color in the PANTONE color for coated paper.

To print the PANTONE reference pages, download the PANTONE file using the WebDownloader. (For instructions on using the WebDownloader, see "Chapter 4 Managing Print Jobs".) The printed pages display PANTONE color simulation names and numbers. Refer to these pages to see how PANTONE colors defined in applications print on the KX-P8420 printer.

Appendix A *Fonts*

The following section lists the built-in fonts included with your KX-P8420 printer.

NOTE:
- All fonts that are pre-installed on your printer have also been included on the KX-P8420 Driver & Utility CD-ROM. For information on how to install these fonts on your computer, see "Installing additional software for Windows users" in the *Setup Manual* or *Operating Instructions.*

Resident printer fonts

Listed below are the 136 built-in printer fonts on the KX-P8420.
You can print the list of available fonts by printing "PS Font List". See "Printing pages from the front panel" in the *Setup Manual* or *Operating Instructions.* PS Font List includes the CE font of each font which includes multi-lingual extension.

For Macintosh computers, install the corresponding screen fonts from the KX-P8420 Driver & Utility CD-ROM. For instructions, see "Installing additional software for Macintosh users" in the *Setup Manual* or *Operating Instructions.*

Adobe Type 1 PostScript fonts

The KX-P8420 includes 117 Adobe Type 1 fonts:

- AlbertusMT, AlbertusMT-Italic, AlbertusMT-Light
- AntiqueOlive-Roman, AntiqueOlive-Bold, AntiqueOlive-Compact, AntiqueOlive-Italic
- AvantGarde-Book, AvantGarde-BookOblique, AvantGarde-Demi, AvantGarde-DemiOblique
- Bodoni, Bodoni-Bold, Bodoni-Italic, Bodoni-BoldItalic, Bodoni-Poster, Bodoni-PosterCompressed
- Bookman-Demi, Bookman-DemiItalic, Bookman-Light, Bookman-LightItalic
- Carta
- Clarendon, Clarendon-Bold, Clarendon-Light
- CooperBlack, CooperBlack-Italic
- Copperplate-ThirtyThreeBC, Copperplate-ThirtyTwoBC
- Coronet
- Courier, Courier-Bold, Courier-Oblique, Courier-BoldOblique
- Eurostile, Eurostile-Bold, Eurostile-ExtendedTwo, Eurostile-BoldExtendedTwo
- GillSans, GillSans-Bold, GillSans-Italic, GillSans-BoldItalic, GillSans-Condensed, GillSans-BoldCondensed, GillSans-Light, GillSans-LightItalic, GillSans-ExtraBold

69

- Goudy, Goudy-Bold, Goudy-Italic, Goudy-BoldItalic, Goudy-ExtraBold
- Helvetica, Helvetica-Bold, Helvetica-BoldOblique, Helvetica-Condensed, Helvetica-Condensed-Bold, Helvetica-Condensed-BoldObl, Helvetica-Condensed-Oblique, Helvetica-Narrow, Helvetica-Narrow-Bold, Helvetica-Narrow-BoldOblique, Helvetica-Narrow-Oblique, Helvetica-Oblique
- JoannaMT, JoannaMT-Bold, JoannaMT-Italic, JoannaMT-BoldItalic
- LetterGothic, LetterGothic-Bold, LetterGothic-BoldSlanted, LetterGothic-Slanted
- LubalinGraph-Book, LubalinGraph-BookOblique, LubalinGraph-Demi, LubalinGraph-DemiOblique
- Marigold
- MonaLisa-Recut
- NewCenturySchlbk-Roman, NewCenturySchlbk-Bold, NewCenturySchlbk-Italic, NewCenturySchlbk-BoldItalic
- Optima, Optima-Bold, Optima-Italic, Optima-BoldItalic
- Oxford
- Palatino-Roman, Palatino-Bold, Palatino-Italic, Palatino-BoldItalic
- StempelGaramond-Roman, StempelGaramond-Bold, StempelGaramond-Italic, StempelGaramond-BoldItalic
- Symbol
- Tekton
- Times-Roman, Times-Bold, Times-Italic, Times-BoldItalic
- Univers, Univers-Bold, Univers-BoldExt, Univers-BoldExtObl, Univers-BoldOblique, Univers-Condensed, Univers-CondensedBold, Univers-CondensedBoldOblique, Univers-CondensedOblique, Univers-Extended, Univers-ExtendedObl, Univers-Light, Univers-LightOblique, Univers-Oblique
- ZapfChancery-MediumItalic
- ZapfDingbats

TrueType fonts

The KX-P8420 includes 19 TrueType fonts:

- Apple-Chancery

- ArialMT, Arial-BoldMT, Arial-ItalicMT, Arial-BoldItalicMT

- Chicago

- Geneva

- HoeflerText-Regular, HoeflerText-Black, HoeflerText-Italic,
  HoeflerText-BlackItalic, HoeflerText-Ornaments

- Monaco

- NewYork

- TimesNewRomanPSMT, TimesNewRomanPS-BoldMT,
  TimesNewRomanPS-ItalicMT, TimesNewRomanPS-BoldItalicMT

- Wingdings-Regular

■ About the optional font software

For more information on installing Adobe Type Manager (ATM) from Adobe
Systems, see "Installing additional software for Windows users" or
"Installing additional software for Macintosh users" in the *Setup Manual* or
Operating Instructions.

Glossary

Additive color model

A system in which color is produced by combining primary lights additively. The additive primaries are red, green, and blue. When added together in proper amounts, these colors produce white. An RGB video monitor is based on an additive color model.

Additive primaries

Red, green, and blue light that is used in additive color systems. The additive primaries combine to produce white.

Banding

Visible steps between shades in a gradient.

Bit depth

Amount of information required for each pixel in a raster image. Black and white images require only one bit per pixel. Photographic quality color images can require 24 or 32 bits per pixel.

Calibrated RGB

An RGB color space used by KX-P8420 color management software as an interchange standard. The Calibrated RGB color space is defined according to the following specifications for a color monitor: SMPTE phosphors, a white point D50, and gamma of 2.2.

Calibration

The process of ensuring that a device behaves consistently with respect to a set of specifications.

Color gamut

See gamut.

Color rendering dictionary (CRD)

A feature found in PostScript Level 3 color printers that gives improved matching between the monitor and printed output. Color rendering dictionaries are used by the printer's PostScript interpreter when converting RGB data sent to the printer to CMYK data used by the print engine.

Color rendering style

A feature of KX-P8420 color management software that allows you to maintain the best possible translation of color from one color device to another. The KX-P8420 color rendering styles are: photographic transparency and presentation.

Color space

A model for representing color in terms of measurable values, such as the amount of red, green, and blue in an image. RGB and CMYK color spaces are based on color devices—monitors and printers respectively. Other color spaces, such as CIELAB are based on mathematical models, and are device-independent—they are not based on the color response of a particular device.

Colorant

An ink, die, toner, paint or other pigment that modifies the color of what it is applied to.

Composite printer

Any printer that can print directly in color without first creating color separations. A composite is an early proof of a printing job.

Continuous tone

An image containing gradient tones.

Custom color system

A system of named color swatches that can be matched on press using process or spot colors. PANTONE and TruMatch are examples of custom color systems.

Density

A precise measurement of the light energy transmitted or reflected by a surface in the presence of a standard light source.

Densitometer

An instrument that measures density according to a specified standard. Status T densitometers are commonly used in the graphic arts industry.

Four-color printer

A printing device that uses cyan, magenta, yellow, and black ink or toner.

Gamut

A range of colors. A device gamut is the range of colors that a device, such as a printer, can produce. An image gamut is the range of colors in a particular image.

Gamut mapping

The process whereby KX-P8420 color management software compresses—"maps"—the colors in a digital image to fit the color gamut of a particular device.

Gradient fill

A color or grayscale fill made of smooth transitions between two different colors or shades.

Graphics device interface (GDI)

Graphics and display technology used by computers running Windows. GDI applications rely on GDI rather than the PostScript language to send words and pictures to printers.

Halftoning

A method for representing an original continuous tone image using a pattern of dots of various sizes. The pattern is determined by the line frequency, screen angle, and dot shape.

Metamerism

Phenomenon where two colors composed of different combinations of light wavelengths appear identical. The colors are called "metamers".

Moiré

An undesirable pattern in images made using halftone screens. Moiré can be caused by improper screen angles, improper alignment of halftone screens, or by certain types of patterns in the image itself.

Named color

A color that is defined according to a custom color system. For example, PANTONE 107 C is a named color.

Offset lithography

Printing in which ink is transferred from printing plates to a rubber blanket and then from the blanket to paper.

Photographic rendering

A color rendering style that preserves tonal relationships in images. Unprintable colors are mapped to printable colors in a way that retains differences in lightness, slightly sacrificing color accuracy as necessary.

Pixel

The smallest distinct element of a raster image or an image displayed on a monitor.

PostScript Level 2 or 3

Version of Adobe Systems' PostScript language, which is used to print and display pictures and text. PostScript Level 3 includes many enhancements to older versions of PostScript, including improved color matching and the ability to control printer-specific features from applications.

Prepress proof

A print made from a set of film separations, or from an electronic file, to simulate the results of printing. A film proof is the last opportunity to catch problems before the final printing.

Presentation graphics rendering

A color rendering style that does not try to precisely match printed colors to displayed colors. It is appropriate for bright saturated colors used in illustrations and graphs.

Process colors

The four ink colors used to simulate full-spectrum color images: process yellow, magenta, cyan, and black.

QuickDraw

Graphics and display technology built into Macintosh computers. QuickDraw applications rely on QuickDraw rather than the PostScript language to send words and pictures to printers.

Raster image

Electronic representation of a page or image using a grid of points (called pixels) that are numerically defined. Raster images can be black and white, grayscale, indexed color, or photographic quality color.

Separation

The process of separating a color image into the primary color components for printing—cyan, magenta, yellow, and black. Also used to refer to the four sheets of film that result from the process of separating a color image.

Source profile

A profile used by KX-P8420 to determine the context for the color values specified in a digital image.

Spot color

A color that is printed on its own separation plate when separations are specified. A spot color is printed using a special ink for that color, in contrast to process colors that are printed using combinations of cyan, magenta, yellow, and black.

Status T

A spectral response for graphic arts reflection densitometers defined by ANSI (the American National Standards Institute.)

Subtractive color model

A system in which color is produced by combining colorants such as paint, inks, or dyes on media such as paper or transparent film or acetate. The subtractive primaries are cyan, magenta, and yellow. All printing devices use the subtractive color model, as do photographs and transparency film. Many printers use cyan, magenta, yellow, *and* black colorants.

Subtractive primaries

Cyan, magenta, and yellow colorants used in subtractive color systems. Combining the subtractive primaries produces darker colors.

SWOP

The abbreviation for Specifications for Web Offset Publications. A standard of specifications for separations, proofs, and color printing usually designed for magazine production.

Vector image

Graphic illustration created on computers where picture elements are defined mathematically as lines or curves between points. Includes artwork created in illustration and page layout applications.

Index

A

B

C

D

E

S

T

U

V

W