

Adobe

User Guide

Adobe Photoshop® version 5.0

GOOGLE EXHIBIT 1018

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Adobe Photoshop 5.0 User Guide for Macintosh and Windows

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Introduction

Welcome to the Adobe® Photoshop® program—extraordinary photo retouching, image editing, and color painting software. Whether you are a novice or an expert in image editing, the Adobe Photoshop program offers you the tools you need to get professional-quality results.

You'll find that Photoshop excels as an art production tool, whether you are a graphics producer who needs to merge and edit color images, a photographer who wants to retouch proofs, or a graphic designer who is creating original or composite artwork, collages, or photo montages for print or on the Web. Photoshop is equally useful to printers and service bureaus that want to generate color separations, to animators who want to colorize images and produce audio-visual materials quickly, and to artists who want to create new artwork using the latest media and tools.

About this manual

The *Adobe Photoshop User Guide* provides detailed information about the Adobe Photoshop tools and commands. It is designed to be used as a reference tool in your everyday work with Adobe Photoshop. This cross-platform manual provides instructions for using Adobe Photoshop on both the Microsoft® Windows® and Mac OS platforms. Any differences in procedures and commands between platforms are noted in the text.

Before using this manual, you need to install the program by following the instructions given in this chapter. This chapter also describes system requirements, and provides information on new features in Adobe Photoshop 5.0.

This manual assumes you have a working knowledge of your operating system and its conventions, including how to use a mouse and standard menus and commands and how to open, save, and close files. For help with any of these techniques, please see your Windows or Mac OS documentation.

Learning Adobe Photoshop

Adobe Photoshop 5.0 includes the following printed and online documentation. For information on troubleshooting and technical support, see Appendix, "Troubleshooting."

The *Adobe Photoshop User Guide* Contains information on using all Adobe Photoshop commands and features. The user guide also indicates when further information on a topic is available in the Help system.

The Adobe Photoshop Help system Contains all of the information in the Adobe Photoshop user guide, optimized for use online. In addition, the Help system includes a description of the Adobe Photoshop shortcuts, and more detailed information on some commands and filters.

The Adobe Photoshop Tutorials On the Tour and Training CD-ROM contain step-by-step tutorials in PDF format. These are some of the same tutorials included in *Adobe Photoshop Classroom in a Book*. For more information, see the Classroom in a Book section when viewing the tutorials. For information on how to install and use Adobe Acrobat® and QuickTime to view these tutorials, see the Read Me file for these programs.

The Adobe Photoshop Movies On the Tour and Training CD-ROM are QuickTime movies that provide a general tour of Photoshop's features, demonstrate new features, and show how to use layers in Photoshop 5.0.

The Adobe Photoshop Quick Reference Card Contains basic information about the Adobe Photoshop tools and palettes, and shortcuts for using them.

The Electronic Publishing Guide On the Tour and Training CD-ROM gives an overview of electronic publishing design issues and publishing with Adobe Acrobat on the Web and on CD-ROM.

Windows system requirements

To use Adobe Photoshop, you need the following hardware and software:

- An Intel® Pentium®-class or faster processor.
- Windows 95 (or later), or Intel-based Windows NT® version 4.0 or later.
- At least 32 megabytes (MB) of random-access memory (RAM).
- A hard drive with at least 60 MB of free space. You'll need additional disk space if you work with very large image files.
- An 8-bit (256-color) display adapter card.
- A CD-ROM drive.
- A sound card (required to use the Adobe Photoshop Tour and Training CD-ROM).

For the best performance, Adobe Systems recommends the following hardware and software:

- 64 MB or more of RAM.
- A 24-bit (millions of colors) video display card.
- A PostScript® printer.

Adobe Photoshop performance improves with more RAM, faster CPUs, and faster and larger hard disk drives. Multiprocessor systems and systems with Intel's MMX® technology can also speed performance.

For the latest system requirements, see the Read Me file.

Mac OS system requirements

To use Adobe Photoshop, you need the following hardware and software:

- An Apple® Power Macintosh® computer.
- At least 32 megabytes (MB) of random-access memory (RAM).
- Mac OS version 7.5 or later.
- A color monitor with an 8-bit (256-color) or better video display card.

• A hard drive with at least 60 MB of free space. You'll need additional disk space if you work with very large image files.

• A CD-ROM drive.

For the best performance, Adobe Systems recommends the following hardware and software:

• Mac OS version 8.1 or later.

• At least 64 MB of RAM.

• A 24-bit (millions of colors) video display card.

• A PostScript® printer.

Adobe Photoshop performance improves with more RAM, faster CPUs, and faster and larger hard disk drives. Multiprocessor systems can also speed performance.

For the latest system requirements, see the Read Me file.

The Adobe Photoshop package contents

The Adobe Photoshop software package includes the following software and documentation:

• The Adobe Photoshop CD-ROM Set consisting of the Application and Tutorial CD-ROM discs. (For a description of their contents, see the following sections.)

• *Adobe Photoshop User Guide.*

• *Adobe Photoshop Quick Reference Card.*

• Registration card. (The card is not included in upgrades from previous versions.)

Contents of the Adobe Photoshop Application CD-ROM

The Application CD-ROM contains the following software:

The Adobe Photoshop installer Includes everything needed to install Adobe Photoshop 5.0 on your hard drive—the installer, the Adobe Photoshop program, Adobe Gamma control utility, plug-in modules, the Adobe Photoshop tutorial files, and numerous sample files.

Goodies (Windows)\Other Goodies (Mac OS) folder Includes textures for use with the Lighting Effects plug-in filter, third-party plug-in modules, the HSL and HSB filter for converting Adobe Photoshop RGB images to HSL or HSB mode (Mac OS only), the Filter Factory plug-in which lets you create your own plug-in filters, and the Adobe PSPrinter™ driver. Documentation is included in Adobe Acrobat electronic format (PDF).

QuickTime® software (QuickTime for Windows, Apple QuickTime for Mac OS) Enables you to view the movies included in the Adobe Photoshop CD-ROM Set.

Adobe technical notes Written by the Adobe technical staff, this information appears on-screen as Acrobat PDF files. You can print the sections you refer to regularly.

Stock art Includes many high-resolution digitized images, backgrounds, and textures for your personal, non-commercial use.

Tryout versions of other Adobe applications

Adobe Acrobat Reader® software Lets you view PDF files online and is required to use the Tour and Training CD-ROM.

Contents of the Adobe Photoshop Tour and Training CD-ROM

The Tour and Training CD-ROM contains the following documentation and software:

The Adobe Photoshop Overview Is a set of interactive movies and links to tutorials, as described in this section.

The Photoshop Quick Tour movie Gives a basic overview of Adobe Photoshop's features. A step-by-step description of the techniques shown in this movie is in Chapter 1 of this user guide.

The New Features movie Introduces and demonstrates new features in Adobe Photoshop 5.0, including re-editable type, layer effects, the history palette, and new transformation commands.

The Layers movie Teaches you how to use layers in Photoshop.

A series of tutorials in PDF format Is an excerpt from *Adobe Photoshop Classroom in a Book*.

The Electronic Publishing Guide Explains how to use Adobe products to produce art and documentation for online display.

The Photoshop Digital Art show Displays examples of digital art.

Adobe Acrobat Reader software.

QuickTime software for Windows and Mac OS.

Registration

Adobe is confident you will find that the Adobe Photoshop program greatly increases your productivity. So that Adobe can continue to provide you with the highest-quality software, offer technical support, and inform you about new Photoshop software developments, please register your copy using the online registration software (if you have a modem and the software is available in your version of the program), or fill out and return the enclosed warranty registration card.

About Adobe products and services

For more information about Adobe products and services, you can use forums through Internet services such as CompuServe® and America Online℠, and the Adobe Home Page on the World Wide Web. Forums vary by country.

To open the Adobe Home Page, enter the URL http://www.adobe.com in your Web browser. To launch the Adobe Photoshop Home Page from within Photoshop, with links to relevant Photoshop information and the Adobe site, choose File > Adobe Online or click the image at the top of the tool bar.

For more information about Adobe technical support resources, see the notice that came with Adobe Photoshop.

Adobe Systems training opportunities

The Adobe Photoshop 5.0 Tutorials have been excerpted from Adobe Photoshop Classroom in a Book. Classroom in a Book is the official training series for Adobe graphics and publishing software developed by experts at Adobe and published by Adobe Press. For information on purchasing Adobe Photoshop Classroom in a Book, contact Macmillan Computer Publishing in the U.S. at 800-428-5331 or http://mcp.com, or contact your local book distributor.

The Adobe Certification program offers end-users, instructors, and training centers the opportunity to demonstrate their product proficiency and promote their software skills as Adobe Certified Experts, Adobe Certified Instructors, or Adobe Authorized Learning Providers. Visit the U.S. web site at http://www.adobe.com to learn how you can become certified.

Installing and starting Adobe Photoshop

You must install the application from the Application CD-ROM onto your hard drive; you cannot run the program from the CD-ROM.

If you're upgrading to Adobe Photoshop 5 from an earlier version, the installer creates by default a new folder containing the new Adobe Photoshop files. Your current Adobe Photoshop files are not affected.

For tips on installing the software, see "Before you call Adobe Technical Support" on page 361.

To install the Adobe Photoshop program:

1 Do one of the following:

- Start Windows, if necessary.
- In Mac OS, turn off or remove any virus-protection software, and restart your computer.

2 Insert the Application CD-ROM disc into your CD-ROM drive.

3 Start the Adobe Photoshop installer:

- In Windows, follow the on-screen instructions to start the installer; or open the Photoshp folder and double-click the Setup.exe file.
- In Mac OS, double-click the Install Adobe Photoshop 5 icon.

4 Follow the on-screen instructions to install the program files. A message appears when the installation is complete.

The following sections provide more information on the installation procedure.

Installation setup When prompted, specify an installation option:

- Typical (Windows) or Easy Install (Mac OS) installs the complete set of Photoshop program files and system support files.
- Compact (Windows only) installs the minimum options required to use Photoshop.

• Custom (Windows) or Custom Install (Mac OS) lets you choose the options you want to install.

Note: *In the Chinese, Japanese, and Korean versions of Photoshop, the Typical or Easy Install option also installs CMap files that enable the use of double-byte fonts in Photoshop images. To install the CMap files in any other version of Photoshop, you must use the Custom or Custom Install option.*

Registration When prompted, enter your name and company information. Type the serial number exactly as it appears on the registration card or on the inside front cover of the user guide (including the hyphen).

If you're upgrading to Adobe Photoshop 5 from an earlier version, the serial number is also located on the first page of your original user guide. If you're upgrading from the LE version, use the serial number that you received with the upgrade. Your original LE serial number won't work.

Gamma utility (Mac OS only) If you have installed earlier versions of Adobe Photoshop on your system, perform this step after completing the version 5 installation: Open your System Folder and drag the Gamma control panel to the Trash. This step prevents conflicts with the new Adobe Gamma utility installed with Photoshop 5.

QuickTime To view the movies in the Adobe Photoshop CD-ROM Set and to show previews when opening images in Mac OS, you also must install QuickTime, located on the CD-ROM.

Starting Adobe Photoshop

Follow these steps to start the program.

To start Adobe Photoshop in Windows:

Choose Start > Programs > Adobe > Adobe Photoshop 5.0. (If you installed the program in a folder other than Adobe, choose that folder from the Start > Programs menu.)

The Adobe Photoshop window appears. You can now open an image and start working.

To start Adobe Photoshop in Mac OS:

Open the Adobe Photoshop folder, and double-click the Adobe Photoshop program icon.

The Adobe Photoshop window appears. You can now open an image and start working.

What's new in Adobe Photoshop 5.0

Adobe Photoshop 5.0 includes new features for undoing changes made during the working session, transforming paths and selection borders, applying interactive effects to a layer, re-editing text, managing color, creating spot colors, selecting images and drawing paths, and rotating images in three dimensions. This version of Adobe Photoshop also enhances support for file formats and includes many new commands, palette features, and keyboard shortcuts that simplify common tasks.

History palette Photoshop's new History palette allows multiple undos by tracking and listing recent changes you make to an image during the current working session. Selecting any change listed in the History palette returns the image to that earlier state. (See "Reverting to any state of the image" on page 168.)

Reselect command The new Reselect command lets you easily retrieve the last selection used on your image in the current work session. (See "Making selections" on page 137.)

Path and selection transformation In addition to transforming images, you can now rotate, resize, and reshape paths and selection borders. (See "Transforming objects in two dimensions" on page 182.)

Layer effects New in Photoshop 5.0, layer effects automatically apply complex effects such as beveling, embossing, and drop shadows to any layer. You can turn these effects on and off. You don't have to reapply these effects each time you change the artwork—Photoshop automatically updates the effect when you make changes to the layer. (See "Using layer effects" on page 284.)

Type layers with re-editable text You can now create type on a type layer, with character-level formatting and precise control over kerning and tracking. Type layers can be re-edited at any time. (See Chapter 12, "Using Type.")

Alignable layers New Layer alignment commands let you align and distribute linked layers by edges and centers. (See the procedure to align or distribute layers on page 266.)

Improved color management With new ICC profile support, you can more easily maintain consistent color in your images, regardless of the monitor or printer you use. (See Chapter 5, "Reproducing Color Accurately.")

Expanded support for 16-bit color Support for 16-bit channels is increased and can now be used with more commands and tools. Both 48-bit RGB and 64-bit CMYK images are supported. (See "Converting between bit depths" on page 69.)

Color samplers To monitor color changes more easily, you can place up to four non-printing color samplers into your image. These samplers display color information in the Info palette, showing before-and-after color data as you make color adjustments. (See "Previewing color adjustments" on page 106.)

Enhanced Hue/Saturation command The updated Hue/Saturation dialog box now gives you special color range controls for much finer and more targeted adjustments of hue, saturation, and lightness. (See "Using the Hue/Saturation command" on page 124.)

Channel Mixer Photoshop's new Channel Mixer command enables blending one or more channels into an existing channel. For example, you can use this command to blend parts of the cyan, magenta, yellow, and black channels to create a grayscale image. (See "Mixing channels" on page 243.)

Spot color Photoshop images can now be separated to one or more spot color plates. (See"Adding spot colors" on page 245.)

Measure tool The measure tool lets you measure the length, angle, and location of areas in the image. (See "Using the measure tool" on page 174; "Using rulers, the measure tool, guides, and grids" on page 173.)

Magnetic lasso tool Because it discriminates between different levels of contrast in an image, the magnetic lasso tool snaps a selection border to the edge of the area you drag around. (See "Using the lasso, polygon lasso, and magnetic lasso tools" on page 139.)

Magnetic pen tool The magnetic pen tool works much like the magnetic lasso tool, but lets you draw a path that snaps to the edge of a defined area in your image. (See "Drawing freehand paths" on page 151.)

Freeform pen tool The freeform pen tool lets you create paths simply by drawing the shape of the path you want. As you drag, the tool automatically places anchor points, which you can then adjust. (See "Drawing freehand paths" on page 151.)

Action palette enhancements You can now record more tools and palettes in actions. For easier organization, you can now also create sets of actions. (See Chapter 16, "Automating Tasks.")

Wizards (Windows) and Assistants (Mac OS) New commands in the File > Automate and Help menus simplify multi-step operations such as exporting transparent images, resizing images, and creating contact sheets. (See "Using the Automate commands" on page 358.)

3-D transformation The new 3D Transform filter can map parts of an image to a cube, sphere, or cylinder, enabling you to rotate an image in three dimensions. (See "Transforming objects in three dimensions" on page 187.)

Expanded scratch space support Photoshop now supports up to four scratch volumes, for a total of up to 200 GB of scratch space.

Interface improvements Photoshop's interface is further improved, including an updated Curves dialog box and changes to the Path tools to make them more consistent with Adobe Illustrator®.

More live previews The Color Settings, Duotone, and Indexed Color dialog boxes now provide live previews, making it easier to see the results before applying the change.

PDF import Any PDF file can now be opened and rasterized in Photoshop. Support for Adobe Illustrator and generic EPS files also is improved. (See Chapter 14, "Saving and Exporting Images.")

New Save As options New Save As options make it easy to minimize file size by excluding unwanted options. (See "About file formats" on page 321.)

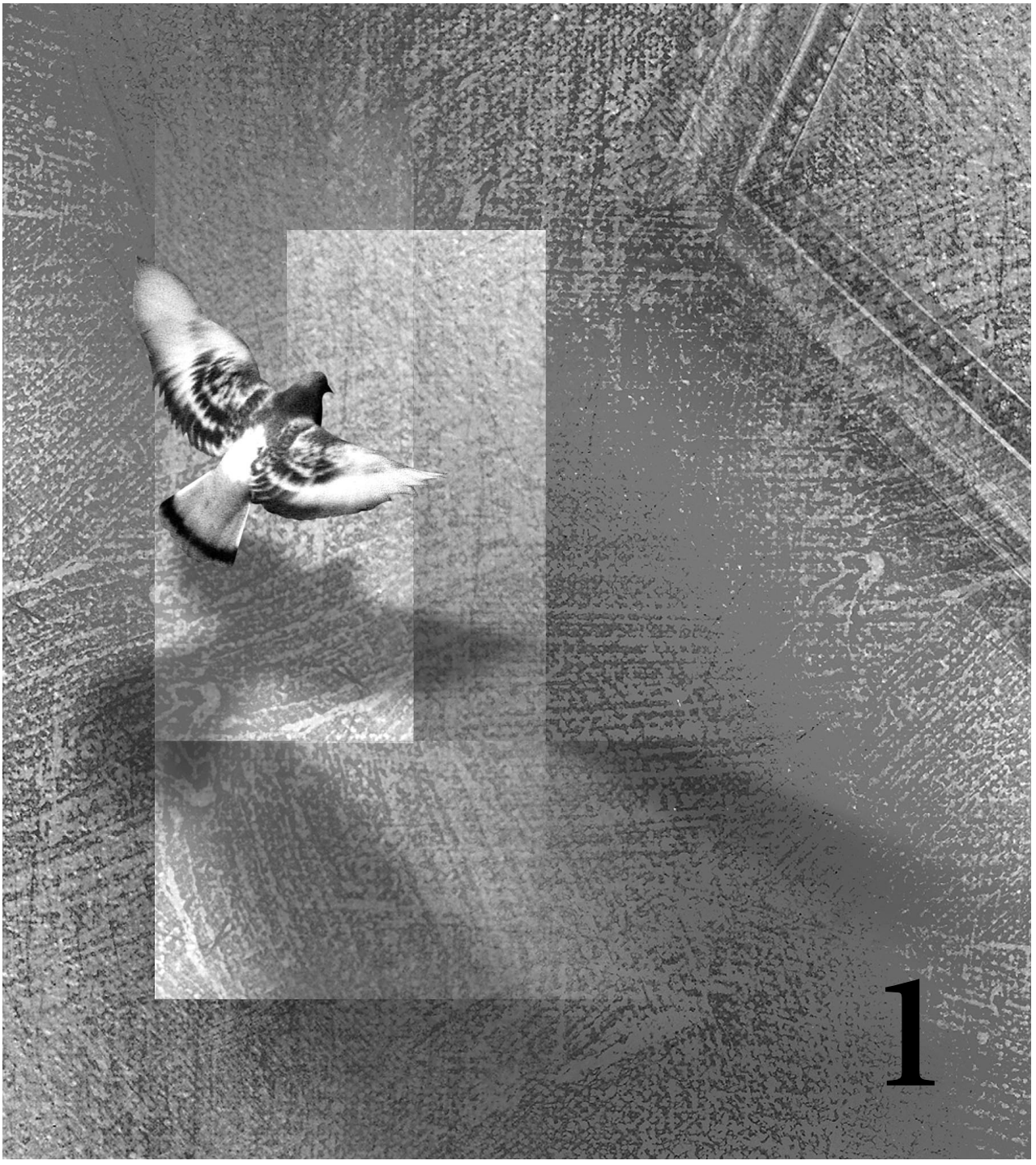
DCS 2.0 support The EPS export module now includes support for DCS (Desktop Color Separations) 2.0 format, which permits more than four separated plates. (See "Saving files in Photoshop EPS or DCS format" on page 315.)

PostScript Level 3 support Photoshop supports printing to PostScript Level 3 printers.

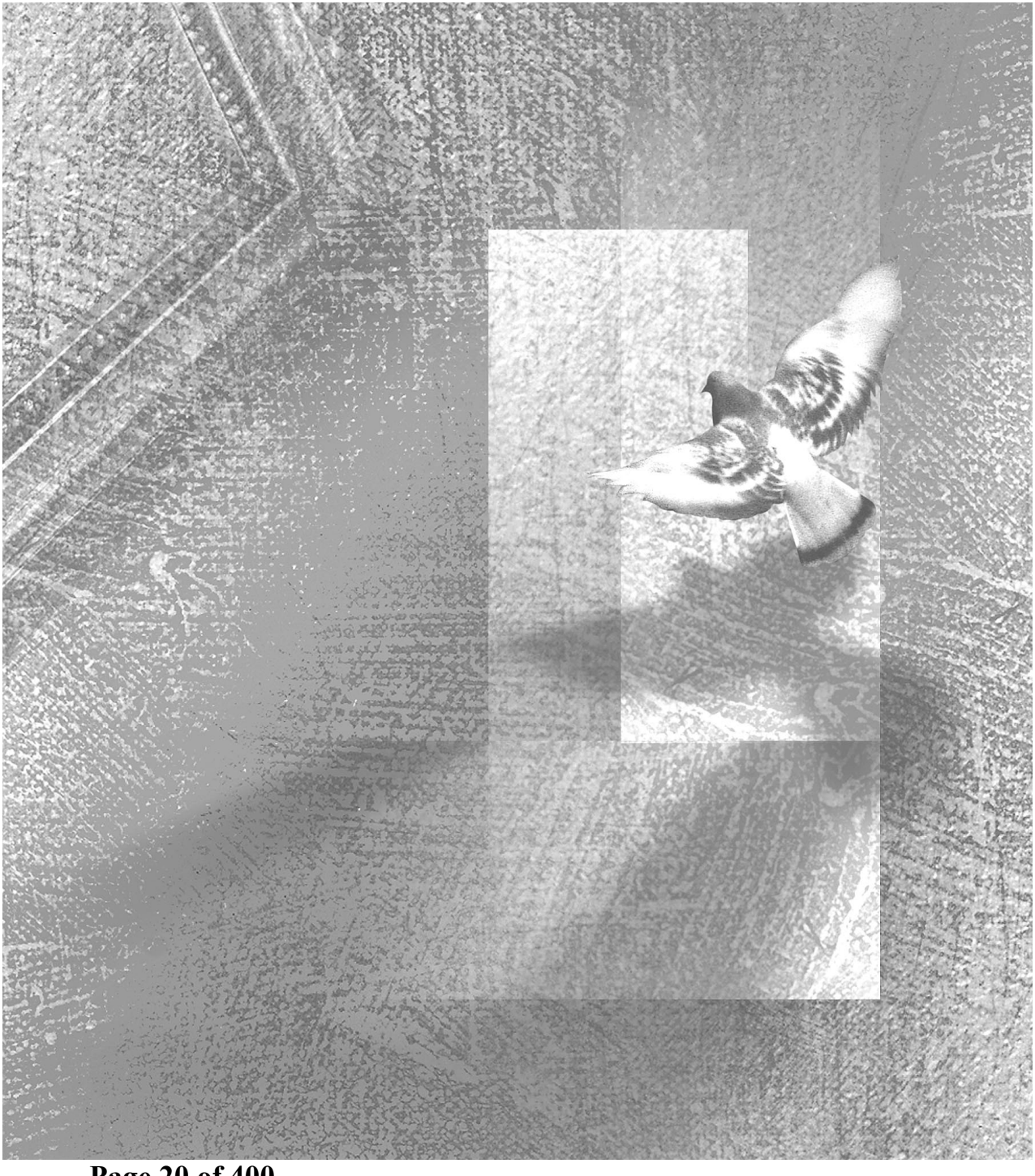
Changed keyboard shortcuts, tools, and commands

The following are some of the Photoshop 4.0 shortcuts, tools, and commands that have been changed for Photoshop 5.0. For a complete list of shortcuts, see the online help:

- To cycle through a series of related tools on the Tool palette, press Shift+(the shortcut key for the tool).
- To select the add-anchor-point tool while the delete-anchor-point tool is selected, press +.
- To select the subtract-anchor-point tool while another tool is selected, press -.
- To select the direct-selection tool while another tool is selected, press A.
- To scroll forward or backward through the blend modes for the current tool, press Shift+(+) or Shift+(-).
- To select the airbrush tool while another tool is selected, press J.
- To repeat the last transformation, press Ctrl+Shift+T (Windows) or Command+Shift+T (Mac OS). This shortcut no longer displays the Numeric Transformation dialog box.
- Pressing Option while choosing Apply Images no longer provides additional options to the dialog box.
- The image transformation commands are now located under the Edit menu.
- The functions of the rubber stamp tool are now split into three tools: the rubber stamp tool, the pattern stamp tool, and the history brush.



1



Chapter 1: A Quick Tour of Adobe Photoshop

This interactive tour introduces you to key features of Adobe Photoshop and takes about an hour to complete.
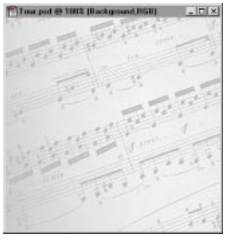
For detailed instructions on how to use many of the features introduced in this tour, as well as a movie version of the tour, see the lessons on the Tutorial CD. For complete information about any feature, see the index in this user guide.



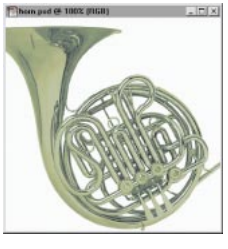
You can bring images into Adobe Photoshop in many ways. Most projects begin with a scanned image, stock digital art, or artwork created with a drawing program, such as Adobe Illustrator. You can also create images from scratch in Adobe Photoshop. For this tour, you'll use files from all of these sources.

1 Start Adobe Photoshop.

2 Choose File > Open, and open the files Tour.psd, CD.psd, and Horn.psd, located in the in the Adobe Photoshop 5/Training/Tour folder or on the tutorial CD. Arrange the windows so that you can work with them easily.







Selecting

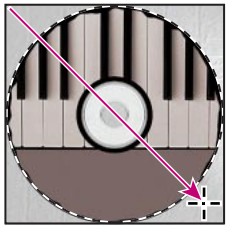
In Adobe Photoshop, you modify part of an image by first selecting that area. You'll begin the tour by making selections in images using the selection tools. (If you make a mistake at any point in the tour, simply choose Edit > Undo, and try again.)

First, you'll make a simple selection, and drag an image from one file to another.

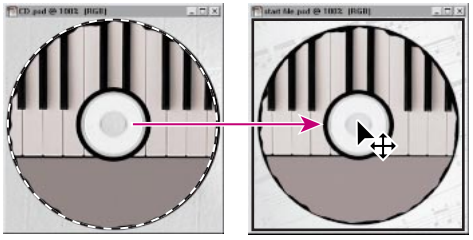
1 Click the title bar of the CD.psd window to make it active.

2 Hold down the mouse button on the rectangular marquee tool ( ) in the toolbox, and drag to the elliptical marquee tool ( ). Click in the upper left corner of the image's gray background, and begin dragging diagonally. Then hold down Shift to change the elliptical selection to a circular selection, and drag to the bottom right corner of the image.

3 When the selection border matches the outside edge of the CD, release the mouse button and then release Shift.

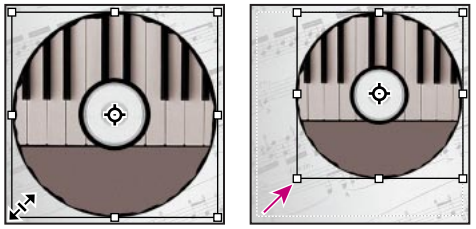


4 Select the move tool ( ) in the toolbox, position it within the selection border, and drag the CD onto the Tour.psd window. The CD is now part of that file.

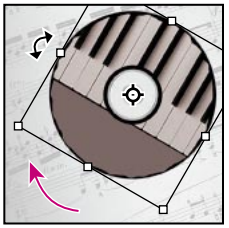


Now you'll resize the CD.

5 Choose Edit > Free Transform. Move the pointer onto one of the corner handles. Hold down Shift, and drag a corner handle to shrink the CD to about three-fourths its current size. Holding down Shift constrains the image's proportions as you resize it.



6 Move the pointer outside the selection handles, and drag clockwise to rotate the CD about 30°. Press Enter (Windows) or Return (Mac OS) to apply the transformation to the CD.



Note: *You can also use the Numeric Transform dialog box to transform a selection using specific numeric values.*

Next, you'll make a selection with the magic wand tool, which selects areas based on how similar they are in color.

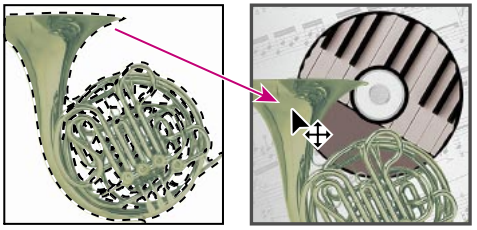
7 Select the magic wand tool (); then click the title bar of the Horn.psd window to make it active.

8 Click the white background in the upper right corner of the image to select it. Notice that not all the white background was selected.

9 Choose Select > Similar to add the rest of the background to the selection. You've now selected everything except the horn.

10 Choose Select > Inverse. The Inverse command selects everything that wasn't selected—in this case, the horn.

11 Hold down Control (Windows) or Command (Mac OS), position the pointer within the selection marquee, and drag the horn onto the Tour.psd window. (Holding down Control/Command temporarily changes the current tool to the move tool.) Move the horn to the bottom left corner of the image.



12 Choose File > Save As. Select a folder in which to save the file, enter the filename Work01.psd, and click Save.

13 Close the CD.psd and Horn.psd files.

Layers

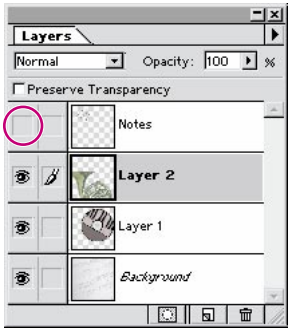
Photoshop lets you organize artwork on separate transparent layers so that you can easily construct composite images and experiment with various effects.

1 If the Layers palette is not visible on your screen, choose Window > Show Layers. Click the minimize/maximize box (Windows) or resize box (Mac OS) at the top of the Layers palette to expand the palette.

Notice that this file has several layers, each named and with a *thumbnail*, or miniature representation, of the image on that layer. Photoshop automatically created separate layers for the CD image (Layer 1) and horn image (Layer 2) when you brought them into the Tour file. In addition, the background and the Notes layer were already in the file.

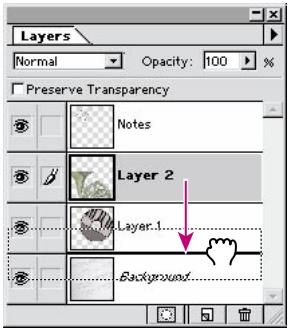
From the Layers palette you can display or hide layers in the image.

2 Click the eye icon column to the far left of the Notes layer to display the layer. Then try clicking the eye icon for Layer 2 to hide the layer, and again to redisplay it.



By changing the order of layers, you can restack images in the artwork.

3 Drag Layer 2 (the horn layer) until it's between Layer 1 (the CD layer) and the background on the Layers palette. Release the mouse button to set Layer 2 in its new position. The horn now appears behind the CD in the artwork.

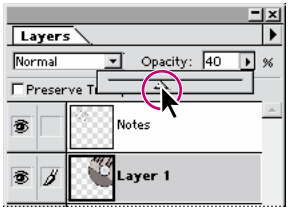


4 Click Layer 1 in the Layers palette to make it the active layer. The layer is highlighted and a paintbrush icon appears next to the layer thumbnail, indicating that your changes now will affect artwork only on that layer.

5 Select the move tool (▸+). Then drag the CD to the top right corner of the artwork. Because the CD is on its own layer, you can move it separately from artwork on other layers.

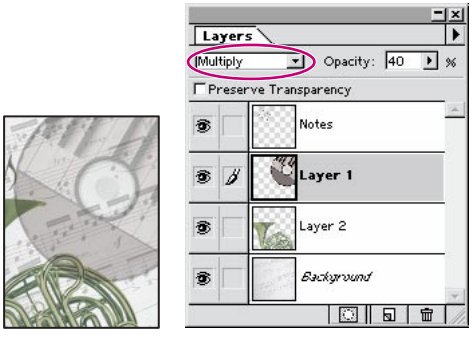
Now you'll adjust the opacity of Layer 1.

6 Select Layer 1 in the Layers palette, and drag the opacity slider to 40%. You can now see other layers through the CD.



By specifying *blending modes*, you can determine how one layer interacts with another.

7 Choose Multiply from the mode menu at the top left of the Layers palette. Notice how the CD blends with the layers below it.



Now you're ready to create and manipulate some text. You will create the text with the type tool, which places the text on its own type layer. You will then edit the text and apply special effects to its layer.

8 Select the type tool (T), and click the image in the upper right corner.

9 Choose a font from the Font menu in the Type Tool dialog box, and enter a point size in the Size and Leading boxes (we used 22-point Lucida Sans Bold with 43-point leading). At the far right of the dialog box, select the right alignment option.

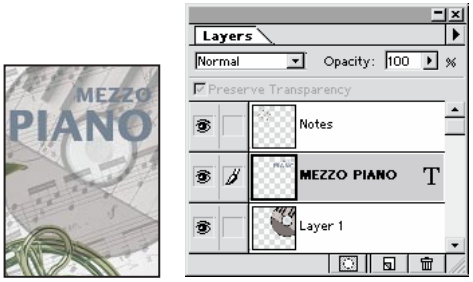
10 Type "MEZZO PIANO" in two lines in the large text box at the bottom of the dialog box.

11 Click the color box on the left side of the dialog box, select a color from the color picker, and click OK.

12 Then select "PIANO," and enter a larger point size in the Size box.

13 With the Type Tool dialog box still displayed, move the pointer into the image area. Notice that the pointer temporarily changes to the move tool. You can now reposition the text.

14 When the text looks the way you want it, click OK in the dialog box. The text is automatically placed in the Layers palette on a new type layer, marked with a T icon.



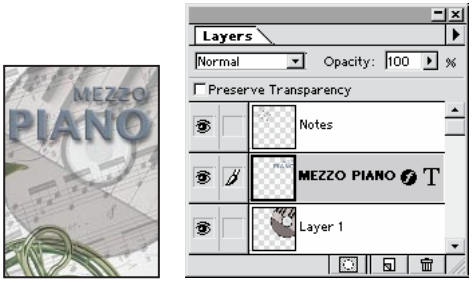
You can enhance any layer by adding a shadow, glow, bevel, or emboss special effect from the program's assortment of layer effects. You can also apply a combination of layer effects to the same layer. Here you'll apply the Drop Shadow and Bevel and Emboss layer effects to the type.

15 Make sure that the MEZZO PIANO type layer is active. Then choose Layer > Effects > Drop Shadow.

16 In the dialog box, change the opacity to 60% and set the angle to 150°.

17 Now choose Bevel and Emboss from the menu at the top of the dialog box.

18 In the new dialog box, click Apply. Then change the opacity for both Highlight and Shadow to 50%, select Inner Bevel for Style, set Blur to 2 pixels, and click OK. The drop shadow and bevel and emboss effects are now applied to the type.



Photoshop makes it easy to change text on a type layer and assures that any layer effects applied will automatically track changes made to the layer. You can see how this works by changing the wording of your text.

19 Double-click the T icon on the Mezzo Piano layer in the Layers palette. In the Type Tool dialog box, select the word "PIANO" and change it to "FORTE." Notice how the layer effects are applied to the new word.



20 If you like, try applying other layer effects to the text. When you are finished, click OK.

21 Choose File > Save.

Filters

To quickly add special effects to your artwork, you can choose from a wide variety of filters. In this part of the tour, you'll apply some filters to transform the background.

1 Click the background in the Layers palette to make it active.

2 Choose Filter > Distort > Wave. In the dialog box, set Number of Generators to 3, Maximum Wavelength to 350, Minimum Amplitude to 1, and Maximum Amplitude to 20. Click OK.

3 Choose Filter > Brush Strokes > Angled Strokes, and click OK to accept the default settings.

4 Then choose Filter > Fade Angled Strokes. In the dialog box, set the opacity to 50%, select Multiply for the mode, and click OK.



Explore some additional filters if you like.

Painting

With the Photoshop painting tools, you can add color to your artwork using preset swatches, colors you create, or colors you sample from existing art. Now you'll paint part of the background using the paintbrush tool.

1 Double-click the paintbrush tool ( ), and make sure that the opacity in the Paintbrush Options palette is set to 100%.

Note: *Each tool in Photoshop has its own Options palette, which you can display by double-clicking the tool in the toolbox.*

2 Choose Window > Show Brushes, and click the 35-pixel brush from the bottom row of the Brushes palette.

Now you'll paint arcs of four different colors over the bell of the French horn. The first color is white, which you'll select through the toolbox color selection box. This box sets the foreground color, the color you paint with, and the background color, the color used when you erase part of an image. The default colors are black for foreground and white for background.

3 Click the switch colors icon (↹) in the upper right corner of the color selection box to make the foregound color white.



4 Paint a white arc over the bell of the French horn.

You can use the eyedropper tool to select additional colors by sampling (copying) them from artwork in the image. You'll use a keyboard shortcut to access the eyedropper when selecting colors for the next three arcs.

5 Hold down Alt (Windows) or Option (Mac OS) to temporarily change from the paintbrush tool to the eyedropper tool (🖉). Then click a yellow note in the image. The foreground color in the color selection box switches to the same yellow as in the note, indicating that you can now paint with this color.

6 Release the Alt/Option key, change the opacity in the Options palette to 80%, and paint a yellow arc just above the first white arc.

7 Now hold down Alt/Option, and click a red note to change the foreground color to red. Release the Alt/Option key, change the opacity in the Options palette to 60%, and paint a red arc above the yellow arc.
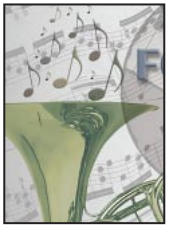
8 Repeat the process but this time sample the foreground color from a green note, change the opacity to 40%, and paint a green arc.



Next you'll use the History palette to remove the paint you just applied. The History palette records changes you make to the image and lets you step back through recent changes. Using this palette, you can return to an earlier version of the image and continue working from that point.

9 To display the History palette, choose Window> Show History.

10 Click Fade Angled Strokes in the history list. The image reverts to the way it looked right after you applied the Fade Angled Strokes filter.

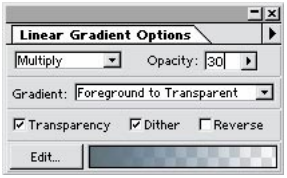




You can now continue working from this version of the image. All changes past Fade Angled Strokes will be deleted, and new changes will be recorded in their place.

Next you'll try out a gradient fill to "paint" or blend between two colors on the background of the image.

11 Choose Window > Show Swatches, and click a blue swatch to set your foreground color. Then double-click the linear gradient tool (), and in the Gradient Tool Options palette choose Foreground to Transparent for the gradient, 30% for the opacity, and Multiply for the mode.



12 Drag the gradient tool from the top left to the bottom right corner of the background to set the beginning and end of the gradient.

13 Choose File > Save.



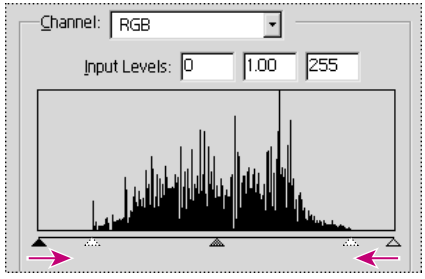
Retouching

Adobe Photoshop provides a full range of tools for retouching images, including dodge and burn tools, as well as features for adjusting color, tone, contrast, hue, and saturation. You'll use a few of these tools to do some basic color correction and editing on an image.

1 Click Layer 2 in the Layers palette to make it active.

2 To set the basic contrast and tonal range between the highlights and shadows in the horn, choose Image > Adjust > Levels.

3 In the dialog box, select the Preview option and then drag the left and right triangles inward to where the first spikes of the dark and light ends of the histogram's color range begin.



4 Click OK to apply the changes and extend the tonal range of the image.

Notice that the midtones in the horn are still not right; they need to be more red. To correct the color, you'll use the Color Balance command.

5 Choose Image > Adjust > Color Balance. A dialog box appears for adjusting the mixture of colors in the image.

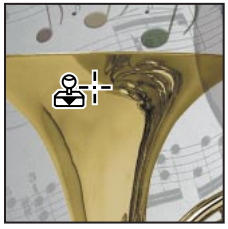
6 Select the Preview option in the dialog box, drag the top slider away from Cyan toward Red, and click OK. The horn turns more red.

Now you'll remove a scratch on the horn with the rubber stamp tool. This tool lets you sample part of an image and then paint with a copy of the sampled area.

7 Double-click the rubber stamp tool (🖃) to display its Options palette, and select the Aligned option. Then choose a small feathered brush in the second row of the Brushes palette.

8 Place the rubber stamp tool over the horn next to the scratch. Hold down Alt (Windows) or Option (Mac OS), and click to sample this area. Release the Alt/Option key. Then drag the rubber stamp tool to paint over the scratch.





9 Choose File > Save.

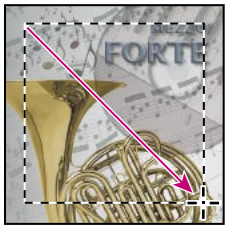
Actions

The Actions palette lets you combine a set of commands into a single command or *action* and then execute the action on a single file or multiple files within a folder. With the Actions palette, you can record, play, edit, and delete commands to easily automate common techniques.

Adobe Photoshop offers some ready-made actions you can run on a file or set of files. You'll use one of these actions to add a vignette effect to the image. But first, to get the best results from the vignette, you'll flatten the file's layers into one layer. Then you'll make a selection to set the vignette's border.

1 Choose Layer > Flatten Image.

2 Hold down the mouse button on the elliptical marquee tool, and drag to the rectangular marquee tool. Then click approximately 1/8 inch in from the upper left corner of the image, and drag diagonally to 1/8 inch in from the lower right corner.



You can now apply the vignette action.

3 To display the Actions palette, choose Window> Show Actions.

4 In the Actions palette, select Vignette (selection) by clicking on its name.

5 Click the Play button (▷) at the bottom of the palette.

6 In the Feather Selection dialog box, accept the default feather radius of 5 pixels, and click OK.

The action is then run on the image, creating the vignette.

7 When the action is complete, choose Layer > Flatten Image, and in the dialog box click OK to discard the hidden layers.

Saving the file

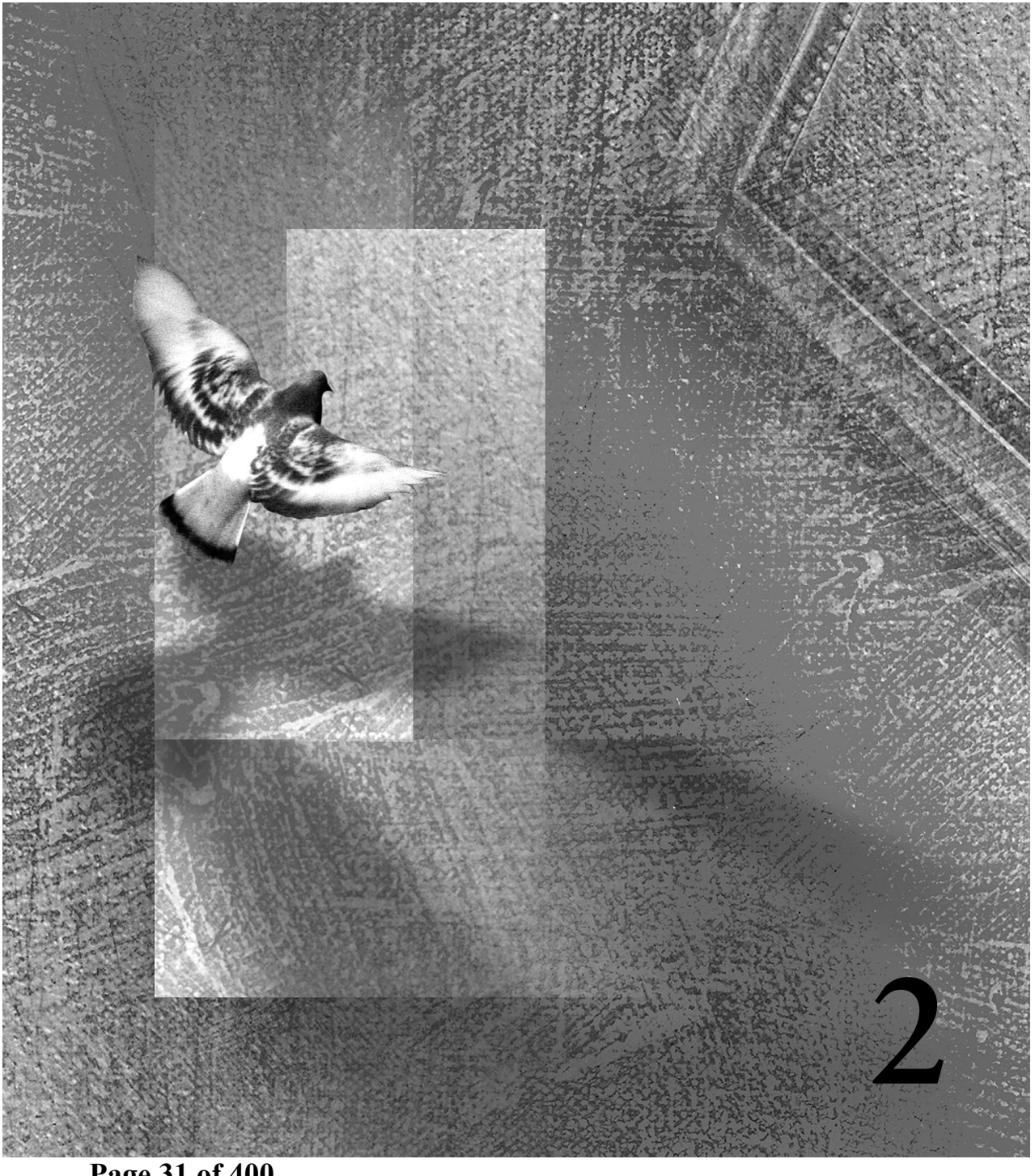
Because you may want to return to a version of the file with all its layers intact, you can use the Save As command to save the flattened file with a new name.

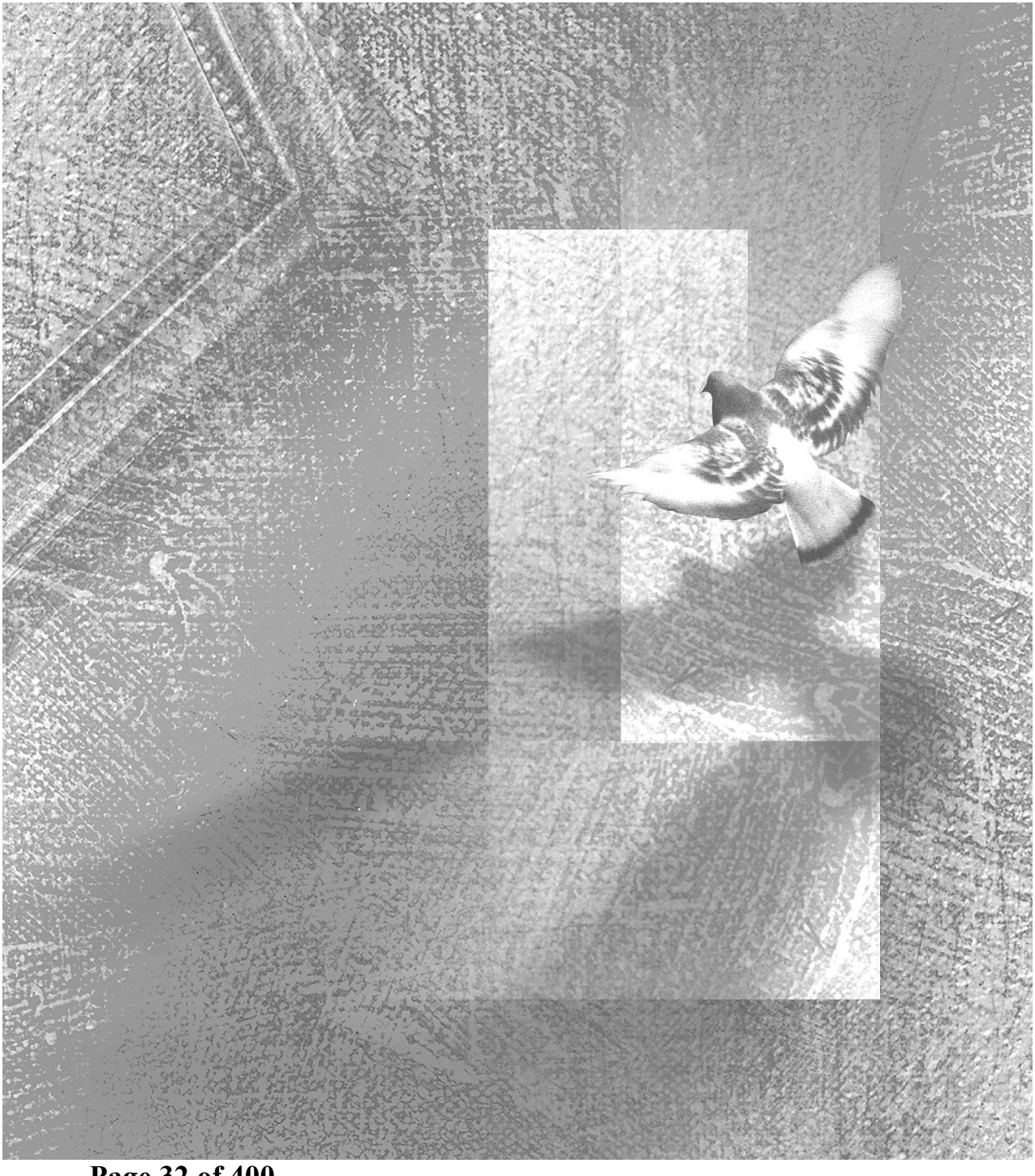
Choose File > Save As. Select a folder in which to save the file, enter a new filename, and click Save.

Note that you can save files in various formats, depending on how you plan to use the file. For example, you can save a file in JPEG format for display on the World Wide Web. (See About file formats in Chapter 14.)



Congratulations, you've finished the tour. Continue experimenting by creating your own Photoshop artwork, or try some of the lessons on the Tutorial CD.

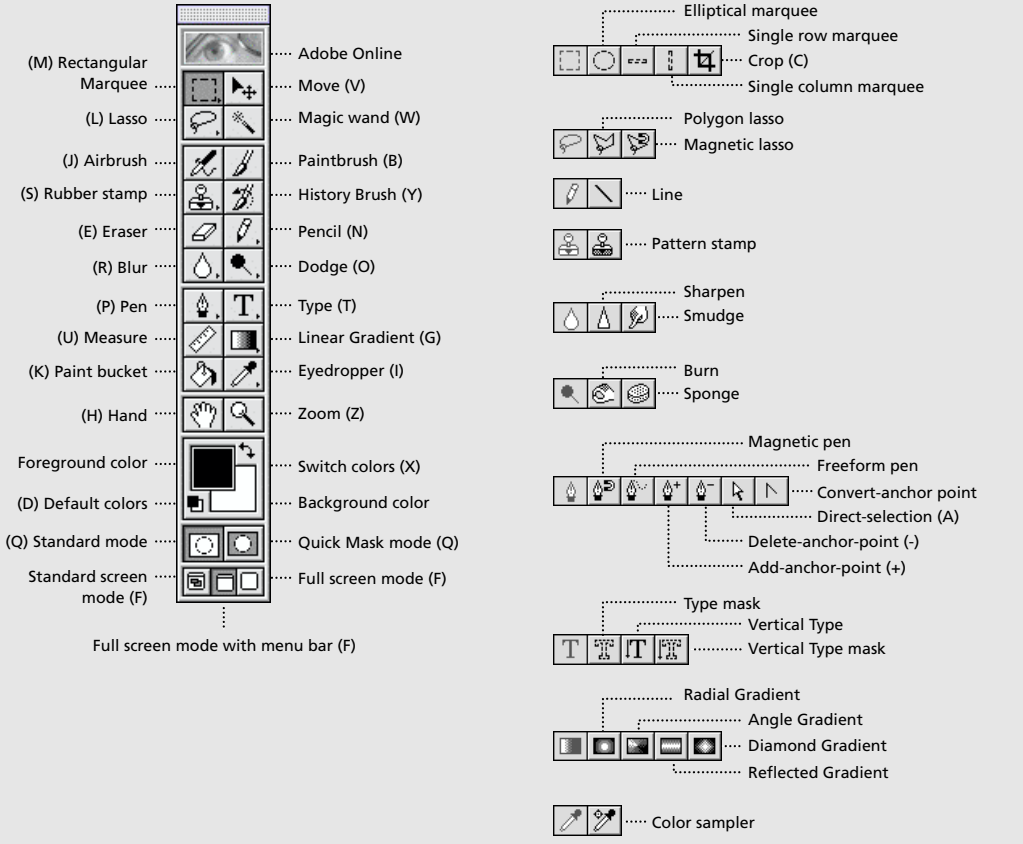

2



Chapter 2: Looking at the Work Area

The Adobe Photoshop work area includes the menu bar at the top of your screen, the image window containing an image, and a variety of tools and palettes for editing and adding elements such as masks, layers, and channels. You can also add commands and filters to the menus by installing software programs called *plug-in modules*.

SELECTING TOOLS You select a tool from the toolbox by clicking the tool or pressing the shortcut key shown in parentheses in the illustration below. You can select the hidden tools by dragging, or Alt-clicking (Windows) or Option-clicking (Mac OS).



Using the toolbox

The tools in the toolbox let you select, paint, edit, and view images. Other controls choose foreground and background colors, create quick masks, and change the screen display mode. Most tools have associated Brushes and Options palettes, which let you define the tools' painting and editing effects. (See "Using the Options palette" on page 29.)

For information on the foreground and background color controls, see page 214; on Quick Mask mode control, see page 250.

For an overview of each tool, see online help.

To display the toolbox:

Choose Window > Show Tools.

To move the toolbox:

Drag the toolbox by its title bar.

Selecting tools

You select a tool by clicking its icon in the toolbox. A small triangle to the right of a tool icon indicates a pull-out menu of hidden tools.

To select a tool:

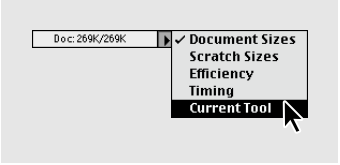
Do one of the following:

- To select a visible tool, click its icon.
- To select a hidden tool, position the pointer on the visible tool, and drag to highlight the tool you want.

Use these shortcuts to select tools:
• To select a tool quickly, press its shortcut key on the keyboard. These keys appear in the illustration on page 25.
• To cycle through a set of hidden tools, press Alt (Windows) or Option (Mac OS) and click the visible tool; or hold down Shift and press the visible tool's shortcut key.

To display the active tool name:

Position the pointer over the triangle in the bottom border of the program window (Windows) or image window (Mac OS), hold down the mouse button, and choose Current Tool from the menu.



The name of the currently selected tool appears in the lower left of the window.

Using the tool pointers

When you select most tools, the mouse pointer matches the tool's icon. This is the default standard tool pointer. The marquee, line, and gradient pointers appear by default as crosshairs.

Each default pointer has a different *hot spot*, where an effect or action begins. You can switch to precise pointers, which appear for most tools as cross hairs centered around the hot spot. For the magnetic lasso and magnetic pen tools, precise pointers appear as circles representing the lasso or pen width. With the painting tools, you can also display the pointer as a brush shape of a certain size.

To set the tool pointer appearance:

1 Choose File > Preferences > Display & Cursors.

2 Select the tool pointer appearance:

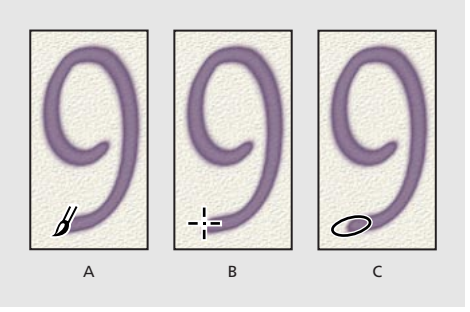
• Click Standard under Painting Cursors, Other Cursors, or both to display pointers as tool icons.

• Click Precise under Painting Cursors, Other Cursors, or both to display pointers for most tools as crosshairs.

• Click Brush Size under Painting Cursors to display the painting tool pointers as brush shapes representing the size of the current brush. Brush Size pointers may not display for very large brushes.

3 Click OK.

With very small brushes, the brush shape is surrounded by four dots for finer accuracy.



A. *Standard* ***B.*** *Precise* ***C.*** *Brush Size*

The Painting Cursors options control the pointers for the eraser, pencil, airbrush, paintbrush, rubber stamp, pattern stamp, smudge, blur, sharpen, dodge, burn, and sponge tools.

The Other Cursors options control the pointers for the marquee, lasso, polygon lasso, magic wand, crop, eyedropper, pen, gradient, line, paint bucket, magnetic lasso, magnetic pen, measure, and color sampler tools.

To change the appearance of some tool pointers, press Caps Lock. Press Caps Lock again to return to your original setting. The pointers change in these ways:
• Standard to precise
• Precise to brush size
• Brush size to precise

Using the status bar

The status bar at the bottom of the program window displays useful information—such as the current magnification and file size of the active image, and brief instructions for using the active tool.

To show or hide the status bar (Windows only):

Choose Window > Show Status Bar or Window > Hide Status Bar.

Using palettes

Palettes help you monitor and modify images. You can display or hide them as you work. By default, they appear in stacked groups.

To show or hide a palette:

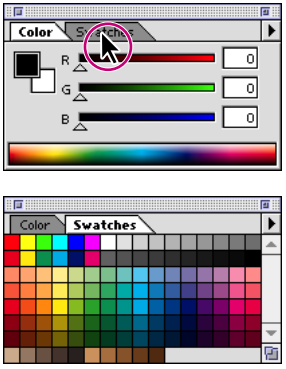
Choose the appropriate Window > Show or Window > Hide command.

Show displays the selected palette at the front of its group; Hide conceals the entire group.

Changing the palette display

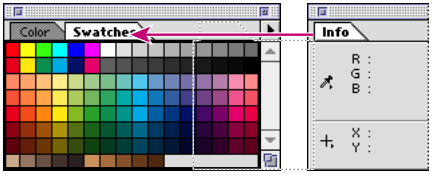
You can reorganize your work space using the following techniques:

- To hide or display all open palettes and the toolbox, Press Tab. To hide or display the palettes only, press Shift+Tab.
- To make a palette appear at the front of its group, click the palette's tab.

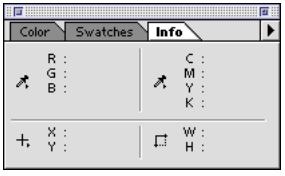


Click the Swatches tab to move it to the front.

- To move an entire palette group, drag its title bar.
- To rearrange or separate a palette group, drag a palette's tab. Dragging a palette outside of an existing group creates a new group.



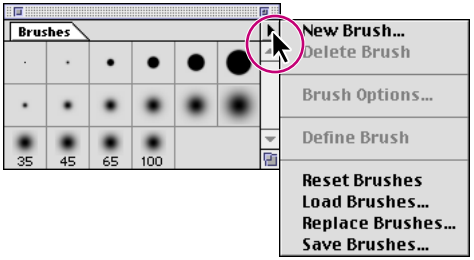
Click the palette tab, and drag the palette to a new group.



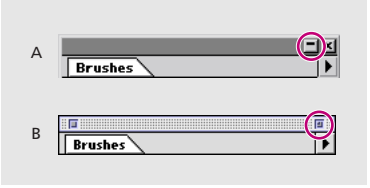
Palettes are grouped.

• To move a palette to another group, drag the palette's tab to that group.

• To display a palette menu, position the pointer on the triangle in the upper right corner of the palette, and hold down the mouse button.



• To change the height of a palette (except the Color, Options, or Info palette), drag its lower right corner. To return the palette to default size, click the minimize/maximize box (Windows) or the resize box (Mac OS) in the right of the title bar. (A second click collapses the palette group.)



Click to collapse or expand palette.
***A.** Windows **B.** Macintosh*

• To collapse a group to palette titles only, Alt-click the minimize/maximize box (Windows) or Option-click the resize box (Mac OS). Or double-click a palette's tab. You can still access the menu of a collapsed palette.

Setting the positions of palettes and dialog boxes

The positions of all open palettes and moveable dialog boxes are saved by default when you exit the program. Alternatively, you can always start with default palette positions or restore default positions at any time.

To reset palettes to the default positions:

1 Choose File > Preferences > General.

2 Click Reset Palette Locations to Defaults.

To start always with the preset palette and dialog box positions:

1 Choose File > Preferences > General.

2 Deselect Save Palette Locations. The change takes effect the next time you start Adobe Photoshop.

Using the Options palette

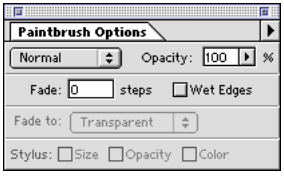
Most tools have an Options palette. Depending on the tool selected, the palette's appearance and available choices change.

Some settings in the Options palette are common to several tools (such as painting modes and opacity), some specific to one tool (such as the Auto Erase setting for the pencil tool).

To display the Options palette:

Do one of the following:

- Choose Window > Show Options.
- Double-click a tool in the toolbox (except the zoom or hand tool).
- Click a tool or press its keyboard shortcut, and press Enter (Windows) or Return (Mac OS).



Paintbrush Options palette

To return to a tool's default settings:

Do one of the following:

- To return a tool to its default settings, double-click the tool in the toolbox, and choose Reset Tool from the Options palette menu.
- To return all the tools to their default settings, choose Reset All Tools from the Options palette menu.

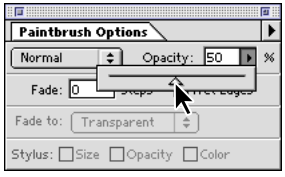
Using pop-up sliders

A number of palettes and dialog boxes contain settings that use pop-up sliders (for example, the Opacity option in the Layers palette).

To use a pop-up slider:

Do one of the following:

- Position the pointer over the triangle next to the setting, hold down the mouse, and drag the slider or angle radius to the desired value.



- Click the triangle next to the setting to open the pop-up slider box, and drag the slider or angle radius to the desired value. Click outside the slider box or press Enter (Windows) or Return (Mac OS) to close the slider box. (To cancel changes, press Esc.)

Use the following shortcuts when the pop-up slider box is open:
• To increase or decrease values in 1% increments, press the Up or Down arrow key.
• To increase or decrease values in 10% increments, hold down Shift and press the Up or Down arrow key.

Using the Info palette

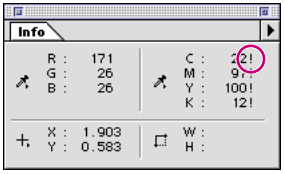
The Info palette displays information about the color values beneath the pointer and, depending on the tool in use, other useful measurements. You can also display color values of specific target points in your image using color samplers (see "Previewing color values" on page 107) and use the measure tool to measure distances and angles (see "Using the measure tool" on page 174).

To display the Info palette:

Choose Window > Show Info.

The Info palette displays the following specific information:

• When displaying CMYK values, the Info palette displays an exclamation point if the color beneath the pointer or color sampler is out of the printable CMYK color gamut. (See "Identifying out-of-gamut colors" on page 110.)



Out-of-gamut color

• When you use the marquee tool, the Info palette displays the *x* and *y* coordinates of your starting position and the width (W) and height (H) of the marquee as you drag.

• When you use the crop tool or zoom tool, the Info palette displays the width (W) and height (H) of the marquee as you drag. The palette also shows the angle of rotation of the crop marquee.

• When you use the line tool, pen tool, or gradient tool or when you move a selection, the Info palette displays the *x* and *y* coordinates of your starting position, the change in *X* (ΔX), the change in *Y* (ΔY), the angle (A), and the distance (D) as you drag.

• When you use a two-dimensional transformation command, the Info palette displays the percentage change in width (W) and height (H), the angle of rotation (A), and the angle of horizontal skew (H) or vertical skew (V).

• When you use any color adjustment dialog box (for example, Curves), the Info palette displays the before and after color values of the pixels beneath the pointer and beneath color samplers. (See "Previewing color values" on page 107.)

To change the Info palette options:

1 Choose Palette Options from the Info palette menu.

2 For First Color Readout, choose one of the following display options:

• Actual Color to display values in the current color mode of the image.

• Total Ink to display the total percentage of all CMYK ink at the pointer's current location, based on the values set in the CMYK Setup dialog box.

• Opacity to display the opacity of the current layer. This option does not apply to the background.

• Any other option to display the color values in that color mode. (See "Color modes and models" on page 63.)

3 For Second Color Readout, choose a display option listed in step 2.

4 For Ruler Units, choose a unit of measurement.

5 Click OK.

To change measurement units, click the cross-hair icon in the Info palette for a menu of options. To change color readout modes, click the eyedropper icon.

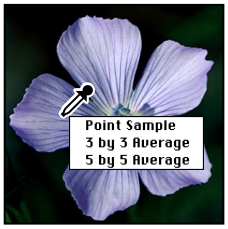
Using context menus

In addition to the menus at the top of your screen, context-sensitive menus display commands relevant to the active tool, selection, or palette.

To display context menus:

1 Position the pointer over the image or over an item in a palette list (for example, a thumbnail in the Layers palette).

2 Click with the right mouse button (Windows) or press Control and hold down the mouse button (Mac OS).



Using online help

Adobe Photoshop includes complete documentation in online help, including all of the information in this user guide, plus a description of new features, keyboard shortcuts (including shortcut key changes from Photoshop 4.0), and more.

To get online help in Windows:

Do one of the following:

- Press F1 to display the Help Contents menu.
- Choose Help > Contents, or choose another topic from the Help menu.

To get online help on the Macintosh:

Choose Help > Help Contents.

To get context-sensitive help (Windows only):

Do one of the following:

- Press Shift + F1 (a question mark appears next to the pointer), and choose a command or click in a palette to display the appropriate help topic.
- With a dialog box open, press F1 to display the help topic for that dialog box.

Using Adobe online services

If you have an Internet connection and a Web browser installed on your system, you can access the Adobe Systems Home Page on the World Wide Web (at http://www.adobe.com) for information on services, products, and tips pertaining to Photoshop.

To use Adobe Online:

1 Do one of the following:

- Choose File > Adobe Online.
- Click the icon at the top of the toolbox.

2 Click a topic to open the Adobe Home Page.

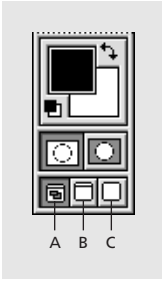
Viewing images

The hand tool, the zoom tools, the Zoom commands, and the Navigator palette let you view different areas of an image at different magnifications. You can open additional windows to display several views at once (such as different magnifications) of an image.

A list of open windows appears in the Window menu. Available memory may limit the number of windows per image.

To change the viewing mode of image windows:

Click a window control in the toolbox:



A. *Standard screen mode*
B. *Full screen mode with menu bar*
C. *Full screen mode*

- The left window control to display the default window with a menu bar at the top and scroll bars on the sides.
- The center window control to display a full-screen window with a menu bar but no title bar or scroll bars.
- The right window control to display a full-screen window with no title bar, menu bar, or scroll bars.

The hand tool or the Navigator palette can be used for scrolling.

To open multiple views of the same image:

Choose View > New View.

To arrange multiple windows (Windows only):

Do one of the following:

- Choose Window > Cascade to display windows stacked and cascading from the top left to the bottom right of the screen.
- Choose Window > Tile to display windows edge to edge.

To close windows:

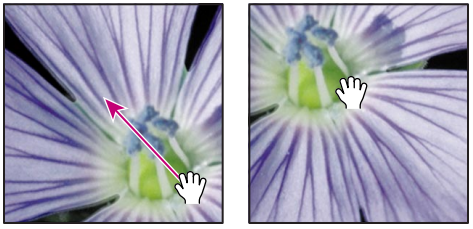
Choose a command:

- Choose File > Close to close the active window.
- Choose Window > Close All (Windows only) to close all windows.

To view another part of an image:

Do one of the following:

- Use the window scroll bars.
- Select the hand tool, and drag in the image to move its view.



Drag the hand tool to move the view.

To use the hand tool while another tool is selected, hold down the spacebar as you drag in the image.

Using the Navigator palette

With a thumbnail, the Navigator palette lets you quickly change the view of an image.

To display the Navigator palette:

Choose Window > Show Navigator.

To move the view of an image using the Navigator palette:

Do one of the following:

- Drag the view box, which represents the boundaries of the image window.
- Click in the thumbnail of the image. The new view includes the area you click.

To change the color of the Navigator palette view box:

1 Choose Palette Options from the Navigator palette menu.

2 Choose a color:

- To use a preset color, choose an option for Color.
- To specify a different color, click the color box, and choose a color as described in "Using the Adobe Photoshop Color Picker" on page 218.

3 Click OK.

Try these viewing shortcuts:
• Press Page Up/Page Down to scroll the view up/down by one screen.
• Press Shift+Page Up/Shift+Page Down to scroll up or down by 10 pixels, or to move to the previous or next frame in a Filmstrip file.

Magnifying and reducing the view

You can magnify or reduce your view using various methods. The window's title bar displays the zoom percentage at all times.

Note: *The 100% view of an image displays an image based on the monitor resolution and the image resolution, not on the actual image dimensions. (See "Pixel dimensions and monitor resolution" on "About image size and resolution" on page 42.)*

To zoom in:

Do one of the following:

- Select the zoom tool, and click the area you want to magnify. Each click magnifies the image to the next preset percentage, centering the display around the point you click. At maximum magnification, the center of the zoom tool appears empty.
- Choose View > Zoom In to magnify to the next preset percentage.

To zoom out:

Do one of the following:

- Select the zoom tool. Hold down Alt (Windows) or Option (Mac OS) to activate the zoom-out tool, and click the area of the image you want to reduce. Each click reduces the view to the previous preset percentage.

• Choose View > Zoom Out to reduce to the previous preset percentage.

Use these zoom shortcuts:
• To activate the zoom-in tool, press Ctrl+spacebar (Windows) or Command+spacebar (Mac OS).
• To activate the zoom-out tool, press Alt+spacebar/Option+spacebar.
• To zoom in, press Ctrl+(=)/Command+(=).
• To zoom out, press Ctrl+(-)/Command+(-).

To magnify by dragging:

1 Select the zoom tool.

2 Drag over the part of the image you want to magnify.



Drag the zoom tool to magnify the view.

The area inside the zoom marquee appears at the highest possible magnification.

To magnify or reduce to a specified percentage:

Enter a percentage value in the zoom percentage box at the lower left of the program window (Windows) or image window (Mac OS), and press Enter (Windows) or Return (Mac OS).

To display an image at 100%:

Do one of the following:

• Double-click the zoom tool.

• Choose View > Actual Pixels.

To change the view to fit the screen:

Do one of the following:

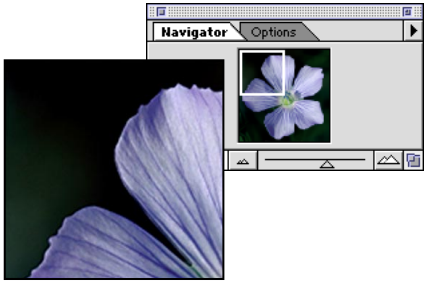
• Double-click the hand tool.

• Choose View > Fit on Screen.

These options scale both the view and the window size to match the monitor size.

To constrain the window size:

In the Zoom Tool Options palette, deselect Resize Windows To Fit. Doing this maintains a constant window size regardless of the image's magnification and can be helpful when using smaller monitors or working with tiled views.



View in Navigator palette, and 210% view of image

To magnify or reduce the view using the Navigator palette:

Do one of the following:

• Click the zoom in ( ) or zoom out ( ) button at the bottom of the Navigator palette.

• Drag the zoom slider at the bottom of the palette.

• Enter the percentage of magnification or reduction you want, and press Enter (Windows) or Return (Mac OS).

• Hold down Ctrl (Windows) or Command (Mac OS), and drag over the area of the Navigator palette's thumbnail that you want to magnify.

To zoom to the specified percentage and keep the zoom percentage box highlighted, hold down Shift while pressing Enter/Return.

Using plug-in modules

Plug-in modules are software programs developed by Adobe Systems, and by other software developers in conjunction with Adobe Systems, to add features to Adobe Photoshop. A number of importing, exporting, automation, and special effects plug-ins come with your program—automatically installed in the Plug-Ins folder. If you want to use a plug-in that is installed in another folder, you must change the preference settings so Photoshop uses the other plug-ins location.

Once installed, plug-in modules appear as options in the Import, Export, or Automate menus; as file formats in the Open, Save As, and Save a Copy dialog boxes; or as filters in the Filter menus.

Note: *If many plug-in modules are installed, Photoshop may not be able to list all the plug-ins in their appropriate menus. Newly installed plug-ins will appear in the Filter > Other submenu.*

To install an Adobe Systems plug-in module:

If an installer is provided, use it to install the plug-in module. Otherwise, drag a copy of the module to the Plug-Ins folder inside the Adobe Photoshop folder.

Follow any installation instructions that come with third-party plug-ins.

To set plug-ins preferences:

1 Choose File > Preferences > Plug-Ins & Scratch Disk.

2 Click Choose, and select a folder or directory from the list. (Be sure not to select a location inside the Plug-Ins folder.) To display the contents of a folder, double-click the folder (Windows) or click Open (Mac OS).

Important: *If you change the plug-ins location, the usual Photoshop plug-ins, filters, and scanners will be unavailable until you change back to the Plug-Ins location inside the application folder.*

3 When you have highlighted the new plug-ins folder, click OK (Windows) or Select (Mac OS).

4 Restart Adobe Photoshop.

On the Macintosh, to select the plug-ins location immediately upon starting Adobe Photoshop, press Command+Option as you launch the program.

Setting preferences

Numerous program settings are stored in *preferences files,* located in the Adobe Photoshop Settings folder inside the application folder. The settings stored in these files include general display options, separation setup information, calibration options, display options, tool options, ruler units, and options for exporting information from the Clipboard. Most of these options are set in dialog boxes that can be opened through the Preferences submenus in the File menu. Preference settings are saved each time you exit Adobe Photoshop.

To open a preferences dialog box:

1 Choose the desired preference dialog box from the File > Preferences submenu.

2 Switch to a different preference dialog box:

• Choose an option from the menu at the top of the dialog box.

• Click Next to display the next preference dialog box in the menu list; click Prev to display the previous preference dialog box.

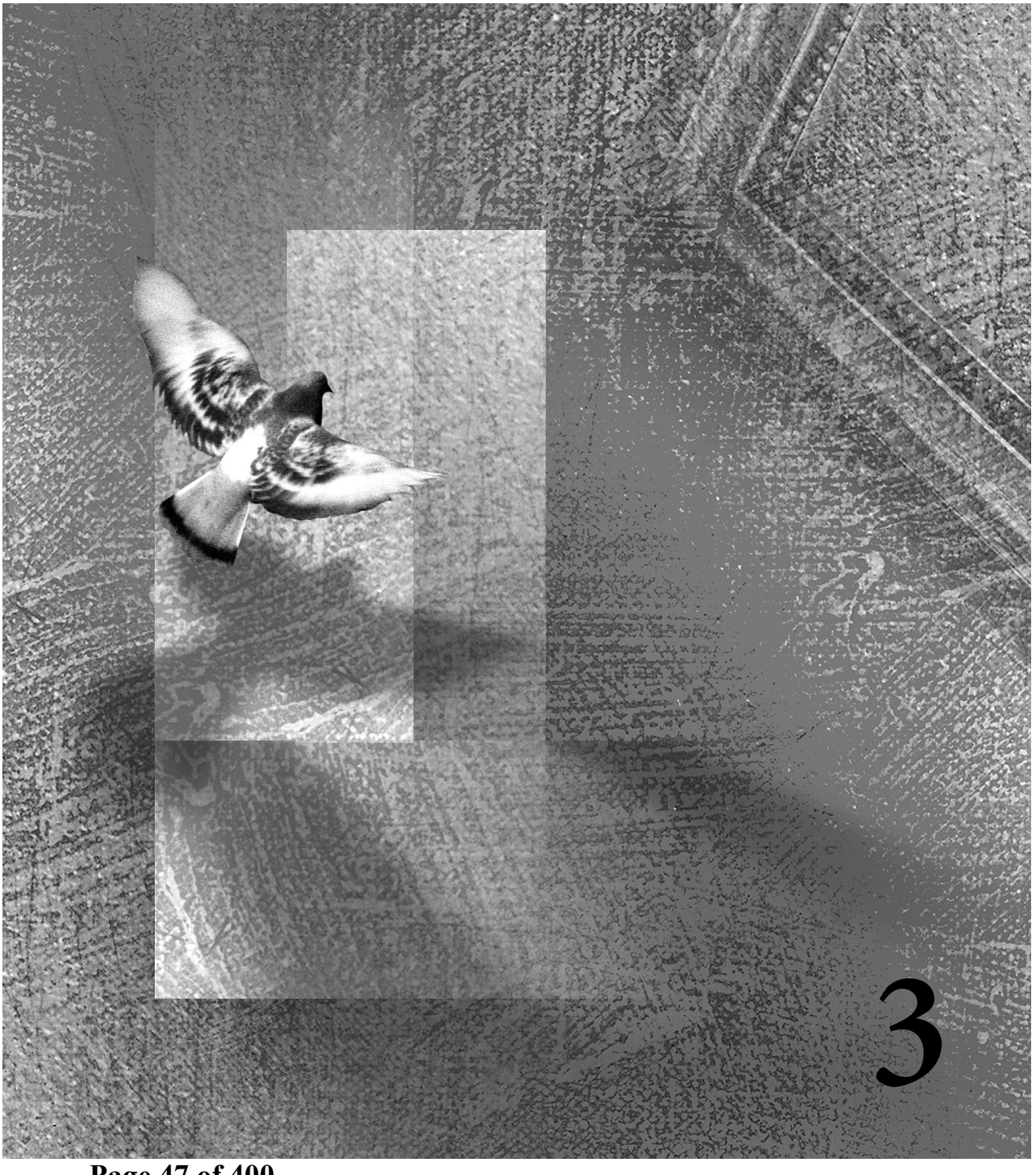
For information on a specific preferences option, see the Index.

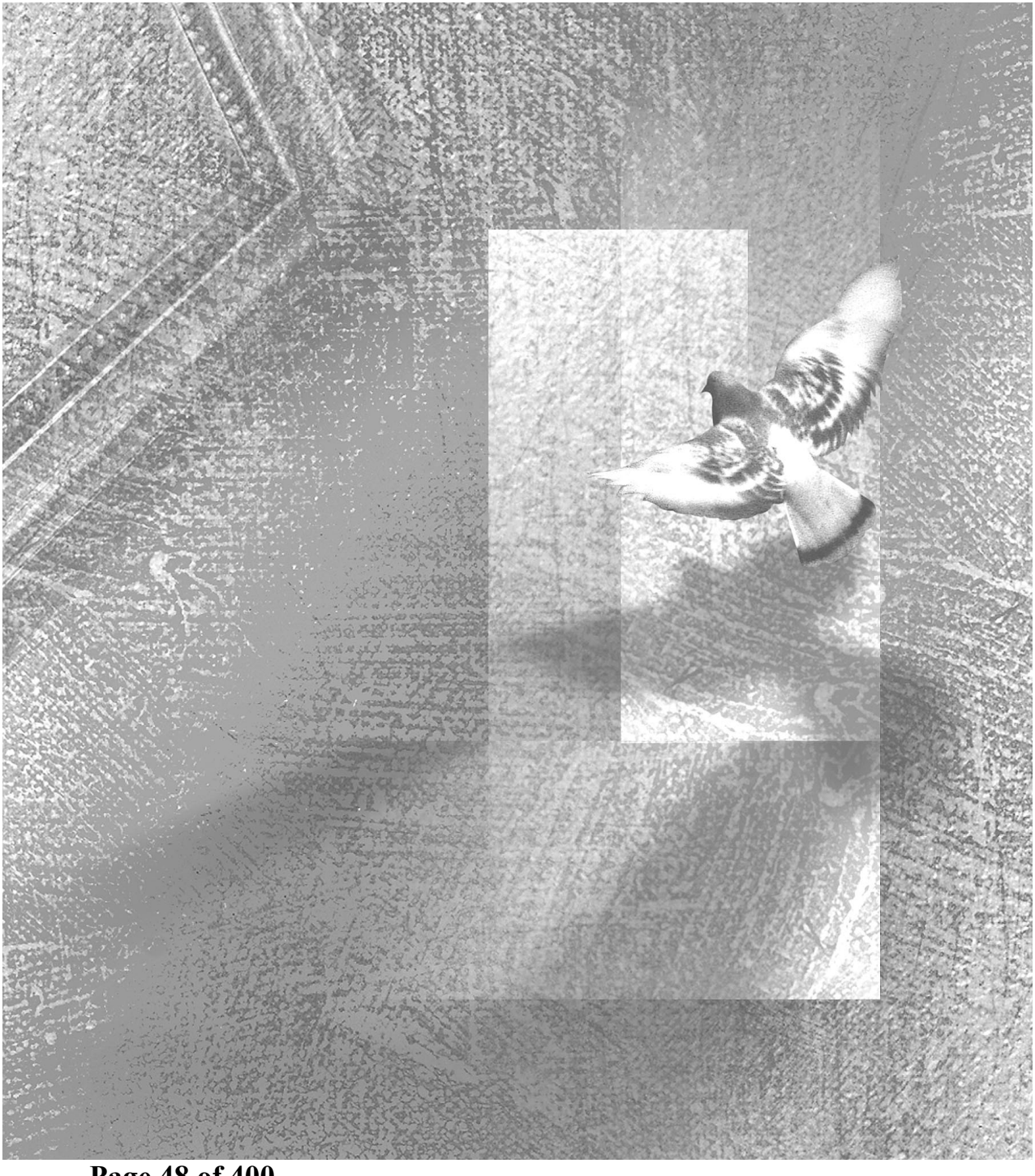
To restore all preferences to their default settings:

Open the Adobe Photoshop Settings folder inside the Photoshop folder, and rename or delete the Adobe Photoshop 5.0 Prefs file and the Color Settings file.

New default preferences files will be created the next time you start Photoshop.

Note: *You should not rename or delete the Actions Palette file, unless you believe that your actions have been damaged.*


3



Chapter 3: Getting Images into Photoshop

In Adobe Photoshop, you can create new images, import them from another graphics application, or capture them from video. Often you will begin by scanning a photograph, a slide, or an image. To create effective artwork, you must understand some basic concepts about how to work with digital images, how to produce high-quality scans, how to work with a variety of file formats, and how to adjust the resolution and size of images.

About bitmap images and vector graphics

Computer graphics fall into two main categories—*bitmap images* and *vector graphics*. Understanding the difference between the two will help as you create and edit digital images.

Bitmap images

Photoshop and other paint and image-editing programs generate bitmap images, also called *raster images.* Bitmap images use a grid (the bitmap or raster) of small squares known as pixels to represent images. Each pixel is assigned a specific location and color value. For example, a bicycle tire in a bitmap image is made up of a mosaic of pixels in that location. When working with bitmap images, you edit pixels rather than objects or shapes.

A bitmap image is resolution-dependent—that is, it contains a fixed number of pixels to represent its image data. As a result, a bitmap image can lose detail and appear jagged if viewed at a high magnification on-screen or printed at too low a resolution. Bitmap images are the best choice for representing subtle gradations of shades and color—for example, in photographs or painted images.

Vector graphics

Drawing programs such as Adobe Illustrator® create vector graphics, made of lines and curves defined by mathematical objects called *vectors*. Vectors describe graphics according to their geometric characteristics. For example, a bicycle tire in a vector graphic is made up of a mathematical definition of a circle drawn with a certain radius, set at a specific location, and filled with a specific color. You can move, resize, or change the color of the tire without losing the quality of the graphic.

A vector graphic is resolution-independent—that is, it can be scaled to any size and printed on any output device at any resolution without losing its detail or clarity. As a result, vector graphics are the best choice for type (especially small type) and bold graphics that must retain crisp lines when scaled to various sizes—for example, logos.

Because computer monitors represent images by displaying them on a grid, both vector and bitmap images are displayed as pixels on-screen.

About image size and resolution

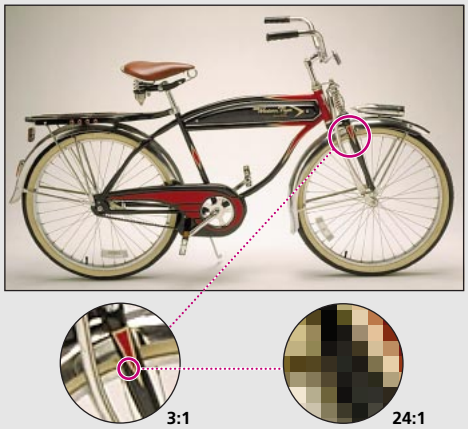
To produce high-quality images using Photoshop, it is important to understand how the pixel data of bitmap images is measured and displayed. For more on how pixel data is displayed as color, see "About bit depth" on page 68.

Pixel dimensions The number of pixels along the height and width of a bitmap image. The display size of an image on-screen is determined by the pixel dimensions of the image plus the size and setting of the monitor. The file size of an image is proportional to its pixel dimensions.

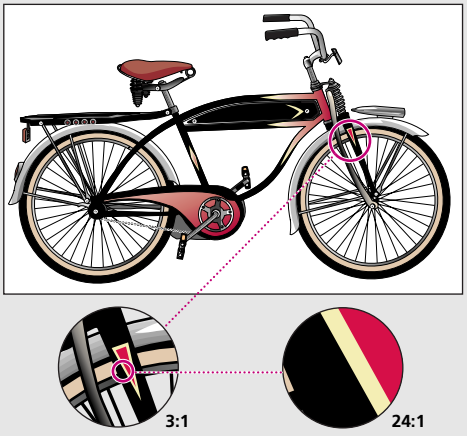
A typical 13-inch monitor displays 640 pixels horizontally and 480 vertically. An image with pixel dimensions of 640 by 480 would fill this small screen. On a larger monitor with a 640 by 480 setting, the same image (with pixel dimensions of 640 by 480) would still fill the screen, but each pixel would appear larger. Changing the setting of this larger monitor to 1152 pixels by 870 pixels would display the image at a smaller size, occupying only part of the screen.

When preparing an image for online display (for example, a Web page that will be viewed on a variety of monitors), pixel dimensions become especially important. Because your image may be viewed on a 13-inch monitor, you'll probably want to limit the size of your image to a maximum of 640 pixels by 480 pixels.

BITMAP VS. VECTOR A bitmap image is composed of a grid of small squares known as pixels. A vector graphic is defined by mathematical objects called vectors.



Bitmap images *are good at reproducing subtle gradations of color, as in photographs. They can show jagged edges when printed at too large a size or displayed at too high a magnification.*



Vector graphics *are good at reproducing crisp outlines, as in logos or illustrations. They can be printed or displayed at any resolution without losing detail.*

ON-SCREEN DISPLAY SIZE How large an image appears on-screen depends on a combination of factors—the pixel dimensions of the image, the monitor size, and the monitor resolution setting. The examples below show a 620 x 400 pixel image displayed with various monitor sizes and monitor resolutions.

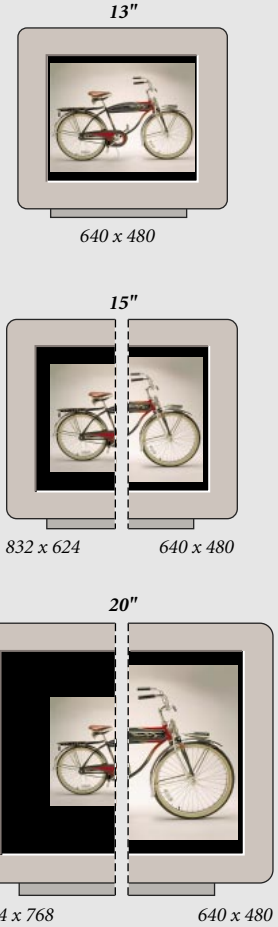
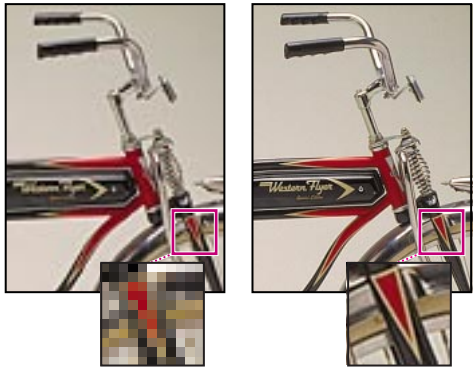


Image resolution The number of pixels displayed per unit of printed length in an image, usually measured in pixels per inch (ppi). An image with a high resolution contains more, and therefore smaller, pixels than an image of the same printed dimensions with a low resolution. For example, a 1-inch-by-1-inch image with a resolution of 72 ppi contains a total of 5184 pixels (72 pixels wide x 72 pixels high = 5184). The same 1-inch-by-1-inch image with a resolution of 300 ppi would contain a total of 90,000 pixels.



72-ppi and 300-ppi images; inset zoom 200%

Because they use more pixels to represent each unit of area, higher-resolution images usually reproduce more detail and subtler color transitions than lower-resolution images when printed. However, increasing the resolution of an image scanned or created at a lower resolution only spreads the original pixel information across a greater number of pixels and rarely improves image quality.

To determine the image resolution to use, consider the medium of final distribution for the image. If you're producing an image for online display, the image resolution only needs to match the typical monitor resolution (72 or 96 ppi). However, using too low a resolution for a printed image results in *pixelation*—output with large, coarse-looking pixels. Using too high a resolution (pixels smaller than what the output device can produce) increases the file size and slows the printing of the image; furthermore, the device will be unable to print the image at the high resolution. (See "Screen frequency" on page 45 for guidelines on choosing an image resolution for a printed image.)

Monitor resolution The number of pixels or dots displayed per unit of length on the monitor, usually measured in dots per inch (dpi). Monitor resolution depends on the size of the monitor plus its pixel setting. The typical resolution of a PC monitor is about 96 dpi, of a Mac OS monitor 72 dpi. Understanding monitor resolution helps explain why the display size of an image on-screen often differs from its printed size.

In Photoshop, image pixels are translated directly into monitor pixels. This means that when the image resolution is higher than the monitor resolution, the image appears larger on-screen than its specified print dimensions. For example, when you display a 1-inch-by-1-inch, 144-ppi image on a 72-dpi monitor, it appears in a 2-inch-by-2-inch area on-screen. Because the monitor can display only 72 pixels per inch, it needs 2 inches to display the 144 pixels that make up one edge of the image.

Printer resolution The number of ink dots per inch (dpi) produced by an imagesetter or laser printer. For best results, use an image resolution that is proportional to, but not the same as, printer resolution. Most laser printers have output resolutions of 300 dpi to 600 dpi and produce good results with images from 72 ppi to 150 ppi.

IMAGE RESOLUTION AND SCREEN FREQUENCY
To ensure high-quality output when printing with a halftone screen, you need to choose an image resolution based on the screen frequency of the printing device. In general, an image resolution from 1.5 to 2 times the screen frequency gives the best results.

65 lpi: Coarse screen commonly used to print newsletters and grocery coupons.

85 lpi: Average screen often used to print newspapers.



133 lpi: High-quality screen typically used to print four-color magazines.

177 lpi: Very fine screen typically used for annual reports and images in art books.

High-end imagesetters can print at 1200 dpi or higher and produce good results with images from 200 ppi to 300 ppi.

Screen frequency The number of printer dots or halftone cells per inch used to print grayscale images or color separations. Also known as screen ruling or line screen, screen frequency is measured in lines per inch (lpi)—or lines of cells per inch in a halftone screen.

The relationship between image resolution and screen frequency determines the quality of detail in the printed image. To produce a halftone image of the highest quality, you generally use an image resolution that is from 1.5 to at most 2 times the screen frequency. But with some images and output devices, a lower resolution can produce good results.



354 ppi (2 x 177 lpi) 266 ppi (1.5 x 177 lpi)

A resolution at the low end of the recommended range can produce good results.

***Note:** Some imagesetters and 600-dpi laser printers use screening technologies other than halftoning. If you are printing an image on a nonhalftone printer, consult your service provider or your printer documentation for the recommended image resolutions.*

File size The digital size of an image, measured in kilobytes (K), megabytes (MB), or gigabytes (GB). File size is proportional to the pixel dimensions of the image. Images with more pixels may produce more detail at a given printed size, but they require more disk space to store and may be slower to edit and print. For instance, a 1-inch-by-1-inch 200-ppi image contains four times as many pixels as a 1-inch-by-1-inch 100-ppi image and so has four times the file size. Image resolution thus becomes a compromise between image quality (capturing all the data you need) and file size.

Photoshop supports a maximum file size of 2 GB and maximum pixel dimensions of 30,000 by 30,000 pixels per image. This restriction places limits on the print size and resolution available to an image. For example, an image 100 by 100 inches can have a resolution of at most 300 ppi (30,000 pixels / 100 inches = 300 ppi).

Changing image size and resolution

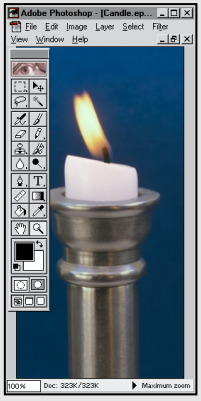
Once you have scanned or imported an image into Photoshop, you may want to adjust its size or resolution. The Image Size command lets you adjust the pixel dimensions, print dimensions, and resolution of an image.

For assistance with resizing and resampling images, choose Help > Resize Image. This interactive wizard helps you scale your images for printed or online display.

RESOLUTION, FILE SIZE, AND OUTPUT The file size of an image refers to the total amount of pixel information in the image. For example, a 1-inch-by-2-inch high-resolution image has more pixels, and thus a larger file size, than a 1-inch-by-2-inch low-resolution image. In print, a high-resolution image has more detail than the same image at low resolution. On-screen, a high-resolution image appears larger (see page 43). The enlarged on-screen display does not affect the dimensions of the printed image.



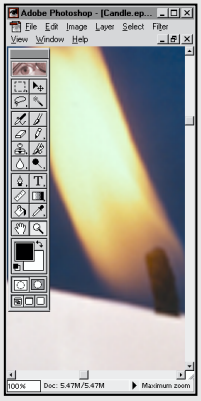
1 in. x 2 in. @ 72 ppi; file size 323K



100% view on-screen



1 in. x 2 in. @ 300 ppi; file size 5.47 MB



100% view on-screen

Information about the current file size and resolution of an image is displayed at the lower left of the image window. Before you change the size of an image, you also may want to preview how the image will appear when printed.

To display the file size:

Position the pointer over the triangle in the bottom border of the program window (Windows) or image window (Mac OS), hold down the mouse button, and choose Document Sizes from the menu.

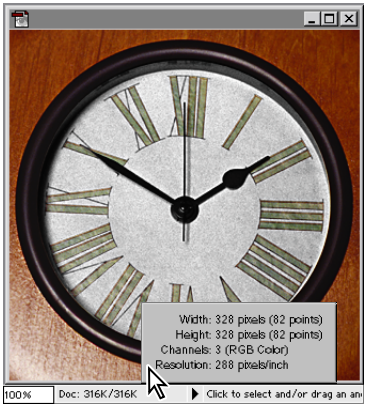


The file size appears at the lower left of the window. The first value indicates the size if saved as a flattened file with no layer data, the second value the size if saved with all layers and channels. For more information on how layers affect file size, see "Managing layered images" on page 267.

To display dimensions, channel information, and resolution information:

Press Alt (Windows) or Option (Mac OS), position the pointer over the box in the lower left of the window, and hold down the mouse button.

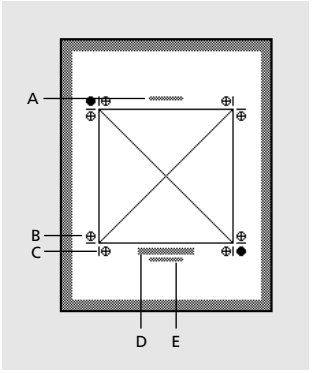
The box displays the width and height of the image (both in pixels and in the unit of measurement currently selected for the rulers), the number of channels, and the image resolution.



To preview a page:

Position the pointer over the box where the file size is displayed, and hold down the mouse button.

The dimensions of the page shown in the page preview box correspond to the page size specified with the Page Setup command (see "General printing options" on page 333). Other options selected appear as gray boxes.



Previewing a page
A. *Label* ***B.*** *Registration marks* ***C.*** *Crop marks*
D. *Calibration bar* ***E.*** *Caption*

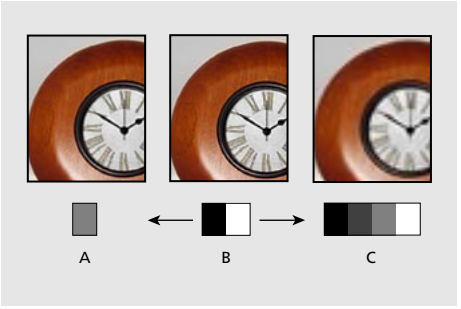
To view the print size on-screen:

Choose View > Print Size.

The magnification of the image is adjusted to display its approximate printed size, as specified in the Print Size section of the Image Size dialog box. (See "Changing the print dimensions and resolution of an image" on page 49.)

About resampling

Resampling refers to changing the pixel dimensions (and therefore file size) of an image. When you *downsample* (or decrease the number of pixels), information is deleted from the image. When you *resample up* (or increase the number of pixels), new pixel information is added based on color values of existing pixels. You specify an approximation or interpolation method to determine how pixels are added or deleted. (See "Choosing an interpolation method" on page 51.)



A. *Resampled down* ***B.*** *Original* ***C.*** *Resampled up*

Keep in mind that resampling can result in poorer image quality. For example, when you resample an image to a higher resolution, the pixels interpolated from the new image data can make the image appear blurry or out of focus.

You can avoid the need for resampling by scanning in or creating the image at a high enough resolution. If you want to preview the effects of changing pixel dimensions on-screen or print proofs at different resolutions, resample a duplicate of your original file. (See "Duplicating images" on page 172.)

Applying the Unsharp Mask filter to a resampled image can help refocus the image's details. For instructions, see "Step 6: Sharpen the image" on page 128.



A. Original B. Resampled down C. Unsharp Mask applied

Changing the pixel dimensions of an image

When preparing images for online distribution (on a Web site, for example), it's useful to specify image size in terms of the pixel dimensions. Keep in mind that changing pixel dimensions affects not only the size of an image on-screen but also its image quality and its printed characteristics—either its printed dimensions or its image resolution. (See "About image size and resolution" on page 42; "About resampling" on page 48.)

To change the pixel dimensions of an image:

1 Choose Image > Image Size.

2 Make sure that Resample Image is selected, and choose an interpolation method, as described in "Choosing an interpolation method" on page 51.

3 To maintain the current proportions of pixel width to pixel height, select Constrain Proportions. This option automatically updates the width as you change the height, and vice versa.

4 Under Pixel Dimensions, enter values for Width and Height. To enter values as percentages of the current dimensions, choose Percent as the unit of measurement.

The new file size for the image appears at the top of the Image Size dialog box with the old file size in parentheses.

5 Click OK to change the pixel dimensions and resample the image.

For best results in producing a smaller image, resample down and apply the Unsharp Mask filter. To produce a larger image, rescan the image at a higher resolution.

Changing the print dimensions and resolution of an image

When preparing images for print, it's useful to specify image size in terms of the printed dimensions and the image resolution. These two measurements determine the total pixel count and therefore the file size of the image. (See "About image size and resolution" on page 42.)

If you turn on resampling for the image, you can change print dimensions and resolution independently. If you turn resampling off, you can change either the dimensions or the resolution—Photoshop adjusts the other value automatically to preserve the total pixel count. For the highest print quality, it's generally best to change the dimensions and resolution first without resampling. Then resample only as necessary.

Note: *If your image resolution is more than 2.5 times the screen ruling, an alert message appears when you try to print the image. This means that the image resolution is higher than necessary for the printer (see page 42). Save a copy of the file, and then lower the resolution.*

To change the print dimensions and resolution of an image:

1 Choose Image > Image Size.

2 Change the print dimensions or image resolution or both:

• To change only the print dimensions or only the resolution and adjust the total number of pixels in the image proportionately, make sure that Resample Image is selected. Then choose an interpolation method, as described in "Choosing an interpolation method" on page 51.

• To change the print dimensions and resolution without changing the total number of pixels in the image, deselect Resample Image.

3 To maintain the current proportions of image width to image height, select Constrain Proportions. This option automatically updates the width as you change the height, and vice versa.

4 Under Print Size, enter new values for the height and width. If desired, choose a new unit of measurement. Note that for Width, the Columns option uses the width and gutter sizes specified in the Units & Rulers preferences (see "Using rulers" on page 173).

5 For Resolution, enter a new value. If desired, choose a new unit of measurement.

6 Click OK.



To return to the original values displayed in the Image Size dialog box, hold down Alt (Windows) or Option (Mac OS), and click Reset.

Determining a recommended resolution for an image

If you plan to print your image using a halftone screen, the range of suitable image resolutions depends on the screen frequency of your output device. You can have Photoshop determine a recommended resolution for your image based on your device's screen frequency. (See "Screen frequency" on page 45.)

To determine a suggested resolution for an image:

1 Choose Image > Image Size.

2 Click Auto.

3 For Screen, enter the screen frequency for the output device. If desired, choose a new unit of measurement. Note that the screen value is used only to calculate the image resolution, not to set the screen for printing.

Important: *To specify the halftone screen ruling for printing, you must use the Halftone Screens dialog box, accessible through the Page Setup dialog box.*

4 For Quality, select an option:

• Draft to produce a resolution the same as the screen frequency (no lower than 72 pixels per inch).

• Good to produce a resolution 1.5 times the screen frequency.

• Best to produce a resolution 2 times the screen frequency.

5 Click OK.

Choosing an interpolation method

When an image is resampled, Adobe Photoshop uses an *interpolation method* to assign color values to any new pixels based on the color values of existing pixels in the image. The more sophisticated the method, the more quality and detail from the original image are preserved.

The General Preferences dialog box lets you specify a default interpolation method to use whenever images are resampled with the Image Size or transformation commands. The Image Size command also lets you specify an interpolation method other than the default.

To specify the default interpolation method:

1 Choose File > Preferences > General.

2 For Interpolation, choose an option:

• Nearest Neighbor for the fastest, but least precise, method. This method can result in jagged effects, which become apparent when distorting or scaling an image or performing multiple manipulations on a selection.

• Bilinear for a medium-quality method.

• Bicubic for the slowest, but most precise, method, resulting in the smoothest tonal gradations.

Scanning images

Before you scan an image, make sure that the software necessary for your scanner has been installed. To ensure a high-quality scan, you should predetermine the scanning resolution and dynamic range your image requires. These preparatory steps can also prevent unwanted colors casts from being introduced by your scan.

Scanner drivers are provided and supported by the manufacturers of the scanners, not Adobe Systems. If you have problems with scanning, make sure that you are using the latest version of the appropriate scanner driver.

Importing scanned images

You can import scanned images directly from any scanner that has an Adobe Photoshop-compatible plug-in module or supports the TWAIN interface. To import the scan, choose the scanner name from the File > Import submenu. (See your scanner documentation for instructions on installing the scanner plug-in; see page 36 for general plug-in information.)

If your scanner does not have an Adobe Photoshop-compatible scanner driver, use the manufacturer's software to scan your images, and save the images as TIFF, BMP, or PICT files. Then open the files in Adobe Photoshop.

Importing an image using the TWAIN interface

TWAIN is a cross-platform interface for acquiring images captured by certain scanners, digital cameras, and frame grabbers. The manufacturer of the TWAIN device must provide a Source Manager and TWAIN Data source for your device to work with Photoshop.

Adobe Photoshop supports the current TWAIN_32 standard for scanning. Photoshop does not support TWAIN software used with Windows 3.1. Contact your scanner manufacturer for information on the availability of TWAIN_32 source modules.

To import an image using the TWAIN interface:

1 If you're using the TWAIN device for the first time with Adobe Photoshop, choose File > Import > Select TWAIN_32 Source. Then select the device you're using. You do not need to repeat this step for subsequent uses of the TWAIN module.

If more than one TWAIN device is installed in your system and you want to switch devices, use the Select Source command.

2 To import the image, choose TWAIN_32 (Windows) or TWAIN Acquire (Mac OS) from the File > Import submenu.

Scanning using the resolution setting

You can determine the settings for your scan using the original and final image dimensions and the screen frequency of your output device to calculate a *scan resolution* to enter in the scanner settings. This scan resolution translates into image resolution when you open the scan in Photoshop.

The quality of final output depends not only on the scan resolution but also on the resolution of your output device and the size of the original image compared with the final image. (See "About image size and resolution" on page 42 and "Image resolution and screen frequency" on page 45.)

To estimate scan resolution:

1 Multiply the screen frequency by 2 (the typical ratio of image resolution to screen frequency needed to produce a high-quality image).

2 Multiply the result in step 1 by the ratio of final image dimensions to original dimensions to determine an estimated scan resolution.

For example, suppose you are scanning a 2-inch-by-3-inch image and want to produce a final 6-inch-by-9-inch image. You are using a screen frequency of 85 lpi.

First multiply 85 (the screen frequency) by 2 to get 170. Then multiply 170 by 3 (the ratio of final image dimensions to original ones) to get a scan resolution of 510 ppi.

Different color separation procedures might require different ratios of image resolution to screen frequency (see page 45). It's a good idea to check with your service provider or print shop before you scan the image.

Scanning using the file size setting

You can create a dummy file to predict the file size needed for the final output of your scan.

To calculate the file size before scanning an image:

1 Open Adobe Photoshop, and choose File > New.

2 Enter the width, height, and resolution for your final printed image. The resolution should be 1.5 to 2 times the screen frequency you will use to print. Make sure that the mode you plan to scan in is selected. (See "Color modes and models" on page 63.) The New dialog box then displays the file size.

For example, suppose you want the final image to be 4 inches wide and 5 inches high. You plan to print it with a 150-line screen using a 2:1 ratio, so you set the resolution to 300. The resulting file size is 5.15 megabytes.

To produce the scan, enter the resulting file size in your scanner settings. Don't worry about resolution or image dimensions. After you have scanned the image and imported it into Photoshop, use the Image Size command to enter the correct width and height for the image.

Optimizing the dynamic range of the scan

Keep in mind that the human eye can detect a wider tonal range than can be printed. If your scanner allows, set the black and white points before scanning a file to produce the best tonal range and capture the widest dynamic range. Then use Photoshop's color correction tools to set the white and black points for the scanned image (see "Step 3: Set the highlight and shadow values" on page 114).

Eliminating unwanted color casts

If your scanned image contains an unwanted color cast, you can perform a simple test to determine whether the cast was introduced by your scanner. If it was, you can use the same test file to create a color-cast correction for all images scanned with the scanner.

To identify and correct a color cast introduced by a scanner:

1 Make sure that your monitor has been calibrated. (See "Calibrating your monitor" on page 82.)

2 Open a new Photoshop file, and use the linear gradient tool () to create a blend from pure black to pure white.

3 Choose Image > Adjust > Posterize, and posterize the blend using 11 levels.

4 Print the 11-step gray wedge on a black-and-white printer, and then scan it into Photoshop.

Note: *You can also perform this test using an 18-percent neutral gray card or an 11-step gray wedge from a photography store.*

5 Open the Info palette, and read the RGB values on-screen for each of the gray levels. Uneven R, G, and B values indicate a color cast.

6 Use Levels or Curves to correct the color cast, and then save the dialog box settings. (For instructions, see Chapter 6, "Making Color and Tonal Adjustments.")

7 Open the scanned image you want to correct, reopen the dialog box you used to correct the cast in step 6, and load the saved settings.

Creating new images

The New command lets you create a blank, untitled Photoshop image. You can also use this command to create a new image with the exact same pixel dimensions as an image or selection that has been copied to the Clipboard.

To create a new image:

1 Do one of the following:

• To base the image dimensions and resolution on the Clipboard contents, choose File > New.

• To base the image size on the default dimensions and resolution or the last entered settings, hold down Alt (Windows) or Option (Mac OS) as you choose File > New.

• To base the image size on an open window, choose File > New. With the New dialog box open, choose the image whose size you want to match from the Window menu.

2 Type a name for the image and if desired, set the width, height, resolution, and mode. (See "Color modes and models" on page 63.)

3 For Contents, select an option:

• White to fill the background with white, the default background color.

• Background Color to fill the image with the current background color. (See "Choosing the foreground and background color" on "Choosing the foreground and background colors" on page 214.)

• Transparent to create an image containing a single layer with no color values.

Note: *Because images created with the transparent option contain a single layer instead of a background, they must be saved in Photoshop format. Photoshop is the only format that supports layers. (See "Saving files" on page 311.)*

Opening and importing images

In Adobe Photoshop, you can open and import images in various file formats and have multiple images open at one time. If a file format does not appear in the Open dialog box or in the File > Import submenu, install the format's plug-in module (see "Using plug-in modules" on page 36). For more information on a specific file format, see "About file formats" on page 321.

To import an image, choose the import module from the File > Import submenu. The options for some import modules are discussed later in this section.



For information on opening Raw, Anti-aliased PICT, or PICT Resource files, see online help.

To open a file:

1 Choose File > Open.

2 Specify a file format:

• In Windows, for Files of Type, choose All Formats to display all the files in the selected directory. Choose an individual format to display only files saved in that format.

• In Mac OS, select Show All Files to display all files in the selected folder. To locate files in other folders, click Find and type the filename.

3 In Mac OS, select Show Thumbnail to preview files before opening them (if a preview has been saved with the image). This option requires the Apple QuickTime extension.

4 Select the file.

5 Click Open. In some cases, a dialog box appears, letting you set the open options. The formats requiring an open dialog box are described in the following sections.

In some cases (such as when first opening a file that was saved in an older version of Photoshop), a status bar appears indicating the file is being converted to a specified color space. If the Profile Mismatch dialog box appears, specify whether to convert the file's color profile (see "Managing ICC profiles in files" on page 99).

To specify the file format in which to open a file:

Do one of the following:

• In Windows, choose File > Open As, select the desired format, and click Open.

• In Mac OS, choose File > Open, and select Show All Files. For Format, choose the desired file format, and click Open.

Note: *If the file does not open, then the chosen format may not match the file's true format, or the file may be damaged.*

Importing Adobe Illustrator, PDF, and EPS files

You can import files created in Adobe Illustrator and PDF and EPS files containing vector art using these commands:

• The Open command to open an Illustrator, PDF, or EPS file as a new Photoshop image.

• The Place command to place an Illustrator, PDF, or EPS file as a new layer in an existing Photoshop image.

• The Paste commands to paste copied Illustrator artwork into a Photoshop image either as pixels or as a path. (See "Using drag and drop to copy between applications" on page 179.)

When an Illustrator, PDF, or EPS image is opened or placed in Photoshop, it is *rasterized*—the mathematically defined lines and curves of the vector image are converted into the pixels or bits of a bitmap image. For more on vector and bitmap images, see page 41.



To convert a multiple-page PDF file to multiple images in Photoshop format, choose File > Automate > Multi-Page PDF to PSD.

To open an Adobe Illustrator, PDF, or EPS file as a new Adobe Photoshop image:

1 Choose File > Open.

2 Select the file you want to open, and click Open. If the file does not appear, for Files of Type, choose All Formats (Windows) or select Show All Files (Mac OS).

3 If you are opening a PDF file that contains multiple pages, select the page you want to open, and click OK.

4 Indicate the desired dimensions, resolution, and mode. To maintain the same height-to-width ratio, select Constrain Proportions.

5 Select Anti-aliased to minimize the jagged appearance of the artwork's edges as it is rasterized.

6 Click OK.

To place Adobe Illustrator, PDF, or EPS artwork into an Adobe Photoshop image:

1 Open the Adobe Photoshop image in which you want to place the artwork.

2 Choose File > Place, select the file you want to place, and click Open.

3 If you are placing a PDF file that contains multiple pages, select the page you want to place, and click OK.

The placed artwork appears as a new layer inside a bounding box at the center of the Adobe Photoshop image. The artwork maintains its original aspect ratio.

4 Adjust the placed artwork:

• To move, position the pointer inside the bounding box, and drag.

• To scale, drag one of the handles at the corners or sides of the bounding box. Hold down Shift as you drag to constrain the proportions.

• To rotate, position the pointer outside the bounding box (the pointer turns into a curved arrow), and drag. To adjust the point around which the marquee is rotated, drag the circle at the center of the bounding box.

• To skew, hold down Ctrl (Windows) or Command (Mac OS) and drag a side handle of the bounding box.

5 To confirm the placement of the artwork, press Enter (Windows) or Return (Mac OS). To cancel the placement, press Esc.

Turning off anti-aliasing for imported objects.

The Anti-alias PostScript® option removes jagged edges from a pasted or placed selection by making a subtle transition between the edges of the selection and its surrounding pixels. Turning off this option helps maintain the hard edges of line art as it is rasterized.

To turn off the Anti-alias Postscript option:

1 Choose File > Preferences > General.

2 Deselect Anti-alias PostScript. Clearing this option can decrease the time it takes to import the file.

Opening Photo CD files

You can open Kodak® Photo CD™ files, including high-resolution files from Pro Photo CD discs, directly in Photoshop. The Kodak Precision Color Management System (KPCMS) lets you control the color mode and display of Photo CD images by specifying profiles for the source film and the destination output device. The KPCMS is automatically installed on your system when you install Photoshop.

Note: *You cannot save files in the Photo CD format from Photoshop.*

To open a Photo CD file:

1 Choose File > Open.

2 Select the file you want to open, and click Open. If the file does not appear, for Files of Type, choose All Formats (Windows) or select Show All Files (Mac OS).

3 Choose a resolution for the image.

4 Select Landscape to open portrait images in landscape orientation.

5 Click Source. Choose a device and a profile description, and click OK.

If you are unsure of the source profile, click Image Info and note the number next to Product Type of Original. Then click Source and choose the profile that displays the same number for Input Device Settings.

6 Click Destination, choose a profile for the output device, and click OK.

In addition to the RGB and Lab color mode profiles, you can install profiles for specialized output needs.

7 To display scanner information about the image, click Image Info.

8 Click OK to open the image.

Viewing copyright and file information

Once you have opened a file, you can view copyright and authorship information that has been added to the file. This information includes standard file information (see "Adding file information" on page 313) and Digimarc watermarks.

Photoshop automatically scans opened images for watermarks using the Digimarc Detect Watermark plug-in. If a watermark is detected, Photoshop displays a copyright symbol in the image window's title bar and updates the Copyright & URL section of the File Info dialog box.

To view file information:

Choose File > File Info. For section, choose the attribute you want to view.

To read a Digimarc watermark:

1 Choose Filter > Digimarc > Read Watermark. If the filter finds a watermark, a dialog box displays the Creator ID, copyright year (if present), and image attributes.

2 Click OK, or for more information choose from the following:

• If you have a Web browser installed, click Web Lookup to get more information about the owner of the image. This option launches the browser and displays the Digimarc Web site, where contact details appear for the given Creator ID.

• Call the phone number listed in the Watermark Information dialog box to get information faxed back to you.

For information on adding Digimarc watermarks to images, see online help.

Cropping an image

Photoshop provides two ways to crop an image:

• The Image > Crop command discards the area outside of a rectangular selection and keeps the same resolution as the original.

• The crop tool (⧉) lets you crop an image by dragging over the area you want to keep. The advantage of using the crop tool is that you can rotate and resample the area as you crop. See "About resampling" on page 48 for more information on resampling.

To crop an image using the Crop command:

1 Use the rectangle marquee tool to select the part of the image you want to keep. Make sure that the Feather option is set to 0 pixels. (See "Feathering" on page 147.)

2 Choose Image > Crop.

To use the crop tool:

1 Select the crop tool (⧉).

2 Drag over the part of the image you want to keep.



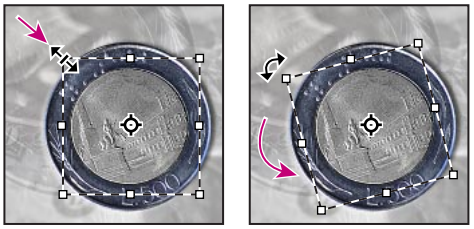
When you release the mouse button, the crop marquee appears as a bounding box with handles at the corners and sides.

3 Adjust the crop marquee:

• To move the marquee to another position, position the pointer inside the bounding box and drag.

• To scale the marquee, drag a handle. To constrain the proportions, hold down Shift as you drag a corner handle.

• To rotate the marquee, position the pointer outside the bounding box (the pointer turns into a curved arrow), and drag. To adjust the point around which the marquee is rotated, drag the circle at the center of the bounding box.



Drag handle to scale; drag outside bounding box to rotate.

4 To crop the image, press Enter (Windows) or Return (Mac OS). To cancel the cropping operation, press Esc.



Cropped area

***Note:** You can't rotate the crop tool marquee for an image in Bitmap mode.*

To specify the size and resolution of the cropped area:

1 Double-click the crop tool (⧉) to display its Options palette.

2 Select Fixed Target Size.

3 To begin with the size and resolution values of the current image, click Front Image.

4 Choose the units of measurement you want from the menus. The Columns option measures width in terms of the columns specified in the Rulers & Units preferences.

5 Enter values for the size and resolution you want for the cropped area.

The Fixed Target Size option constrains the file size of the image. If you specify size but not resolution, the resolution changes automatically to compensate for the size change. If you specify resolution but not size, the size changes automatically to compensate for the resolution change.

6 Drag over the area you want to keep with the crop tool, and then press Enter (Windows) or Return (Mac OS).

Increasing the size of the work canvas

The Canvas Size command lets you add or remove work space around an existing image. You can crop an image by decreasing the canvas area. Added canvas appears in the same color or transparency as the background.

To use the Canvas Size command:

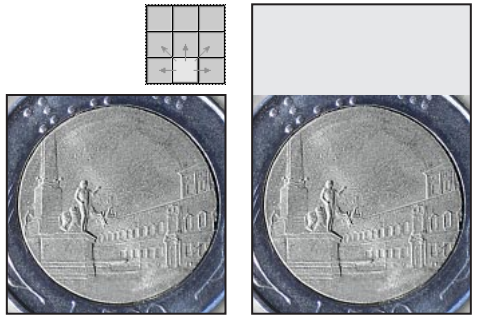
1 Choose Image > Canvas Size.

2 Choose the units of measurement you want. The Columns option measures width in terms of the columns specified in the Rulers & Units preferences.

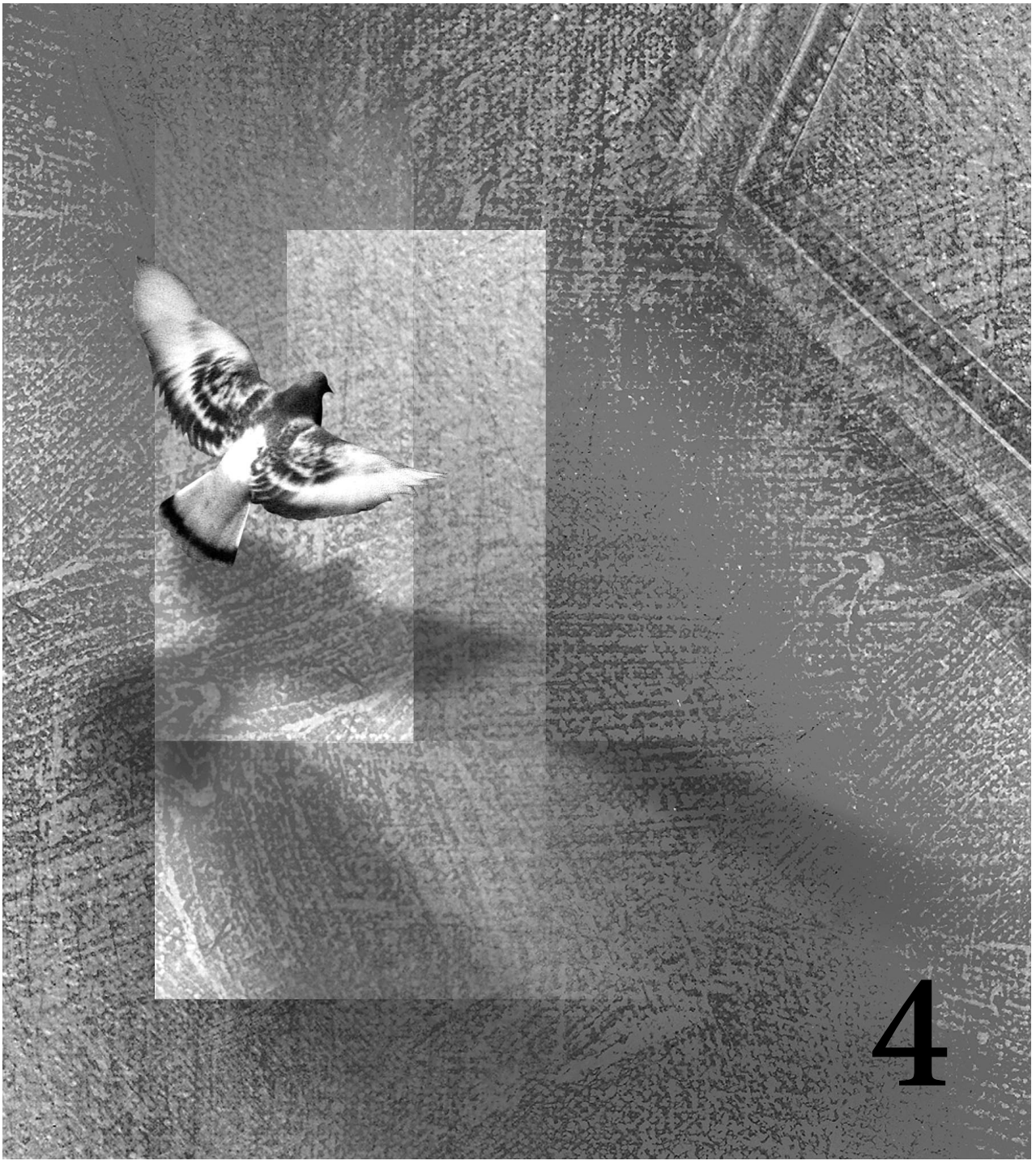
3 Enter the dimensions in the Width and Height boxes. A new file size appears.

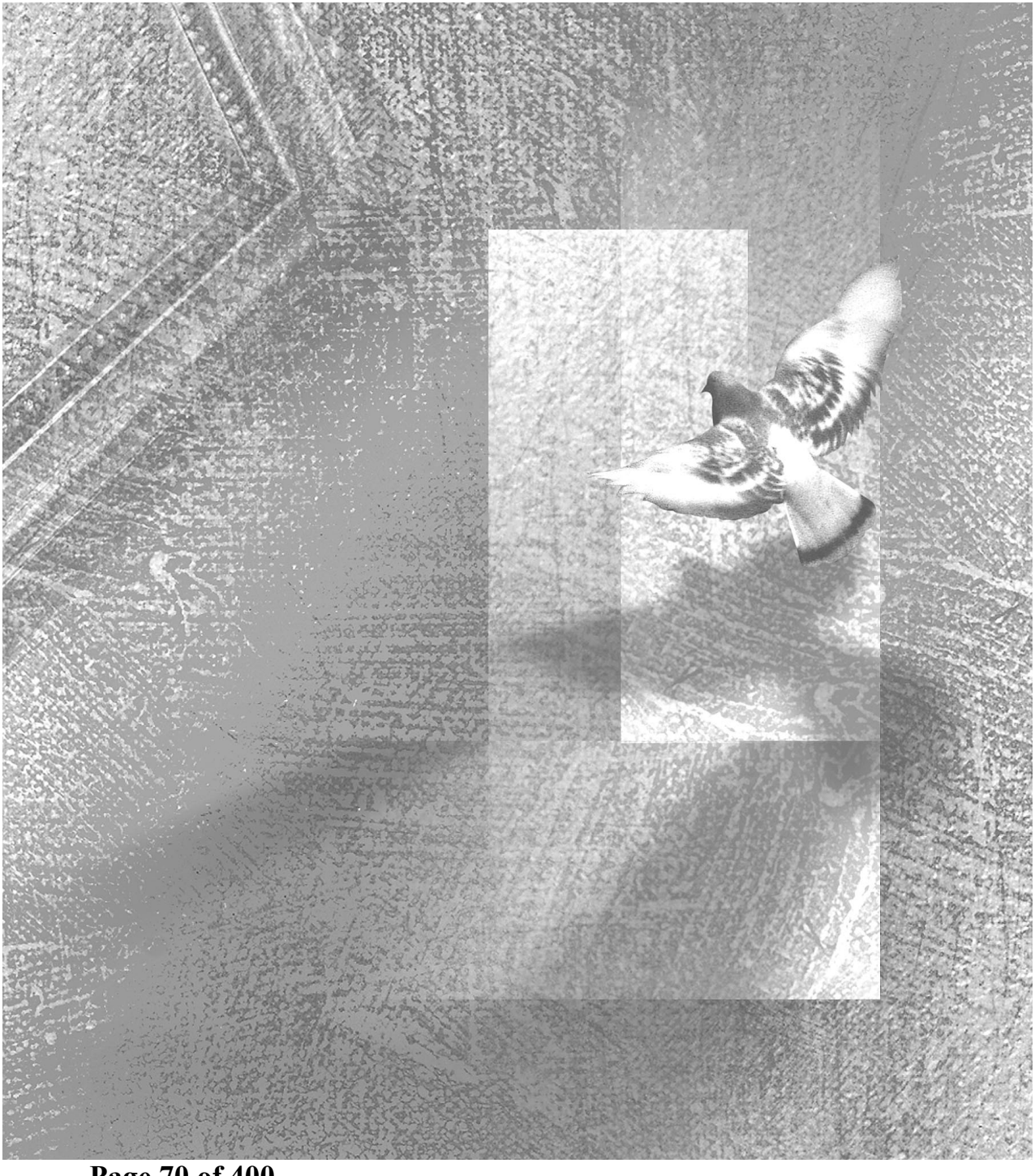
4 For Anchor, click a square to indicate where to position the existing image on the new canvas.

5 Click OK.



Original canvas, and canvas added to top of image


4



Chapter 4: Choosing a Color Mode

Familiarity with color theory and terminology can help you understand how color is measured and how Adobe Photoshop uses this information to define, display, and print color values.

Color modes and models

A color mode in Photoshop determines the color model used to display and print Photoshop documents. Photoshop bases its color modes on established models for describing and reproducing color. Common models include HSB (for hue, saturation, brightness); RGB (for red, green, blue); CMYK (for cyan, magenta, yellow, black); and CIE L*a*b. Photoshop also includes modes for specialized color output such as indexed color and duotones.

HSB model

Based on the human perception of color, the HSB model describes three fundamental characteristics of color:

- *Hue* is the color reflected from or transmitted through an object. It is measured as a location on the standard color wheel, expressed as a degree between 0° and 360°. In common use, hue is identified by the name of the color such as red, orange, or green.
- *Saturation*, sometimes called *chroma,* is the strength or purity of the color. Saturation represents the amount of gray in proportion to the hue, measured as a percentage from 0% (gray) to 100% (fully saturated). On the standard color wheel, saturation increases from the center to the edge.
- *Brightness* is the relative lightness or darkness of the color, usually measured as a percentage from 0% (black) to 100% (white).

Although you can use the HSB model in Photoshop to define a color in the Color palette or Color Picker dialog box, there is no HSB mode available for creating and editing images.

For a color illustration of the HSB model, see figure 4-1 on page 223.

RGB model

A large percentage of the visible spectrum can be represented by mixing red, green, and blue (RGB) colored light in various proportions and intensities. Where the colors overlap, they create cyan, magenta, and yellow.

Because the RGB colors combine to create white, they are also called *additive* colors. Adding all colors together creates white—that is, all light is reflected back to the eye. Additive colors are used for lighting, video, and monitors. Your monitor, for example, creates color by emitting light through red, green, and blue phosphors.

For a color illustration of additive colors in RGB, see figure 4-2 on page 223.

RGB mode

Photoshop's RGB mode uses the RGB model, assigning an intensity value to each pixel ranging from 0 (black) to 255 (white) for each of the RGB components in a color image. For example, a bright red color might have an R value of 246, a G value of 20, and a B value of 50. When the values of all three components are equal, the result is a shade of gray. When the value of all components is 255, the result is pure white; when the value is 0, pure black.

RGB images use three colors to reproduce up to 16.7 million colors on-screen. RGB images are three-channel images, so they contain 24 (8 x 3) bits per pixel. RGB is the default mode for new Photoshop images. Computer monitors always display colors using the RGB model. This means that when working in color modes other than RGB, such as CMYK, Photoshop temporarily converts data into RGB data for display on-screen.

CMYK model

The CMYK model is based on the light-absorbing quality of ink printed on paper. As white light strikes translucent inks, part of the spectrum is absorbed and part is reflected back to your eyes.

In theory, pure cyan (C), magenta (M), and yellow (Y) pigments should combine to absorb all color and produce black. For this reason these colors are called *subtractive* colors. Because all printing inks contain some impurities, these three inks actually produce a muddy brown and must be combined with black (K) ink to produce a true black. (*K* is used instead of *B* to avoid confusion with blue.) Combining these inks to reproduce color is called *four-color process printing.*

The subtractive (CMY) and additive (RGB) colors are *complementary colors*. Each pair of subtractive colors creates an additive color, and vice versa.



For a color illustration of subtractive color in CMYK, see figure 4-3 on page 223.

CMYK mode

In Photoshop's CMYK mode, each pixel is assigned a percentage value for each of the process inks. The lightest (highlight) colors are assigned small percentages of process ink colors, the darker (shadow) colors higher percentages. For example, a bright red might contain 2% cyan, 93% magenta, 90% yellow, and 0% black. In CMYK images, pure white is generated when all four components have values of 0%.

Use the CMYK mode when preparing an image to be printed using process colors. Converting an RGB image into CMYK creates a *color separation*. If you start with an RGB image, it's best to edit first and then convert to CMYK. In RGB mode, you can use the CMYK Preview command to simulate the effects of the change without actually changing image data (see "Previewing CMYK colors" on page 110). You can also use CMYK mode to work directly with CMYK images scanned or imported from high-end systems.

L*a*b model

The L*a*b color model is based on the model proposed by the Commission Internationale d'Eclairage (CIE) in 1931 as an international standard for color measurement. In 1976, this model was refined and named CIE L*a*b.

L*a*b color is designed to be *device independent;* creating consistent color whatever the device (such as monitor, printer, computer, or scanner) used to create or output the image.

L*a*b color consists of a *luminance* or lightness component (*L*) and two chromatic components: the *a* component (from green to red) and the *b* component (from blue to yellow).



For a color illustration of the luminance model, see figure 4-4 on page 223.

Lab mode

In Photoshop's Lab mode (the asterisks are dropped from the name), the lightness component (L) can range from 0 to 100. The *a* component (green-red axis) and the *b* component (blue-yellow axis) can range from +120 to –120.

You can use Lab mode to work with Photo CD images, edit the luminance and the color values in an image independently, move images between systems, and print to PostScript® Level 2 and Level 3 printers. To print Lab images to other color PostScript devices, convert to CMYK first.

Lab color is the internal color model Photoshop uses when converting from one color mode to another.

Specialized color modes

Photoshop also provides specialized color modes.

Bitmap mode Uses one of two color values (black or white) to represent the pixels in an image. Images in Bitmap mode are called *bitmapped,* or 1-bit, images because they have a bit depth of 1. (See "About bit depth" on page 68.)

Grayscale mode Uses up to 256 shades of gray. Every pixel of a grayscale image has a brightness value ranging from 0 (black) to 255 (white). Grayscale values can also be measured as percentages of black ink coverage (0% is equal to white, 100% to black). Images produced using black-and-white or grayscale scanners typically are displayed in Grayscale mode. You can convert both Bitmap-mode and color images to grayscale.

To convert a color image to a high-quality black-and-white image, Photoshop discards all color information in the original image. The gray levels (shades) of the converted pixels represent the luminosity of the original pixels.



You can mix information from the color channels to create a custom grayscale channel by using the Channel Mixer command.

When converting from grayscale to RGB, the color values for a pixel are based on its previous gray value. A grayscale image can also be converted to a CMYK image (for creating process-color quadtones without converting to Duotone mode) or to a Lab color image.

Duotone mode Creates duotone (two-color), tritone (three-color), and quadtone (four-color) grayscale images using two to four colored inks. (See "Using monotones, duotones, tritones, and quadtones" on page 339.)

Indexed color mode Uses at most 256 colors. When converting to indexed color, Photoshop builds a color lookup table (CLUT), which stores and indexes the colors in the image. If a color in the original image does not appear in the table, the program chooses the closest one or simulates the color using available colors.

By limiting the palette of colors, indexed color can reduce file size while maintaining visual quality—for example, for a multimedia animation application or a Web page. Limited editing is available in this mode. For extensive editing you should convert temporarily to RGB mode. (See "Converting to indexed color" on page 72.)

Multichannel mode Uses 256 levels of gray in each multiple channel. Multichannel images are useful for specialized printing—for example, converting a duotone for printing in Scitex CT format.

These guidelines apply to converting images to Multichannel mode:

- You can convert any image composed of more than one channel to a multichannel image. The original channels are converted to spot color channels.
- When converting a color image to multichannel, the new grayscale information is based on the color values of the pixels in each channel.
- Converting a CMYK image to multichannel creates cyan, magenta, yellow, and black spot channels.
- Converting an RGB image to multichannel creates cyan, magenta, and yellow spot channels.
- Deleting a channel from an RGB, a CMYK, or a Lab image automatically converts the image to multichannel mode. See "Color channels" on page 67 for more information on channels.

Note: *You cannot print a color composite from Multichannel mode. Also, most export file formats do not support multichannel mode images. However, you can export the file in Photoshop DCS 2.0 format.*



For a color illustration of the effect of color modes on file size, see the figure on page 229.

Color gamuts

A *gamut* is the range of colors that a color system can display or print. The spectrum of colors seen by the human eye is wider than the gamut available in any color model.

Among the color models used in Photoshop, L*a*b has the largest gamut, encompassing all colors in the RGB and CMYK gamuts. Typically, the RGB gamut contains the subset of these colors that can be viewed on a computer or television monitor (which emits red, green, and blue light).

Therefore, some colors, such as pure cyan or pure yellow, can't be displayed accurately on a monitor.

Note: *The Wide Gamut RGB mode extends this color range beyond what can be previewed on a monitor, creating a larger RGB color range in which to work. For information on editing images in this mode, see "Entering RGB setup information" on page 84.*

The CMYK gamut is smaller, consisting only of colors that can be printed using process-color inks. When colors that cannot be printed are displayed on-screen, they are referred to as out-of-gamut colors—that is, outside the CMYK gamut. (See "Identifying out-of-gamut colors" on page 110.)



For a color illustration of the Lab, RGB, and CMYK color gamuts, see figure 4-5 on page 223.

Color channels

Every Adobe Photoshop image has one or more *channels,* each storing information about color elements in the image. The number of default color channels in an image depends on its color mode. For example, a CMYK image has at least four channels, one each for cyan, magenta, yellow and black information. Think of a channel as analogous to a plate in the printing process, with a separate plate applying each layer of color.

In addition to these default color channels, extra channels, called *alpha channels,* can be added to an image for storing and editing selections as masks; and spot color channels can be added, to add spot color plates for printing. (See Chapter 10, Using Channels and Masks.)

An image can have up to 24 channels. By default, Bitmap-mode, grayscale, duotone, and indexed-color images have one channel; RGB and Lab images have three; and CMYK images have four. You can add channels to all image types except Bitmap-mode images. For information on these image types and other distinctions, see the sidebar "Color modes" on page 229.

Measuring color values in the Info palette

Depending on how your Info palette is set up, you can select any tool, position the pointer over any part of an image, and determine the color value under the pointer. You can customize the Info palette and color samplers to express color values using the HSB, RGB, CMYK, Lab, or Grayscale modes without changing the mode of the image itself. For more information on measuring color with the Info palette and color samplers, see "Previewing color values" on page 107 and the procedure to change Info palette options in "Using the Info palette" on page 30.

Adjusting the monitor display

Although the RGB color model used by computer monitors is capable of displaying much of the visible spectrum, the video system sending data to a given monitor often limits how many colors can be displayed at once. By understanding how color data is measured in digital files and on-screen, you can better adjust Photoshop's preferences to offset the limitations of your video system.

This understanding also will help you choose a file format for your images. For more information, see Chapter 14, Saving and Exporting Images.

About bit depth

Bit depth—also called pixel depth or color depth—measures how much color information is in the image to display or print pixels. Greater bit depth (more bits of information per pixel) means more available colors and more accurate color representation in the digital image. For example, a pixel with a bit depth of 1 has two possible values: black and white. A pixel with a bit depth of 8 has 2^8, or 256, possible values. And a pixel with a bit depth of 24 has 2^{24}, or roughly 16 million, possible values. Common values for bit depth range from 1 to 64 bits per pixel.

Photoshop supports up to 16 bits per pixel for each channel in an image. A 24-bit RGB image, for example, would have 8 bits per pixel for each of the red, green, and blue channels.



For a color illustration of bit depth as displayed on monitors, see figure 4-6 on page 224.

Color display options for 8-bit color displays

Each image mode in Adobe Photoshop uses a *color lookup table*, or *color palette*, to store the colors used in the image. When you're working with a display system that supports 8-bit color (or fewer colors), the monitor displays only 256 different colors at a time. For example, a 24-bit RGB image can display 16.7 million colors in any image at a time. However, if the monitor can display only 256 of the 16.7 million colors, Adobe Photoshop uses a technique called *dithering* to mix pixels of available colors and thus simulate colors not currently available.

By default, Adobe Photoshop uses *pattern dithering,* which can result in a distinctive pattern of darker or lighter areas in the image. In contrast, *diffusion dithering* eliminates this distinctive patterning by using the surrounding pixels in the mix of pixel color. But diffusion dithering can cause visual inconsistencies when only part of a screen is redrawn as you scroll, edit, or paint. Keep in mind that dithering effects only appear on-screen, not in print.

To select a color display option:

1 Choose File > Preferences > Display & Cursors.

2 Choose one or both of these display options:

- System Palette to use the system's standard 256-color palette.
- Diffusion Dither to minimize dither patterns produced by dithering.

Converting between bit depths

In most cases, RGB, grayscale, and CMYK images contain 8 bits of data per color channel. With three channels in an RGB image, this translates to a 24-bit RGB bit depth (8 bits x 3 channels), an 8-bit grayscale bit depth (8 bits x 1 channel), and a 32-bit CMYK bit depth (8 bits x 4 channels). Photoshop can also read and import 48-bit RGB, 64-bit CMYK, and 16-bit grayscale images (each with 16 bits of data per color channel).

Note: *A16-bit-per-channel image provides finer distinctions in color, but its file size is much larger than an 8-bit-per-channel image.*

Photoshop supports these tools and commands in 16-bit-per-channel images: the marquee, lasso, crop, measure, zoom, hand, pen, eyedropper, color sampler, and rubber stamp tools; and the Duplicate, Feather, Modify, Levels, Auto Levels, Curves, Histogram, Hue/Saturation, Brightness/Contrast, Color Balance, Equalize, Invert, Channel Mixer, Image Size, Transform Selection, and Rotate Canvas commands. To take full advantage of Photoshop's features, you can convert a 16-bit-per-channel image to an 8-bit-channel image.

To convert from 8 bits per channel to 16 bits per channel:

1 Flatten the image you want to convert, as explained in "Flattening all layers" on page 269.

2 Choose Image > Mode > 16 Bits/Channel.

To convert from 16 bits per channel to 8 bits per channel:

Choose Image > Mode > 8 Bits/Channel.

Converting images from one mode to another

The transition between converting an image from one mode to another permanently changes color values in the image. For example, when you convert an RGB image to CMYK mode, RGB color values outside the CMYK gamut are adjusted to fall within the CMYK gamut. Consequently, before converting images, it's best to do the following:

- Do as much editing as possible in the image's original mode (usually RGB from most scanners, or CMYK from traditional drum scanners or if imported from Adobe Illustrator or from a Scitex system).
- Save a backup copy before converting. Be sure to save a copy of your image that includes all layers in order to edit the original version of the image after the conversion.
- Flatten the file before converting it. The interaction of colors between layer blending modes will change when the mode changes.

For information on converting to CMYK, see "Converting to CMYK" on page 97, "About calibration" on page 80, and "Adjusting the separation type and black generation" on page 90. For converting open images to a different color space, see "Converting the color space of open images" on page 100.

To convert an image to another mode:

Choose Image > Mode and the mode you want from the submenu. Modes not available for the active image appear dimmed in the menu.

The following mode conversions flatten the file:

- RGB to Indexed color or Multichannel mode.
- CMYK to Multichannel mode.
- Lab to Multichannel, Bitmap, or Grayscale mode.
- Grayscale to Bitmap, Indexed, or Multichannel mode.
- Duotone to Bitmap, Indexed, or Multichannel mode.

Converting between Grayscale mode and Bitmap mode

Converting an image to Bitmap mode reduces the image to two colors, greatly simplifying the color information in the image and reducing its file size. To convert an image to Bitmap mode, you must first convert it to Grayscale mode. This removes the hue and saturation information from the pixels and leaves just the brightness values. However, because few editing options are available for Bitmap-mode images, it's usually best to edit the image in Grayscale mode and then convert it.

Keep in mind that a Bitmap-mode image edited in Grayscale mode may not look the same when converted back to Bitmap mode. For example, a pixel that is black in Bitmap mode and then edited in Grayscale mode may be converted to a shade of gray. If the pixel is light enough, it will be white when converted back to Bitmap mode.

To convert an image to Bitmap mode:

1 Do one of the following:

- If the image is in color, choose Image > Mode > Grayscale. Then choose Image > Mode > Bitmap.
- If the image is grayscale, choose Image > Mode > Bitmap.

2 For Output, enter a value for the output resolution of the Bitmap-mode image, and choose a unit of measurement. By default, the current image resolution appears as both the input and the output resolutions.

3 Select a bitmap conversion method, and click OK. If you choose Halftone Screen, see the following section. For other conversion methods, see "Additional bitmap conversion options" on page 71.

To convert a Bitmap-mode image to grayscale:

1 Choose Image > Mode > Grayscale.

2 Enter a value between 1 and 16 for the size ratio.

The size ratio is the factor for scaling down the image. For example, to reduce a grayscale image by 50%, enter 2 for the size ratio. If you enter a number greater than 1, the program averages multiple pixels in the Bitmap-mode image to produce a single pixel in the grayscale image. This process lets you generate multiple shades of gray from an image scanned on a 1-bit scanner.

Specifying a halftone screen for a Bitmap-mode image

The Halftone Screen option in the Bitmap dialog box lets you convert a grayscale image to simulated halftone dots.

Important: *The halftone screen becomes part of the image. If you print the image on a halftone printer, it will print with the halftone screen you choose here plus that of the printer. On some printers, the result probably will be a moiré pattern in the image.*

To specify the halftone screen for a Bitmap-mode image:

1 Choose Image > Mode > Bitmap.

2 Click Halftone Screen; then click OK.

3 For Frequency, enter a value for the screen frequency, and choose a unit of measurement. Values can range from 1 to 999 for lines per inch and from 0.400 to 400 for lines per centimeter. You can enter decimal values.

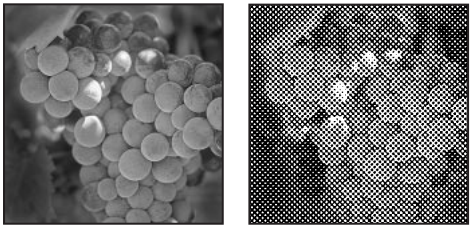
The screen frequency specifies the ruling of the halftone screen in lines per inch (lpi). The frequency depends on the paper stock and type of press used for printing. Newspapers commonly use an 85-line screen. Magazines use higher resolution screens, such as 133 lpi and 150 lpi. Check with your print shop for correct screen frequencies.

4 Enter a value for the screen angle in degrees from –180 to +180.

The screen angle refers to the orientation of the screen. Continuous-tone and black-and-white halftone screens commonly use a 45° angle.

5 For Shape, choose the dot shape you want.

6 Click OK.



Original grayscale image, and Halftone Screen conversion: 53 lpi, 45° angle, round dot

You can save and reuse halftone screen settings by using the Save and Load buttons in the Halftone Screen dialog box.

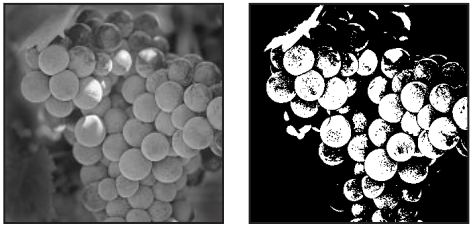
Additional bitmap conversion options

Like the Halftone Screen option, the other bitmap conversion options determine the quality of the Bitmap-mode image.

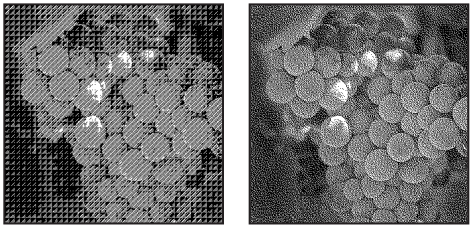
50% Threshold Converts pixels with gray values above the middle gray level (128) to white and below to black. The result is a very high-contrast, black-and-white representation of the image.

Pattern Dither Converts an image by organizing the gray levels into geometric configurations of black-and-white dots.

Diffusion Dither Converts an image by using an error-diffusion process, starting at the pixel in the upper left corner of the image. If the pixel's value is above middle gray (128), the pixel is changed to white—if below, to black. Because the original pixel is rarely pure white or pure black, error is inevitably introduced. This error is transferred to surrounding pixels and diffused throughout the image, resulting in a grainy, filmlike texture. This option is useful for viewing images on a black-and-white screen.



Original grayscale image, and 50% Threshold conversion method



Pattern Dither conversion method, and Diffusion Dither conversion method

Custom Pattern Simulates the effect of printing a grayscale image through a custom halftone screen. This method lets you apply a screen texture, such as a wood grain, to an image. To use this option, you must first define a pattern (see "Filling and stroking selections and layers" on page 211).

You can create a pattern representing the texture you want and then screen the grayscale image to apply the texture. To cover the entire image, the pattern must be as large as the image. Otherwise, the pattern will be tiled. For example, if you apply a 1-inch-by-1-inch pattern to a 4-inch-by-4-inch image, the pattern appears as 16 squares. Adobe Photoshop comes with several self-tiling patterns that can be used as halftone screen patterns (see the procedure to use a pattern from the PostScript Patterns folder in "Filling and stroking selections and layers" on page 211).

Because the Custom Pattern option simulates dark and light colors by making the halftone pattern thicker and thinner, it makes sense to choose a pattern that lends itself to thickness variations, typically one with a variety of gray shades.

To prepare a black-and-white pattern for conversion, you can first convert the image to grayscale and then apply the Blur More filter several times. This blurring technique creates thick lines tapering from dark gray to white.

Converting to indexed color

Converting to indexed color deletes all but 256 colors from the image—the standard number of colors supported by many multimedia animation applications and Web pages. Converting an RGB image to indexed color lets you edit the image's color table or export it to an application supporting only 8-bit color. The conversion also reduces the file size by deleting color information from the image.

To convert an RGB image to an indexed-color image:

1 Choose Image > Mode > Indexed Color.

Note: *The image must be flattened first, or you will lose layers.*

2 Select Preview to display a preview of the changes.

3 Select a palette, color depth (bit depth), and dither method as described in the following sections.

4 Click OK.

Specifying a palette

Eight palette types are available for converting an image to indexed color.

Exact Creates a palette using the exact colors appearing in the RGB image—an option available only if the image uses 256 or fewer colors. Because the image's palette contains all colors in the image, there is no dithering.

System (Windows) Uses the Windows system's default 8-bit palette, which is based on a uniform sampling of RGB colors.

System (Macintosh) Uses the Macintosh system's default 8-bit palette, which is based on a uniform sampling of RGB colors.

Web Uses the palette most often used by Web browsers to display 8-bit images. This palette is a subset of the Windows and Macintosh systems' palettes.

Uniform Creates a palette by uniformly sampling colors from the spectrum. For example, if you choose an 8-bit color depth, Photoshop takes 6 evenly spaced color levels each of red, green, and blue and calculates the combinations of these colors to produce a uniform palette of 216 colors (6 x 6 x 6 = 216). A lower bit depth creates a uniform palette composed of fewer colors. The total number of colors displayed in the image corresponds to the cube nearest the chosen bit depth (8, 27, 64, 125, or 216).

Adaptive Creates a palette by sampling the colors from the spectrum appearing most commonly in the image. For example, an RGB image with only the colors green and blue produces a palette made primarily of greens and blues. Most images concentrate colors in particular areas of the spectrum.

To control a palette more precisely, first select a part of the image containing the colors you want to emphasize. Photoshop weights the conversion toward these colors.

Custom Creates a custom palette using the Color Table dialog box. Either edit the color table and save it for later use or click Load to load a previously created color table. (See "Specifying color matching options" on page 74.)

This option also displays the current adaptive palette, which is useful for previewing the colors most often used in the image.

Previous Uses the custom palette from the previous conversion, making it easy to convert several images with the same custom palette.



For a color illustration of color palettes, see figure 4-7 on page 224.

Specifying the bit depth

Using the Uniform or Adaptive palette, you can specify the bit depth of an indexed-color image—the number of bits of color information per pixel. Bit depth, also known as color depth, determines the number of colors used to display (or print) an image. For example, if you choose 4 bits per pixel, the image is composed of 16 colors; 6 bits per pixel, 64 colors; 8 bits per pixel, 256 colors. (The number of colors used is displayed in the Colors text box.) In addition, you can specify the exact number of colors to be displayed (up to 256) by choosing Other for Color Depth and entering a value for Colors.

The options in the Indexed Color dialog box control only how the indexed color table is created. Adobe Photoshop still treats the image as an 8-bit, 256-color image.

Specifying dithering options

Unless you're using the Exact color table option, the color table may not contain all the colors used in the image. To simulate colors not in the color table, you can dither the colors. Dithering mixes the pixels of the available colors to simulate the missing colors. You can choose from three dithering options:

None Does not dither colors but instead uses the color closest to the missing color. This tends to result in sharp transitions between shades of color in the image, creating a posterized effect.

Diffusion Uses an error-diffusion method that produces a less structured dither than the Pattern option.

Pattern Uses a halftone-like square pattern to simulate any colors not in the color table. This option is available only when you're using the Mac OS System palette, the Web palette, or the Uniform (216 colors) palette.

Specifying color matching options

You can choose from three options to match colors in the original image when dithering:

Best Finds the best possible match for each pixel. Although this option takes longer to process, it can provide a better image. This option is only available if you choose None or Diffusion for the dithering option.

Faster Takes less time than Best, but may not find the best color match for each pixel. This option is only available if you choose None or Diffusion for the dithering option.

Preserve Exact Colors Prevents colors that are already in the chosen palette from being dithered. This is useful for preserving fine lines and text for Web images. This option is only available if you choose Diffusion for the dithering option.

Manipulating the color table

You can change one or more colors in the color table of an indexed-color image, edit colors to produce special effects, model the colors after a predefined color table, and save a color table for reuse with other indexed-color images.

Another type of image with fewer than 256 colors is a *pseudocolor image*—a grayscale image displaying variations in gray levels with color rather than shades of gray, and often used in scientific and medical applications. The color table-editing features are particularly useful with pseudocolor images, but can also produce special effects with indexed-color images having a limited number of colors.

Note: *Simply to change colors in an image, choose Image > Adjust, and use the color correction commands in the submenus. (See Chapter 6, Making Color and Tonal Adjustments, for a description of these commands.)*

To edit colors in the color table:

1 Open the indexed-color image.

2 Choose Image > Mode > Color Table.

3 Click or drag in the table to choose the color or range of colors you want to change.

4 Choose the color you want, as explained in "Using the Adobe Photoshop Color Picker" on page 218, and click OK.

If you are changing a range of colors, Photoshop creates a gradient in the color table between the starting and ending colors. The first color you choose in the Color Picker is the beginning color for the range. When you click OK, the Color Picker reappears so that you can choose the last color in the range.

The colors you selected in the Color Picker are placed in the range you selected in the Color Table dialog box.

5 Click OK in the Color Table dialog box to apply the new colors to the indexed-color image.

Choosing a color-table option

Your indexed color table can be modeled after predefined color tables, which you select from the Table menu in the Color Table dialog box.

Custom Creates a palette you specify.

Black Body Displays a palette based on the different colors a blackbody radiator emits as it is heated—from black to red, orange, yellow, and white.

Grayscale Displays a palette based on 256 levels of gray—from black to white.

Spectrum Displays a palette based on the colors produced as white light passes through a prism—from violet, blue, and green to yellow, orange, and red.

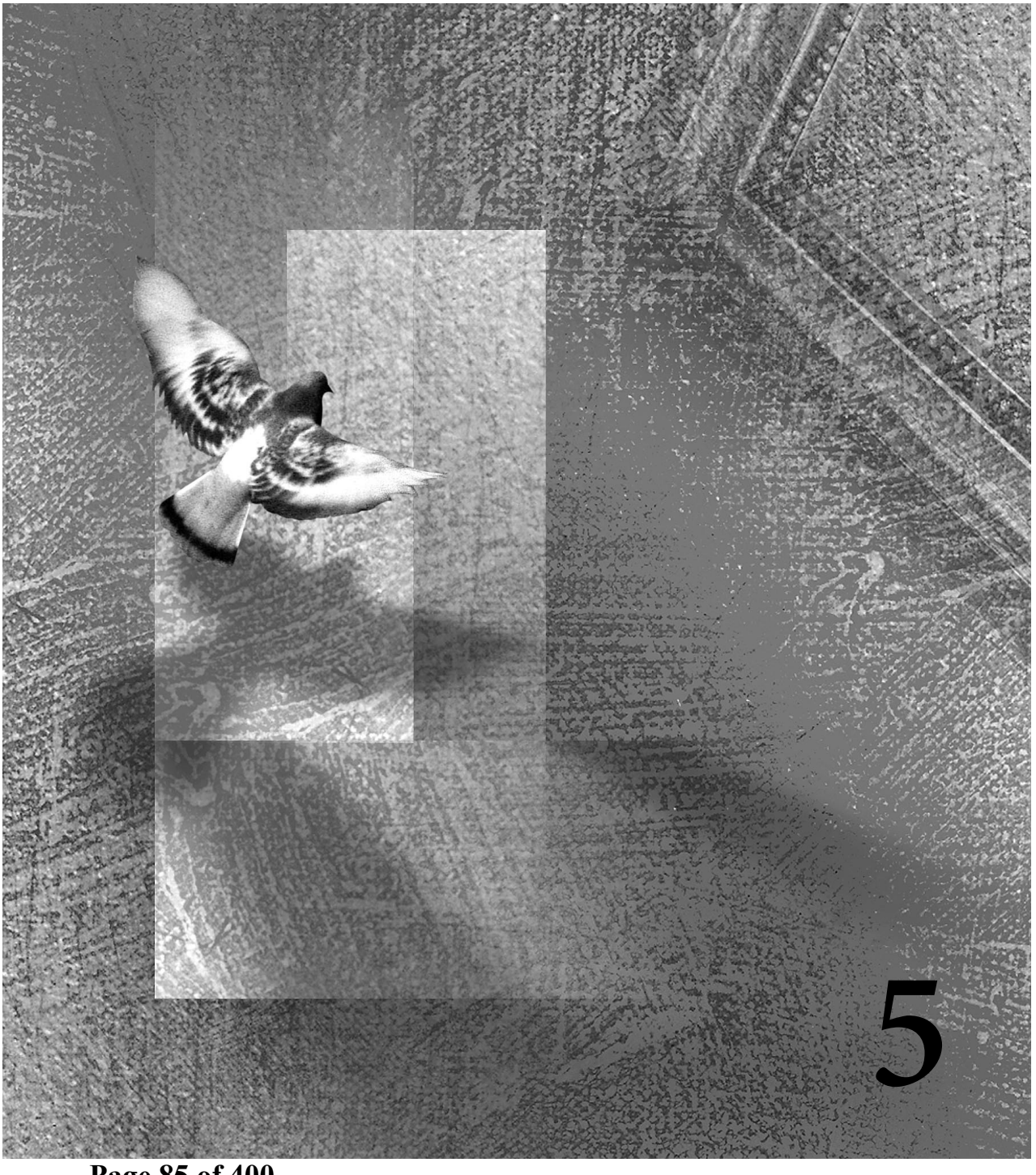
Windows System Displays the standard Windows 256-color system palette.

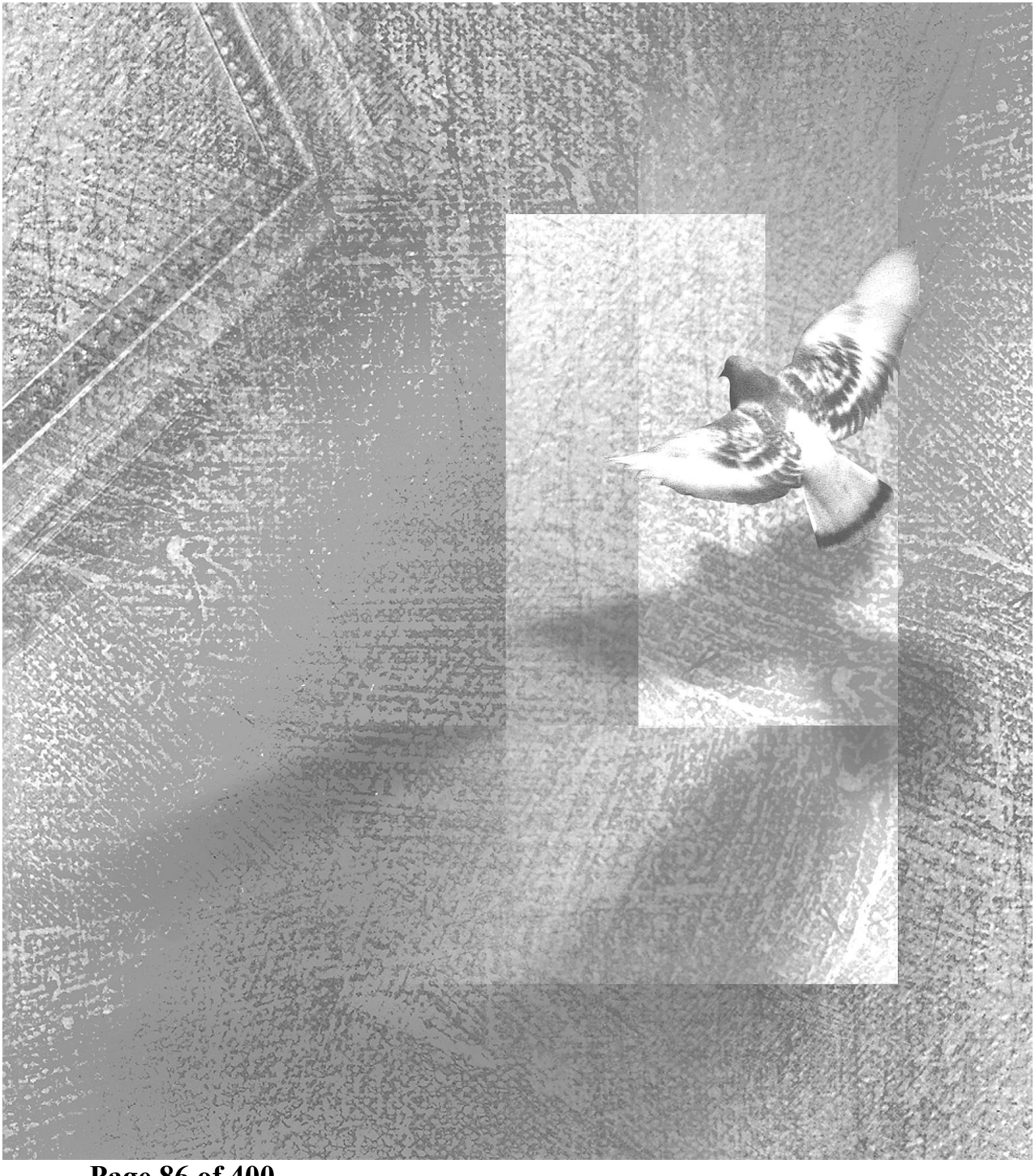
Macintosh System Displays the standard Mac OS 256-color system palette.

Saving and loading a color table

You use the Save and Load buttons in the Color Table dialog box to save your indexed color tables for use with other Adobe Photoshop images. Once you load a color table into an image, the colors in the image change to reflect the color positions they reference in the new color table.

Note: *You can also load saved color tables into the Swatches palette. See the procedure to save and reuse custom swatch sets in "Using the Swatches palette" on page 216.*


5



Chapter 5: Reproducing Color Accurately

Whether preparing artwork for print or online use, you should begin by calibrating your monitor. This will ensure the closest possible match between your colors on-screen and those produced by a printer, a video display, or a different computer monitor, and also between your colors in Adobe Photoshop and in other software programs. If your monitor isn't calibrated, the resulting colors may not even be close to what you originally saw on it.

Most problems associated with accurately reproducing colors from a software program stem from reconciling the differences between the total set of colors, or *gamut*, produced by the red, green, and blue phosphors of a computer monitor and the gamut produced by the cyan, magenta, yellow, and black inks of a printer. In addition, colors can vary dramatically between different monitors, printers, and software. The color space for a device is defined by the gamut it can represent.

Every image file you create needs to reside in a specific color space. For example, a CMYK file created for one printer may have slightly different color characteristics than one created for another printer. Photoshop requires you to specify what color space you want to use for all of your RGB, CMYK, and Grayscale files.

This workflow provides an overview of how to reproduce colors accurately:

1 Calibrate your monitor as described on page 82.

The Adobe Gamma utility calibrates your monitor and defines the RGB color space that your monitor can display. You must calibrate your monitor before you can display colors accurately on it. Once you have calibrated your monitor, Photoshop will compensate for differences between the color space in which your image resides and the color space in which your monitor displays images.

2 In most cases you should not have to adjust RGB Setup information, especially if you have left the dialog box at its default settings. However, if you want to change the RGB color space in which Photoshop edits RGB images, enter RGB Setup information as described on page 84.

The RGB Setup dialog box defines the RGB color space to use for editing RGB images. It also determines whether images are converted to your monitor's RGB space when displaying them.

3 If you plan to create or edit CMYK files, either for print, for color separations, or for exporting to another application, enter CMYK setup information as described on page 86.

The CMYK Setup dialog box defines which CMYK color space to use for editing and printing CMYK images.

Even if you plan to print your files, you may not need to do this step. Most low-end inkjet printers and some other output devices accept RGB data directly, and don't require that you define a CMYK color space. If you are unsure whether your printer is an RGB printer, see the documentation that came with your printer or contact the printer's manufacturer.

4 If you plan to work on grayscale images, enter Grayscale Setup information as described on page 95.

The Grayscale Setup dialog box defines whether grayscale images behave as RGB images or black ink.

5 If you want to control how Photoshop opens and saves ICC profiles (color space definitions) in files, enter Profile Setup information as described on page 99.

The Profiles Setup dialog box specifies whether ICC profiles are saved with files, and lets you specify how to handle files that don't match the working color spaces defined for Photoshop (as described in the RGB Setup and CMYK Setup dialog boxes).

This step is optional, particularly if you left the Profile Setup dialog box at its default settings.

6 To fine-tune the CMYK settings you made in step 3, print a pre-separated CMYK proof as described on page 92. Then adjust the CMYK Setup settings to match the proof as described on page 92.

Note: *If you defined your CMYK color space using ICC profiles, your ability to fine-tune the settings will be limited.*

About workflow

Once you've calibrated your system and defined your working color spaces, the normal workflow is that any file that is opened or acquired is compared against those defined color spaces. If it doesn't match, the file is converted to the defined color space. When you save an image, the profile of the working color space is saved with the file so that the file can be handled correctly with Photoshop and other applications.

About calibration

Calibration is the process of adjusting your monitor and Photoshop's color conversion settings to compensate for factors that affect how colors in the image appear on-screen and in print. Calibration helps you do the following:

• Display printed colors accurately on the screen. With a well-calibrated system, the color corrections you make to the image are an accurate reflection of what will come out of the printer.

- Display RGB colors accurately on the screen.
- Display CMYK colors accurately on the screen.

About ICC profiles

One of the methods Photoshop can use to manage color is based on the use of ICC profiles. An ICC profile is a color space description. The ICC profile format was defined by the International Color Consortium (ICC) as a cross-application standard. ICC profiles help you reproduce colors accurately across different platforms, devices, and ICC-compliant applications (such as Adobe Illustrator and Adobe PageMaker®).

Adobe Photoshop uses a Color Management Module (CMM) to interpret the ICC profiles that describe the RGB and CMYK color spaces you are using in your system. You can select from existing ICC profiles or create your own. These profiles can then become part of your image files. The CMM interprets the ICC profiles to automatically manage color issues among different color models as well as color issues between your monitor, other monitors, and the final print image. Although you do not have to use ICC profiles, it can greatly simplify managing color.

Important: *To ensure that color management works correctly on your system, change the color management settings every time you change printing devices.*

Choosing a color management module

To work with ICC profiles in Adobe Photoshop, you can choose which CMM to use for converting images. These are typical CMMs:

- The Photoshop built-in CMM. In most cases, this CMM will give you the best results. If you have trouble matching colors between applications, you can try setting Photoshop's CMM to match the other application's.
- The Kodak Digital Science Color Management System®, which is installed on your system when you install the Kodak Photo CD Acquire plug-in that comes with Photoshop.
- The CMM specified by the operating system, such as Apple ColorSync 2.1.2 or later, and Microsoft ICM 2.0.
- Any other CMM on your system.

About the RGB, Grayscale, and CMYK Setup dialog boxes

The RGB Setup, Grayscale Setup, and CMYK Setup dialog boxes let you define the native color space for editing RGB, Grayscale, and CMYK images. The settings in these dialog boxes are used for the following:

- To convert images between standard color modes (such as from RGB to CMYK).

• When opening an RGB, Grayscale, or CMYK file, to compare the file's color space to the color space defined in the appropriate Setup dialog box. If the two color spaces are not the same, you can convert the file. (See "Managing ICC profiles in files" on page 99.)

• When viewing a file on-screen, to convert the file to the monitor's color space. This only affects the display, not the file—Photoshop assumes that the file's true color space is the one defined in the appropriate Setup dialog box.

Note: *If you have disabled the Display Using Monitor Compensation option in the RGB Setup dialog box, files may not be displayed accurately in the monitor's color space. (See "Entering RGB setup information" on page 84.)*

Changes to the Setup dialog boxes do not affect the pixel values of open images. However, the on-screen appearance may change, because Photoshop then displays the image assuming a different native color space.

For example, suppose your file was created in the sRGB color space and you use the RGB Setup dialog box to change the color space to ColorMatch RGB. Photoshop will treat your file as a ColorMatch RGB file when it displays it online, even though it is not changing the actual pixel values in the file.

Calibrating your monitor

The Adobe Gamma utility lets you calibrate the contrast and brightness, gamma (midtones), color balance, and white point of monitors. This helps you eliminate any color cast in your monitor display, make your monitor grays as neutral as possible, and standardize your display of images on different monitors (whatever the combinations of monitor and video card). The utility then saves these settings as an ICC profile for your monitor.

The following guidelines can help you in calibrating your monitor:

• You can use a third-party calibration utility and an ICM 2.0- or ColorSync-compatible ICC profile generator instead of the Adobe Gamma utility. See the utility's documentation for details.

• You don't need to recalibrate your monitor if you have already done so with an ICC-aware calibration tool and you have not changed your monitor settings.

• Gamma settings saved by the Monitor Setup Utility (Windows) or the Gamma control panel (Mac OS) in Photoshop 4.0 and earlier are not supported.

• You only need to set calibration and save it as an ICC profile once on your system, for all applications, unless you change any of the factors affecting calibration. For example, if you change the room lighting or readjust the monitor

brightness and contrast controls, you must recalibrate the system. If you haven't done so already, after calibrating the monitor consider taping down your monitor's brightness and contrast controls and your room's lighting controls.

To calibrate a monitor:

1 Make sure your monitor has been turned on for at least a half hour, to stabilize the monitor display.

2 Set the room lighting at the level you plan to maintain.

3 Turn off any desktop patterns and change the background color on your monitor to a light gray. This prevents the background color from interfering with your color perception and helps you adjust the display to a neutral gray. (For more on how to do this, refer to the manual for your operating system.)

4 Start the Adobe Gamma utility located in the Photoshop/Calibrate folder (Windows) or Photoshop/Goodies/Calibration folder (Mac OS).

5 Select which version of the utility you want:

• Step by Step and click OK for a version of the utility that will guide you through each step of the process. If you choose this option, follow the instructions described in the utility.

• Control Panel and click OK for a version of the utility that is contained in a single dialog box. If you choose this option, follow the instructions in the rest of this section.

6 If desired, choose Load and select the monitor ICC profile that most closely matches your monitor. Use this as a starting point from which to calibrate your monitor.

Note: *In Windows, the folder Windows/System/Color is displayed by default, and contains .icm files in 8.3 format. Select a file to display the type of monitor ICC profile at the bottom of the Open Monitor Profile dialog box.*

7 Turn up the contrast and brightness controls on your monitor to their maximum settings. Leave the contrast control at maximum.

8 For Brightness and Contrast, adjust the brightness control on your monitor to make the alternating gray squares in the top bar as dark as possible (but not black), while keeping the bottom bar a bright white.

9 For Phosphors, choose a monitor type. If the correct type is not listed, choose Custom, and enter the red, green, and blue chromaticity coordinates as specified by the monitor manufacturer. This option accounts for the different red, green, and blue phosphors used by monitors to display color.

10 For Gamma, choose one of the following options to establish your current gamma settings:

• View Single Gamma Only to adjust the gamma based on a single combined grayscale reading. Drag the slider under the gamma preview until the center box fades into the patterned frame.

• Deselect View Single Gamma Only to adjust the gamma based on Red, Blue, and Green reading. Drag the slider under each box, until the center box matches the patterned frame.

The gamma setting of your monitor defines how bright the midtones are.

11 For Desired, choose the target gamma you want. For example, the default target gamma in Windows is 2.2 and in Mac OS is 1.8.

Note: *This option is not available on Windows systems that cannot control the monitor.*

12 For Hardware, choose the white point of your monitor as described by your monitor's manufacturer. This setting determines whether you are using a warm or cool white. To measure the hardware white point, choose Measure and follow the instruction on-screen.

13 For Adjusted, if you know the color temperature at which the finished image will be viewed, choose it here. Otherwise, choose Same As Hardware. Only choose a different setting to work at a different white point than your monitor's factory-specified hardware setting.

Note: *This option is not available on Windows systems that cannot control the monitor.*

14 Click the close button on the window.

15 Save the settings.

To calibrate multiple monitors:

1 Drag the Adobe Gamma control panel onto the secondary monitor.

2 Repeat the calibration steps for that monitor.

3 Deselect Use As Default Monitor Profile in the Adobe Gamma control panel unless you want the secondary monitor's profile to be used as the default monitor profile for all of your monitors.

Entering RGB setup information

The RGB Setup dialog box lets you describe the RGB color space in which to edit RGB images. This space is usually different from the monitor's RGB definition (listed in the bottom part of the RGB Setup dialog box), so that you can create RGB images without being restricted by a particular monitor's limitations.

The default settings are generally the most appropriate. You should change them if you need to specify a different RGB space.

Note: *RGB Setup is not the same as Monitor Setup in Photoshop 4.0. To set up your monitor, use the Adobe Gamma utility as described in "Calibrating your monitor" on page 82.*

To enter RGB setup information:

1 Choose File > Color Settings > RGB Setup.

2 Select Preview to display a preview of your changes.

3 For RGB, choose one of the following:

• sRGB for the standard RGB color space. This color space is endorsed by a wide variety of hardware and software manufacturers and is becoming the default color space for many scanners, low-end printers, and software applications.

• Apple RGB for the RGB color space used by earlier versions of Adobe Photoshop as well as a variety of other desktop publishing applications. Apple RGB is a good choice for online images that will be displayed on Mac OS systems.

• CIE RGB for the RGB color space defined by the Commission Internationale d'Eclairage. This option provides a fairly large color gamut, but does not handle cyan very well.

• ColorMatch RGB for the RGB color space defined by Radius that matches the native color space of their Pressview monitors.

• NTSC (1953) for the video color space defined by the National Television Standards Committee (NTSC). This is the original color television standard. It has been mostly superseded by the more recent SMPTE-C standard.

• PAL/SECAM for the current color television standard for Europe and other parts of the world that use PAL or SECAM-based television.

• SMPTE-240M for the RGB color space for high-definition television production (as opposed to broadcast). It has a larger color gamut than the spaces based on HDTV phosphors. This option can be a good choice if you need a wider color gamut than many of the other color spaces—sRGB in particular—without going to the extreme of using Wide-Gamut RGB.

• SMPTE-C for the current color television standard in the United States and other parts of the world that use NTSC-based television.

• Wide-Gamut RGB for a very wide-gamut RGB space defined using pure spectral-color primaries. This space's gamut includes almost all visible colors and is wider than what the typical monitor can display accurately. However, many colors specified in the gamut cannot be reproduced on RGB monitors or on press.

• Custom to create a custom RGB profile. This option may be useful if you know the description of the RGB space for your scanner and you want to set Photoshop's RGB color space to be the same. (For details see the instructions "To create a custom RGB profile" later in this section.)

4 Select Display Using Monitor Compensation to display images using the monitor's RGB color space. This does not affect the color information in images, only the way images look on the screen, and provides a more accurate display. Leaving this option deselected displays images directly to the monitor, with no compensation, and can make screen updates faster but less accurate.

5 Click OK.

To create a custom RGB profile:

1 Enter the Gamma value you want to use.

2 For White Point, choose a setting.

3 For Primaries, choose a set of red, green, and blue phosphor or primary types. This option is based on the different red, green, and blue phosphors or primaries used by monitors to display color. If the correct type is not listed, choose Custom, and enter the red, green, and blue chromaticity coordinates.

Note: *Because you are defining the color space in which to edit images, the primaries do not have to match your monitor.*

To save and load the settings for different RGB color spaces:

Select Save or Load in the RGB Setup dialog box. Saving the setting saves it as an ICC profile.

Note: *Only RGB profiles that exactly match Photoshop's RGB model can be loaded. They must be matrix-based, and use a single, pure-gamma tone response curve. Most RGB profiles are not supported as a working RGB space.*

Entering CMYK setup information

The CMYK Setup dialog box lets you define the CMYK color space using ICC profiles, color separation tables, or by specifying the properties of the inks and paper stock used to reproduce your color plates.

As with the RGB Setup dialog box, Photoshop uses information in the CMYK Setup dialog box when converting color values between modes. If you change the CMYK Setup settings after you have converted an image to CMYK mode, only the display is affected. You must revert to the original RGB image (by choosing File > Revert) and then reconvert the image for the changes to affect the separation data. See "Converting to CMYK" on page 97, for more information on how the printing inks settings affect mode conversions.

If you are using an RGB-based printer (such as most low-end inkjet printers, some thermal printers, and some high-end proofing devices, such as Fujix Pictography), you don't need to enter CMYK setup information. Such printers use RGB information, not CMYK information, to print the file. If you are unsure whether your printer is an RGB printer, see the documentation that came with your printer or contact the printer's manufacturer. All options for managing color in RGB-based output devices are in the Print dialog box. For more information, see "Converting the color space of images while printing" on page 338.

To specify the CMYK settings:

Do one of the following:

- To use an ICC profile to define the CMYK color space for your printer, see "Using ICC profiles to define the CMYK color space" on page 87.

• To specify the ink and separation options yourself, see "Using the Built-in option to define the CMYK color space" on page 88.

• To create or use third-party, Photoshop-compatible color separation tables, see "Using color separation tables" on page 98.

Using ICC profiles to define the CMYK color space

The CMYK Setup dialog box lets you specify the CMYK color space based on the ICC profile of the printer you select. The CMM then maps the colors in the image to the profiled printer's color gamut, or range of printable colors.You can choose the method (called *rendering intent*) that is used to translate the colors to the printed gamut.

To use ICC printer profiles to define the CMYK color space:

1 Choose File > Color Settings > CMYK Setup.

2 For CMYK Model, select ICC.

3 Select Preview to display a preview of your changes. A flashing bar under the option indicates a preview is being created.

4 For Profile, choose the printer profile you want to use. If the printer you use is not listed in the Profile menu, contact your printer manufacturer for the appropriate printer profile or create one using third-party printer profiling software.

5 For Engine, choose the CMM you want to use. Built-in refers to Photoshop's built-in CMM.

Note: *This option is not the same as choosing Built-in for CMYK Model.*

6 For Intent, choose one of the following:

• Perceptual (Images) to maintain the relative color values among the original pixels as they are mapped to the printer gamut. This method preserves the relationship between colors, although the color values themselves may change.

• Saturation (Graphics) to maintain the relative saturation values of the original pixels. Out-of-gamut colors are converted to colors that have the same saturation but fall just inside the gamut.

• Relative Colorimetric to leave colors that fall inside the gamut unchanged. This method usually converts out-of-gamut colors to colors that have the same lightness but fall just inside the gamut.

• Absolute Colorimetric to disable white point matching when converting colors. This option is not generally recommended.

7 If desired, choose Black Point Compensation to map the darkest neutral color of the source's color space to the darkest neutral color of the destination's color space rather than to black when converting colors.

8 Click OK.

Using the Built-in option to define the CMYK color space

The Built-in option in the CMYK Setup dialog box lets you specify the ink and separation options. Photoshop then enters a default value for the dot gain (the change in the halftone dot size caused by absorption on the output device). After you print a proof or talk to your print shop, you might need to return to the CMYK Setup dialog box to adjust for dot gain, ink characteristics, and color casts. (See "About dot gain" on page 93.)

To specify the CMYK settings using the Built-in option:

1 Choose File > Color Settings > CMYK Setup.

2 Select Preview to display a preview of your changes. A flashing bar under the option indicates a preview is being created.

3 For CMYK Model, choose Built-in.

4 For Ink Colors, select an ink type.

The default color values used in the color separation calculations are designed to produce quality separations using SWOP (Specifications for Web Offset Publication) inks on coated paper. These inks differ slightly from those used in Europe. Similarly, the color and ink absorption qualities of the paper stock affect the final printed result. You can think of this information as telling Photoshop what printed cyan, magenta, yellow, and black look like given a certain set of inks and paper stock under your lighting conditions.

Note: *In most cases, printing ink characteristics do not vary greatly from printer to printer within the same printer type. For example, one Tektronix Phaser II printer prints ink hues very similar to another one. But the amount of dot gain can vary significantly. Thus, for a different printer of the same type, you may have to change the dot gain setting in the CMYK Setup dialog box but not the printing ink colors.*

If you choose Custom for Ink Colors, the Ink Colors dialog box appears. (See "Setting the characteristics of custom ink colors" on page 96.)

5 Verify the dot gain percentage.

Do not adjust this value until you have run a proof (which includes a calibration bar) and have measured the density values on the proof with a reflective densitometer. Change this value if your print shop has provided a different value for estimated dot gain. See "Calibrating the screen image to the proof" on page 92 and "Specifying dot gain" on page 94 for more information on dot gain.

6 Click OK.

For information on choosing separation options, see "Adjusting separation options" on page 89.

To save and load settings:

Use the Save and Load buttons in the CMYK Setup dialog box to save these settings as an ICC profile. The profile can then be used again by Photoshop and other ICC-aware applications.

Adjusting separation options

Along with the other options when you choose Built-in as the CMYK model in the CMYK Setup dialog box, the separation options control how the CMYK plates are generated. The separation options determine the method used for black generation and undercolor removal and specify the total ink limit for the press.

When converting RGB values to CMYK, Photoshop uses information in the RGB Setup and CMYK Setup dialog boxes. The settings in these dialog boxes help ensure the closest match possible between the colors on-screen and in the final output. The CMYK Setup dialog box settings determine the precise CMYK values chosen for a given RGB color. Once an image is in CMYK mode, Photoshop converts the CMYK color values internally to display them on an RGB monitor. (See "Converting to CMYK" on page 97.)

About separation types and black generation

To make color separations, the three additive colors (red, green, and blue) are translated into their subtractive counterparts (cyan, magenta, and yellow). In theory, equal parts of cyan, magenta, and yellow combine to subtract all light reflected from the paper and create black. Due to impurities present in all printing inks, however, a mix of these colors instead yields a muddy brown. To compensate for this deficiency in the color separation process, printers remove some cyan, magenta, and yellow in areas where the three colors exist in equal amounts, and they add black ink.

A given color can be translated from RGB mode to CMYK mode in an endless number of ways. But prepress operators typically use one of two ways to generate black in print: undercolor removal (UCR) or gray component replacement (GCR):

- With UCR, black ink is used to replace cyan, magenta, and yellow ink in neutral areas only (that is, areas with equal amounts of cyan, magenta, and yellow). This results in less ink and greater depth in shadows. Because it uses less ink, UCR is generally used for newsprint and uncoated stock.
- With GCR, black ink is used to replace portions of cyan, magenta, and yellow ink in colored areas as well as in neutral areas. GCR separations tend to reproduce dark, saturated colors somewhat better than UCR separations do and maintain gray balance better on press.

Choose the type of separation based on your paper stock and the requirements of your print shop.

Adjusting the separation type and black generation

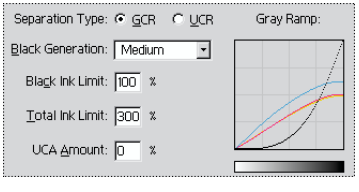
In most cases, the Photoshop color separation defaults produce excellent results. But when necessary, you can modify the black generation method, set new ink limits, and change the separation type. If you have already converted the image to CMYK mode, you must reconvert the image after adjusting the separation options.

Note: *The separation options don't affect output from non-PostScript color printers (such as HP DeskJet, Canon® Bubblejet™, and Epson® Color Stylus™), because they generate their own black values.*

To adjust the separation type and black generation:

Choose File > Color Settings > CMYK Setup.

For Color Model, choose Built-in.



The Separation Options area in the CMYK Setup dialog box displays a graph based on current settings showing how the neutral colors in the image will separate. In the graph, sometimes called a *gray ramp*, neutral colors have equal parts of cyan, magenta, and yellow. The horizontal axis represents the neutral color value, from 0% (white) to 100% (black). The vertical axis represents the amount of each ink that will be generated for the given value. In most cases, the cyan curve extends beyond the magenta and yellow curves, because a small extra amount of cyan is required to produce a true neutral.

Choosing the separation type

By default, Photoshop uses the GCR type of color separation. Select UCR if you want to use undercolor removal. Check with your print shop to find out which to use.

Choosing the degree of black generation

For GCR separations, you choose the degree of black generation, set ink limits, and indicate undercolor addition.

Note: *ICC profiles specify the degree of black generation.*

For a color illustration of black generation, see figure 5-2 on page 225.

You can choose from several Black Generation settings in the Separation Setup dialog box:

- None generates the color separation using no black plate.
- The Light and Heavy settings decrease and increase the effect of the Medium setting (the default). In most cases, Medium produces the best results.
- Maximum maps the gray value directly to the black generation value. This option is useful for images with a large amount of solid black against a light background, such as screen shots from a computer.
- Custom lets you adjust the black generation curve manually.

To use the Custom option:

1 For Black Generation, select an option (Light, Medium, Heavy, or Maximum) that is closest to the type of black generation you want. This gives you a black generation curve to use as a starting point.

2 For Black Generation, select Custom.

3 Position the pointer on the curve, and drag to adjust the black curve. The curves for cyan, magenta, and yellow are adjusted automatically relative to the new black curve and the total ink densities.

Choosing the ink limits

For both GCR and UCR separations, the black generation uses the ink limit settings you enter in the Separation Options area. The total ink limit is the maximum ink density your press can support. By default, the Black Ink Limit is 100%; the Total Ink Limit is 300%. Check with your print shop to see if you should adjust these values.

Note: *In the Gray Ramp graph, these limits determine the cutoff points for the CMYK curves.*

Using undercolor addition

Use the UCA (undercolor addition) Amount text box in the Separation Options area to compensate for the loss of ink density in neutral shadow areas. This additional ink produces rich, dark shadows in areas that might appear flat if printed with only black ink. UCA can also prevent posterization in subtle detail in the shadows. This option is available only for GCR separations.

Increasing the UCA Amount increases the amount of CMY added to shadow areas. Values can range from 0 to 100%. Check with your print shop for the preferred value. If you are unsure of this value, leave it at 0%.

Printing a color proof

After calibrating your monitor and entering settings for CMYK Setup, you should print a CMYK image, called a *proof*, on the printer you are calibrating to. The document you use to generate the proof should contain color samples of all the CMYK color combinations and must be created or imported directly in CMYK mode.

You can produce a proof by printing the Testpict.jpg (Windows) or Olé No Moire (Mac OS) CMYK image included with the Adobe Photoshop software, or you can create your own CMYK image. Do not print an RGB image that has been converted to CMYK in Photoshop. Instead use an image that has been saved in CMYK format without an embedded ICC profile and whose CMYK values have been assigned directly in CMYK mode.

Important: *Before opening an existing test file, open the Profile Setup dialog box. In the Profile Mismatch Handling area, for CMYK, choose Ignore. This will prevent the file from being converted to a different CMYK color space, and possibly changing the results of the test. Reset this dialog box when you are done printing the file.*



For a color illustration of a color proof, see figure 5-1 on page 224.

To create your own CMYK proof document:

1 Create a new Photoshop document in CMYK mode.

2 Create a set of swatches that includes the following:

- Four swatches, each containing 100% of the CMYK colors (100% cyan, 100% magenta, 100% yellow, and 100% black).
- Four combination swatches (100% each of magenta and yellow, 100% each of cyan and yellow, 100% each of cyan and magenta, and 100% each of cyan, magenta, and yellow).
- A set of swatches that make up a four-color black, such as 60% cyan, 50% magenta, 50% yellow, and 100% black.

3 To include a calibration bar in the image, choose File > Page Setup, and select the Calibration Bars option. Then click OK.

4 Print the document on a color printer you are calibrating to.

Calibrating the screen image to the proof

If you are not using ICC profiles, after examining the color proof you may need to adjust some calibration settings to make the image on-screen exactly match the proof. In particular, you may need to adjust settings in the CMYK Setup dialog box to compensate for dot gain, custom ink characteristics, and color casts.

If you are using ICC profiles and the on-screen image doesn't match the printed proof closely enough, you can do the following:

- Check that the printer is not miscalibrated. It may not match the dot gain specified in its ICC profile. Adobe Systems strongly recommends that you calibrate the imagesetter using the manufacturer's calibration software or a third-party imagesetter calibration device, such as Precision Color by Kodak. If you are using a service bureau, verify that the imagesetter is not off by more than 1 percentage point.
- Get a more accurate ICC profile from the printer's manufacturer.
- Create an ICC printer profile using hardware designed for this task. (See the documentation that came with the ICC profile creation hardware.)
- Adjust the dot gain using transfer functions. (See "Compensating for dot gain in film using transfer functions" on page 95.)
- Instead of using ICC profiles, define your CMYK space using the Built-in option in the CMYK Setup dialog box. (See "Entering CMYK setup information" on page 86.)

About dot gain

Dot gain or loss can occur when the specified printer's halftone dots change as the ink spreads and is absorbed by paper. Photoshop calculates dot gain as the amount by which the expected dot increases or decreases. For example, a 50% halftone screen may be read with a densitometer at an actual density on the printed page of 55%. In this case, the dot gain would be 5%. Dot gain can also result when a miscalibrated imagesetter is used during the imaging process.

The dot gain estimate in the CMYK Setup dialog box represents dot gain for a specified paper stock for the midtones (the 50% pixels). Photoshop uses this value to create a dot gain curve that adjusts for dot gain throughout the image.

Note: *If you will be printing separations, consult your printer service bureau for recommended printer dot gain settings.*

The default dot gain estimate reflects the expected dot gain between film and final output. (The dot gain between the color proof and the final output is typically between 2% and 5%.)



Proof (no dot gain), and printed image (with dot gain)

Decreasing the dot gain makes the image on-screen appear lighter, because the dots are smaller. Increasing the dot gain makes the image appear darker, because the dots are larger. Changes don't affect actual data in the image until Photoshop uses the setting to adjust the CMYK percentages to compensate for dot gain during the conversion process.

Specifying dot gain

The CMYK Setup dialog box gives you two ways to specify a printer's dot gain: by defining a single dot gain value at the 50% level or by setting up to 13 values along the grayscale to create a customized dot gain curve for one or more CMYK plates.

If the proof has a significant color cast along its gray range, then the printer probably has different dot gain values for each ink. In this case, specify the dot gain using curves.

To specify the dot gain at the standard 50% mark:

1 Include a calibration bar with your proof by choosing File > Page Setup and selecting the Calibration Bars option.

2 Using a reflective densitometer, take a reading at the 50% mark of the printed calibration bar.

Note: *If you don't have a densitometer, adjust the Dot Gain value until the image on-screen looks like the proof, and then add that value to your printer's estimate of the expected dot gain between proof and final output.*

3 Choose File > Color Settings > CMYK Setup.

4 For CMYK Model, choose Built-in.

5 Choose Standard from the Dot Gain menu and enter the total amount of dot gain from step 2 in the Dot Gain text box. For example, if the value in step 2 was 54%, you would enter 4 in the text box, because the dot gain is 4%.

To specify the dot gain using curves:

1 Include a calibration bar with your proof by choosing File > Page Setup and selecting the Calibration Bars option.

2 Using a reflective densitometer, take a reading at one or more marks of the printed calibration bar.

Note: *If you don't have a densitometer, adjust the Dot Gain value until the image on-screen looks like the proof.*

3 Choose File > Color Settings > CMYK Setup.

4 For Color Model, choose Built-in.

5 Choose Curves from the Dot Gain menu.

6 Select the plates for which you want to set dot gain curves: Cyan, Magenta, Yellow, Black, or All.

7 Do one of the following:

• Calculate the required adjustment, and enter the values (as percentages) in the Dot Gain Curves dialog box.

For example, if you have specified a 30% dot, and your printer prints it at 36%, you have a 6% dot gain in your midtones. To compensate for this gain, enter 36% in the 30% text box of the Dot Gain Curves dialog box.

• Click to add an adjustment point in the dot gain curve, and drag the point to change its value. The value then appears in the appropriate text box.

• Click OK.

Applying dot gain settings to grayscale images

If your grayscale images will be viewed only on-screen, you don't need to compensate for dot gain. However, if you will print your images, you should apply the same dot gain values you used for CMYK output.

To specify Grayscale Setup settings:

1 Choose File > Color Settings > Grayscale Setup.

2 Select Preview to display a preview of your changes.

3 Select a grayscale behavior option:

• RGB to work without any compensation for dot gain.

• Black Ink to use the dot gain settings specified in the CMYK Setup dialog box. This option is equivalent to choosing the Use Dot Gain for Grayscale Images option in Photoshop 4.0.

4 Click OK.

Compensating for dot gain in film using transfer functions

When using ICC profiles, you cannot adjust the dot gain with the CMYK Setup dialog box. However, you may be able to compensate for dot gain from a miscalibrated imagesetter by using the transfer functions.

Transfer functions enable you to compensate for dot gain between the image and film. For example, the Transfer function makes 50% dots in the image print as 50% dots on film. Similarly to dot gain curves, the transfer functions let you specify up to 13 values along the grayscale to create a customized transfer function.

The following guidelines can help you in using transfer functions:

• Check that the printer is not miscalibrated. (See "Calibrating the screen image to the proof" on page 92.)

• Do not use transfer functions to compensate for dot gain from film to press. Instead, use the dot gain curves in the CMYK Setup dialog box. (Dot gain curves affect the CMYK to RGB conversions and on-screen display, but transfer functions apply only to printing—they don't affect the image color data. (See "Specifying dot gain" on page 94.)

Important: *Remember, use the transfer functions only for dot gain problems that cannot be fixed any other way.*

To adjust the transfer function values:

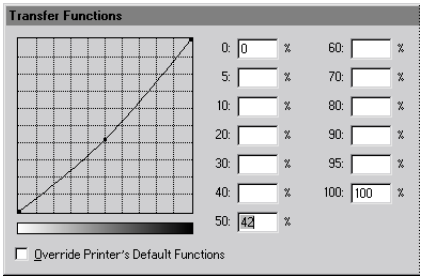
1 Use a transmissive densitometer to record the density values at the appropriate steps in your image on film.

2 Choose File > Page Setup.

3 Click the Transfer button.

4 Calculate the required adjustment, and type the values (as percentages) in the Transfer Functions dialog box.

For example, if you specified a 50% dot, and your imagesetter prints it at 58%, an 8% dot gain occurs in the midtones. To compensate for this gain, enter 42% (50% – 8%) in the 50% text box of the Transfer Functions dialog box. The imagesetter then prints the 50% dot you want.



When entering transfer function values, keep in mind the density range of your imagesetter. On a given imagesetter, a very small highlight dot may be too small to hold ink. Beyond a certain density level, the shadow dots may fill as solid black, removing all detail in shadow areas.

Note: *To preserve transfer functions in an exported EPS file, select Override Printer's Default Functions in the Transfer Functions dialog box and then export the file with Include Transfer Functions selected in the EPS Format dialog box. (See"Saving files in Photoshop EPS or DCS format" on page 315.)*

To save the current transfer function settings as the default:

Hold down Alt (Windows) or Option (Mac OS) to change the Save button to —> Defaults, and click the button.

To load the default transfer function settings:

Hold down Alt (Windows) or Option (Mac OS) to change the Load button to <— Defaults, and click the button.

Setting the characteristics of custom ink colors

In most cases, the Ink Colors options in the CMYK Setup dialog box accurately describe various printing inks. In some situations, however, you may want to adjust the ink colors further by using a color proof. For example, you may be using ink sets not listed for Ink Colors. When you change these settings, you change the profile of the inks Photoshop uses during the color separation.

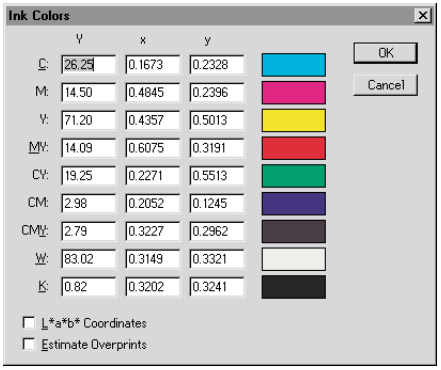
To adjust for custom ink colors:

1 Choose File > Color Settings > CMYK Setup.

2 For Color Model, choose Built-in.

3 For Ink Colors, select Custom.

The Ink Colors dialog box displays the various combinations of CMYK and the CIE coordinates measured for each. CIE coordinates are an international color definition standard supported by PostScript Level 2.



By default, the Ink Colors dialog box defines colors as *Y* (lightness), *x*, and *y* values. The default ink sets are calibrated for viewing conditions of 5000K (when viewed under D50 lighting), 2° field of view.

Note: *Colors appear slightly different based on how much of the eye's field of view they cover. The CIE has defined two standard ways of measuring color coordinates, one based on colors filling 10° of the eye's field of view, and one based on colors filling 2° of the field of view. Photoshop uses the 2° field of view standard.*

4 If desired, choose L*a*b Coordinates to enter the color box coordinates as Lab values rather than *Yxy* values. Use this option if your colorimeter only has Lab readouts.

5 Using your printed CMYK proof, take a reading of the color values using a spectrophotometer or a colorimeter, and then enter those values in the Ink Colors dialog box.

Alternatively, you can click the color box of the ink color you want to adjust and then adjust the color on-screen until it matches the patch on the color proof.

6 If desired, choose Estimate Overprints to automatically estimate the overprint colors (MY, CY, CM, and CMY) using the CMYK and white values you entered. This is useful if you don't have a proof.

7 Click OK.

Converting to CMYK

To print a color separation, you convert an RGB, indexed-color, or Lab image to a CMYK image. (PostScript Level 2 color printers can interpret and print Lab images.) The conversion splits the RGB or Lab colors into the four colors commonly used for printing color separations: cyan, magenta, yellow, and black.

Note the following when converting an image to CMYK:

- Be sure to save a copy of your RGB or indexed color image in case you want to reconvert the image.

• Avoid multiple conversions between RGB and CMYK mode, because each conversion requires color values be recalculated and rounded, resulting in less accurate color.

• When converting color values from one mode to another, Photoshop uses the Lab color mode, which provides a system for defining color values in all modes. Using Lab ensures that colors are not visibly altered during conversion—other than the necessary remapping of colors to confine them to a reduced gamut. (See "Color gamuts" on page 66; "L*a*b model" on page 65.)

For example, when converting an RGB image to CMYK, Photoshop first converts the RGB color values to Lab mode using the information in the RGB Setup dialog box. Once the image is in CMYK mode, Photoshop converts the CMYK values back to RGB to display the image on an RGB monitor.

• The conversion from CMYK to RGB for screen display does not affect the actual data in the file. The conversion is performed on a copy of the data.

Preparing for CMYK conversion

Photoshop lets you preview CMYK colors prior to making the conversion. You can also use the Gamut Warning command in the View menu to check for and correct any out-of-gamut colors. (See "Previewing CMYK colors" on page 110 and "Identifying out-of-gamut colors" on page 110.)

Using color separation tables

The Tables option lets you do the following:

• Save the CMYK setup from the built-in model as an ICC profile for use by other programs.

• Load Photoshop 4.0 format separation tables.

To save the CMYK settings as an ICC profile:

1 Choose File > Color Settings > CMYK Setup.

2 Enter the settings you want. (See "Entering CMYK setup information" on page 86 and "Adjusting separation options" on page 89.)

3 For CMYK Model, choose Tables.

4 Click Save. Select a location, and then name and save the new separation table. Then click OK.

To load a Photoshop 4.0 format separation table:

1 Choose File > Color Settings > CMYK Setup.

2 For CMYK Model, choose Tables.

3 Select Preview to display a preview of your changes.

4 Click Load.

5 Select the table you want to use, and click Open.

The name of the table appears in the CMYK Setup dialog box.

6 Click OK to use the table in CMYK conversions. The table settings will be used the next time you convert an image to CMYK.

Loading a separation table overrides any options in the CMYK Setup dialog boxes. To use the dialog box settings again, you must choose File > Color Settings > CMYK Setup, and select Built-in or ICC.

Managing ICC profiles in files

To manage color effectively across systems and applications, it is important to embed (or tag) ICC profiles into files. The ICC profiles then indicate the correct color space for the file. When another ICC-aware application opens a properly tagged image file, that application knows what if any color conversions are required.

The Profile Setup dialog box lets you specify how Photoshop uses ICC profiles when opening and saving files. This controls what color spaces are assumed when you exchange files between applications and devices.

The default settings for Profile Setup are designed to properly tag files in other applications and to correctly convert files from Photoshop 4.0 and earlier, which may have been created using a different color space than in Photoshop 5. As a result, entering Profile Setup information is optional, particularly if you left the Profile Setup dialog box at its default settings.

Note: *When opening files, you may see a status bar indicating that Photoshop is performing this conversion. This conversion generally happens the first time you open a file that is tagged with a different ICC profile.*

The following information can help you in specifying Profile Setup options:

- Embedding profiles increases the file size.
- Embedding profiles provides color consistency when a file is opened in another application or on another system.
- The Embed Profiles option affects how files are saved.
- Assumed Profiles and Profile Mismatch handling options affect how files are opened.
- File formats that support embedding include EPS, JPEG, PCT, PDF (only for RGB and Grayscale images), PSD, and TIFF.
- Some applications require you to choose which profile to associate with a file when opening the file. To create an ICC profile for your RGB or CMYK settings, see the instructions about loading settings in "Entering RGB setup information" on page 84 and "Using color separation tables" on page 98.

To specify how Photoshop should interact with ICC profiles:

1 Choose File > Color Settings > Profile Setup.

2 For Embed Profiles, select the types of files into which you want to embed ICC profiles: RGB, CMYK, Grayscale, Lab, or none at all. ICC profiles will then be embedded when you save those types of files.

Note: *Deselecting the Embed Profiles option marks the file as intentionally untagged, which disables the assumed profile feature when the file is reopened. This will prevent the file from being converted each time you open it.*

3 In the Assumed Profiles area, choose which ICC profiles to use to define the RGB, CMYK, and Grayscale color spaces to convert from when opening files that don't contain an ICC profile.

For example, if an RGB image was previously saved in Photoshop 4.0 in Mac OS, choosing Monitor RGB here would open the image using the same RGB color space it used before. (This occurs because earlier versions of Photoshop edited images within your monitor's color space.)

Note: *This feature is disabled for images saved from Photoshop 4.0.*

Choosing Ask When Opening displays a dialog box when opening a file that doesn't have an embedded profile.

4 In the Profile Mismatch Handling area, choose whether to convert files being opened for which the embedded or assumed ICC profile does not match the profiles specified in the appropriate RGB Setup, Grayscale Setup, and CMYK Setup dialog boxes.

Choosing Ask When Opening displays a dialog box when opening a file whose embedded or assumed profile doesn't match the setting in the appropriate Setup dialog box.

Choosing Ignore ignores color information embedded in a file and opens the file with no color conversion.

Choosing Convert converts the image to the chosen color space as defined by the appropriate Setup dialog box.

Important: *Adobe does not recommend automatically converting CMYK images to other color spaces, because CMYK color space mismatches can cause color information (such as black generation, undercolor removal, and trapping) to be lost in the image. For CMYK, you should choose Ask When Opening, Convert to RGB Color, or Convert to Lab Color.*

To open a file when the Profile Mismatch dialog box appears:

Do one of the following:

- Click Don't Convert to open the file without converting its color space.
- Click cancel to close the file without converting its color space.
- Apply the options described for the Profile to Profile command. (See Converting the color space of open images.) Then click Convert to convert the file's color space.

Converting the color space of open images

The Profile to Profile command lets you convert an open image from any color space to the color spaces defined in the RGB Setup, Grayscale Setup, and CMYK Setup dialog boxes.

If you've changed one of the Setup dialog boxes, use this command to maintain accurate color on any open images. For example, if you've used the RGB Setup dialog box to change the RGB color space from sRGB to CIE RGB, you can select an open RGB image and use the Profile to Profile command to convert the image data from sRGB to CIE RGB.

The Profile to Profile command is also useful if you chose to ignore ICC profiles when opening files. You can then convert the open file to your native RGB space using this command.

Note: *The Profile to Profile command can also convert an image to a color space that does not match the color settings in the RGB Setup or CMYK Setup dialog boxes. However, this is not usually recommended, because it can result in inaccurate on-screen displays and can embed the wrong profiles in saved files.*

If you want to convert an image to an arbitrary color space, and you are aware of these issues, hold down the Alt (Windows) or Option (Macintosh) key when selecting Profile to Profile. The To option will then list all available ICC profiles.

To convert the color space of open images:

1 Select an open image.

2 Choose Image > Mode > Profile to Profile.

3 For From, choose the image's color space.

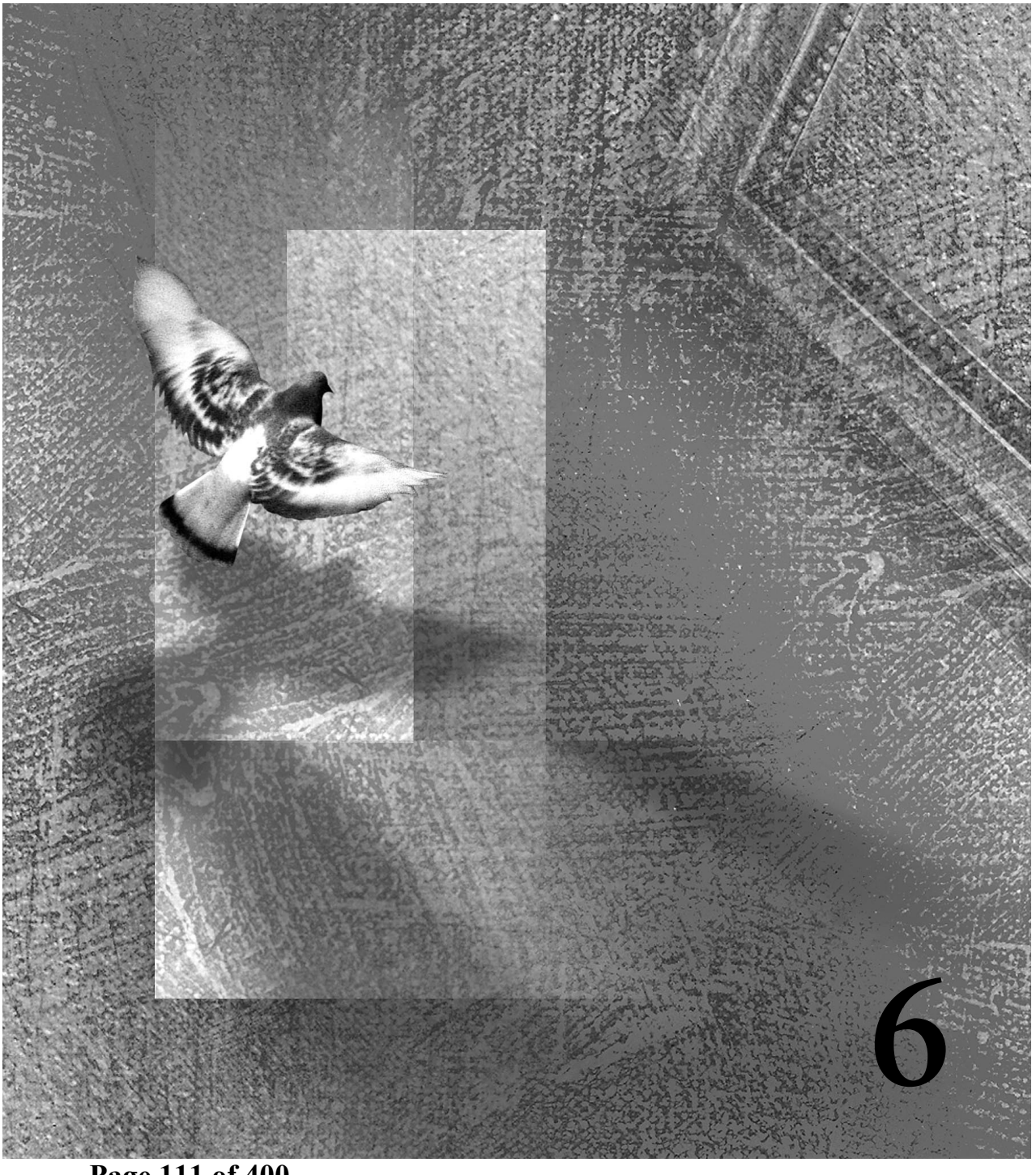
4 For To, choose the color space to which you want to convert the image. Choosing RGB or CMYK will use the color space information defined in that RGB Setup or CMYK Setup dialog box.

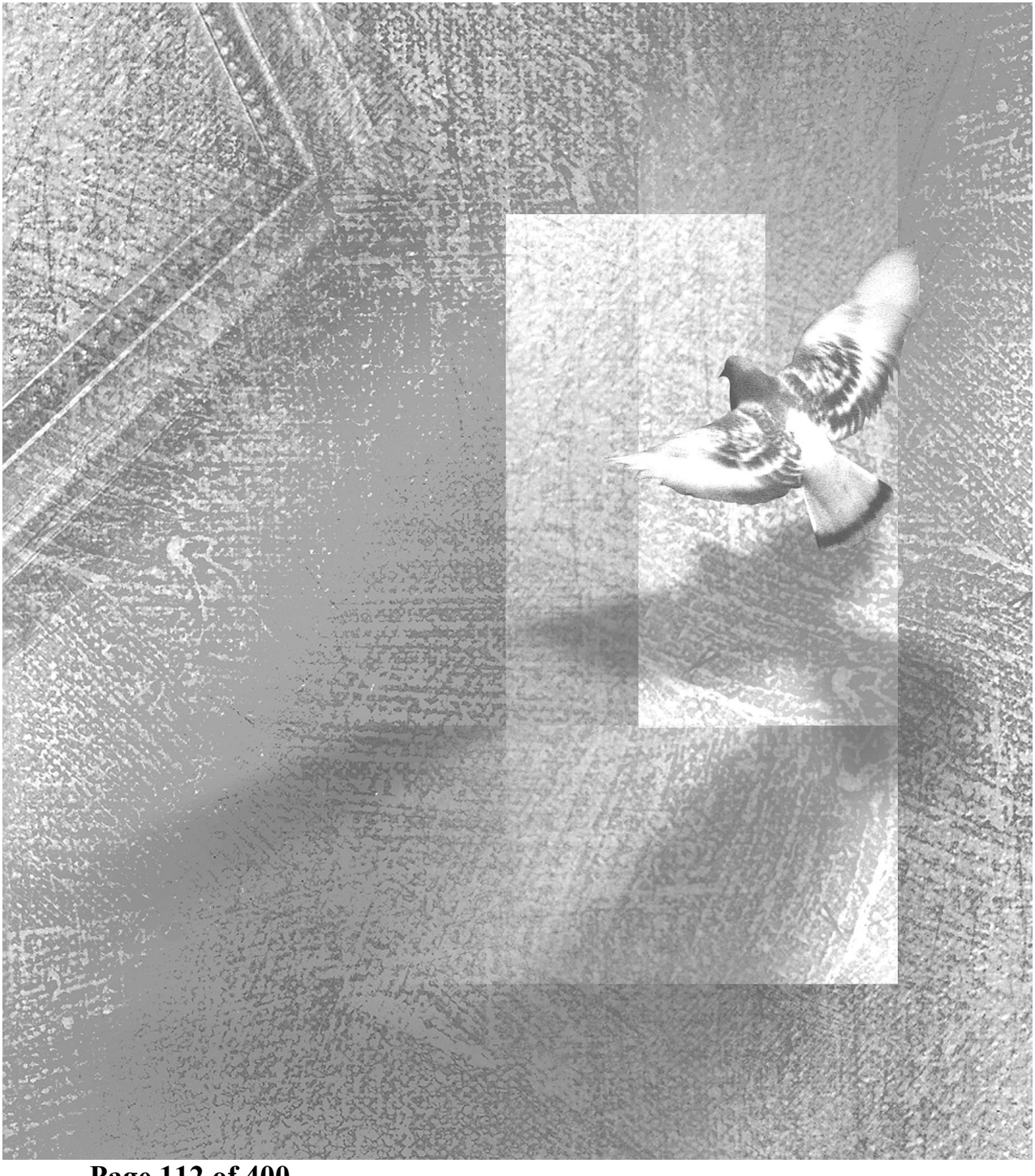
5 For Engine, choose a CMM.

6 For Intent, choose a rendering intent. (See"Using ICC profiles to define the CMYK color space" on page 87.)

7 If desired, choose Black Point Compensation to map the darkest neutral color of the images "From" color space to the darkest neutral color of the images "To" color space rather than to black when converting colors.

8 Click OK.


6



Chapter 6: Making Color and Tonal Adjustments

By calibrating your system as described in Chapter 5, "Reproducing Color Accurately," you ensure that the colors contained in images are displayed accurately on your monitor. (If you have not calibrated, you may be making adjustments to an image based on a false representation of its color.) Once your system is calibrated correctly, you are ready to adjust the color and tone of individual images by following the general steps outlined in this chapter.

Using the Adobe Photoshop color correction tools

All Adobe Photoshop color correction tools work essentially the same way: by mapping existing ranges of pixel values to new ranges of values. The difference between the tools is the amount of control you have.

For example, the Brightness/Contrast command makes the same adjustment to every pixel in the selection or image—if you increase the brightness value by 30, 30 is added to the brightness value of every pixel. On the other hand, two of the color adjustment tools are particularly useful because of the control and flexibility they provide. Levels allows you precise adjustments using three variables (highlights, shadows, and midtones). Curves replicates high-end color correction systems and lets you isolate 16 ranges of pixel values between pure highlight and pure shadow.

For finer control over color, convert your artwork to a 16-bit image as described in "Converting between bit depths" on page 69. When you finish making color adjustments, convert it back to an 8-bit image.

Using color adjustment commands

You can use most color adjustment tools in three ways: applying them to one or more channels, to a regular layer, or to an adjustment layer. When you make color adjustments to a channel or a regular layer, you permanently alter the pixels on that layer.

With an adjustment layer, your color and tonal changes reside only within the adjustment layer and do not alter any pixels. The effect is as if you were viewing the visible layers through the adjustment layer above them. This lets you experiment with color and tonal adjustments without permanently altering pixels in the image. Adjustment layers are also the only way to affect multiple layers at once. (See "Using adjustment layers" on page 281; "Color channels" on page 67; and Chapter 10, "Using Channels and Masks.")

To open a color adjustment dialog box:

Do one of the following:

- Choose Image > Adjust and choose the command you want from the submenu.
- Hold down Ctrl (Windows) or Command (Mac OS), and click the New Layer button in the Layers palette. For type, choose the color adjustment command you want, and click OK.
- Choose Layer > New > Adjustment Layer. For Type, choose the color adjustment command you want and click OK.
- For an existing adjustment layer, double-click the adjustment layer name in the Layers palette.

To cancel color changes without closing a color adjustment dialog box, hold down Alt (Windows) or Option (Mac OS) to change the Cancel button to the Reset button; click Reset. This action—like resetting an adjustment layer—resets the image to the default settings (except for the Posterize and Threshold commands).

Previewing color adjustments

When you make color changes to a selection, Photoshop usually displays the changes throughout the entire screen. This happens because the Preview option is selected and, by default, Photoshop does not use the video card's color lookup table (VLUT) in response to your adjustments. Known as *video table lookup*, or *color table animation*, this process displays an immediate, but not always accurate, preview of changes. You can turn off color table animation to display an accurate preview of color adjustments to the selected area only.

The following guidelines apply when using color table animation:

- The VLUT is off by default on Windows and is not available for most operations on Windows and Mac OS unless the monitor is set to 256 colors.
- For color table animation to work in 24-bit mode with Windows, you must install a color table animation extension, supplied by your video card manufacturer, in the Plug-Ins directory.
- The color table animation feature can cause problems in Mac OS if you are using a 24-bit or 32-bit video card for which certain color QuickDraw commands have not been properly implemented. If you have a problem, contact your video card manufacturer for ROM updates. You should also reset the video mode and turn off the Video LUT Animation option in the General Preferences dialog box.

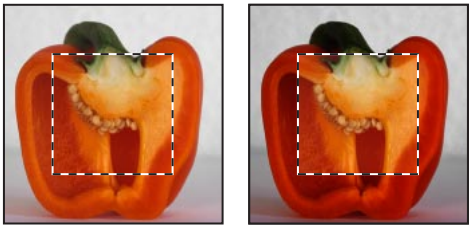


Image with Preview option off and on

To turn on previewing and deactivate color table animation:

Select the Preview option in any color correction dialog box.

To turn off color table animation:

1 Choose File > Preferences > Display & Cursors.

2 Deselect Video LUT Animation, and click OK.

To reset the video mode in a Mac OS machine with a 24-bit or 32-bit video card, for previewing changes:

1 Choose Control Panels from the Apple menu, and double-click Monitors.

2 Click one of the other color display options (such as 256 Colors), and perform a preview to see the results.

3 Click your original color display option.

4 Close the Control Panel.

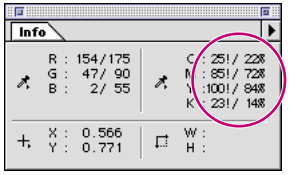
5 In Photoshop, choose File > Preferences > Display & Cursors, and deselect Video LUT Animation; then click OK.

You can still preview changes by clicking the Preview option, but clicking Preview will not turn the color table animation off and on.

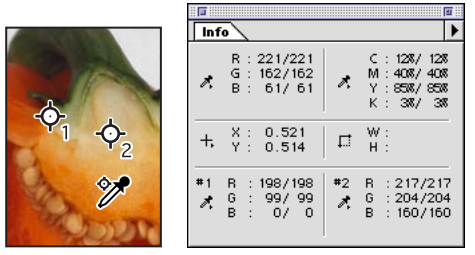
Previewing color values

You can use the Color palette and the Info palette to preview the color values of pixels affected by color adjustments.

When you work with a color adjustment dialog box, the Info palette displays two sets of color values for the pixels under the pointer. The value in the left column is the original pixel's color value. The value in the right column is the color value after the adjustment is made.



You can view the color of a single area using the eyedropper tool, or you can use up to four color samplers to display color information for one or more locations in the image. These samplers are saved in the image, so you can refer to them repeatedly as you work, even if you close and reopen the image.



Color samplers and Info palette

To view color samplers and color sampler information:

Select the eyedropper (🖉) or color sampler (🖉) tool, or open a color adjustment dialog box.

To display or hide color sampler information in the Info palette:

• Choose Show Color Samplers or Hide Color Samplers from the Info palette menu.

To place a color sampler:

Select the color sampler tool (), and click where you want to place it.

To set the area measured by the color sampler tool:

1 Select the color sampler tool ().

2 Choose Window > Show Options.

3 Choose what to sample:

• Point Sample to read the value of a single pixel.

• 3 by 3 Average to read the average value of a 3-by-3 pixel area.

• 5 by 5 Average to read the average value of a 5-by-5 pixel area.

To delete a color sampler:

1 Select the color sampler tool ().

2 Delete the color sampler:

• Drag the sampler out of the document window.

• Hold down Alt (Windows) or Option (Mac OS), and click the sampler.

To move a color sampler:

1 Select the color sampler tool ().

2 Drag to the new location.

Note: *The sampler does not move to the new location until you release the mouse button.*

To change the color space in which a color sampler displays values:

1 Move the pointer onto the color sampler icon in the Info palette.

2 Hold down the mouse button and choose a color space from the menu.

To use the Info palette to preview color changes:

1 Choose Window > Show Info. (See "Using the Info palette" on page 30 for information on the Info palette display options.)

2 Place one or more color samplers if desired. As with the eyedropper tool, the color sampler reads a 1-by-1, 3-by-3, or 5-by-5 pixel area.

3 Open a color adjustment dialog box (see "Using color adjustment commands" on page 105).

4 Move the pointer over an area of the image you want to examine. The eyedropper reads the value of a single screen pixel, a 3-by-3 screen pixel area, or a 5-by-5 screen pixel area, depending on the Sample Size option chosen in the Eyedropper Options palette. (See "Using the eyedropper tool" on page 214.)

Note: *Opening a color adjustment dialog box activates the eyedropper tool outside the dialog box. However, you still have access to the scroll controls and to the hand and zoom tools when using keyboard modifier keys.*

5 Make any color adjustments, and before applying them, view the before and after color values in the Info palette.

To use the Color palette to preview color values:

1 Choose Window > Show Color.

2 Select the eyedropper tool (✎).

3 Open a color adjustment dialog box (see "Using color adjustment commands" on page 105).

4 Click the pixel you want to preview in the image.

The color values of the pixel after the adjustment has been made are shown in the Color palette.

Saving and loading color adjustment settings

The Save and Load buttons in the Levels, Curves, Selective Color, Replace Color, Hue/Saturation, and Variations dialog boxes let you save color corrections and apply them to other images.

To apply a color correction adjustment to another image:

1 Click Save in the color correction dialog box you are using, and name and save the color correction settings.

2 Close the color correction dialog box, and open the image to which you want to apply the corrections.

3 Reopen the color correction dialog box, and click Load. Locate and open the saved color correction file.

4 Click OK to apply the corrections to the image.

If you routinely apply the same color correction, consider recording and running the correction as an action.

Comparing CMYK and RGB mode corrections

Even though you can perform all tonal and color corrections in either RGB or CMYK mode, you should choose carefully.

Whenever possible avoid multiple conversions between modes, because color values are rounded and lost with each conversion. If an RGB image is to be used on-screen, you needn't convert it to CMYK mode. Conversely, if a CMYK scan is to be separated and printed, you needn't perform corrections in RGB mode.

But if you must convert your image from one mode to another anyway, it makes sense to perform most of your tonal and color corrections in RGB mode and use CMYK mode for fine-tuning. Keep in mind the following advantages of working in RGB mode:

- You save memory and improve performance.
- You have more device independence, because RGB color spaces are not dependent on monitors or inks. Corrections made to the image are preserved regardless of the monitor, computer, or output device used. If any of these devices change, simply change the appropriate CMYK Setup options and then reconvert the RGB image to CMYK.

• With certain types of separations, you must work in RGB mode anyway. For example, if you separate an image using the Maximum Black Generation option in the CMYK Setup dialog box, it will be difficult, if not impossible, to make any corrections requiring a significant increase in the C, M, or Y components. To make these changes, you must reconvert the image to RGB, correct the color, and then reseparate the image—or you must reseparate the image with a lighter Black Generation option.

Previewing CMYK colors

When adjusting out-of-gamut colors or making color corrections in RGB mode, you can preview CMYK colors in an RGB image.

To preview CMYK colors:

Choose View > Preview > CMYK, Cyan, Magenta, Yellow, Black, or CMY. (To return to the normal preview mode, reselect this option.)

CMYK equivalents for colors in the image are displayed using the current separation and calibration values in the CMYK Setup dialog boxes, but no permanent changes are made.

Monitor CMYK colors as you edit in RGB mode by choosing View > New View to open a second window. Turn on CMYK Preview in one window and leave it off in the other.

Identifying out-of-gamut colors

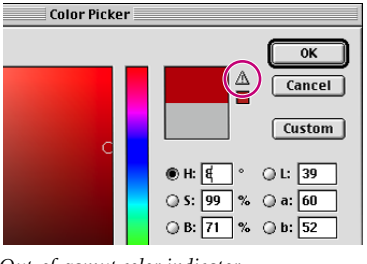
The *gamut* is the range of colors that can be displayed or printed in a color system. A color that can be displayed in RGB or HSB models may be out-of-gamut, and therefore unprintable, for your CMYK setting. (See "Color gamuts" on page 66.)

Photoshop automatically brings all colors into gamut when you convert an image to CMYK. But you might want to identify the out-of-gamut colors in an image or correct them manually before converting to CMYK.

In RGB mode, you can identify out-of-gamut colors in the following ways:

• In the Info palette, an exclamation point appears next to the CMYK values whenever you move the pointer over an out-of-gamut color.

• In both the Color Picker and the Color palette, an alert triangle appears and the closest CMYK equivalent is displayed whenever you select an out-of-gamut color. To select the CMYK equivalent, click the triangle or the color patch.



Out-of-gamut color indicator

You can also quickly identify all out-of-gamut colors in an RGB image by using the Gamut Warning command. This command highlights all pixels that are out of gamut in the image.

To turn on and off the highlighting of out-of-gamut colors:

Choose View > Gamut Warning.

To change the gamut warning color:

1 Choose File > Preferences > Transparency & Gamut.

2 Under Gamut Warning, click the color box to display the color picker; then choose a new warning color.

3 Enter a value in the Opacity text box. Values can range from 0 to 100%. Use this setting to reveal more or less of the underlying image through the warning color. Then click OK.



For a color illustration of the gamut warning color, see figure 6-1 on page 225.

Note: *Because the gamut warning is generated using the current CMYK settings, be sure to fill in the CMYK Setup dialog box properly before following these out-of-gamut procedures. (See "Calibrating the screen image to the proof" on page 92 and "Adjusting separation options" on page 89.)*

STEPS IN MAKING COLOR AND TONAL ADJUSTMENTS

1 Calibrate (page 111).

2 Check the scan quality (page 112).

3 Set the highlights and shadows (page 114).

4 Adjust the midtones (page 119).

5 Adjust the color balance and fine-tune (page 122).

6 Apply Unsharp Mask (page 128).

Step 1: Calibrate your system

The first, critical step before making a color or tonal adjustment to an image is to make sure that you have calibrated your system as described in Chapter 5, "Reproducing Color Accurately." Otherwise, the image's color on your screen can look vastly different from the same image when printed or when seen on another monitor.

If you are a color expert, you could print a full-color proof of each image whenever any element in your environment changed (such as lighting) or whenever you adjusted the image's color and tone. However, by calibrating you ensure that colors are reproduced more accurately on your system, saving you time and expense.

Step 2: Check the scan quality and tonal range

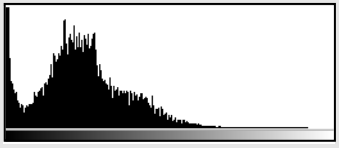
It's important to determine whether your image has sufficient detail to produce high-quality output. The higher the number of pixels in an area, the greater the detail. Bad photographs or bad scans can be difficult if not impossible to correct. Too many color corrections can also result in loss of pixel values and too little detail.

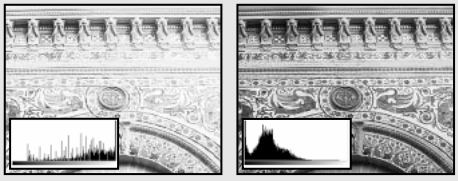
If you save a copy or use adjustment layers, you can always revert to the original image.

A *histogram* graphs the number of pixels at each brightness level in an image. It can show you whether an image contains enough detail to make a good correction. It also gives a quick picture of the tonal range of the image, or the image *key type*. A low-key image has detail concentrated in the shadows, a high-key one has detail concentrated in the highlights. An image with full tonal range has a high number of pixels in all these areas. Identifying tonal range helps determine appropriate tonal corrections.

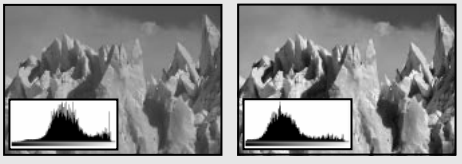
A quick way to adjust an image that's too dark is to move the white point to where the pixels begin, using the histogram in the Levels dialog box.

LOOKING AT THE HISTOGRAM The histogram shows how the pixels' values are distributed in an image, and whether the image contains enough detail in the shadows (shown in the left part of the histogram), the midtones (shown in the middle), and the highlights (shown in the right) to produce a good correction.

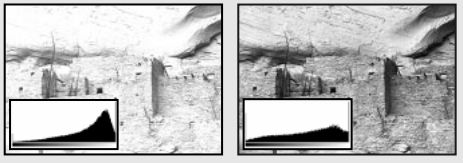




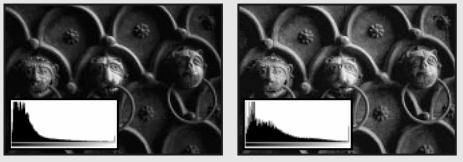
Original with insufficient detail, and sufficient detail



Original, and corrected average-key image



Original, and corrected high-key image



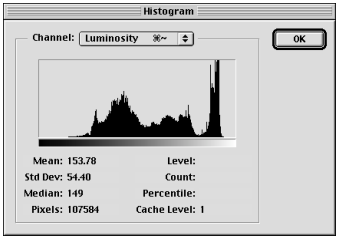
Original, and corrected low-key image

To determine whether a scan captured enough detail for high-quality output, check the RGB pixel values of your highlight and shadow areas in the Info palette—generally, 240 and 10, respectively. The scan must also be free of large gaps within these ranges.

To check the histogram for an image:

1 Open the image you want to examine, and choose Image > Histogram.

Note: *To include pixel data from spot channels and alpha channels, hold Alt (Windows) or Option (Mac OS) when you choose Image > Histogram.*



Histogram of gray levels in entire image

The *x* axis of the histogram represents the color values from darkest (0) at the far left to brightest (255) at the far right; the *y* axis represents the total number of pixels with a given value.

Note: *If part of the image is selected, the histogram represents only the selected pixels. In addition, the histogram for an adjustment layer depends on the visibility of the layers beneath it.*

The numerical values at the lower left of the Histogram dialog box display statistical information about the color values of the pixels:

- Mean is the average brightness value.
- Standard deviation (Std Dev) represents how widely the values vary.
- Median shows the middle value in the range of color values.
- Pixels represents the total number of pixels used to calculate the histogram.
- Cache Level shows the setting for the image cache. If the Use Cache for Histograms option is selected in the Memory & Image Cache Preferences dialog box, the histogram is based on a representative sampling of pixels in the image (based on the magnification), rather than on all of the pixels.

2 For RGB, CMYK, and indexed-color images, choose an option from the Channel menu. You can plot either the color values in the individual channels or the luminance of the composite channel (with the Luminosity option).

3 To view information about a specific point on the histogram, place the pointer there. To view information about a range of values, drag in the histogram to highlight the range.

The values at the lower right of the dialog box change to display the gray level (Level) of the point (from 0 to 255), the total number of pixels at that level (Count), and the percentage of pixels at or below that level (Percentile).

Step 3: Set the highlight and shadow values

You begin professional tonal correction by assigning values to the extreme highlight and shadow pixels in the image, setting an overall tonal range that allows for the sharpest detail possible throughout the image. This process is known as *setting the highlights and shadows* or *setting the white and black points*. You can do this several ways.

Determining highlight and shadow values

High-key and low-key images may benefit from slightly different target values than those suggested in "Setting the highlights and shadows using target values" on page 114:

- With a low-key image, you might want to set the highlight to a lower value to avoid too much contrast.
- With a high-key image, you might want to set the shadow to a higher value to maintain detail in the highlights.

Experiment with shadow Brightness values between 4 and 20 and highlight Brightness values between 96 and 80.

Use an adjustment layer for each color correction technique described in this section. Adjustment layers let you experiment with different color correction settings without permanently changing underlying pixel values. (See "Using adjustment layers" on page 281.)

For a color illustration on determining highlight and shadow values, see page 230.

Setting the highlights and shadows using target values

Professional color technicians typically set the highlights and shadows in the image by assigning their lightest and darkest CMYK ink values to the lightest and darkest areas of detail in the image.

It's important to identify a truly representative highlight and shadow area. Otherwise the tonal range may be expanded unnecessarily to include extreme pixel values that don't give the image detail. A highlight area must be a printable highlight, not *specular white*. Specular white has no detail, and so no ink is printed on the paper. For example, a spot of glare is specular white, not a printable highlight.



Selecting the specular highlight area and the representative highlight area

To set the highlight and shadow using target values:

1 Select and double-click the eyedropper tool (🖉) to display its Options palette.

2 For Sample Size, choose 3 by 3 Average.

The eyedropper displays the average value of each 3-by-3-screen-pixel area, ensuring a representative sample of an area rather than the value of a single screen-pixel.

3 Identify the highlight:

• Open the Info palette, and move the pointer around the image to help identify the lightest neutral areas in the image. (See "Previewing color values" on page 107.)

• Use Threshold mode in the Levels dialog box to identify the highlight area in the image (see the procedure for using Threshold mode to identify the lightest and darkest areas in the image on page 116).

• Open the Curves dialog box and drag the pointer in the image to identify the lightest and darkest areas. (See "Using the Curves command" on page 120.)

4 Open the Levels or Curves dialog box, as described in "Using color adjustment commands" on page 105.

5 Double-click the white eyedropper tool to display the color picker. In the color picker, enter the value that you want to assign to the highlight you identified in step 3, following these guidelines:

• In most situations when you are printing on white paper, you can achieve a good highlight in an average-key image using CMYK values of 5, 3, 3, and 0, respectively.

• The RGB equivalent is 244, 244, 244.

• The grayscale equivalent is a 4% dot.

• You can reproduce these target values quickly by entering a value of 96% in the Brightness text box.

Important: *If you have changed your monitor or separation setup values from their defaults, entering non-CMYK values will generate different values from those shown in this example. For more information on target values for highlights and shadows, see the color illustration on page 230.*

6 Click OK in the Color Picker dialog box when you've entered the values, and then click the highlight area that you identified in step 3. If you accidentally click the wrong highlight, hold down Alt (Windows) or Option (Mac OS), and click Reset in the dialog box.

The pixel values throughout the image are adjusted proportionately to the new highlight values. Any pixels lighter than the area you clicked become specular white. The Info palette shows the values both before and after the color adjustment.

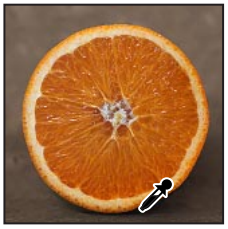
7 Use the Info palette to help identify a representative shadow area in the image. (Don't click the area yet.)

8 Double-click the black eyedropper tool in the Levels or Curves dialog box, and enter a target shadow value following these guidelines:

• Typical when you're printing on white paper. You can achieve a good shadow in an average-key image using CMYK values of 65, 53, 51, and 95.

- The RGB equivalent is 10, 10, 10.
- The grayscale equivalent is a 96% dot.
- You can reproduce these same values quickly by entering a value of 4 in the Brightness text box.

9 Click OK when you've entered the values. Then click the shadow area you identified in step 7.



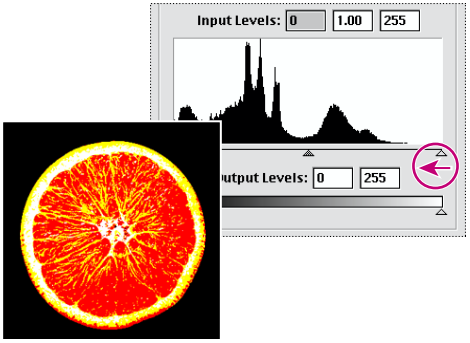
To use Threshold mode to identify the lightest and darkest areas in the image:

1 Open the Levels dialog box (see "Using color adjustment commands" on page 105). Make sure that the Preview option is deselected.

The Levels dialog box displays a histogram of the image (unless it is an adjustment layer). (See "Step 2: Check the scan quality and tonal range" on page 112.)

Note: *On most systems running Windows, Threshold mode works only if the monitor is set to 256 colors. The Video LUT Animation option in the General Preferences dialog box must be on for Threshold mode to work. (See "Previewing color adjustments" on page 106.)*

2 Hold down Alt (Windows) or Option (Mac OS), and drag the white or black Input Levels triangle.



The image changes to Threshold mode, and a high-contrast preview image appears. The visible areas of the image indicate the lightest parts of the image if you are dragging the white slider, and the darkest parts if you are dragging the black slider. If a color channel is selected in the Levels dialog box, the black area indicates where none of the given color component exists.

3 Slowly drag the slider to the center of the histogram to identify the light or dark areas in the image. Use these pixels for targeting the black point and white point in your image.

Setting the highlights and shadows using the Levels sliders

You can also set the highlights and shadows in an image by moving the Levels input sliders to the first group of pixels on both ends of the histogram. Doing so maps these pixels—the darkest and lightest pixels in each channel—to black and white, increasing the tonal range of the image. The corresponding pixels in the other channels are adjusted proportionately to avoid altering the color balance.

Less exact than assigning target values or using the Curves dialog box, this method often gives good results, especially if you want to maintain a color cast in the highlights and shadows. (For more information, see "Using the Curves command" on page 120.)

In many images, eliminating the color cast is useful. But in other images, using the Levels sliders to set the highlights and shadows may produce better results precisely because it does not affect the color balance.



For a color illustration of color cast, see figure 6-2 on page 225.

To set the highlights and shadows using the Levels sliders:

1 Open the Levels dialog box (see "Using color adjustment commands" on page 105).

The Levels dialog box displays a histogram of the image. (See "Step 2: Check the scan quality and tonal range" on page 112.)

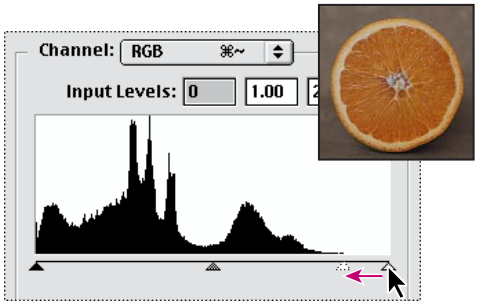
2 If the image has more than one color channel, choose the channel (or channels) you want to adjust from the Channel menu. (See "Using the Channels palette" on page 240.)

To edit a combination of color channels at the same time, Shift-select the channels in the Channels palette before choosing the Levels command. The Channel menu then displays the abbreviations for the target channels—for example, CM for cyan and magenta. The menu also contains the individual channels for the selected combination.

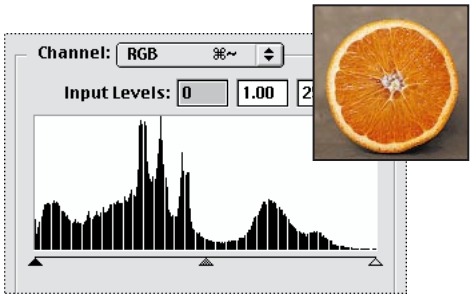
3 Drag the Input Levels sliders to the edge of the first group of pixels on either end of the histogram.

For example, suppose you want to increase the contrast in an image with pixels that currently cover a range of only 0–233. If you drag the Input Levels white triangle to 233, pixels with brightness values of 233 and higher (in each channel of the image) are mapped to 255, pixels with lower brightness values are mapped to corresponding lighter values. This remapping lightens the image, increasing the contrast in highlight areas.

You can also enter values directly into the Input Levels text boxes.



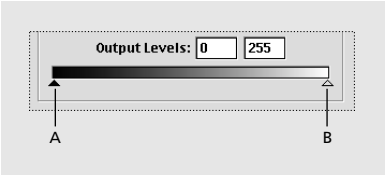
Original



Resulting histogram

Suppose instead you want to decrease the contrast in the image. If you drag the Output Levels white triangle to 220, pixels with brightness values of 255 are remapped to 220, and pixels with lower brightness values are mapped to corresponding darker values. This darkens the image, decreasing the contrast in highlight areas.

You can also enter values directly into the Output Levels text boxes.



A. *Decreases shadows* ***B.*** *Decreases highlights*

4 If your image also needs midtone corrections, you can set them now with the Levels dialog box. Do this before applying the levels changes. (See "Adjusting the midtones using the Levels sliders" on page 119.)

5 Click OK.

6 To view the new histogram, reopen the Levels dialog box. The histogram has been stretched out to accommodate the new white and black points, causing gaps in the histogram.

These gaps do not indicate a perceptible problem in the image unless they are large or accompanied by a low pixel count.

Setting the highlights and shadows automatically

The Auto Levels command and Auto buttons in the Levels and Curves dialog boxes perform automatically the equivalent of the Levels slider adjustment: they define the lightest and darkest pixels in each channel as white and black and then redistribute the intermediate pixel values proportionately.

By default, the Auto feature clips the white and black pixels by 0.5%—that is, it ignores the first 0.5% of either extreme when identifying the lightest and darkest pixels in the image. This clipping of color values ensures that white and black values are based on representative rather than extreme pixel values.

The Auto feature gives good results when an image with an average distribution of pixel values needs a simple contrast adjustment. However, adjusting the Levels or Curves controls manually is more precise. (See "Setting the highlights and shadows using the Levels sliders" on page 117, and "Using the Curves command" on page 120.)

To set the black and white points automatically:

1 Do one of the following:

• Choose Image > Adjust > Auto Levels.

• Open the Levels or Curves dialog box, as described in "Using color adjustment commands" on page 105, and then click Auto.

To change the amount of white and black values clipped:

1 Hold down Alt (Windows) or Option (Mac OS), and click Options in the Levels or Curves dialog box.

2 In the Auto Range dialog box, enter the percentage of extreme highlight and shadow pixels to ignore, and click OK. A value between 0.5% and 1% is recommended.

Step 4: Adjust the midtones and fine-tune the tonal correction

Once you have set the highlights and shadows, you may want to fine-tune the contrast. This step is usually not necessary with average-key images. Setting the highlights and shadows typically redistributes the midtone pixel values appropriately. But when pixel values are concentrated on either end of the grayscale, the midtones often need adjustment.

You can use the gray eyedropper button in the Levels or Curves dialog box to eliminate color casts in the midtones. But for precise control over midtone adjustments, use the Levels midtone slider or Curves. (See "Setting the highlights and shadows using target values" on page 114 for a description of how the eyedropper buttons work.)

Adjusting the midtones using the Levels sliders

The Levels sliders let you gradually adjust the brightness, contrast, and midtones in an image. By adjusting the midtones, you can change the brightness values of the middle range of gray tones without dramatically altering the shadows and highlights.

To use the Levels sliders:

1 Open the Levels dialog box (see "Using color adjustment commands" on page 105).

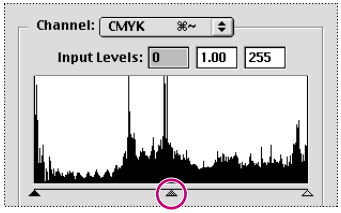
The Levels dialog box displays a histogram of the image. (See "Step 2: Check the scan quality and tonal range" on page 112.)

2 If you're working in an image with more than one color channel, choose the channel (or channels) you want to adjust from the Channel menu. (See "Using the Channels palette" on page 240.)

To edit a combination of color channels at the same time, Shift-select the channels in the Channels palette before choosing the Levels command. The Channel menu then displays the abbreviations for the target channels—for example, CM for cyan and magenta. The menu also contains the individual channels for the selected combination.

3 Select Preview to see your changes as you drag the Levels sliders.

4 To adjust the midtones, use the gray slider directly under the histogram. Drag the slider to the right to darken the midtones, drag it to the left to lighten the midtones. You can also enter values directly in the Input Levels text boxes, using the center text boxes for midtones.



Adjusts gamma or gray levels

5 Click OK.

Using the Curves command

Like Levels, Curves lets you adjust the tonal range of an image. However, instead of making the adjustments using just three variables (highlights, shadows, and midtones), you can adjust any point along the 0–255 scale while keeping up to 15 other values constant.

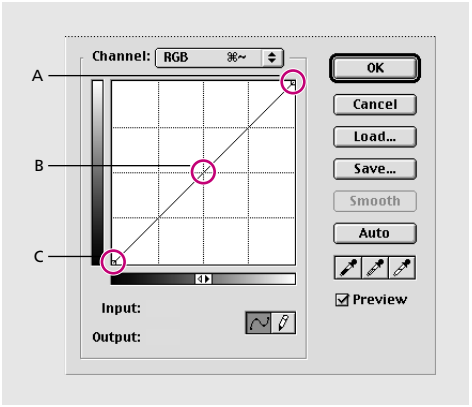
You can also use the Arbitrary Map option in the Curves dialog box to draw a tonal curve by dragging. This feature lets you create a variety of interesting tonal and color effects.



For a color illustration of using curves for tonal adjustment, see the sidebar on page 231.

To use the Curves dialog box:

1 Open the Curves dialog box (see "Using color adjustment commands" on page 105).



***A.** Highlights **B.** Midtones **C.** Shadows*

The horizontal axis of the graph represents the original brightness values of the pixels (Input levels); the vertical axis represents the new brightness values (Output levels). In the default diagonal line, no pixels have been mapped to new values, so all pixels have identical Input and Output values.

Note: *For RGB images, Curves displays brightness values from 0 to 255, with shadows (0) on the left. For CMYK images, Curves displays percentages from 0 to 100, with highlights (0) on the left. To reverse the curve and change the display at any time, click the double arrow beneath the curve.*

2 If the image has more than one color channel, choose the channel (or channels) you want to adjust from the Channel menu.

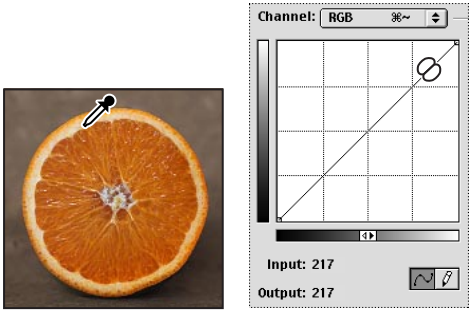
To edit a combination of color channels at the same time, Shift-select the channels in the Channels palette before choosing the Curves command. The Channel menu then displays the abbreviations for the target channels—for example, CM for cyan and magenta. The menu also contains the individual channels for the selected combination.

For more information on choosing channels, see "Using the Channels palette" on page 240.

3 To make the Curves grid finer, hold down Alt (Windows) or Option (Mac OS), and click the grid. Alt/Option-click again to make the grid larger.

4 Click the part of the curve you want to adjust.

A set of direction arrows marks the pixel's position on the graph, and the Input and Output values appear at the bottom of the dialog box.



Clicking in the image displays the pixel values and location on the curve.

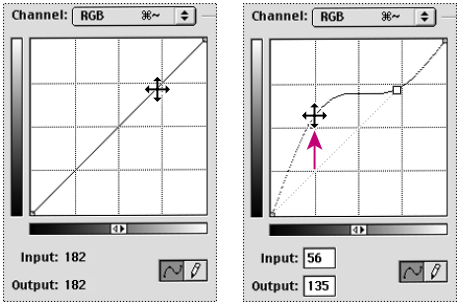
Drag through the image to determine the lightest and darkest areas in the composite channel of an RGB, Lab, or grayscale image, or in individual channels of all images. This is particularly useful in Windows when the threshold function in Levels is unavailable.

5 Click any points on the curve that you want to remain fixed. For example, if you want to adjust the midtones while minimizing the effect on the highlights and shadows, click the quarter and three-quarter points on the curve.

You can add up to 14 points to the curve, locking those values. To remove a fixed point, drag it off the graph; select it and press Delete; or Ctrl-click (Windows) or Command-click (Mac OS) it. You cannot delete the endpoints of the curve.

6 Adjust the curve:

- Drag the curve until the image looks as you want it.
- Enter an Input and Output value for the selected point on the curve.



Click to fix a point on the curve. Click and drag to adjust.

The gamma of any curve is its slope, expressed as the ratio of the logs of the output to input values. For example, a gamma value of 1.0 equals an output-to-input ratio of 1:1. Moving the midpoint of the curve up (in an RGB readout) lowers the gamma value (that is, to less than 1.0); moving the midpoint down raises the gamma value. (This is the same as moving the gamma Levels slider to the right to lower the gamma level, left to raise it.)

The following shortcuts work with the Curves dialog box:

- Ctrl-click (Windows) or Command-click (Mac OS) in the image to set a point on the curve for the selected color in the composite channel (but not in the component channels).
- Shift+Ctrl-click (Windows) or Shift+Command-click (Mac OS) in the image to set a point on the curve for the selected color in each color component channel (but not in the composite channel).
- Arrow keys to move points on the curve.
- Shift-click to select multiple points.
- Ctrl+Tab (Windows) or Command+Tab to move forward through control points on the curve.
- Shift+Ctrl+Tab (Windows) or Shift+Command+Tab to move backward through control points on the curve.
- Ctrl-click (Windows) or Command-click (Mac OS) in the grid to deselect all points on the curve.
- Ctrl-D (Windows) or Command-D (Mac OS) in the grid to deselect all control points on the curve.

To use the Arbitrary Map option in the Curves dialog box:

1 Click the pencil at the bottom of the Curves dialog box.

2 Drag to draw the curve you want in the Curves graph area.

The pencil pointer appears when you move into the graph. To constrain the curve to a straight line, hold down Shift, and click to define the endpoints of the curve. For example, you can create an image negative by holding down Shift and clicking the upper left and then the lower right corner of the graph.

3 If desired, click Smooth to smooth the curve.

Step 5: Adjust the color balance

With the tonal correction complete, you can accurately examine and diagnose any problems with color in the image—a color cast, oversaturated or undersaturated colors.

Once again, although you can use the Levels command, Curves offers the most precise control over pixel distribution within a channel. The commands Hue/Saturation, Replace Color, and Selective Color offer additional control over specific color components and attributes. For examples of corrections of specific color imbalances, see "Correcting The Color Plates" on page 232.

Adjusting color balance

Every color adjustment affects the overall color balance in your image. You have numerous ways to achieve similar effects, so determining which adjustment is appropriate depends on the image and on the desired effect.

It helps to keep a diagram of the color wheel on hand if you're new to adjusting color components. You can use the color wheel to predict how a change in one color component affects other colors and also how changes translate between RGB and CMYK color models. For example, you can decrease the amount of any color in an image by increasing the amount of its opposite on the color wheel—and vice versa. Similarly, you can increase and decrease a color by adjusting the two adjacent colors on the wheel, or even by adjusting the two colors adjacent to its opposite.


For a color illustration of the color wheel, see figure 6-3 on page 225.

For example, in a CMYK image you can decrease magenta either by decreasing the amount of magenta or its proportion (by adding cyan and yellow). You can even combine these two corrections, minimizing their effect on overall lightness. In an RGB image, you can decrease magenta by removing red and blue or by adding green. All of these adjustments result in an overall color balance containing less magenta.


For a color illustration of correcting color plates with the Curves command, see the sidebar on page 232.

Using the Color Balance command

The Color Balance command lets you change the mixture of colors in a color image. Like the Brightness/Contrast command, this tool provides generalized color correction. For precise control over individual color components, use Levels, Curves, or one of the specialized color correction tools: Hue/Saturation, Replace Color, or Selective Color.

Note: *You can also change the mixture of colors with the Channel Mixer command. (See "Mixing channels" on page 243.)*

To adjust the levels of a particular color in an image:

1 Open the Color Balance dialog box, as described in "Using color adjustment commands" on page 105.

Note: *You must be viewing the composite channel to use the Color Balance command. (See "Using the Channels palette" on page 240.)*

2 Choose Shadows, Midtones, or Highlights to select the tonal range on which you want to focus the changes.

3 With RGB images, select Preserve Luminosity to prevent changing the luminosity values in the image while changing the color. This option maintains the tonal balance in the image.

4 Drag a triangle toward a color you want to increase in the image; drag a triangle away from a color you want to decrease in the image.

The values above the color bars show the color changes for the red, green, and blue channels. (For Lab images, the values are for the *a* and *b* channels.) Values can range from –100 to +100.

For a color illustration of adjusting the color balance, see figure 6-4 on page 226.

Using the Hue/Saturation command

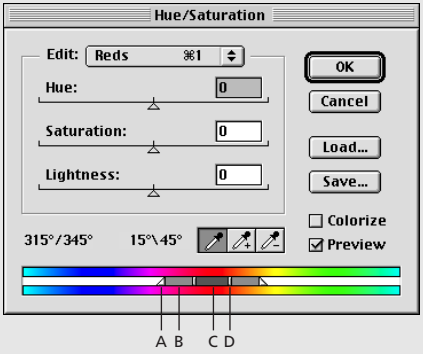
The Hue/Saturation command lets you adjust the hue, saturation, and lightness of individual color components in an image. Like the Color Balance command, this command relies on the color wheel. Adjusting the hue, or color, represents a move around the color wheel. Adjusting the saturation, or purity of the color, represents a move across its radius.

You can also use the Colorize option to add color to a grayscale image converted to RGB, or to an RGB image—for example, to make it look like a duotone image by reducing its color values to one hue.

For a color illustration of hue, saturation, and brightness, see figure 4-1 on page 223.

To adjust an image using Hue/Saturation:

1 Open the Hue/Saturation dialog box, as described in "Using color adjustment commands" on page 105.



***A.** Adjusts fall off without affecting range **B.** Adjusts range without affecting fall off **C.** Moves entire slider **D.** Adjusts range of color component*

Two color bars are displayed in the dialog box. These bars represent the colors in their order on the color wheel.

The upper color bar shows the color before the adjustment; the lower bar shows how the adjustment affects all of the hues at full saturation.

2 Choose which colors to adjust:

- Choose Master from the Edit menu in the dialog box to adjust all colors at once.
- Choose one of the other preset color ranges listed for the color you want to adjust. An adjustment slider appears between the color bars, which you can use to edit any range of hues. (For information on how to modify the slider's range, see the instructions later in this section.)

3 For Hue, enter a value or drag the slider until the colors appear as you want.

The values displayed in the text box reflect the number of degrees of rotation around the wheel from the pixel's original color. A positive value indicates clockwise rotation, a negative value counterclockwise rotation. Values can range from -180 to +180.

4 For Saturation, enter a value or drag the slider to the right to increase the saturation, left to decrease it. The color shifts away from or toward the center of the wheel, relative to the beginning color values of the selected pixels. Values can range from -100 to +100.

For a color illustration of saturation, see figure 6-5 on page 226.

5 For Lightness, enter a value or drag the slider to the right to increase the lightness, left to decrease it. Values can range from –100 to +100.

To modify the range of an adjustment slider:

1 Choose an individual color from the Edit menu in the dialog box:

2 Do any of the following to the adjustment slider:

• Drag the dark gray, center part to move the entire adjustment slider, selecting a different color area.

• Drag one of the vertical white bars next to the dark gray, center part to adjust the range of the color component. Increasing the range decreases the fall off, and vice versa.

• Drag one of the lighter gray bars to adjust the range without affecting the amount of fall off.

• Drag one of the white triangles to adjust the amount of fall off, without affecting the range.

• Ctrl-drag (Windows) or Command-drag (Mac OS) to drag the color bar, so that a different color is in the center of the bar.

If you modify the adjustment slider so that it falls into a different color range, the name changes to reflect this. For example, if you choose Yellow and alter its range so that it falls in the red part of the color bar, the name changes to Red 2. You can convert up to six of the individual color ranges to varieties of the same color range (for example, Red through Red 6).

Note: *By default, the range of color selected when you choose a color component is 30° wide, with 30° of fall off on either side. Setting the fall off too low can produce dithering in the image.*

3 To edit the range by choosing colors from the image, select the eyedropper tool () in the dialog box and click in the image. Use the eyedropper + tool to add to the range; use the eyedropper - tool to subtract from the range. (While the eyedropper tool is selected, you can also press Shift to add to the range or Alt (Windows) or Option (Mac OS) to subtract.)

For a color illustration of hue change, see figure 6-6 on page 226.

To colorize a grayscale image or create a monotone effect:

1 If you are colorizing a grayscale image, choose Image > Mode > RGB to convert the image to RGB.

2 Open the Hue/Saturation dialog box, as described in "Using color adjustment commands" on page 105.

3 Select Colorize. The image is converted to the hue of the current foreground color. The lightness value of each pixel does not change.

4 Use the Hue slider to select a new color if desired.

5 Use the Saturation and Lightness sliders to adjust the saturation and lightness of the pixels. Then click OK.

For a color illustration of the Colorize option, see figure 6-7 on page 226.

Using the Replace Color command

The Replace Color command lets you create a mask based on specific colors in the image to adjust hue, saturation, and lightness values. The mask is temporary and does not create a selection.

For a color illustration of replacing color, see figure 6-8 on page 226.

To adjust and replace a color:

1 Choose Image > Adjust > Replace Color.

2 Choose from the following options:

• Selection to display the mask in the preview box. Masked areas are black and unmasked areas are white. Partially masked areas (areas covered with a semitransparent mask) appear as varying levels of gray according to their opacity. For more information, see "About masks" on page 249.

• Image to display the image in the preview box. This option is useful when you are working with a magnified image or have limited screen space.

3 Click in the image or in the preview box to select areas for the mask. Shift-click or use the Eyedropper + button to add areas; Alt-click (Windows), Option-click (Mac OS), or use the Eyedropper - button to remove areas.



Color changed to mask

4 Adjust the tolerance of the mask by using the slider or by entering a Fuzziness value. This option controls the degree to which related colors are included in the selection.

5 Drag the hue, saturation, and lightness sliders (or enter values in the text boxes) to change the color of the selected areas.

6 Click OK to replace the color.

Using the Selective Color command

Like the other color correction tools, the Selective Color command lets you correct imbalances and adjust colors. *Selective color correction* is a technique used by high-end scanners and separation programs to increase and decrease the amount of the process colors in each of the additive and subtractive primary color components in an image.

Selective color correction is based on a table that shows the amount of each process ink used to create each primary color. By increasing and decreasing the amount of a process ink in relation to the other process inks, you can modify the amount of a process color in any primary color *selectively*—without affecting any other primary colors. For example, you can use selective color correction to dramatically decrease the cyan in the green component of an image while leaving the cyan in the blue component unaltered.

Note: *You must be viewing the composite channel to use the Selective Color command. (See "Using the Channels palette" on page 240.)*

To use the Selective Color command:

1 Open the Selective Color dialog box, as described in "Using color adjustment commands" on page 105.

2 Choose the color you want to adjust from the Colors menu at the top of the dialog box. Color sets consist of the primary additive and subtractive colors plus whites, neutrals, and blacks.

3 For Method, select an option:

• Relative to change the existing amount of cyan, magenta, yellow, or black by its percentage of the total. For example, if you start with a pixel that is 50% magenta and add 10%, 5% is added to the magenta (10% of 50% = 5%) for a total of 55% magenta. (This option cannot adjust pure specular white, which contains no color components.)

• Absolute to adjust the color in absolute values. For example, if you start with a pixel that is 50% magenta and add 10%, the magenta ink is set to a total of 60%.

Note: *The adjustment is based on how close a color is to one of the indicated correction points. For example, a pixel that contains 50% magenta is not at any exact correction point, and so will get a mix of corrections.*

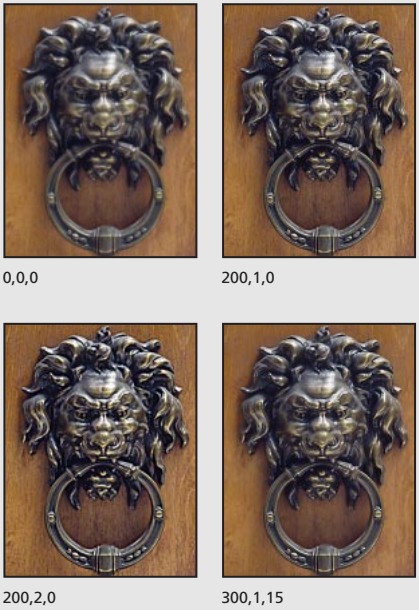
4 Drag the sliders to increase or decrease the components in the selected color.



Use the Info palette to show before and after color values.

Step 6: Sharpen the image

Unsharp masking, or *USM*, is a traditional film compositing technique used to sharpen edges in an image. The Unsharp Mask filter corrects blurring introduced during photographing, scanning, resampling, or printing. It is useful for images intended both for print and online.



Numbers represent Unsharp Mask amount, Radius, and Threshold.

The Unsharp Mask filter locates pixels that differ from surrounding pixels by the threshold you specify and increases the pixels' contrast by the amount you specify. In addition, you specify the radius of the region to which each pixel is compared.

The effects of the Unsharp Mask filter are far more pronounced on-screen than in high-resolution output. If your final destination is print, experiment to determine what dialog box settings work best for your image.

To sharpen an image using the Unsharp Mask filter:

1 Choose Filter > Sharpen > Unsharp Mask.

2 Sharpen the image:

• For Amount, drag the slider or enter a value to determine how much to increase the contrast of pixels. For high-resolution printed images, an amount between 150% and 200% is recommended.

• For Radius, drag the slider or enter a value to determine the number of pixels surrounding the edge pixels that affects the sharpening. For high-resolution images, a Radius between 1 and 2 is recommended.

A lower value sharpens only the edge pixels, whereas a higher value sharpens a wider band of pixels. This effect is much less noticeable in print than on-screen, because a 2-pixel radius represents a smaller area in a high-resolution printed image.

• For Threshold, drag the slider or enter a value to determine how different the sharpened pixels must be from the surrounding area before they are considered edge pixels and sharpened by the filter. To avoid introducing noise (in images with flesh-tones, for example), experiment with Threshold values between 2 and 20. The default Threshold value (0) sharpens all pixels in the image.

If applying the Unsharp Mask filter makes already bright colors appear overly saturated, convert the image to Lab mode and apply the filter to the L channel only. This technique sharpens the image without affecting the color components.

General-purpose color and tonal adjustment commands

The Variations and Brightness/Contrast commands change colors or brightness values in an image but are not as precise or flexible as the high-end color adjustment commands described in the previous sections. They provide a simple way to make fast overall adjustment to an image.

Using the Variations command

The Variations command lets you visually adjust the color balance, contrast, and saturation of an image or selection. This command is most useful for average-key images that don't require precise color adjustments. It does not work on indexed-color images.

To use the Variations command:

1 Open the Variations dialog box, as described in "Using color adjustment commands" on page 105.

Note: *If the Variations command does not appear in the Adjust submenu, the Variations plug-in module may not have been installed. (See "Using plug-in modules" on page 36.)*

The two thumbnails at the top of the dialog box show the original selection (Original) and the selection with its currently selected adjustments (Current Pick). When you first open the dialog box, these two images are the same. As you make adjustments, the Current Pick image changes to reflect your choices.

2 Select any of these adjustments:

• Show Clipping to display a neon preview of areas in the image that will be clipped by the adjustment—that is, converted to pure white or pure black. Clipping does not occur when you adjust midtones.

Note: *Clipping is not the same as out-of-gamut colors.*

• Shadows, Midtones, or Highlights to indicate whether you want to adjust the dark, middle, or light areas.

• Saturation to change the degree of hue in the image. With the Show Clipping option selected, the image may show clipping after an adjustment. This means you have exceeded maximum saturation for the color.

• The Fine/Coarse slider to determine the amount of each adjustment. Moving the slider one tick mark doubles the adjustment amount.

3 Adjust the color and brightness:

• To add a color to the image, click the appropriate color thumbnail.

• To subtract a color, click its opposite on the color wheel (see "Adjusting color balance" on page 123). For example, to subtract cyan, click red.

4 Click the thumbnails on the right of the dialog box to adjust the brightness in the image.

Each time you click a thumbnail, all thumbnails change. The center thumbnail always reflects the current choices.

Using the Brightness/Contrast command

Using the Brightness/Contrast command is the easiest way to make simple adjustments to the tonal range of the image. Unlike Curves and Levels, this command adjusts all pixel values in the image at once—highlights, shadows, and midtones. In addition, the Brightness/Contrast command does not work with individual channels and is not recommended for high-end output.

To use the Brightness/Contrast dialog box:

1 Open the Brightness/Contrast dialog box, as described in "Using color adjustment commands" on page 105.

2 Drag the sliders to adjust the brightness and contrast.

Dragging to the left decreases the level and to the right increases it. The number at the right of each slider value displays the brightness or contrast value. Values can range from –100 to +100.

3 When you've finished making adjustments, click OK.

Special-purpose color adjustment commands

The Invert, Equalize, Threshold, Posterize, and Desaturate commands also change colors or brightness values in an image but are typically used for enhancing color and producing special effects, rather than for correcting color.

Note: *You can also make color adjustments with the Channel Mixer command. (See "Mixing channels" on page 243.)*

Using the Invert command

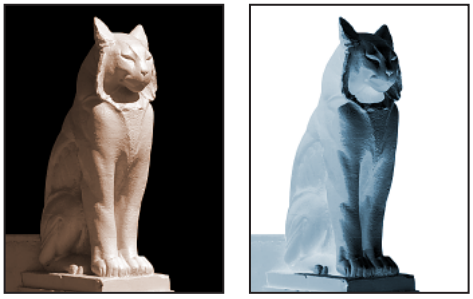
The Invert command inverts an image. You might use this command to make a positive black-and-white image negative or to make a positive from a scanned black-and-white negative.

Note: *Because color film contains an orange mask in its base, the Invert command cannot make negatives and positives from scanned color film.*

When you invert an image, the brightness value of each pixel in the channels is converted to the inverse value on the 256-step color-values scale. For example, a pixel in a positive image with a value of 255 is changed to 0, and a pixel with a value of 5 to 250.

To invert an image:

Choose Image > Adjust > Invert.



Original image, and Invert command applied

Using the Equalize command

The Equalize command redistributes the brightness values of the pixels in an image so that they more evenly represent the entire range of brightness levels. When you choose this command, Photoshop finds the brightest and darkest values in the image so that the darkest value represents black (or as close to it as possible) and the brightest value represents white. Photoshop then attempts to equalize the brightness—that is, to distribute the intermediate pixel values evenly throughout the grayscale.

You might use this command when a scanned image appears darker than the original and you want to balance the values to produce a lighter image. Using the Equalize command together with the Histogram command lets you see before-and-after brightness comparisons.

To equalize the brightness values of pixels:

1 Choose Image > Adjust > Equalize.

2 If you selected an area of the image, in the Equalize dialog box select what to equalize:.

• Equalize Selected Area Only to distribute evenly only the selection's pixels.

• Equalize Entire Image Based on Selected Area to distribute evenly all image pixels based on those in the selection.

3 Click OK to equalize the image or the selection.



Original image, and Equalize command applied

Using the Threshold command

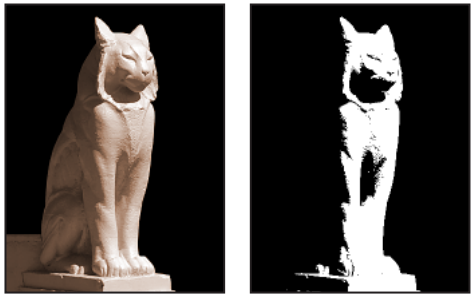
Use the Threshold command to convert grayscale or color images to high-contrast, black-and-white images. This command lets you specify a certain level as a threshold. All pixels lighter than the threshold are converted to white and all pixels darker to black.

To use the Threshold command:

1 Open the Threshold dialog box, as described in "Using color adjustment commands" on page 105.

The Threshold dialog box displays a histogram of the luminance levels of the pixels in the current selection.

2 Drag the slider below the histogram until the threshold level you want appears at the top of the dialog box. As you drag, the image changes to reflect the new threshold setting.



Original image, and Threshold command applied: 170

Using the Posterize command

The Posterize command lets you specify the number of tonal levels (or brightness values) for each channel in an image and then maps pixels to the closest matching level. For example, choosing two tonal levels in an RGB image gives six colors, two for red, two for green, and two for blue.

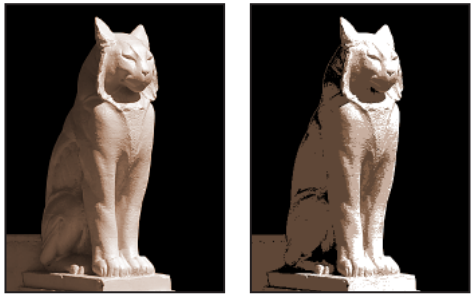
This command is useful for creating special effects, such as large, flat areas in a photograph. Its effects are most evident when you reduce the number of gray levels in a grayscale image. But it also produces interesting effects in color images.

If you want a specific number of colors in your image, convert the image to grayscale and specify the number of levels you want. Then convert the image back to the previous color mode, and replace the various gray tones with the colors you want.

To specify the number of levels in an image:

1 Open the Posterize dialog box, as described in "Using color adjustment commands" on page 105.

2 Enter the number of levels you want, and click OK.



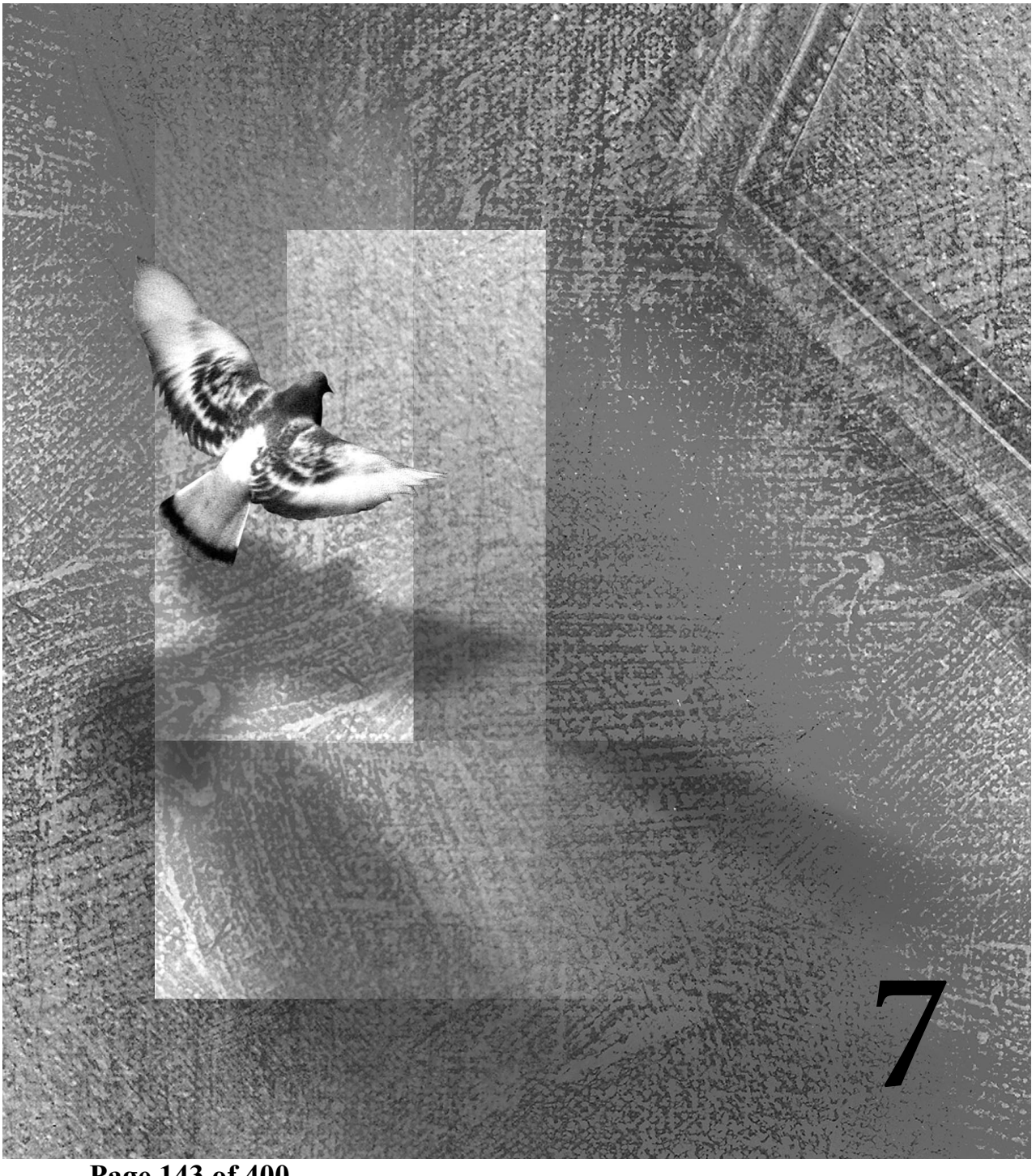
Original image, and Posterize command applied: 2 levels of color

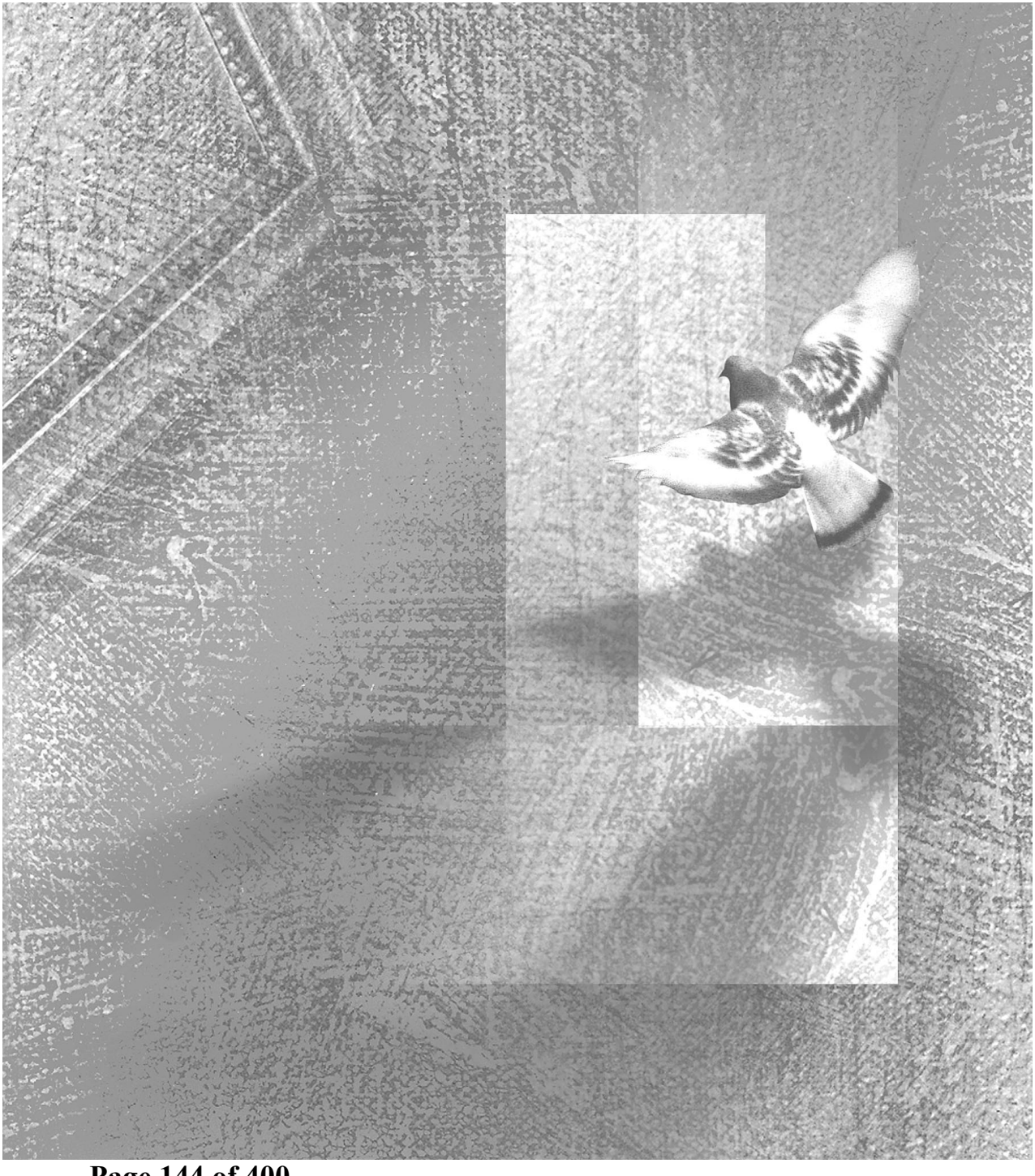
Using the Desaturate command

The Desaturate command removes all color values from a color image, converting it to a grayscale image in the same color mode.

To desaturate an image:

Choose Image > Adjust > Desaturate.


7



Chapter 7: Selecting

To modify part of an image in Adobe Photoshop, you first select the area you want to edit. A selected area is indicated by a dotted selection border, also called a selection marquee. The area outside the selection border is protected while you move, copy, paint, or apply special effects to the isolated area.

You can choose from a variety of specialized tools for creating selection borders. You can also create selections using the pen tool, which produces precise outlines called *paths*. You can make more sophisticated selections using masks. (See Chapter 10, "Using Channels and Masks.") For information on editing selections, see Chapter 8, "Editing and Retouching."

Making selections

You make selections by clicking and dragging with the marquee, lasso, polygon lasso, or magnetic lasso tool, or by targeting color areas with the magic wand tool or the Color Range command. The choices associated with a selection tool appear in its Options palette. Making a new selection replaces the existing one.



Key selected

To select all pixels on a layer within the canvas boundaries:

1 Select the layer in the Layers palette, as explained in "Using the Layers palette" on page 259.

2 Choose Select > All.

To deselect selections:

Do one of the following:

- Choose Select > Deselect.
- If you are using the rectangular marquee, elliptical marquee, or lasso tool, click anywhere in the image outside the selected area.

To reselect the most recent selection:

Choose Select > Reselect.

Photoshop reloads the last selection you deselected in the active image.

Using the marquee tools

The marquee tools let you select rectangular or elliptical areas. By default, the selection border is dragged from its corner.



Rectangular and elliptical selections

To use the marquee tools:

1 Select and double-click one of the following marquee tools to display its Options palette:

• Rectangular marquee ( ) to make a rectangular selection.

• Elliptical marquee ( ) to make an elliptical selection.

• Single row ( ) or single column ( ) marquee to define the border as a 1-pixel-wide row or column.

2 In the Marquee Options palette, specify feathering and anti-aliasing settings. (You cannot select anti-aliasing for the rectangular marquee tool.) (See "Softening the edges of a selection" on page 147.)

3 For the rectangular or elliptical marquee, choose an option for Style in the Marquee Options palette:

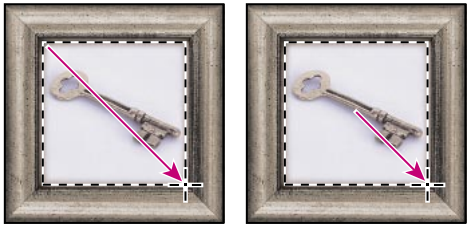
• Normal to determine marquee proportions by dragging.

• Constrained Aspect Ratio to set a height-to-width ratio. Enter the values (including decimal values) for the aspect ratio. For example, to draw a marquee twice as wide as it is high, enter 2 for the width and 1 for the height.

• Fixed Size to specify set values for the marquee's height and width. Enter pixel values in whole numbers. Keep in mind that the number of pixels needed to create a 1-inch selection depends on the resolution of the image. (See "About image size and resolution" on page 42.)

4 To make a selection, do one of the following:

• With the rectangular or elliptical marquee, drag over the area you want to select. Hold down Shift as you drag to constrain the marquee to a square or circle. To drag a marquee from its center, hold down Alt (Windows) or Option (Mac OS) after you begin dragging.



Dragging from corner and from center

• With the Single Row or Single Column marquee, click near the area you want to select, and then drag the marquee to the exact location. If no marquee is visible, increase the magnification of your image view.

To reposition a rectangular or elliptical marquee, first drag to create the border, keeping the mouse button depressed; then hold down the spacebar, and continue to drag. If you have finished drawing the border, click inside the selection; then drag it where you want.

Using the lasso, polygon lasso, and magnetic lasso tools

The lasso and polygon lasso tools let you draw both straight-edged and freehand segments of a selection border. With the magnetic lasso tool, the border snaps to the edges of defined areas in the image. The magnetic lasso tool is especially useful for quickly selecting objects with complex edges set against high-contrast backgrounds.

To use the lasso tool:

1 Select and double-click the lasso tool (🪢) to display its Options palette, and select options as described in the procedure on setting options for the lasso, polygon lasso, and magnetic lasso tools on page 141.

2 Drag to draw a freehand selection border.



Freehand selection with lasso tool

3 To draw a straight-edged selection border, hold down Alt (Windows) or Option (Mac OS), and click where segments should begin and end. You can switch between drawing freehand and straight-edged segments.

4 To erase recently drawn segments, hold down Delete until you've erased the desired segment.

5 To close the selection border, release the mouse without holding down Alt/Option.

To use the polygon lasso tool:

1 Select and double-click the polygon lasso tool (🪢) to display its Options palette, and select options as described in the procedure on setting options for the lasso, polygon lasso, and magnetic lasso tools on page 141.

2 Click in the image to set the starting point.

3 To draw a straight segment, position the pointer where you want the first straight segment to end, and click. Continue clicking to set endpoints for subsequent segments.



Click to add straight segments.

4 To draw a freehand segment, hold down Alt (Windows) or Option (Mac OS), and drag. When finished, release Alt/Option and the mouse button.

5 To erase recently drawn straight segments, press Delete. To erase freehand segments, hold down Delete.

6 Continue to click and Alt/Option-drag to finish selecting.

7 Close the selection border:

• Position the polygon lasso tool pointer over the starting point (a closed circle appears next to the pointer) and click.

• If the pointer is not over the starting point, double-click the lasso tool pointer, or Ctrl-click (Windows) or Command-click (Mac OS).

To use the magnetic lasso tool:

1 Select and double-click the magnetic lasso tool () to display its Options palette, and select options as described in the procedure on setting options for the lasso, polygon lasso, and magnetic lasso tools on page 141.

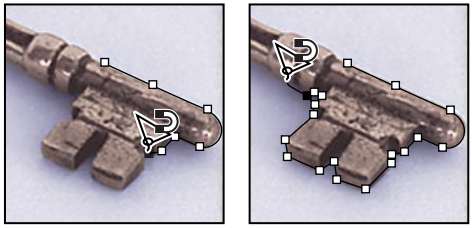
2 Click in the image to set the first fastening point.

Fastening points anchor the selection border in place.

3 To draw a freehand segment, move the pointer along the edge you want to trace. (You can also drag with the mouse button depressed.)

The most recent segment of the selection border remains active. As you move the pointer, the active segment snaps to the strongest edge in the image. Periodically, the magnetic lasso tool adds fastening points to the selection border to anchor previous segments.

4 If the border doesn't snap to the desired edge, click once to add a fastening point manually. Continue to trace the edge and add fastening points as needed.



Fastening points anchor selection border to edges.

5 To switch temporarily to the other lasso tools, do one of the following:

• To activate the lasso tool, hold down Alt (Windows) or Option (Mac OS) and drag with the mouse button depressed.

• To activate the polygon lasso tool, hold down Alt/Option and click.

6 To erase recently drawn segments and fastening points, press Delete.

7 Close the selection border:

• To close the border with a freehand magnetic segment, double-click, or press Enter (Windows) or Return (Mac OS).

• To close the border with a a straight segment, hold down Alt (Windows) or Option (Mac OS), and double-click.

To set options for the lasso, polygon lasso, and magnetic lasso tools:

1 If needed, double-click the tool to open its Options palette.

2 Specify feather and anti-aliasing options, as described in "Softening the edges of a selection" on page 147.

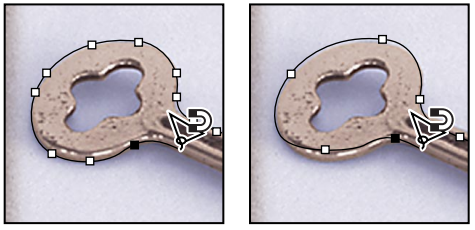
3 For the magnetic lasso tool, set any of these options:

• To specify a detection width, enter a pixel value between 1 and 40 for Lasso Width. The magnetic lasso only detects edges within the specified distance from the pointer.

• To specify the rate at which the lasso sets fastening points, enter a value between 0 and 100 for Frequency. A higher value anchors the selection border in place more quickly.

• To specify the lasso's sensitivity to edges in the image, enter a value between 1% and 100% for Edge Contrast. A higher value detects only edges that contrast sharply with their surroundings; a lower value detects lower-contrast edges.

On an image with well-defined edges, you can use a greater lasso width and higher edge contrast and trace the border roughly. On an image with softer edges, try a smaller width and lower edge contrast setting, and trace the border more precisely.



Use smaller width, higher value for edge contrast value for most precise border. Use wider width, smaller value for edge strength for rough path.

• If you are working with a stylus tablet, select or deselect the Stylus: Pressure option. When the option is selected, an increase in stylus pressure will cause the lasso width to narrow.

While creating a selection, you can press [to decrease the magnetic lasso width by 1 pixel; press] to increase the lasso width by 1 pixel.

Using the magic wand tool

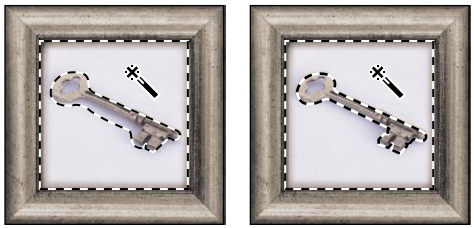
The magic wand tool ( ) lets you select a consistently colored area (for example, a red flower) without having to trace its outline. You specify the color range, or *tolerance*, for the magic wand tool's selection.

Note: *You cannot use the magic wand tool on an image in Bitmap mode.*

To use the magic wand tool:

1 Double-click the magic wand tool to display its Options palette.

2 For Tolerance, enter a value in pixels, ranging from 0 to 255. Enter a low value to select colors very similar to the pixel you click or a higher value to select a broader range of colors.



High tolerance detects shadow; lower tolerance detects only the key

3 To define a smooth edge, select Anti-aliased. (See "Softening the edges of a selection" on page 147.)

4 To select colors using data from all the visible layers, select Use All Layers. Otherwise, the magic wand tool selects colors from the active layer only.

5 In the image, click the color you want to select.

All adjacent pixels within the tolerance range are selected.

Using the Color Range command

The Color Range command selects a specified color or color subset within an existing selection or an entire image. If you want to replace a selection, be sure to deselect everything before applying this command.

To refine an existing selection, use the Color Range command repeatedly to select a subset of colors. For example, to select the green areas in a cyan selection, select Cyans in the Color Range dialog box, and click OK. Then reopen the Color Range dialog box, and select Greens. (The results are subtle because the technique selects parts of colors within a color mix.)

To select a color range using sampled colors:

1 Choose Select > Color Range.

2 For Select, choose Sampled Colors.

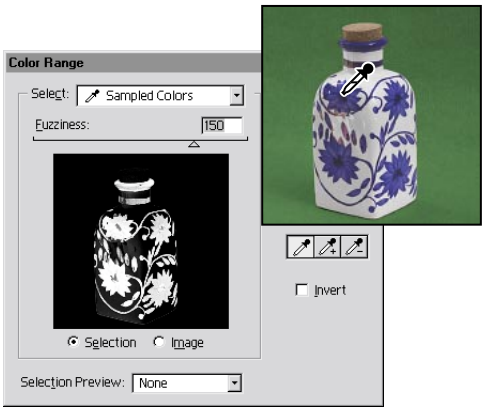
3 Select one of the following options listed below the preview box:

• Selection to preview only the selection as you build it.

• Image to preview the entire image. For example, you might want to sample from a part of the image that isn't on-screen.

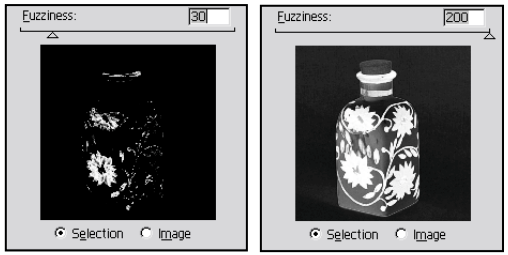
To toggle between the Image and Selection previews in the Color Range dialog box, press Ctrl (Windows) or Command (Mac OS).

4 Position the pointer over the image or preview area, and click to sample the colors you want included.



Sampling color

5 Adjust the range of colors by using the Fuzziness slider or entering a value. To decrease the range of colors selected, decrease the value. The Fuzziness option partially selects pixels by controlling the degree to which related colors are included in the selection (similar to the Tolerance option for the magic wand and paint bucket options).



Increasing Fuzziness expands selection

6 Adjust the selection:

- To add colors, select the plus eyedropper from the Color Range dialog box and click in the preview area or image.
- To remove colors, select the minus eyedropper, and click in the preview area or image.

To activate the plus eyedropper temporarily, hold down Shift. Hold down Alt (Windows) or Option (Mac OS) to activate the minus eyedropper.

7 To preview the selection in the image window, choose an option for Selection Preview:

- None to display no preview in the image window.
- Grayscale to display the selection as it would appear in a grayscale channel.
- Black Matte to display the selection in color against a black background.
- White Matte to display the selection in color against a white background.
- Quick Mask to display the selection using the current quick mask settings. (See "Using Quick Mask mode" on page 250.)

8 To revert to the original selection, hold down Alt (Windows) or Option (Mac OS), and click Reset.

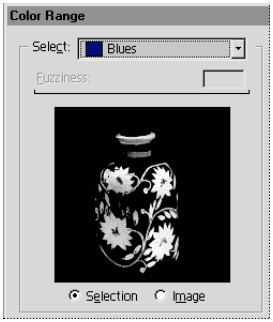
9 Click OK to make the selection.

To select a range using preset colors:

1 Choose Select > Color Range.

2 For Select, choose a color or tonal range. The Out-of-Gamut option works only on RGB and Lab images. (An out-of-gamut color is an RGB or Lab color that cannot be printed using process color printing. See "Color gamuts" on page 66.)

3 Click Selection to display the selected areas in the preview area.



Blue areas displayed in selection preview

4 To preview the selection in the image window, choose an option for Selection Preview. See step 7 of the procedure on selecting a color range using sampled colors.

5 To revert to the original selection, hold down Alt (Windows) or Option (Mac OS), and click Reset.

6 Click OK to make the selection.

Note: *If a message appears stating "No pixels are more than 50% selected," the selection border will not be visible. You may have selected a color, such as red, when the image didn't contain the fully saturated color.*

To save and load color range settings:

Use the Save and Load buttons in the Color Range dialog box to save and reuse settings.

Adjusting selections

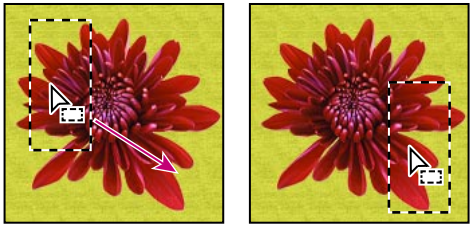
You can adjust and refine your selections using the selection tools or a variety of commands in the Select menu.

In addition, you can apply geometric transformations to change the shape of a selection border. (See "Transforming objects in two dimensions" on page 182.)

To move just the selection border:

1 Using any selection tool, position the pointer inside the selection border.

2 Drag the selection border to enclose a different area of the image. You can drag a selection border beyond the canvas boundaries. When you drag it back, the original border reappears intact. You can also drag the selection border to another image window.



Original selection border, and selection border moved

Use the following methods to control selection movement:

• To constrain the direction to a multiple of 45°, begin dragging, and then hold down Shift as you continue to drag.

• To move the selection in 1-pixel increments, use the keyboard arrow keys.

• To move the selection in 10-pixel increments, hold down Shift, and press an arrow key.

To hide or show a selection border:

Choose View > Hide Edges or Show Edges.

This option affects the current selection only. The selection border reappears when you make another selection.

To select the unselected parts of an image:

Choose Select > Inverse.

You might use this option to select an object placed against a solid-colored background. For example, you could first select the background using the magic wand tool and then invert the selection.

Adjusting selections manually

You can use the selection tools to add to or subtract from existing selections.

Before manually adding to or subtracting from a selection, set the feather and anti-aliased values in the Options palette to the same settings used for the original selection. (See "Softening the edges of a selection" on page 147.)

To add to, subtract from, or intersect a selection:

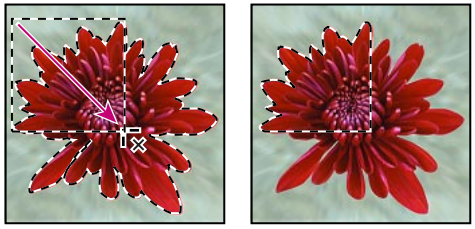
1 Make a selection.

2 Using any selection tool, modify the selection:

• To add to the selection or select an additional area in the image, hold down Shift (a plus sign appears next to the pointer), and select the area or areas you want to add.

• To subtract an area from a selection, hold down Alt (Windows) or Option (Mac OS) (a minus sign appears next to the pointer), and select the area or areas you want to subtract.

• To intersect selections, press Alt+Shift (Windows) or Option+Shift (Mac OS) (a cross appears next to the pointer), and select an area that intersects the original selection. Photoshop retains only that portion of the original selection falling within the newly selected area.



Flower and frame selections intersected

Adjusting selections numerically

You can use the following Select commands to increase or decrease the pixels in an existing selection:

• Modify to expand or contract a selection by a specified number of pixels.

• Grow and Similar to expand a selection to include areas similar in color.

• Smooth to clean up any stray pixels left inside or outside a color-based selection.

To expand or contract a selection border:

1 Choose Select > Modify > Expand or Contract.

2 For Expand By or Contract By, enter a pixel value between 1 and 16, and click OK.

The border is increased or decreased by the specified number of pixels. Any portion of the selection border running along the image's edge is unaffected.

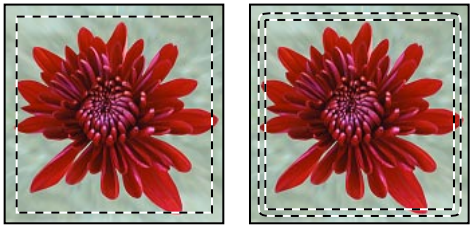
To frame an existing selection with a selection:

1 Use a selection tool to make a selection.

2 Choose Select > Modify > Border.

3 Enter a value between 1 and 64 pixels for the width of the border, and click OK.

The new selection frames the border of the original selected area.



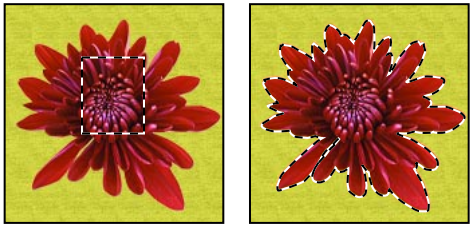
Original selection, and with Border command: 5 pixels

The Border command always creates an anti-aliased selection (see "Softening the edges of a selection" on page 147). To paint a hard-edged border around a selection, use the Stroke command (see "Filling and stroking selections and layers" on page 211).

To extend a selection based on color:

Do one of the following:

• Choose Select > Grow to include adjacent pixels falling within the tolerance range specified in the Magic Wand Options palette.



Original selection, and with Grow command applied

• Choose Select > Similar to include pixels throughout the image, not just adjacent ones, falling within the tolerance range.



Original selection, and with Similar command applied

To increase the selection in increments, choose either command more than once.

Note: *You cannot use the Grow and Similar commands on images that are in Bitmap mode.*

To smooth a selection:

1 Choose Select > Modify > Smooth.

2 For Sample Radius, enter a pixel value between 1 and 16, and click OK.

Adobe Photoshop checks around each selected pixel to find any unselected pixels falling within the specified range. For example, if you enter 16 for the sample radius, the program uses each pixel as the center of a 33-by-33-pixel area (16 pixels in the horizontal and vertical directions). If most pixels in the range are selected, any unselected pixels are added to the selection. If most pixels are unselected, any selected pixels are removed from the selection.

Note: *The relationship between physical distance and pixel distance depends on the resolution of the image. For example, 5 pixels is a longer distance in a 72-ppi image than in a 300-ppi image. (See "About image size and resolution" on page 42.)*

Softening the edges of a selection

Photoshop offers two ways to smooth the hard edges of a selection.

Anti-aliasing Smooths the jagged edges of a selection by softening the color transition between edge pixels and background pixels. Since only the edge pixels change, no detail is lost. Anti-aliasing is useful when cutting, copying, and pasting selections to create composite images.

Anti-aliasing is available for the lasso, polygon lasso, magnetic lasso, elliptical marquee, and magic wand tools. (Double-click the tool to display its Options palette.) You must specify this option before using these tools. Once a selection is made, you cannot add anti-aliasing.

For an illustration of anti-aliasing, see "Specifying anti-aliasing" on page 298.

Feathering Blurs edges by building a transition boundary between the selection and its surrounding pixels. This blurring can cause some loss of detail at the edge of the selection.

You can define feathering for the marquee, lasso, polygon lasso, or magnetic lasso tool as you use the tool, or you can add feathering to an existing selection. Feathering effects become apparent when you move, cut, or copy the selection.

To use anti-aliasing:

1 Double-click the marquee, lasso, polygon lasso, or magnetic lasso tool to display its Options palette.

2 Select Anti-aliased in the Options palette for the selected tool.

To define a feathered edge for a selection tool:

1 Double-click the marquee, lasso, polygon lasso, or magnetic lasso tool to display its Options palette.

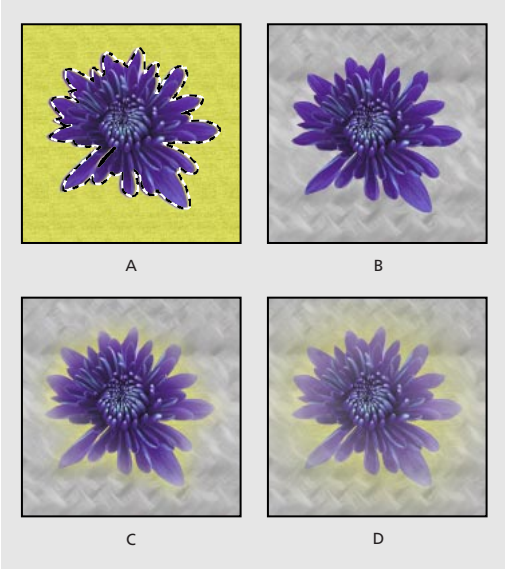
2 Enter a Feather value in the Options palette. This value defines the width of the feathered edge and can range from 1 to 250 pixels.

To define a feathered edge for an existing selection:

1 Choose Select > Feather.

2 Enter a value for the Feather Radius, and click OK.

Note: *A small selection made with a large feather radius may be so faint its edges are invisible and thus not selectable. If a message appears stating "No pixels are more than 50% selected," either decrease the feather radius or increase the selection's size.*

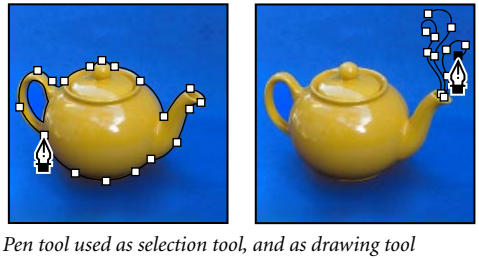


A. *Original selection* ***B.*** *Feather: 0* ***C.*** *Feather: 10* ***D.*** *Feather: 30*

About paths

Paths provide an effective way to draw precise selection borders. A *path* is any line or shape you draw using the pen, magnetic pen, or freeform pen tool. Unlike the bitmap shapes drawn by the pencil or other painting tools, paths are vector objects that contain no pixels. As a result, paths remain separate from the bitmap image and do not print, with the exception of clipping paths. (See "About bitmap images and vector graphics" on page 41.)

Once you have created a path, you can save it in the Paths palette, convert it to a selection border, or fill or stroke the path outline with color. In addition, you can convert a selection to a path. Because they take up less disk space than pixel-based data, paths can be used for long-term storage of simple masks. Paths can also be used to clip sections of your image for export to an illustration or page-layout application (see "Using clipping paths" on page 327).



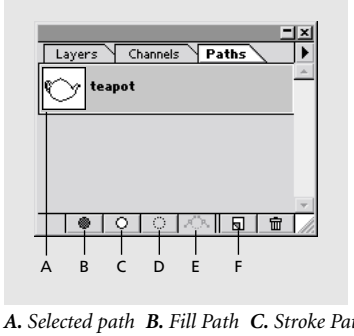
Pen tool used as selection tool, and as drawing tool

Using the Paths palette

The Paths palette lists the name of each saved path and a thumbnail of its contents. Decreasing the size of thumbnails or turning them off lets you view more paths at one time in the palette and can improve performance. To view a path, you must first select the path name in the Paths palette.

To display the Paths palette:

Choose Windows > Show Paths.



***A.** Selected path **B.** Fill Path **C.** Stroke Path*
***D.** Make Selection **E.** Make Work Path **F.** New Path*

To select or deselect a path:

Do one of the following:

- To select a path, click the path name in the Paths palette. Only one path can be selected at a time.
- To deselect a path, click in the blank area of the Paths palette, or choose Turn Off Path from the Paths palette menu.

To change the size of a path thumbnail:

1 Choose Palette Options from the Paths palette menu.

2 Select a size, or select None to turn off the display of thumbnails.

To change a path's stacking order:

1 Select the path in the Paths palette.

2 Drag the path up or down in the Paths palette. When the solid line appears in the desired location, release the mouse button.

To show or hide a path:

Select the path name in the Paths palette and choose View > Show Path or View > Hide Path to toggle the command.



To toggle between hiding and showing a path, Shift-click the path name in the Paths palette.

Creating, saving, and deleting paths

Paths can be created in two ways:

• You can select a pen tool and begin drawing. If no path name is selected, the new path appears as a temporary *work path* in the Paths palette. You must save the work path to avoid losing its contents. If you deselect the work path without saving and then start drawing again, a new work path will replace the first one.

• You can create a new path in the Paths palette and then begin drawing. The path contents are saved automatically.

Paths saved with an image appear when you open it again. In Windows, the Photoshop, JPEG, DCS, EPS, PDF, and TIFF formats support paths. In Mac OS, all available file formats (except GIF89a Export) support paths.

To save a work path:

Do one of the following:

• To save without renaming, drag the *Work Path* name to the New Path button () at the bottom of the Paths palette.

• To save and rename, Choose Save Path from the Paths palette menu, enter a new path name, and click OK.

To create a new path:

Do one of the following:

• To create a path without naming it, click the New Path button at the bottom of the palette.

• To create and name a path, make sure no work path is selected. Choose New Path from the Paths palette menu, or Alt-click (Windows) or Option-click (Mac OS) the New Path button () at the bottom of the palette. Enter a name for the path in the New Path dialog box, and click OK.

To rename a saved path:

1 Double-click the path's name in the Paths palette.

2 Enter a new name in the Rename Path dialog box, and click OK.

To delete a path:

1 Select the path name in the Paths palette.

2 Do one of the following:

• Drag the path to the Trash button at the bottom of the Paths palette.

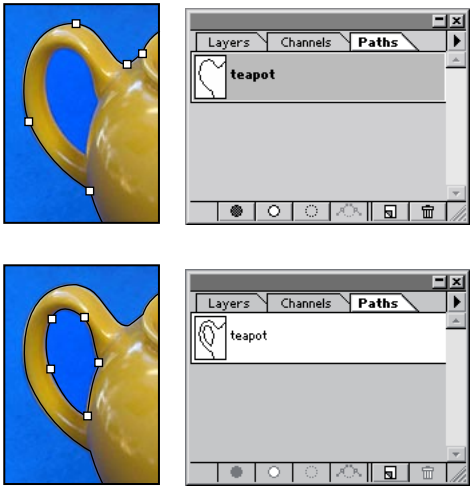
• Click the Trash button at the bottom of the Paths palette, and click Yes.

• Choose Delete Path from the Paths palette menu.

To delete a path automatically, Alt-click (Windows) or Option-click (Mac OS) the Trash button at the bottom of the Paths palette.

Creating multiple subpaths

Each time you draw a connected series of straight or curved segments, you create a *subpath*. You can create several subpaths and save them as a single path in the Paths palette. To create additional subpaths, close or end the current subpath, and begin drawing again to create a new, disconnected segment.



Original path, and subpath added

Drawing freehand paths

The freeform pen tool and the magnetic pen tool let you draw paths as if you were drawing with a pencil on paper. As you draw with the freeform pen tool, anchor points are automatically set down. You do not determine where they are positioned, although you can adjust them once the path is complete. (See "About anchor points, direction lines, and direction points" on page 153, for more information.)

The magnetic pen tool lets you draw a path that snaps to the edges of defined areas in your image. You can define the range and sensitivity of the snapping behavior, as well as the complexity of the resulting path. The magnetic pen and magnetic lasso tools share many of the same options.

To use the freeform pen tool:

1 Select and double-click the freeform pen tool to display its Options palette.

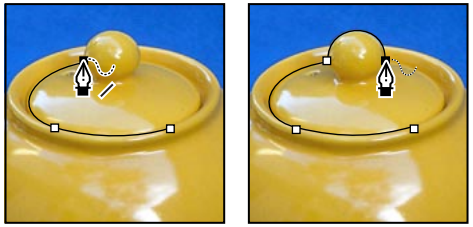
2 For Curve Fit, enter a value between 0.5 and 10.0.

This option controls how sensitive the final path is to the movement of your mouse or stylus. A higher Curve Fit value results in a simpler path with fewer anchor points.

3 Drag the pointer in the image.

As you drag, a path trails behind the pointer. When you release the mouse, a work path is created.

4 To continue the existing freehand path, position the freeform pen pointer on an endpoint of the path, and drag.



Path continued with freeform pen tool

5 To complete the path, release the mouse. To create a closed path, drag over the initial point of the path (a circle appears next to the pointer when it is aligned) and release the mouse.

See "About anchor points, direction lines, and direction points" on page 153 for more on closed and open paths.

To use the magnetic pen tool:

1 Select and double-click the magnetic pen tool ( ) to display its Options palette.

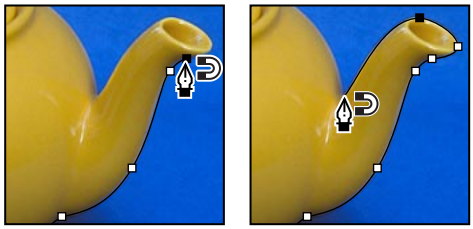
2 Specify tool options as described in the procedure on specifying magnetic pen tool options.

3 Click in the image to set the first fastening point.

4 To draw a freehand segment, move the pointer along the edge you want to trace. (You can also drag with the mouse button depressed.)

The most recent segment of the border remains active. As you move the pointer, the active segment snaps to the strongest edge in the image, connecting the pointer to the last fastening point. Periodically, the magnetic pen tool adds fastening points to the border to anchor previous sections.

5 If the border doesn't snap to the desired edge, click once to add a fastening point manually, to keep the border from moving. Continue to trace the edge and add fastening points as needed.



Click to add fastening point, and continue tracing.

6 To turn off magnetic properties temporarily, do one of the following:

- Hold down Alt (Windows) or Option (Mac OS), and drag with the mouse button depressed to draw a freehand path.
- Hold down Alt/Option and click to draw straight segments.

7 Complete the path:

- Press Enter (Windows) or Return (Mac OS) to end an open path.
- Double-click to close the path with a magnetic segment.

• Hold down Alt (Windows) or Option (Mac OS) and double-click to close the path with a straight segment.

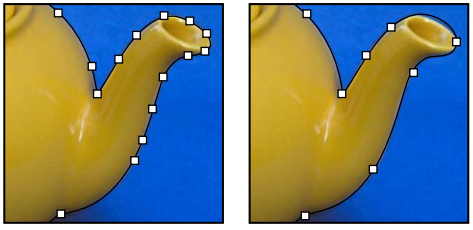
See "About anchor points, direction lines, and direction points" on page 153 for more on closed and open paths.

To specify magnetic pen tool options:

1 If needed, double-click the magnetic pen tool to display its Options palette.

2 For Curve Fit, enter a value between 0.5 and 10.0.

This option controls how sensitive the final path is to the movement of your mouse or stylus. A higher Curve Fit value results in a simpler path with fewer anchor points.



Curve fit tolerance 0.5 and 10.0

3 To specify a detection width, enter a pixel value between 1 and 40 for Pen Width. The magnetic pen only detects edges within the specified distance from the pointer.

While creating a path, press [to decrease the magnetic pen width by 1 pixel; press] to increase the pen width by 1 pixel.

4 Specify Frequency, Edge Contrast, and Stylus: Pressure options, as described in the procedure on page 141.

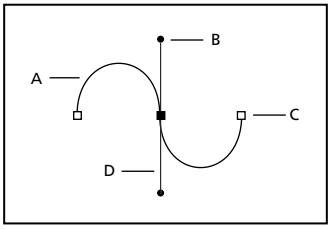
Drawing with the pen tool

The pen tool (✒) lets you create straight lines and smooth flowing curves with greater precision than possible with the freeform pen or magnetic pen tool. For most users, the pen tool provides the best control and greatest accuracy for drawing.

Before you use the pen tool, it is important to understand how paths are constructed.

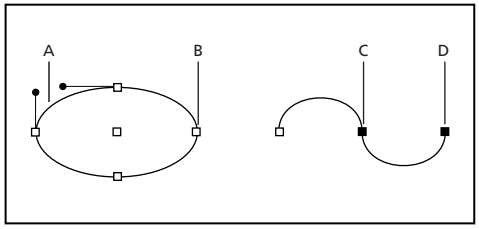
About anchor points, direction lines, and direction points

A path consists of one or more straight or curved segments. *Anchor points* mark the endpoints of the path segments. On curved segments, each selected anchor point displays one or two *direction lines*, ending in *direction points*. The positions of direction lines and points determine the size and shape of a curved segment. Moving these elements reshapes the curves in a path.



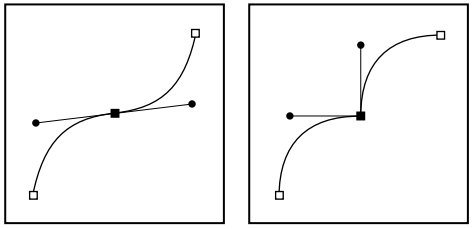
***A.** Curved segment **B.** Direction point*
***C.** Anchor point **D.** Direction line*

A path can be *closed,* with no beginning or end (for example, a circle), or *open,* with distinct *endpoints* (for example, a wavy line).



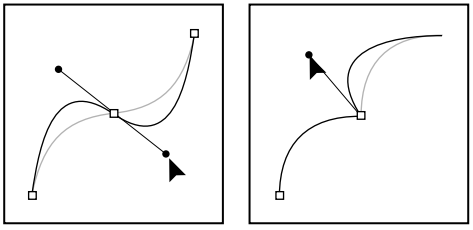
Closed and open paths
A. *Selected line segment* ***B.*** *Unselected anchor point*
C. *Selected anchor point* ***D.*** *Selected endpoint*

Smooth curves are connected by anchor points called *smooth points.* Sharply curved paths are connected by *corner points.*



Smooth point and corner point

When you move a direction line on a smooth point, the curved segments on both sides of the point adjust simultaneously. In comparison, when you move a direction line on a corner point, only the curve on the same side of the point as the direction line is adjusted.



Adjusting smooth point and corner point

To preview path segments as you draw:

1 Double-click the pen tool to display its Options palette.

2 Select Rubber Band.

As you move the pointer in the image, Photoshop displays the proposed segment. The segment doesn't become permanent until you press the mouse button.

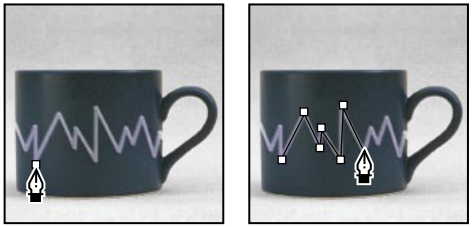
Drawing straight line paths

The simplest path you can draw with the pen tool is a straight line, made by clicking to create anchor points.

To draw straight line paths:

1 Select the pen tool ( ).

2 Position the pen pointer where you want the straight line to begin, and click to define the first anchor point. The anchor point remains selected (solid) until you define the next point.



Click to add straight segments.

3 Click again where you want the first segment of the straight line path to end. Hold down Shift as you click to constrain the angle of the segment to a multiple of 45°.

4 Continue clicking to set anchor points for additional straight segments.

The last anchor point is always a solid square, indicating it is selected. Previously defined anchor points become hollow squares as you add further anchor points.

5 Complete the path:

• To end an open path, click the pen tool in the toolbox. Or hold down the Ctrl key (Windows) or Command key (Mac OS), and then click anywhere away from the path.

• To close a path, position the pen pointer over the first anchor point. A small loop appears next to the pen tip when it is positioned correctly. Click to close the path.

Drawing curved paths

You create curves by dragging the pen tool in the direction you want the curve to go.

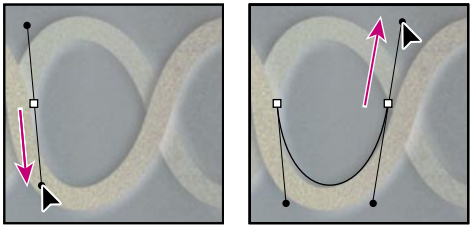
To draw a curved path:

1 Select the pen tool.

2 Position the pointer where you want the curve to begin. Hold down the mouse button. The first anchor point appears, and the pointer changes to an arrowhead.

3 Drag in the direction you want the curve segment to be drawn. As you drag, the pointer leads one of two direction points. Hold down the Shift key to constrain the tool to multiples of 45°.

The length and slope of the direction line determine the shape of the curve segment. You can adjust one or both sides of the direction line later.

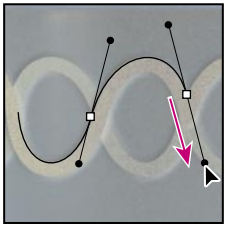


Drag in direction of curve to set first anchor point. Drag in the opposite direction to complete the curve segment.

4 Position the pointer where you want the curve segment to end, press the mouse button, and drag in the opposite direction to complete the segment.

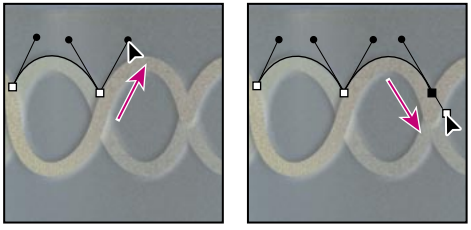
5 Do one of the following:

• To draw the next segment of a smooth curve, position the pointer where you want the next segment to end, and drag away from the curve.



Drag away from curve to create the next segment.

• To change the direction of the curve sharply, release the mouse button, press Alt (Windows) or Option (Mac OS), and then drag the direction point in the direction of the curve. Release Alt/Option and the mouse button, reposition the pointer where you want the segment to end, and drag in the opposite direction to complete the curve segment.



Press Alt/Option, and drag direction point toward the curve. Release the key, and drag in opposite direction.

6 Complete the path:

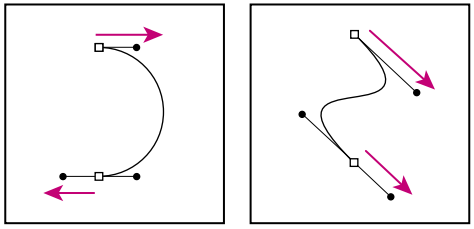
• To end an open path, click the pen tool in the toolbox. Or hold down the Ctrl key (Windows) or Command key (Mac OS), and then click anywhere away from the path.

• To close the path, position the pointer over the first anchor point. A small loop appears next to the pointer when it is positioned correctly. Click or drag to close the path.

Tips for drawing curves

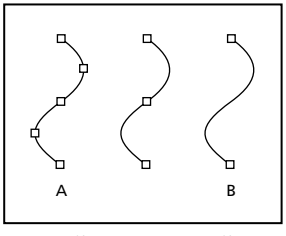
Keep these guidelines in mind when drawing curves:

• Always drag the first direction point in the direction of the bump of the curve, and drag the second direction point in the opposite direction to create a single curve. Dragging both direction points in the same direction creates an "S" curve.



Drag in opposite direction to create a smooth curve. Drag in same direction to create an "S" curve.

• When drawing a series of smooth curves, draw one curve at a time, placing anchor points at the beginning and end of each curve, not at the tip of the curve. Use as few anchor points as possible, placing them as far apart as possible.



***A.** Less efficient **B.** More efficient*

Adjusting path segments

The path tools, in the path pull-out menu, let you change the shapes of a path.

Selecting path segments

To modify the shape of a path, you must first select the path name in the Paths palette to display the path. Then you use the direct-selection tool to select the path or a segment of the path.

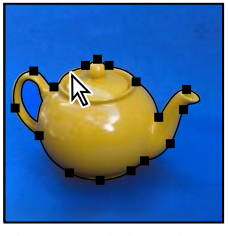
Selecting a path or path segment displays all of the anchor points on the selected portion, including any direction lines and direction points if the selected segment is curved. Direction points appear as filled circles, selected anchor points as filled squares, unselected anchor points as hollow squares.

To select a path or path segment:

1 Select the direct-selection tool ().

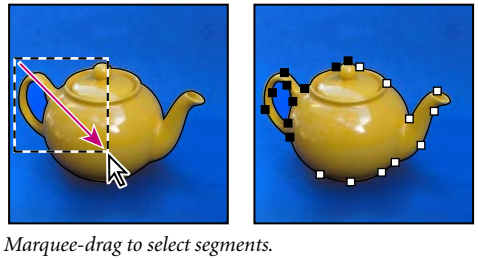
2 Do the following:

• To select an entire path or subpath, hold down Alt (Windows) or Option (Mac OS), and click the path. If the path consists of several subpaths, only the subpath directly under the pointer is selected.



Alt/Option-click to select entire path.

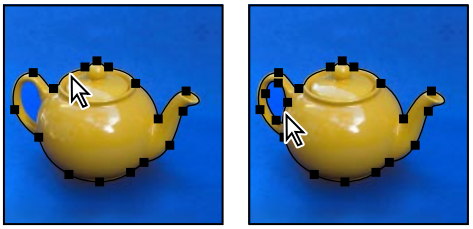
• To select a segment, drag a marquee enclosing the anchor points at the ends of the segment.



Marquee-drag to select segments.

3 To add selections, hold down Shift while selecting additional paths or segments.

To activate the direct-selection tool when any other tool is selected, position the pointer over an anchor point, and press Ctrl (Windows) or Command (Mac OS).



Subpath selected by Alt/Option-clicking, and second subpath selected by holding down Shift and Alt/Option-clicking.

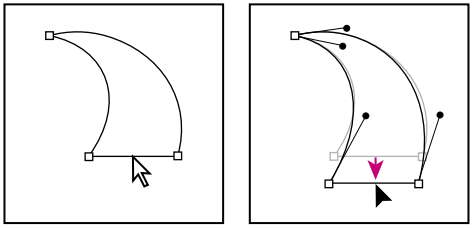
Moving, reshaping, and erasing segments

You also use the direct-selection tool to move and reshape one or more segments on a path. You can also erase part or all of a path.

To adjust a straight segment:

1 Select the direct-selection tool (), and select the segment you want to adjust. To adjust the angle or length of the segment, select an anchor point.

2 Drag the selected segment to its new position.

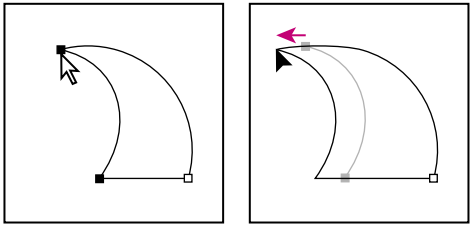


Click to select straight segment. Then drag to adjust.

To move a curved segment:

1 Select the direct-selection tool (), and select the points or segments you want to move. Be sure to select both the points anchoring the segment.

2 Drag the selected anchor points or segments to new positions. Hold down Shift as you drag to constrain the movement to multiples of 45°.



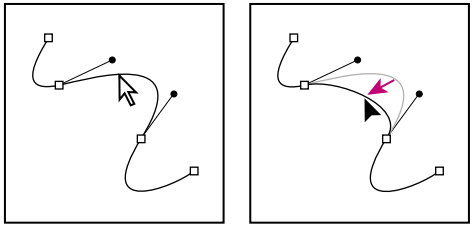
Select points anchoring curve. Then drag to move curve.

To reshape a curved segment:

1 Select the direct-selection tool (), and select the curved segment you want to adjust. Direction lines appear for that segment.

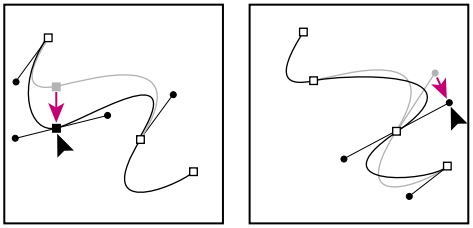
2 Adjust the curve:

• To adjust the position of the segment, drag the segment.



Click to select curve segment. Then drag to adjust.

• To adjust the shape of the segment on either side of a selected anchor point, drag the anchor point, or drag the direction point. Hold down Shift as you drag to constrain the movement to multiples of 45°.



Drag the anchor point, or drag the direction point to reshape.

To erase a path segment:

1 Select the direct-selection tool (), and select the curved segment you want to adjust. Direction lines appear for that segment.

2 Press Backspace (Windows) or Delete (Mac OS) to erase the selected segment. Pressing Backspace/Delete again erases the rest of the subpath.

Adding, deleting, and converting anchor points

The add-anchor-point and delete-anchor-point tools let you add and delete anchor points from a path. The convert-direction-point tool lets you convert a smooth curve to a sharp curve or to a straight segment, and vice versa.

To add an anchor point:

1 Select the add-anchor-point tool (), and position the pointer on the path where you want the anchor point added (a plus sign appears next to the pointer).

2 Do one of the following:

• Click to add an anchor point without changing the shape of the segment.

• To add an anchor point and change the shape of the segment, drag to define direction lines for the anchor point.

To delete an anchor point:

1 Select the delete-anchor-point tool (), and position the pointer on the anchor point you want deleted (a minus sign appears next to the pointer).

2 Delete the anchor point:

• Click the anchor point to delete it and reshape the path to fit the remaining anchor points.

• Drag the anchor point to delete it and change the shape of the segment.

To convert between a smooth point and a corner point:

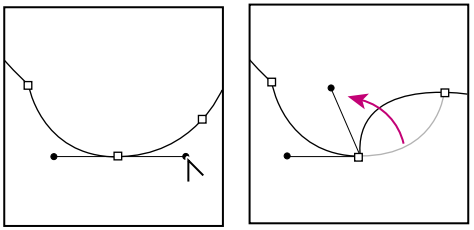
1 Select the convert-anchor-point tool (), and position the pointer over the anchor point you want changed.

To activate the convert-anchor-point tool while the direct-selection tool is selected, position the pointer over an anchor point and press Ctrl+Alt (Windows) or Command+Option (Mac OS).

2 Convert the point:

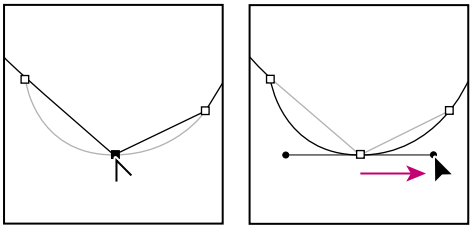
• To convert a smooth point to a corner point without direction lines, click the smooth anchor point.

• To convert a smooth point to a corner point with direction lines, make sure the direction lines are visible. Then drag a direction point to break the pair of direction lines.



Drag direction point to break direction lines.

• To convert a corner point to a smooth point, drag away from the corner point to make direction lines appear.



Click to create a corner point. Drag to create a smooth point.

Moving and copying paths

You can reposition a path anywhere within an image. You can copy paths within an image or between two Photoshop images. You can also use the Copy and Paste commands to duplicate paths, between a Photoshop image and an image in another application, such as Adobe Illustrator, Adobe Streamline™, or Adobe Dimensions®.

To move a path:

1 Select the path name in the Paths palette, and use the direct-selection tool (↖) to select the path in the image.

2 Drag the path to its new location.

If you move any part of a path beyond the canvas boundaries, the hidden part of the path is still available.

Note: *If you drag a path so that the move pointer is over another open image, the path will be copied to that image.*

To copy a path:

Do any of the following:

• To copy a path as you move it, select the path name in the Paths palette, and use the direct-selection tool (↖) to select the path in the image. Hold down Alt (Windows) or Option (Mac OS) as you drag the path.

• To copy a path without renaming, drag the path in the Paths palette to the New Path button (▣) at the bottom of the palette.

• To copy and rename a path, Alt-drag (Windows) or Option-drag (Mac OS) the path in the Paths palette to the New Path button ( ) at the bottom of the palette. Or select the path to copy, and choose Duplicate Path from the Paths palette menu. Enter a new name for the path, and click OK.

To copy paths between two Adobe Photoshop files:

1 Open both images.

2 Use the direct-selection tool to select the path in the source image you want to copy.

3 Copy the path:

• Drag the path from the source image to the destination image. The path is copied to the active path in the Paths palette.

• Drag the path from the source image's Paths palette into the destination image. The path is copied to the active path in the Paths palette.

• In the source image, choose Edit > Copy to copy the path, and in the destination image choose Edit > Paste.

Filling and stroking paths

You can add color values to a path by filling or stroking the path.

• Fill Path lets you fill a path with a specified color, a state of the image, or a pattern.

• Stroke Path lets you paint a path border.

If a subpath is selected, these commands become the Fill Subpath and Stroke Subpath commands.

Important: *When you fill or stroke a path, the color values appear on the active layer. Make sure that the desired layer is active before beginning.*

To fill a path using the current Fill Path settings:

Click the Fill Path button ( ) at the bottom of the Paths palette.

To fill a path and specify options:

1 Select the path in the Paths palette.

2 Fill the path:

• Alt-click (Windows) or Option-click (Mac OS) the Fill Path button at the bottom of the Paths palette.

• Choose Fill Path from the Paths palette menu.

3 For Use, choose the contents for the fill (see "Filling and stroking selections and layers" on page 211).

4 Specify an opacity for the fill. To make the fill more transparent, use a low percentage. A setting of 100% makes the fill opaque.

5 Choose a blending mode for the fill, as explained in "Selecting a blending mode" on page 205.

The Mode list includes a Clear mode that lets you erase to transparency. You must be working in a layer to use this option.

6 Select Preserve Transparency to limit the fill to layer areas that contain pixels. (See "Preserving a layer's transparency" on page 269.)

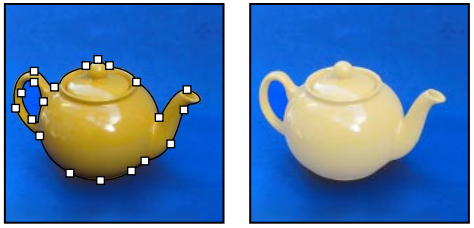
7 Select a Rendering option:

• Feather Radius to define how far inside and outside the selection border the feather edge extends. Enter a value in pixels.

• Anti-aliased to create a finer transition between the pixels in the selection and the surrounding pixels by partially filling the edge pixels of the selection.

(See "Softening the edges of a selection" on page 147 for more on these options.)

8 Click OK to fill the path.



Path created, and filled

To stroke a path using the current Stroke Path settings:

Click the Stroke Path button ( ) at the bottom of the Paths palette. Each click of the Stroke Path button builds up the thickness of the stroke.

To stroke a path and specify options:

1 Select the path in the Paths palette.

2 Select the painting or editing tool you want to use to stroke the path. Set the tool options in the Options palette, and specify a brush in the Brushes palette. You must specify the tool's settings before opening the Stroke Path dialog box. (See Chapter 8, Editing and Retouching, and Chapter 9, Painting, for information on specific tool settings.)

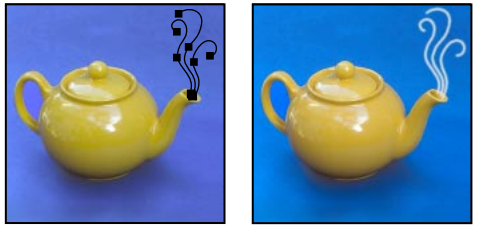
3 Stroke the path:

• Alt-click (Windows) or Option-click (Mac OS) the Stroke Path button ( ) at the bottom of the Paths palette.

• Choose Stroke Path from the Paths palette menu.

4 If you did not select a tool in step 2, choose a tool from the Stroke Path dialog box.

5 Click OK to stroke the path.



Paths selected, and stroked

Converting between paths and selection borders

Because of their smooth outlines, paths can be converted into precise selection borders. You also can convert selection borders into paths, using the direct-selection tool for fine-tuning.

Defining paths as selection borders

You can define any closed path as a selection border. A closed path that overlaps a selected area can be added to, subtracted from, or combined with the current selection.

To convert a path to a selection border using the current Make Selection settings:

Click the Make Selection button ( ) at the bottom of the Paths palette.

To convert a path to a selection border and specify settings:

1 To combine the path with a selection, first make the selection using a selection tool.

2 In the Paths palette, select the name of the path to define as a selection.

3 Make the selection:

• Alt-click (Windows) or Option-click (Mac OS) the Make Selection button ( ) at the bottom of the Paths palette.

• Choose Make Selection from the Paths palette menu.

4 Select a Rendering option:

• Feather Radius to define how far inside and outside the selection border the feather edge extends. Enter a value in pixels.

• Anti-aliased to create a finer transition between the pixels in the selection and the surrounding pixels. Make sure the Feather Radius is set to 0.

See "Softening the edges of a selection" on page 147 for more on these options.

5 Select a selection option:

• New Selection to select only the area defined by the path.

• Add to Selection to add the area defined by the path to the original selection.

• Subtract from Selection to remove the area defined by the path from the original selection.

• Intersect with Selection to select the area common to both the path and the original selection. If the path and selection do not overlap, nothing is selected.

To convert a path to a selection border using shortcuts:

Do any of the following:

• To define a path as a selection using the current settings in the Make Selection dialog box, Ctrl-click (Windows) or Command-click (Mac OS) the path thumbnail in the Paths palette.

• To add the path to the current selection, press Ctrl+Shift/Command+Shift and click the path thumbnail.

• To subtract the path from the current selection, press Ctrl+Alt/Command+Option and click the path thumbnail.

• To select the intersection of the path and the current selection, press Ctrl+Shift+Alt/Command+Shift+Option and click the path thumbnail.

Converting selection borders into paths

Any selection made with a selection tool can be defined as a path. You can convert a selection into a path using the Make Work Path command or the Make Work Path button.

The Make Work Path command eliminates any feathering applied to the selection. It can also alter the shape of the selection, depending on the complexity of the path and the tolerance value you choose in the Make Work Path dialog box.

To convert a selection to a path:

Click the Make Work Path ( ) button at the bottom of the Paths palette.

To convert a selection to a path and specify tolerance:

1 Make the selection.

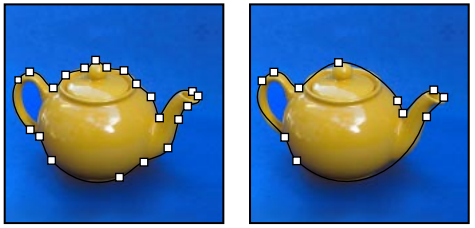
2 Convert the selection to a path:

• Alt-click (Windows) or Option-click (Mac OS) the Make Work Path ( ) button at the bottom of the Paths palette.

• Choose Make Work Path from the Paths palette menu.

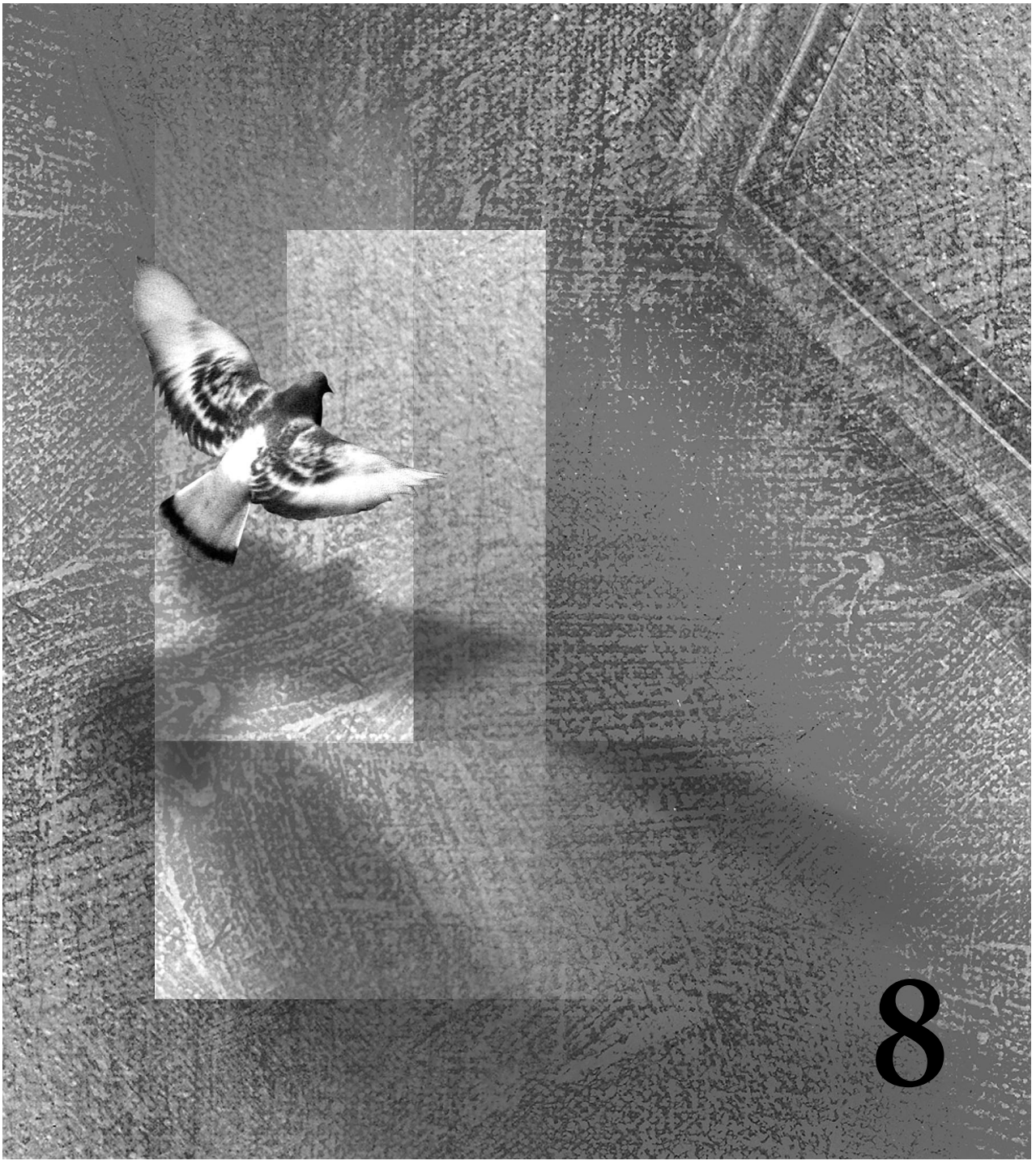
3 Enter a Tolerance value.

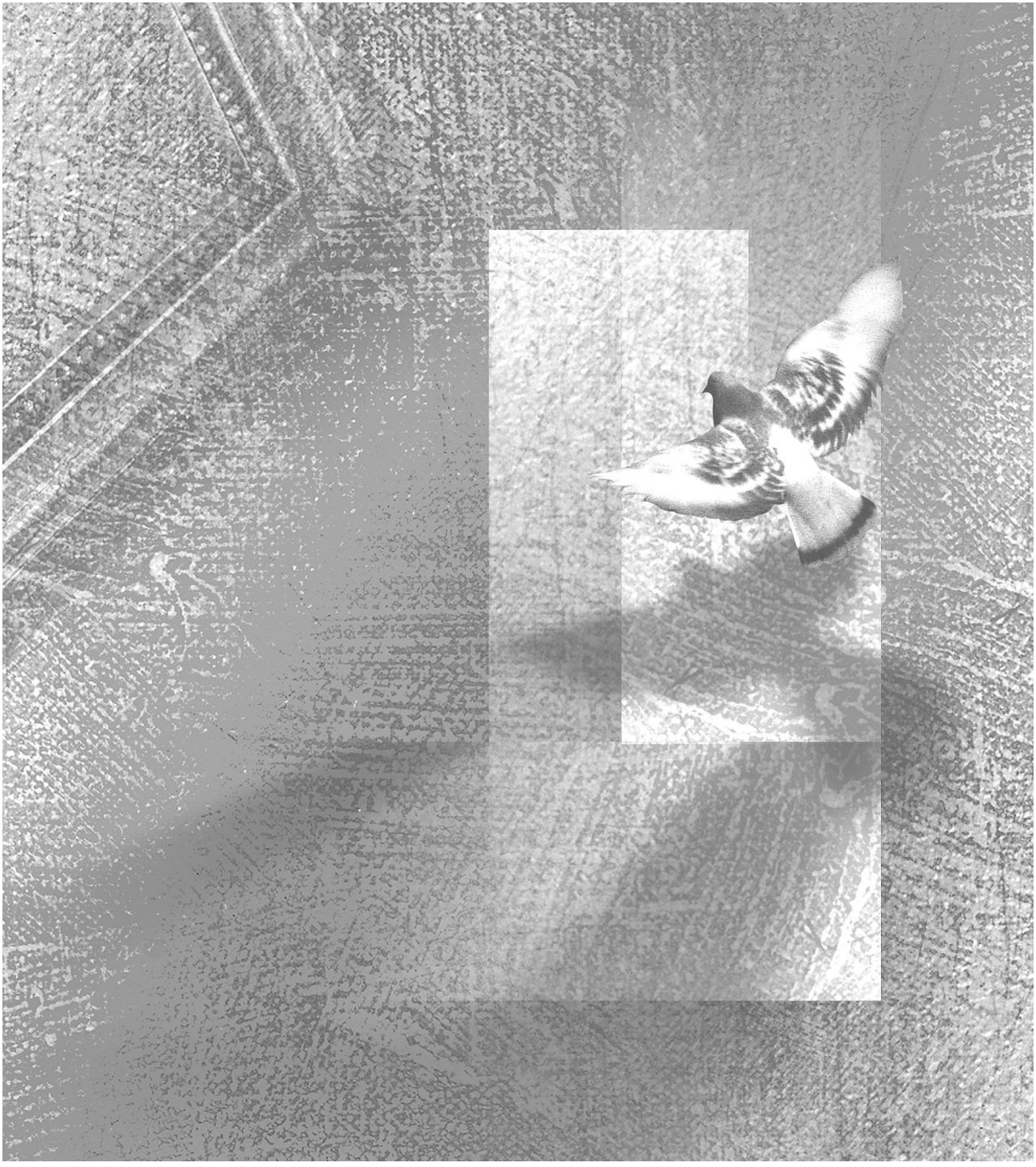
Tolerance values can range from 0.5 to 10 pixels and determine how sensitive the Make Work Path command is to slight changes in the selection shape. The higher the tolerance value, the fewer the anchor points used to draw the path and the smoother the path. If you experience difficulties printing the image, use a higher tolerance value (see "Printing clipping paths" on page 328).



Path tolerance: 2 pixels and 10 pixels

4 Click OK. The converted selection appears as a work path at the bottom of the Paths palette.


8



Chapter 8: Editing and Retouching

Adobe Photoshop makes it easy to edit and retouch your images. For example, you can move and copy selections within and between images and also between programs. A variety of editing tools let you modify your images and apply special effects.

Keep in mind that pixels beyond the borders of the visible canvas cannot be edited or retouched. However, you can use the move tool or selection arrows to move these pixels back onto the visible canvas, you can modify or reposition them using any of the Transform commands, or you can increase the canvas size to incorporate them.

Monitoring operations

You can't continue working while a progress bar is displayed, indicating an operation is in process. But you can usually interrupt the process or have the program beep when it's done.

To interrupt operations:

Hold down Esc until the operation in progress has stopped or press Command+(.) (Mac OS only).

To set the beep:

1 Choose File > Preferences > General.

2 Select Beep When Done, and click OK.

Correcting mistakes

Most operations can be undone if you make a mistake. Alternatively, you can restore all or part of an image to its last saved version. But available memory may limit your ability to use these options.

For information on how to restore your image to how it looked during any point in the current work session, see "Reverting to any state of the image" on page 168.

To undo the last performed operation only:

Choose Edit > Undo.

If an operation can't be undone, the command is dimmed and changes to Can't Undo.

To free memory used by the Undo command, the History palette, the Clipboard, or the Pattern buffer:

Choose Edit > Purge, and choose the item type or buffer you want to clear. If already empty, the item type or buffer is dimmed.

Important: *The Purge command permanently clears from memory the operation stored by the command or buffer, and cannot be undone. For example, choosing Edit > Purge > Histories deletes all history states from the History palette. Use the Purge command when information held in memory is so large, Photoshop cannot perform the next operation.*

To reverse all changes made to the image since it was last saved:

Choose File > Revert, and click Revert.

To restore part of an image to its previously saved version:

Do one of the following:

- Use the history brush tool ( ) to paint with the selected state or snapshot on the History palette. (See "Painting with a state or snapshot of the image" on page 172.)
- Use the eraser tool ( ) with the Erase to History option selected. (See "Using the eraser tool" on page 199.)
- Select the area you want to restore and choose Edit > Fill. For Use, choose History, and click OK. (See "Filling and stroking selections and layers" on page 211.)

Note: *To restore the image with a snapshot of the initial state of the document, make sure that the Automatically Create First Snapshot option is on.*

Reverting to any state of the image

The History palette lets you jump to any recent state of the image created during the current working session. Each time you apply a change to an image, the new state of that image is added to the palette.

For example, if you select, paint, and rotate part of an image, each of those states is listed separately in the palette. You can then select any of these states, and the image will revert to how it looked when that change was first applied. You can then work from that state.

The following guidelines can help you with the History palette:

- Program-wide changes, such as changes to palettes, color settings, actions, and preferences, are not changes to a particular image and so are not added to the History palette.
- By default, the History palette lists the previous 20 states. Older states are automatically deleted to free more memory for Photoshop. To keep a particular state throughout your work session, make a snapshot of the state.

For more information on making snapshots, see "Making a snapshot of the image" on page 171.

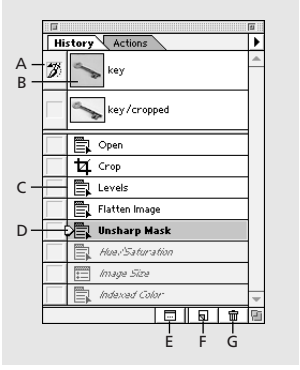
- Once you close and reopen the document, all states and snapshots from the last working session are cleared from the palette.
- By default, a snapshot of the initial state of the document is displayed at the top of the palette.
- States are added from the top down. That is, the oldest state is at the top of the list, the most recent one at the bottom.
- Each state is listed with the name of the tool or command used to change the image.

• By default, selecting a state dims those below. This way you can easily see which changes will be discarded if you continue working from the selected state. (See "To specify history options:" on page 170.)

• By default, selecting a state and then changing the image eliminates all states that come after.

• If you select a state and then change the image, eliminating the states that came after, you can use the Undo command to undo the last change and restore the eliminated states. (See "Correcting mistakes" on page 167.)

• By default, deleting a state deletes that state and those that came after it. If you choose the Allow Non-Linear History option, deleting a state deletes just that state.



A. *Sets the source for the history brush*
B. *Thumbnail of a snapshot*
C. *History state* ***D.*** *History state slider*
E. *Create new document from current state button*
F. *Create new snapshot button* ***G.*** *Trash button*

To display the History palette:

Choose Window > Show History.

To revert to a previous state of the image:

Do any of the following:

• Click the name of the state.

• Drag the slider at the left of the state up or down to a different state.

• Choose Step Forward or Step Backward from the pop-up menu to move to the next or previous state.

• Press Shift+Ctrl+Z (Windows) or Shift+Command+Z (Mac OS) to move to the next state.

• Press Alt+Ctrl+Z (Windows) or Option+Command+Z (Mac OS) to move to the previous state.

To delete one or more states of the image:

Do one of the following:

• Click the name of the state, and choose Delete from the pop-up menu on the palette to delete that change and those that came after it.

• Drag the state to the Trash button (🗑) to delete that change and those that came after it.

• Choose Clear History from the pop-up menu to delete the list of states from the History palette, without changing the image.

• Hold down Alt (Windows) or Option (Mac OS) and choose Clear History from the pop-up menu to purge the list of states from the History palette without changing the image. If you get a message indicating Photoshop is low on memory, purging states is useful, since the command deletes the states from the Undo buffer, and frees up memory. This action cannot be undone.

• Choose Edit > Purge > Histories to purge the list of states from the History palette for all open documents. This action cannot be undone.

To create a new document based on the selected state or snapshot of the image:

Do one of the following:

• Drag a state or snapshot onto the New Document button ( ).

• Select a state or snapshot and click the New Document button ( ).

• Select a state or snapshot and choose New Document from the pop-up menu on the palette.

The history list for the newly created document will be empty.

To save one or more snapshots or image states for use in a later editing session, create a new file for each state you'll save, and save each in a separate file. When you reopen your original file, also open the other saved files. You can drag each file's initial snapshot to the original image and thus access the snapshots again from the original image's History palette.

To replace another document with a selected state:

Drag the state onto the other document.

To specify history options:

1 Choose History Options from the History palette pop-up menu.

2 Select history options:

• For Maximum History Items, enter the maximum number of states that can be listed on the History palette.

Note: *This number is limited by the size of the image, the type of changes you make to it, and the amount of memory available to Photoshop.*

• Select Automatically Create First Snapshot to automatically create a snapshot of the initial state of the image when the document is opened.

• Select Allow Non-linear History to make changes to a selected state without deleting the states that come after. Normally, when you select a state and change the image, all states that come after the selected one are deleted. This enables the History palette to display a list of the editing steps in the order you made them. By recording states in a non-linear way you can select a state, make a change to the image, and delete just that state. The change will be inserted into the list of states, without deleting the states after it. This gives greater flexibility, but is less clearly organized.

3 Click OK.

Making a snapshot of the image

The Snapshot command lets you make a temporary copy (or *snapshot*) of any state of the image. The new snapshot is added to the list of snapshots at the top of the History palette. Selecting the snapshot lets you work from that version of the image.

Important: *Snapshots are not saved with the image—closing an image removes all snapshots. Also, unless you select the Allow Non-linear History option, selecting a snapshot and changing the image deletes all of the states currently listed in the History palette.*

Snapshots let you do the following:

• Switch repeatedly between several states. By taking a temporary snapshot of a state, you can keep that state for the entire work session, even if the original state is deleted from the list of states in the History palette.

• Give a unique name to states, to make them easier to identify.

• Experiment more freely. For example, you may want to compare two different techniques for achieving a similar effect. You can take a snapshot before and after trying the first technique. You can then select the first snapshot, try the second technique on it, and then compare snapshots of each technique.

• Take a snapshot before creating or applying an action. Then you can recover your work more easily if you decide later you don't like the action. Each step in an action is added to the list of states on the History palette. An action with many steps could scroll the current states off the palette, so that you could not return to any of them. Using the Undo command undoes only one step and state. By making a snapshot first, you can select and redisplay the pre-action image.

To create a snapshot:

1 Select a state.

2 Click the New Snapshot button (◱) on the History palette, or choose New Snapshot from the History palette pop-up menu.

3 Enter the name of the Snapshot in the Name text box.

4 For From, select the snapshot contents:

• Full Document to make a snapshot of all layers in the image at that state.

• Merged Layers to make a snapshot that merges all layers in the image at that state.

• Current Layer to make a snapshot of only the currently selected layer at that state.

5 Click OK.

To select a snapshot:

Do any of the following:

• Click the name of the snapshot.

• Drag the slider at the left of the snapshot up or down to a different snapshot.

To delete a snapshot:

Do one of the following:

• Select the snapshot, and choose Delete from the pop-up menu on the palette.

- Select the snapshot, and click the Trash button (🗑).
- Drag the snapshot to the Trash button (🗑).

Painting with a state or snapshot of the image

The history brush tool lets you paint a copy of one state or snapshot of an image into the current image window. This tool makes a copy, or sample, of the image and then paints with it.

For example, you might make a snapshot of a change you made with a painting tool or filter. After undoing the change to the image, you could use the history brush tool to apply the change selectively to areas of the image. Unless you select a merged snapshot, the history brush tool paints from a layer in the selected state to the same layer in another state.

The history brush tool works similarly to the rubber stamp tool, but on any state or snapshot of the image, not just the current one. (See "Using the rubber stamp tool and pattern stamp tool" on page 190.)

To paint with a state or snapshot of an image:

1 Double-click the history brush tool (🖌) to display its Options palette.

2 Specify the opacity and blending mode as explained in "Using the Options palette for painting and editing tools" on page 203.

3 Choose a brush size, as explained in "Using the Brushes palette" on page 200.

4 If desired, select Impressionist to paint with an "impressionistic" copy of the source state or snapshot. This option drags and smears the pixels as you paint.



Original image, and with Impressionist option

5 In the History palette, click the left column of the state or snapshot to use as the source for the history brush tool.

6 Drag to paint with the history brush tool.

Duplicating images

You can copy an entire image (including all layers, layer masks, and channels) into available memory without saving to disk by using the Duplicate command or by dragging and dropping.

To copy an image using the Duplicate command:

1 Open the image you want to copy.

2 Choose Image > Duplicate.

3 Enter a name for the copied image.

4 To duplicate the image without layers, select Merged Layers Only.

5 Click OK.

To duplicate an image and automatically append the name "copy" to it, hold down Alt (Windows) or Option (Mac OS) as you choose Image > Duplicate.

Using rulers, the measure tool, guides, and grids

Rulers, the measure tool, guides, and grids help you position images or elements precisely across the width or length of an image.

Note: *You can also align and distribute parts of an image by using the Layers palette. (See "Moving and aligning layer contents" on page 265.)*

Using rulers

When visible, rulers appear along the top and left side of the active window. Markers in the ruler display the pointer's position when you move it. Changing the ruler origin (the 0, 0 mark on the top and left rulers) lets you measure from a specific point on the image.The ruler origin also determines the grid's point of origin.

To display or hide rulers:

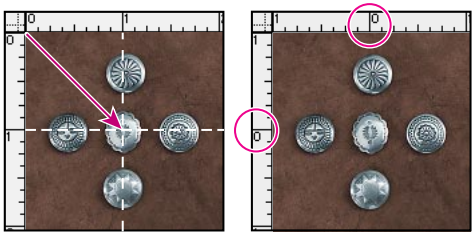
Choose View > Show Rulers or Hide Rulers.

To change the rulers' zero origin:

1 To snap the ruler origin to guidelines or gridlines, choose View > Snap to Guides or View > Snap to Grid.

2 Position the pointer over the intersection of the rulers in the upper left corner of the window, and drag diagonally down onto the image. To make the ruler origin snap to the ruler ticks, hold down Shift as you drag. A set of cross hairs appears while you drag, marking the new origin on the rulers.

Note: *To reset the ruler origin to its default value, double-click the upper left corner of the rulers.*



Dragging to create new ruler origin and result

To change the rulers' settings:

1 Do one of the following:

- Double-click a ruler.
- Choose File > Preferences > Units & Rulers.

2 For Units, choose a unit of measurement.

Note: *Changing the units on the Info palette changes the units on the rulers to match them.*

3 For Width and Gutter, enter values for the column size. You also can change the units.

Some layout programs use the column width setting to specify the display of an image across columns. The Image Size and Canvas Size commands also use this setting. (See "Changing the print dimensions and resolution of an image" on page 49 and "Increasing the size of the work canvas" on page 59.)

4 For Point/Pica Size, choose from the following options:

• PostScript (72 points per inch) if you are printing to a PostScript device.

• Traditional to use printer's 72.27 points per inch.

5 Click OK.

Using the measure tool

The measure tool calculates the distance between any two points in the work area. When you measure from one point to another, a non-printing line is drawn and the Info palette shows the following information:

• The starting location (X and Y).

• The horizontal (W) and vertical (H) distances traveled from the *x* and *y* axes.

• The total distance traveled (D).

• The angle measured relative to the axis (A).

• Optionally, set a second measuring line to create a protractor. This lets you measure angles separated from the *x* and *y* axes, and view two distances traveled (D1 and D2).

All measurements except the angle are calculated in the unit of measure currently set in the Units & Rulers preference dialog box. For information on setting the unit of measure, see "Using rulers" on page 173. For information on applying the values made by the measure tool to the Numeric Transform dialog box, see "Transforming numerically" on page 186.

To display an existing measuring line:

1 Select the measure tool ( ).

To measure between two points:

1 Select the measure tool ( ).

2 Drag from the starting point to the ending point. Hold down the Shift key to constrain the tool to multiples of 45°.

3 To create a protractor from an existing measuring line, Alt-drag (Windows) or Option-drag (Mac OS) at an angle from one end of the measuring line. Hold down the Shift key to constrain the tool to multiples of 45°.



To edit a measuring line or protractor:

1 Select the measure tool ( ).

2 Do one of the following:

• To resize the line, drag one end of an existing measuring line.

• To move the line, place the pointer on the line away from either endpoint and drag the line.

• To remove the line, place the pointer on the line away from either endpoint and drag the line out of the image.

Using guides and the grid

Guides appear as lines that float over the entire image and do not print. You can move, remove, or lock a guide to avoid accidentally moving it. The grid appears by default as nonprinting lines but can also be displayed as dots. The grid is useful for laying out elements symmetrically.

Guides and grids behave in similar ways:

- Selections, selection borders, and tools snap to a guide or the grid when dragged within 8 screen (not image) pixels. Guides also snap to the grid when moved. You can turn this feature on and off.
- Guide spacing, along with guide and grid visibility and snapping, is specific to an image.
- Grid spacing, along with guide and grid color and style, is the same for all images.

To show or hide guides or the grid:

Choose View > Show/Hide Guides or Show/Hide Grid.

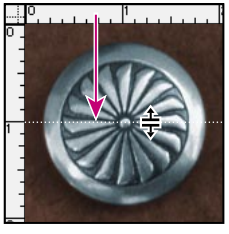
To place a guide:

1 If the rulers are not visible, choose View > Show Rulers.

Note: *For the most accurate readings, view the image at 100% magnification or use the Info palette.*

2 Create a guide:

- Drag from the horizontal ruler to create a horizontal guide.



Dragging to create a horizontal guide

- Hold Alt (Windows) or Option (Mac OS) and drag from the vertical ruler to create a horizontal guide.
- Drag from the vertical ruler to create a vertical guide.
- Hold Alt (Windows) or Option (Mac OS) and drag from the horizontal ruler to create a vertical guide.

The pointer changes to a double-headed arrow when you drag a guide.

To move a guide:

1 Select the move tool ( ).

2 Position the pointer over the guide (the pointer turns into a double-headed arrow).

3 Move the guide:

- Drag the guide to move it.

• Change the guide from horizontal to vertical, or vice versa, by holding down Alt (Windows) or Option (Mac OS) as you click or drag the guide.

• Align the guide with the ruler ticks by holding down Shift as you drag the guide. The guide will snap to the grid if the grid is visible and View > Snap to Grid is selected.

To lock all guides:

Choose View > Lock Guides.

To remove guides from the image:

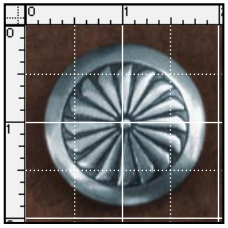
Do one of the following:

• To remove a single guide, drag the guide outside the image window.

• To remove all guides, choose View > Clear Guides.

To turn snapping to guides or the grid on or off:

Choose View > Snap to Guides or Snap to Grid, respectively.



Grids turned on

To set guide and grid preferences:

1 Choose File > Preferences > Guides & Grid.

2 For Color, choose a color for guides or the grid, or both. If you choose Custom, click the color box, choose a color, as described in "Using the Color palette" on page 215, and click OK.

3 For Style, choose a display option for guides or the grid, or both.

4 For Gridline Every, enter a value for the grid spacing. For Subdivisions, enter a value to subdivide the grid.

If desired, change the units for this option. The Percent option creates a grid that divides the image up into even sections. For example, choosing 25 for the Percent option creates an evenly divided 4 by 4 grid.

5 Click OK.

Moving, copying, and pasting selections

You can move or copy selections and layers within or between Photoshop images—and also between images in Photoshop and other applications.

Moving selections and layers within an image

The move tool lets you drag a selection or layer to a new location in the image. With the Info palette open, you can track the exact distance of the move.

To specify move tool options:

1 Double-click the move tool ( ) to display its Options palette.

2 In the Move Options palette, select any of the following:

• Pixel Doubling to speed the preview of the move tool's effect by temporarily doubling the size of the pixels (halving the resolution) in the preview. This option has no effect on the pixels in the file, it simply provides faster previews with the tool.

• Auto Select Layer to select the topmost layer that has pixels under the move tool, rather than the selected layer.

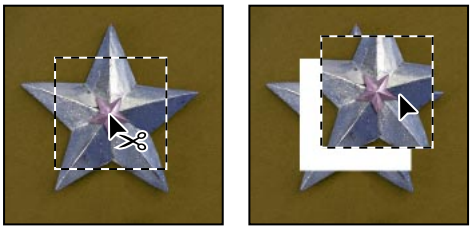
To move a selection or layer:

1 Select the move tool ( ).

To activate the move tool when another tool is selected, hold down Ctrl (Windows) or Command (Mac OS). (This technique does not work with the pen tool ( ), direct-selection tool ( ), hand tool ( ), magnifying glass tool ( ), or anchor-point tools ( ) ( ) ( ).)

2 Do one of the following:

• Move the pointer inside the selection border, and drag the selection to a new position. If you have selected multiple areas, all move as you drag.



Original selection, and selection moved with move tool

• Select the layer you want to move. Then drag the layer to a new position.

Copying selections or layers

You can use the move tool to copy selections as you drag them within or between Photoshop images. Or you can copy and move selections using the Copy, Copy Merged, Cut, and Paste commands. Dragging with the move tool saves memory because the Clipboard is not used as it is with the Copy, Copy Merged, Cut, and Paste commands.

Keep in mind that when a selection or layer is pasted between images with different resolutions, the pasted data retains its pixel dimensions. This can make the pasted portion appear out of proportion to the new image. Use the Image Size command to make the source and destination images the same resolution before copying and pasting (see "Determining a recommended resolution for an image" on page 50).

Photoshop includes two copy and two paste commands:

• The Copy command copies the selected area on the active layer.

• The Copy Merged command makes a merged copy of all the visible layers in the selected area.

• The Paste command pastes a cut or copied selection into another part of the image or into another image as a new layer.

• The Paste Into command pastes a cut or copied selection inside another selection in the same image or different image. The source selection is pasted onto a new layer, and the destination selection border is converted into a layer mask. (See "Using layer masks" on page 276.)

To copy a selection:

1 Select the area you want to copy.

2 Choose Edit > Copy or Edit Copy Merged.

To copy a selection while dragging:

1 Select the move tool (▸+) or hold down Ctrl (Windows) or Command (Mac OS) to activate the move tool.

2 Hold down Alt (Windows) or Option (Mac OS), and drag the selection you want to copy and move.

When copying between images, drag the selection from the active image window into the destination image window. If nothing is selected, the entire active layer is copied. As you drag the selection over another image window, a border highlights the window if you can drop the selection into it.

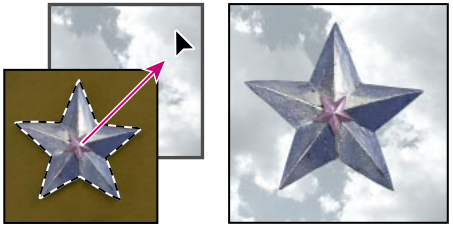
To create multiple copies of a selection within an image:

1 Select the move tool (▸+) or hold down Ctrl (Windows) or Command (Mac OS) to activate the move tool.

2 Copy the selection:

- To copy the selection and offset the duplicate by 1 pixel, hold down Alt (Windows) or Option (Mac OS), and press an arrow key.
- To copy the selection and offset the duplicate by 10 pixels, press Alt+Shift/Option+Shift, and press an arrow key.
- Hold down Alt/Option and drag the selection.

As long as you hold down Alt/Option, each press of an arrow key creates a copy of the selection and offsets it by the specified distance from the last duplicate.

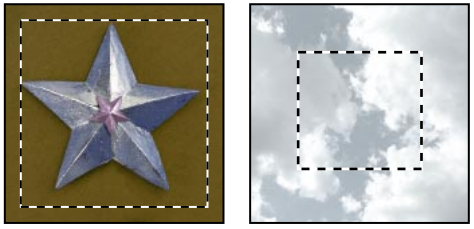


Selection dragged to new image, and result

To paste one selection into another:

1 Cut or copy the part of the image you want to paste.

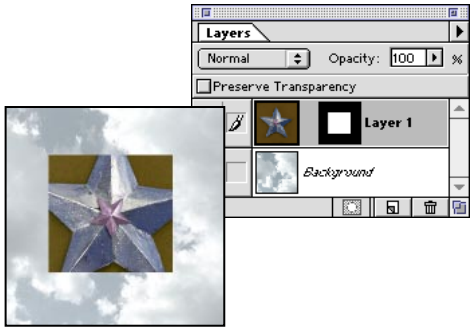
2 Select the part of the image into which you want to paste the selection. The source selection and the destination selection can be in the same image or in two different Photoshop images.



Source selection, and destination selection

3 Choose Edit > Paste Into. The contents of the source selection appear masked by the destination selection.

In the Layers palette, the layer thumbnail for the source selection appears next to the layer mask thumbnail for the destination selection. The layer and layer mask are unlinked—that is, you can move each one independently.



Source selection pasted into destination selection

For more information on editing layer masks, see "Applying and discarding layer masks" on page 280.

4 Select the move tool (), or hold down the Ctrl (Windows) or Command (Mac OS) key to activate the move tool. Then drag the source contents until the part you want appears through the mask.

5 To reveal more or less of the image underlying the layer, click the layer mask thumbnail in the Layers palette, select a painting tool, and edit the mask:

- To hide more of the image underlying the layer, paint the mask with black.
- To reveal more of the image underlying the layer, paint the mask with white.
- To partially reveal the image underlying the layer, paint the mask with gray.

6 If you are satisfied with your results, you can choose Layer > Merge Down to merge the new layer and layer mask with the underlying layer and make the changes permanent.

Using drag and drop to copy between applications

The drag-and-drop feature lets you copy and move artwork between Photoshop and other applications.

In Windows, the application must be OLE-compliant. To duplicate an entire Photoshop image by dragging and dropping, use the move tool to drag the image. To copy an OLE object that contains .psd data, use the OLE Clipboard. (See your Windows documentation.) Dragging vector artwork from Adobe Illustrator or from other applications that use the Illustrator Clipboard converts the artwork to a bitmap image (also called *raster* format). To copy the artwork as a path in Adobe Photoshop, hold down Ctrl as you drag.

In Mac OS, the application must support Macintosh Drag Manager.

Using the Clipboard to copy between applications

You can often use the Edit > Cut or Copy commands to copy selections between Photoshop and other applications. The cut or copied selection remains on the Clipboard until you cut or copy another selection. By default, the contents of the Clipboard are usually converted to a bitmap image (also called raster format), or *rasterized*.

This automatic conversion lets you paste the Clipboard's contents into another application. But because it can be time-consuming, you may want to disable it if you don't plan to paste the Clipboard contents into another application. You can still paste selections between Photoshop images.

Note: *If you are using the system, not the Adobe Clipboard, this technique resizes your image based on an image size of 96 dpi for Windows, and 72 dpi for the Mac OS.*

To change the Export Clipboard preference:

1 Choose File > Preferences > General.

2 Select Export Clipboard to save any Photoshop contents on the Clipboard when quitting Photoshop. Leaving this option unselected deletes any Photoshop contents on the Clipboard when quitting the program.

3 Click OK.

To paste PostScript artwork from another application to Photoshop:

1 In the supporting application, select your artwork, and choose Edit > Copy. Applications which produce PostScript artwork include Adobe Illustrator (version 5.0 and later), Adobe Dimensions, and Adobe Streamline. (See "Photoshop EPS" on page 322.)

2 In Adobe Photoshop, make active the image into which you'll paste the selection.

3 Choose Edit > Paste.

4 In the dialog box that appears, choose from the following options:

- Paste as Pixels to have the artwork rasterized as it is pasted. Rasterizing converts mathematically defined vector artwork to the pixels displayed in Adobe Photoshop.
- Paste as Paths to paste the copy as a path in the Paths palette.

5 If you chose Paste as Pixels in the previous step, do one of the following:

- Keep Anti-aliasing selected to make a smooth transition between the edges of the selection and the surrounding pixels. (See "Softening the edges of a selection" on page 147.)
- Deselect Anti-aliasing if you want the selection to have a crisp edge.

Note: *If anti-aliasing causes ghosting, you can also use the Matting commands. (See "Removing fringe pixels from a selection" on page 181.)*

6 Click OK.

Deleting a selection

To delete a selection, choose Edit > Clear or press Delete. To cut a selection to the Clipboard, choose Edit > Cut. Deleting a selection on a background or on a layer with the Preserve Transparency option selected replaces the original location with the background color. Deleting a selection on a layer with the Preserve Transparency option deselected replaces the original area with the layer transparency.

Removing fringe pixels from a selection

When you move or paste an anti-aliased selection, some of the pixels surrounding the selection border are included with the selection. This can result in a fringe or halo around the edges of the pasted selection. These three Matting commands let you edit these unwanted edge pixels:

- Defringe replaces the color of any fringe pixels with the colors of nearby pixels containing pure colors (those without background color). For example, if you select a yellow object on a blue background and then move the selection, some of the blue background is selected and moved with the object. Defringe replaces the blue pixels with yellow ones.
- Remove Black Matte and Remove White Matte are useful when you want to paste a selection anti-aliased against a white or black background onto a different background. For example, anti-aliased black text on a white background has gray pixels at the edges, which are visible against a colored background.

You can also remove fringe areas by using the sliders in the Layer Options dialog box to remove, or make transparent, areas from the layer. In this case, you would make the black or white areas transparent.

To decrease a fringe on a selection:

1 Choose Layer > Matting > Defringe.

2 Enter a value in the Width text box for the distance to search for replacement pixels, and then click OK. In most cases, a distance of 1 or 2 pixels is enough.



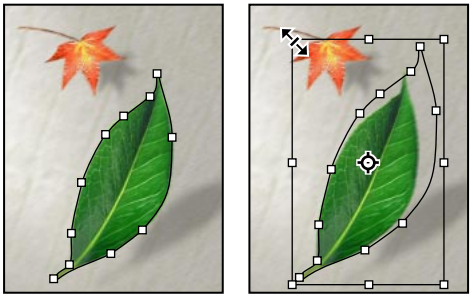
Original selection, and selection defringed: 2 pixels

To remove a matte from a selection:

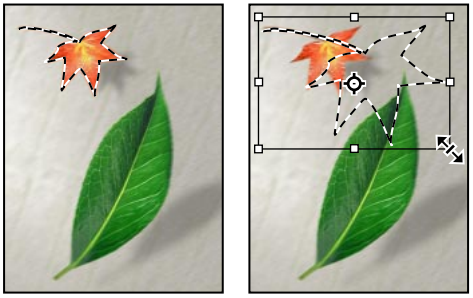
Choose Layer > Matting > Remove Black Matte or Remove White Matte.

Transforming objects in two dimensions

You can scale, rotate, skew, distort, and apply perspective to selected parts of an image, entire layers, paths, and selection borders. You can also rotate and flip part or all of a layer, an entire image, path, or selection border.



Original path and scaled path



Original selection and scaled selection border

Use the following guidelines when applying transformations:

- You can transform a linked layer. The transformation affects all the layers in the linking group.
- You cannot apply transformations to the background as a layer, or on 16-bit-per-channel images. You can, however, transform selections on the background.
- You can apply transformations to an alpha channel by first selecting it in the Channels palette. (See "Using alpha channels" on page 252.)
- You can apply transformations to a layer mask by first selecting its thumbnail in the Layers palette. (See "Using layer masks" on page 276.)
- Pixels are added or deleted during transformations. To calculate the color values of these pixels, Adobe Photoshop uses the interpolation method selected in the General Preferences dialog box. This option directly affects the speed and quality of the transformation. Bicubic interpolation, the default, is slowest but yields the best results. (See "Choosing an interpolation method" on page 51.)

To specify what to transform:

Do one of the following:

- To transform part of a layer, select the layer, and then select part of the image on that layer. (See "Using the Layers palette" on page 259 and Chapter 7, Selecting.)
- To transform an entire layer, make the layer active, and make sure that nothing is selected. (See "Using the Layers palette" on page 259.)
- To transform a path, choose a path tool or select part or all of the path. If you select one or more points on a path, only those path segments connected to the points are transformed. (See "Selecting path segments" on page 157.)

• To transform a selection border, make or load a selection. (See Chapter 7, Selecting.)

To move the center point for the transformation:

Drag the center point. The center point can be outside the part of the image, the path, or the selection you want to transform.

Rotating and flipping an entire image

The Rotate Canvas commands let you rotate or flip the entire image. It does not work on individual layers or parts of layers, paths, or selection borders.



Original image, and with canvas rotated

To rotate or flip an entire image:

Choose Image > Rotate Canvas and, from the submenu, choose one of the following commands:

• 180° to rotate the image by a half-turn.

• 90° CW to rotate the image clockwise by a quarter-turn.

• 90° CCW to rotate the image counterclockwise by a quarter-turn.

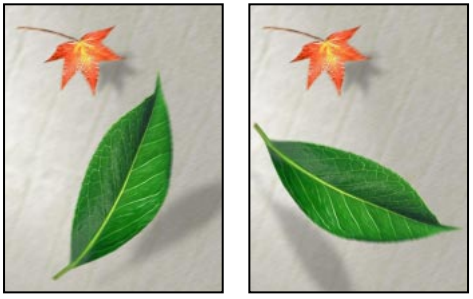
• Arbitrary to rotate the image by the angle you specify. If you choose this option, enter an angle between -359.99 and 359.99 in the angle text box, then select CW or CWW to rotate clockwise or counterclockwise. Click OK.

• Flip Horizontal to flip the image horizontally, along the vertical axis.

• Flip Vertical to flip the image vertically, along the horizontal axis.

Applying a specific transformation

The commands under the Transform submenu let you apply specific transformations to a selection, layer, path, or selection border. Photoshop previews the effect and surrounds the selected area with a bounding border that lets you manipulate the selection, layer, or path.



Original image, and with green leaf layer rotated

You can apply several commands in succession before applying the cumulative transformation. For example, you can choose Scale, drag a handle to scale, and then choose Distort, drag a handle to distort, and press Enter (Windows) or Return (Mac OS) to apply both transformations. For information about making a layer active, see "Using the Layers palette" on page 259.

To scale, rotate, skew, distort, or apply perspective:

1 Do one of the following:

• To transform part or all of a layer, select it. Then choose Edit > Transform > Scale, Rotate, Skew, Distort, or Perspective.

• To transform part or all of a path, select it. Then choose Edit > Transform Points or Transform Path > Scale, Rotate, Skew, Distort, or Perspective.

Note: *Distort and Perspective are only available when transforming entire paths.*

• To transform a selection border, make or load one. Choose Select > Transform Selection. Then choose Edit > Transform > Scale, Rotate, Skew, Distort, or Perspective.

To scale or skew around the center point, press Alt (Windows) or Option (Mac OS) when choosing the Scale or Skew command.

2 Drag the handles to achieve the desired effect.

3 To apply additional transformations, repeat steps 1 and 2.

4 Press Enter (Windows) or Return (Mac OS) to apply the cumulative transformation. Press Esc to cancel the transformation.

To flip or rotate:

1 Do one of the following:

• To flip or rotate part or all of a layer, select it.

• To flip or rotate part or all of a path, select it.

• To transform a selection border, make or load one. Then choose Select > Transform Selection.

2 Choose Edit > Transform, Transform Points, or Transform Path and, from the submenu, choose one of the following commands:

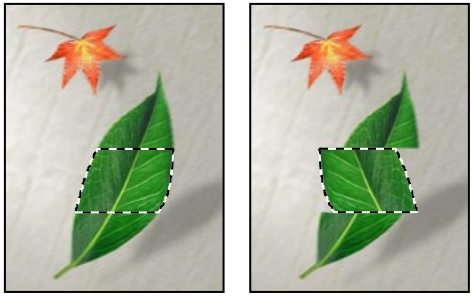
• Rotate 180° to rotate by a half-turn.

• Rotate 90° CW to rotate clockwise by a quarter-turn.

• Rotate 90° CCW to rotate counterclockwise by a quarter-turn.

• Flip Horizontal to flip horizontally, along the vertical axis.

• Flip Vertical to flip vertically, along the horizontal axis.



Original selection, and with selection on green leaf layer flipped

To repeat a transformation:

Choose Edit > Transform > Again, Transform Points > Again, or Transform Path > Again.

To duplicate an item when transforming it:

Press Ctrl+Alt+T (Windows) or Command+Option+T (Mac OS), or hold down Alt/Option when selecting the Transform command.

Freely transforming and previewing effects

The Free Transform command lets you use the Scale, Rotate, Skew, Distort, and Perspective commands without having to select them from the menu. To access the various transformation modes, you use different shortcut keys as you drag the handles of the transform bounding box.

To freely transform:

1 Specify what to transform:

• To transform part or all of the layer, select it. Then choose Edit > Free Transform.

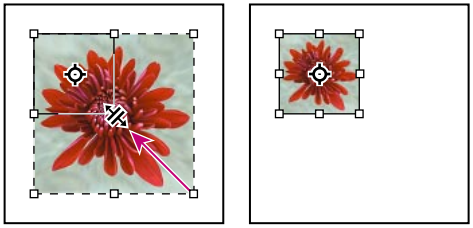
• To transform part or all of the path, select it. Then choose Edit > Free Transform Points or Free Transform Path.

• To transform a selection border, create or load one. Then choose Select > Transform Selection.

2 Transform as follows:

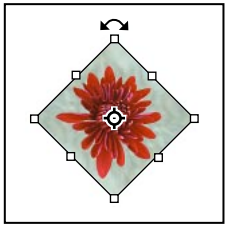
• To move, position the pointer inside the bounding border (it turns into a black arrowhead), and drag.

• To scale, drag a handle. Press Shift as you drag a corner handle to scale proportionately. When positioned over a handle, the pointer turns into a double arrow.



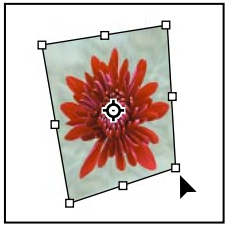
Drag handle to scale, and result

• To rotate, move the pointer outside of the bounding border (it turns into a curved, two-sided arrow), and then drag. Press Shift to constrain the rotation to 15° increments.



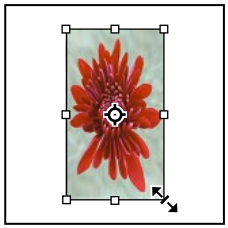
Rotate

• To distort freely, press Control (Windows) or Command (Mac OS), and drag a handle.



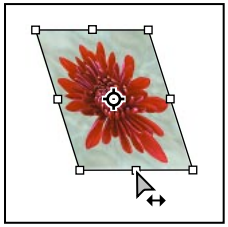
Distort freely

• To distort relative to the center point of the bounding border, press Alt (Windows) or Option (Mac OS), and drag a handle.



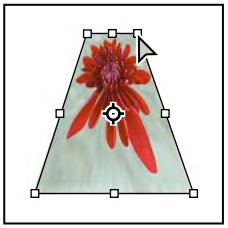
Distort symmetrically

• To skew, press Control+Shift (Windows) or Command+Shift (Mac OS), and drag a side handle. When positioned over a side handle, the pointer turns into a white arrowhead with a small double arrow.



Skew

• To apply perspective, press Control+Alt+Shift (Windows) or Command+Option +Shift (Mac OS), and drag a corner handle. When positioned over a corner handle, the pointer turns into a gray arrowhead.



Apply perspective

To undo the last handle adjustment, choose Edit > Undo.

3 Press Enter (Windows) or Return (Mac OS) to apply the transformation. To cancel the transformation, press Esc.

Transforming numerically

The Numeric command lets you scale, rotate, skew, or move part of the image, a layer, path, or selection border precisely, by entering specific numeric values for the transformation.

To transform a layer or path numerically:

1 Specify what to transform:

• To transform part or all of an image on a layer, select it. Then choose Edit > Transform > Numeric.

• To transform part or all of a path, select it. Then choose Edit > Transform Points > Numeric or Transform Path > Numeric.

• To transform a selection border, make or load one. Choose Select > Transform Selection. Then choose Edit > Transform > Numeric.

2 Deselect any transformation option in the dialog box to turn it off.

3 Transform as follows:

• To move, select Position. Choose the unit of measurement from the menus; then enter a horizontal distance in the X text box and a vertical distance in the Y text box. To move relative to the existing image, layer, or path, select Relative. Otherwise, the movement is relative to the top left corner of the image.

• To resize, select Scale. Choose the unit of measurement from the menus; then enter values for the Width and Height. Select Constrain Proportions to scale proportionally.

• To skew, select Skew. Then enter values for the Horizontal and Vertical angles of slant.

• To rotate, select Rotate. Then enter a value for Angle or drag the radius inside the circle to the desired angle of rotation.

4 Click OK.

Transforming objects in three dimensions

The 3D Transform filter lets you manipulate a flat, two-dimensional image as if it were a solid, 3-D object. Take, for example, a perspective photograph of a cereal box. You specify the corners of the box using a wire frame, and can then manipulate the box as if it were a 3-dimensional object. You can reposition the box, turn or rotate it, shrink or enlarge it, and change its field of view.

In addition to boxes, you can manipulate spheres and cylinders using wire frames based on those shapes. Cylinders can include anything from simple objects, such as a can of soup, to shapes whose sides are lathed, such as a bottle or a lamp.

You can create and manipulate any grouping of cubes, spheres, and cylinders in the same image. For example, you can create and rotate a box, two balls, and a bottle together in the same image.



Wire frames around cubes, spheres, and cylinders

To transform an object in three dimensions:

1 Choose Filters > Render > 3D Transform.

2 Select one of these tools in the dialog box:

• Cube ( ) to map the image (such as a file cabinet) to a cubic surface.

• Sphere ( ) to map the image (such as a globe or ball) to a spherical surface.

• Cylinder ( ) to map the image (such as a can or bottle) to a cylindrical surface.

3 Drag to create a cubic, cylindrical, or spherical wire frame over the image.

4 Move or reshape the wire frame as described in this section. The anchor points should line up with the corners of the box, or the top and bottom of the sphere or cylinder you want to manipulate.

5 Manipulate the object in three dimensions as described in this section.

6 Click OK.

To move or reshape the wire frame:

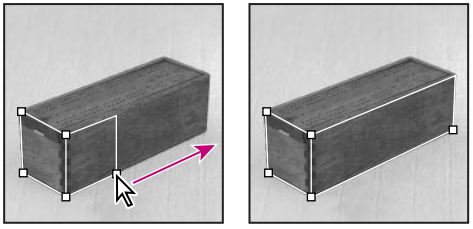
1 Select the selection tool ( ) or direct-selection tool ( ) in the dialog box.

2 Do either of the following:

• Drag an edge of the wire frame to move the entire frame.

• With the direct-selection tool, drag an anchor point on the wire frame to move that anchor point.

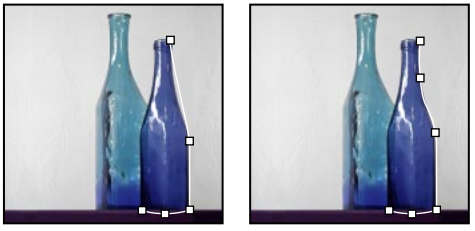
Note: *The wire frame turns red if you try to make a wire frame that would be impossible to re-create in three dimensions.*



Dragging to reshape wire frame over box

3 If you are creating a complex cylinder, do any of the following:

• To add an anchor point to a cylinder, select the add-anchor-point tool ( ) in the dialog box, and click the right side of the wire frame. For example, you can add an anchor point to more closely fit the cylindrical wire frame to a picture of a bottle.

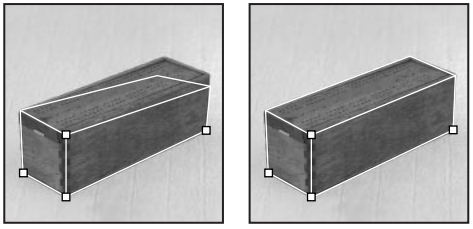


Original, and with smooth point added

• To change an added anchor point from a smooth anchor point to a corner anchor point and vice versa, select the convert-anchor-point tool (⌃) and click the point. A smooth anchor point creates a gentle curve when you adjust it, a corner anchor point creates a sharp corner.

• To delete an added anchor point, select the delete-anchor-point-tool (✒⁻) and click the point.

4 For Field of View, enter a value between 1 and 130 or drag the slider to the left to increase the apparent field of view, right to decrease it.This can make the wire frame fit the image better. If you know the field of view angle used to photograph the image, you can enter it here.



Field of view 76, and field of view 36

To delete a wire frame:

1 Select the selection tool (▸) in the dialog box.

2 Select the wire frame and press Delete.

To manipulate the object in three dimensions:

Do any of the following:

• To move the object, click the pan camera tool in the dialog box and drag the object.

• To rotate the object in any direction, click the trackball tool, and drag the object.

• For Dolly Camera, enter a value between 0 and 100 or drag the slider to the left to magnify the transformed object, right to shrink it. This has the same effect as if you were dollying, or moving, the camera further from or closer to the image.

• For Field of View, enter a value between 1 and 130 or drag the slider to the left to increase the apparent field of view, right to decrease it.

To magnify or shrink the preview image:

1 Select the zoom tool (🔍) in the dialog box.

2 Click the image to Zoom in, or Alt-click (Windows) or Option-click (Mac OS) to zoom out.

To move the view of the preview image:

Select the hand tool (✋) in the dialog box, and drag the hand to drag the preview image. This only works if you are zoomed in on the image.

To specify rendering options:

1 Click Options.

2 Do any of the following:

• For Resolution, choose the quality of the rendered image. The setting has little effect on the image quality of cubes, but will produce smoother curved surfaces in cylinders and spheres.

• For Anti-aliasing, choose the level of anti-aliasing to apply to the rendered image.

• Select Display Background to include the portions of the original image outside of the wire frame in the preview and with the rendered image. Turn this option off to separate the transformed object from the original background.

3 Click OK

For a list of 3D transformation shortcuts, see the online help

The 3D Transform dialog box previews only the active layer. As you manipulate an object in three dimensions, you can align it with the contents of the underlying layers. Duplicate the layer to align to, and place it directly under the layer to be transformed in the layer stacking order. Merge the layer to be transformed with the duplicated layer. With the Display Background option enabled in the 3D Transform dialog box, manipulate the object on the layer. When the layer is aligned, disable the Display Background option and click OK.

Using the rubber stamp tool and pattern stamp tool

The rubber stamp tool takes a sample of the image, which you can then apply over another image or part of the same image. Each stroke of the tool paints on more of the sampled image. Cross hairs mark the original sampling point. The pattern stamp tool lets you select part of an image and paint with the selection as a pattern.

For information on restoring painted areas to their previous states, see "Painting with a state or snapshot of the image" on page 172.

To use the rubber stamp tool and pattern stamp tool:

1 Double-click the rubber stamp tool (🖃) or pattern stamp tool (🖃) to display its Options palette.

2 Do any of the following:

• Specify the blending mode and opacity as explained in "Using the Options palette for painting and editing tools" on page 203.

• Choose a brush size as explained in "Using the Brushes palette" on page 200.

• If you are using a pressure-sensitive drawing tablet, select Size to change the brush size with changes in stylus pressure, Opacity to change the opacity.

3 If you are using the rubber stamp tool, select Use All Layers to sample data from all visible layers. If left deselected, the tool samples only from the active layer.

4 Do one of the following:

• With the rubber stamp tool, select Aligned to apply the entire sampled area once, regardless of how many times you stop and resume painting. This option is useful when you want to use different sized brushes to paint an image. You can also use the Aligned option to duplicate two halves of a single image and place them at different locations.

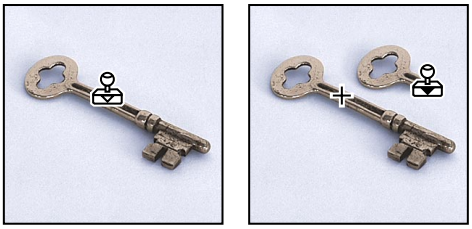
• With the rubber stamp tool, deselect Aligned to apply the sampled area from the initial sampling point each time you stop and resume painting. Because the rubber stamp tool samples the entire image, this option is useful for applying multiple copies of the same part of an image to different images.

• With the pattern stamp tool, select Aligned to repeat the pattern as contiguous, uniform tiles, even when you stop and resume painting in different parts of the image.

• With the pattern stamp tool, deselect Aligned to center the pattern on the pointer each time you stop and resume painting.

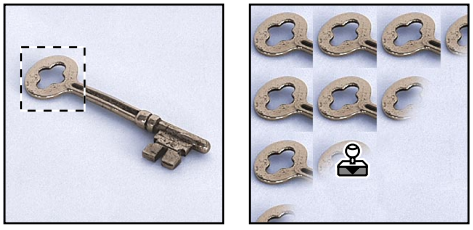
5 Set the sampling point or pattern:

• For the rubber stamp tool, position the pointer on the part of any open image you want to sample, and Alt-click (Windows) or Option-click (Mac OS). This sample point is the location from which the image is duplicated as you paint.



Sampling point, and with cross hairs marking the part of the original being applied

• For the pattern stamp tool, use the rectangle marquee tool ([⬚]) on any open image to select an area to use as a pattern. Then choose Edit > Define Pattern. Reselect the pattern stamp tool.



Area defined for pattern, and painted

Note: *If you are sampling or using a pattern from one image and applying to another, both images must be in the same color mode.*

6 Drag to paint with the tool.

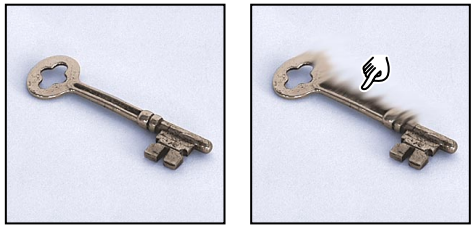
Using other retouching tools

You can also retouch images using the smudge, focus, and toning tools.

Note: *The smudge, focus, and toning tools can't be used with Bitmap or Indexed color mode images.*

The tools work in the following ways:

• The smudge tool simulates the actions of dragging a finger through wet paint. The tool picks up color where the stroke begins and pushes it in the direction you drag.



Original image, and smudging an image

• The focus tools consist of the blur tool and the sharpen tool. The blur tool softens hard edges or areas in an image to reduce detail. The sharpen tool focuses soft edges to increase clarity or focus. For other ways to adjust image sharpness, see "Step 6: Sharpen the image" on page 128, or "Choosing a filter effect" on page 306.



Blurring an image, and sharpening an image

• The toning tools consist of the dodge tool and the burn tool. Used to lighten or darken areas of the image, the dodge and burn tools are based on a traditional photographer's technique for regulating exposure on specific areas of a print. Photographers hold back light to lighten an area on the print (dodging) or increase the exposure to darken areas on a print (burning).



Burning an image, and dodging an image

• The sponge tool subtly changes the color saturation of an area. In Grayscale mode, the sponge tool increases or decreases contrast by moving gray levels away from or toward the middle gray.

For a color illustration of changing saturation, see figure 8-1 on page 227.

To use the smudge tool:

1 Double-click the smudge tool ( ) to display its Options palette.

2 Specify the blending mode and pressure as described in "Using the Options palette for painting and editing tools" on page 203.

3 If you are using a pressure-sensitive drawing tablet, choose Size or Pressure as described in "Specifying stylus pressure options" on page 204.

4 Select a brush size as described in "Using the Brushes palette" on page 200.

5 Select Finger Painting to smudge using the foreground color at the beginning of each stroke. If you leave this option deselected, the smudge tool uses the color under the pointer at the beginning of each stroke.

6 Select Use All Layers to smudge using color data from all visible layers. If deselected, the smudge tool uses colors only from the active layer.

7 Drag in the image to smudge color.

Press Alt (Windows) or Option (Mac OS) as you drag with the smudge tool to use the Finger Painting option.

To use the blur or sharpen tool:

1 Double-click the blur tool ( ) or sharpen tool ( ) to display its Options palette.

2 Specify the blending mode and pressure as described in "Using the Options palette for painting and editing tools" on page 203.

3 If you are using a pressure-sensitive drawing tablet, choose Size or Pressure as described in "Specifying stylus pressure options" on page 204.

4 Select a brush size as described in "Using the Brushes palette" on page 200.

5 To blur or sharpen using data from all visible layers, select Use All Layers. If deselected, the blur or sharpen tool uses data only from the active layer.

6 Drag over the part of the image you want to blur or sharpen.

To use the dodge, burn, or sponge tool:

1 Double-click the dodge tool (), burn tool (), or sponge tool () to display its Options palette.

2 For the dodge tool or burn tool, select what to change in the image:

- Midtones to change only the middle range of grays in the image.
- Shadows to change the dark portions of the image.
- Highlights to change only the light pixels.

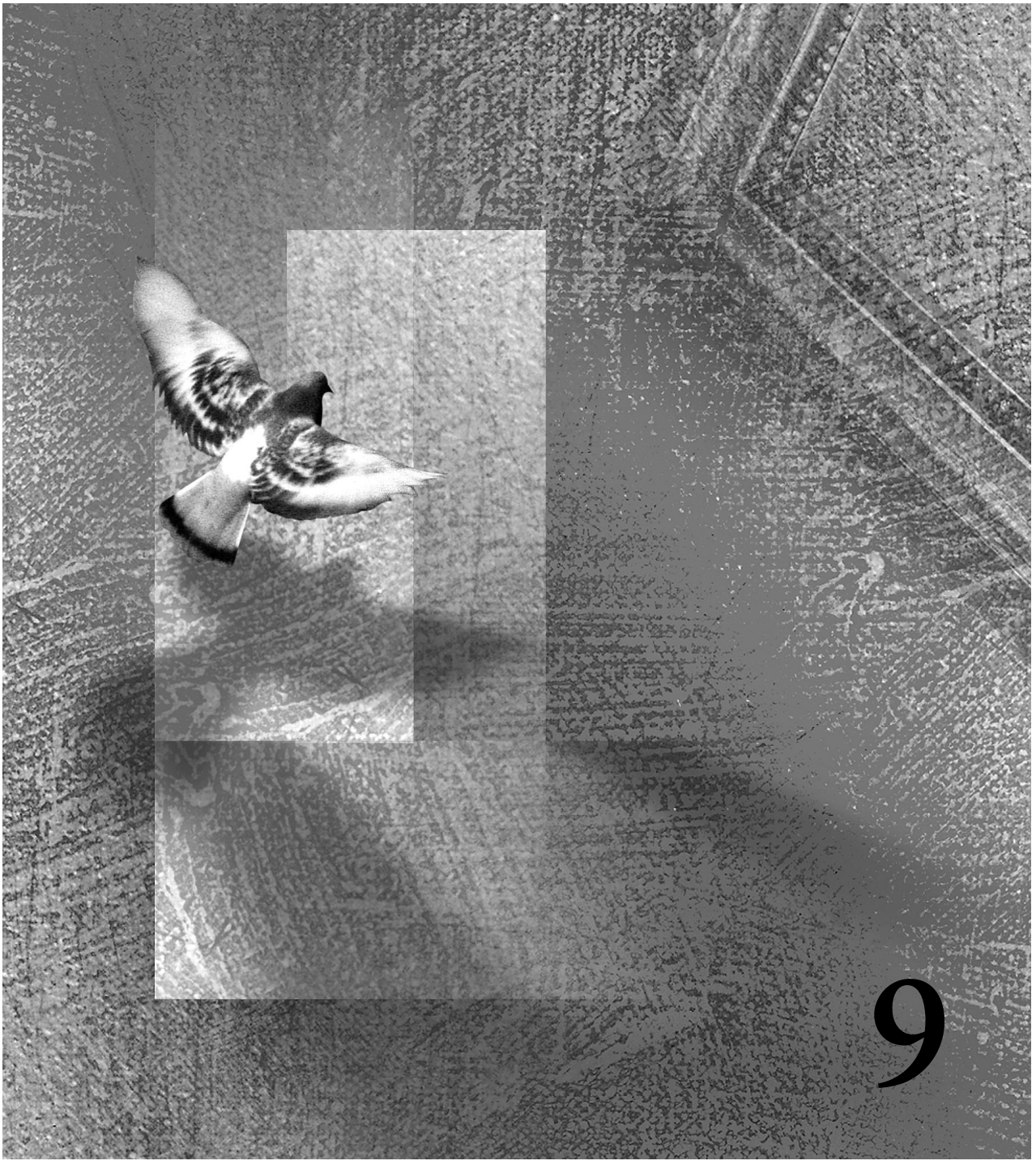
3 For the sponge tool, select how to change the color:

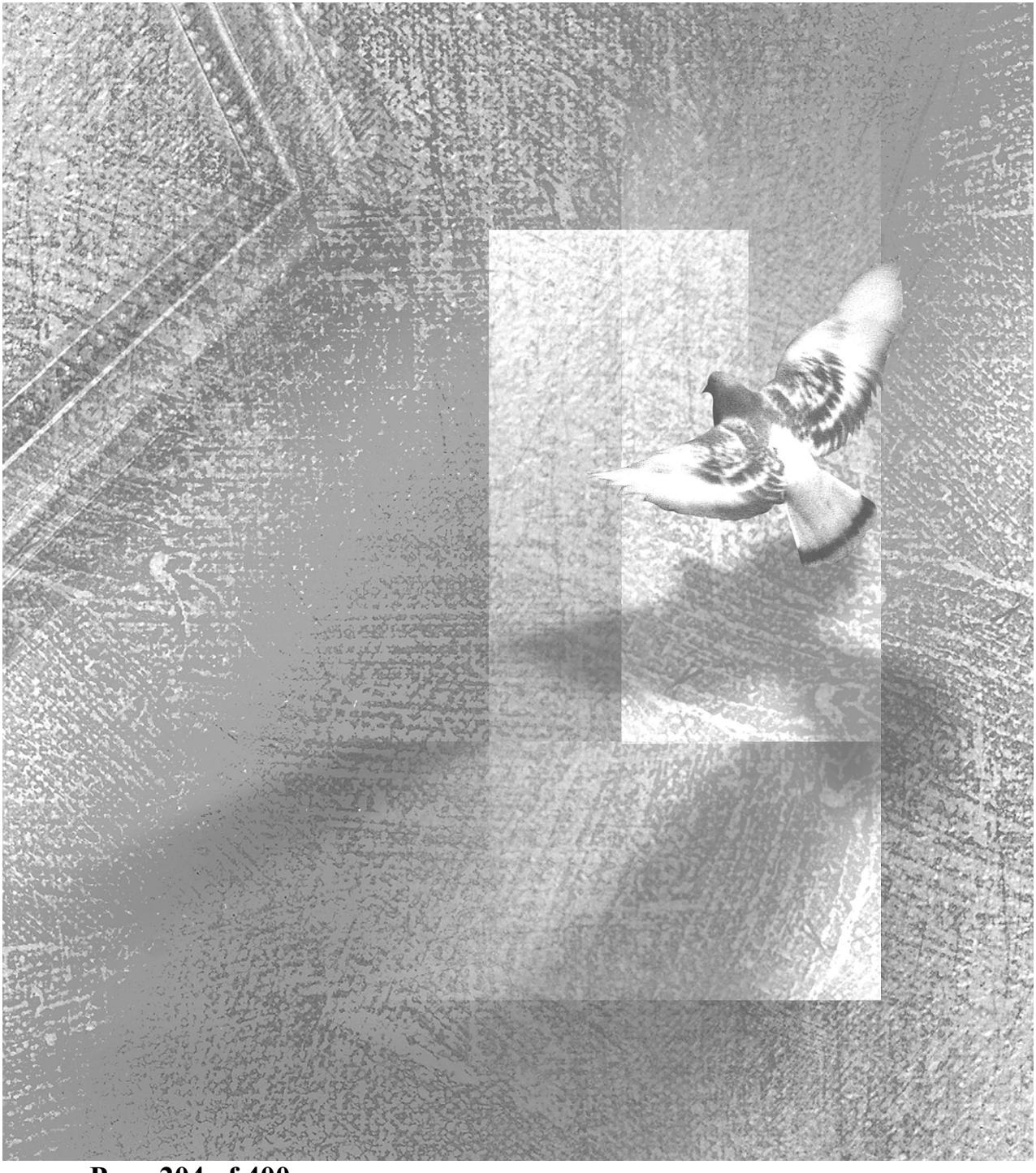
- Saturate to intensify the color's saturation.
- Desaturate to dilute the color's saturation.

4 Specify the exposure for the dodge tool and burn tool, or the pressure for the sponge tool, as described in "Specifying the opacity, pressure, or exposure" on page 203.

5 Select a brush size as described in "Using the Brushes palette" on page 200.

6 Drag over the part of the image you want to modify.


9



Chapter 9: Painting

The painting tools and fill commands let you change the color of pixels to modify and create colored areas in an image.

Using the painting tools

When using the painting tools, consider the painting effects you want:

- The paintbrush tool ( ) creates soft strokes of color.
- The airbrush tool ( ) applies gradual tones (including sprays of color) to an image, simulating traditional airbrush techniques. The edges of the stroke are more diffused than those created with the paintbrush tool. The pressure setting for the airbrush tool controls how quickly the spray of paint is applied. If you hold down the mouse button without dragging, you can build up color.
- The pencil tool ( ) creates hard-edged freehand lines and is most useful for bitmapped images. See page 199 for information on using the Auto Erase option with the pencil tool.

To save time when working with painting tools, make sure that the Options palette and the Brushes/Color/Swatches palette group are displayed.

To draw a straight line with any painting tool, click a starting point in the image. Then hold down Shift, and click an endpoint.

To use the paintbrush, airbrush, or pencil tool:

1 Specify a foreground color as described in "Choosing the foreground and background colors" on page 214.

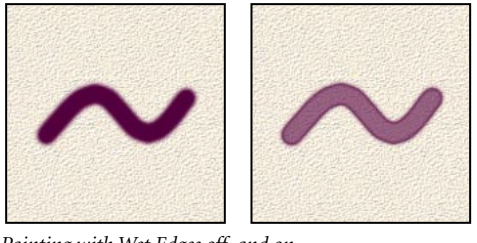
2 Select and double-click the paintbrush, airbrush, or pencil tool to display its Options palette.

3 Specify the blending mode, opacity, paint fade-out rate, and stylus options as described in "Using the Options palette for painting and editing tools" on page 203.

4 Select a brush size as described in "Using the Brushes palette" on page 200.

5 For the paintbrush tool, select Wet Edges to paint with a watercolor effect. With this option selected, the paint builds up along the edges of the brush stroke.

6 Drag in the image to paint.



Painting with Wet Edges off, and on

Using the line tool

The line tool (\) draws straight lines on an image.

To use the line tool:

1 Specify a foreground color as described in "Choosing the foreground and background colors" on page 214.

2 Select and double-click the line tool to display its Options palette.

3 Specify the blending mode and opacity as explained in "Using the Options palette for painting and editing tools" on page 203.

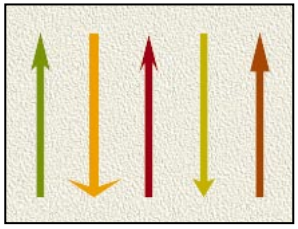
4 For Weight, enter the line width.

5 Select Anti-aliased to create soft-edged lines.

6 To include arrowheads, select Start, End, or both to specify where you want arrowheads.

7 To edit the appearance of arrowheads, click Shape and do the following:

- For the width of the arrowhead, enter a value from 10% to 1000% of the line width.
- For the length of the arrowhead, enter a value from 10% to 5000% of the line width.
- For the concavity of the arrowhead, enter a value from –50% to +50%. The concavity value defines the amount of curvature on the widest part of the arrowhead, where the arrowhead meets the line.



Arrowheads created with different values

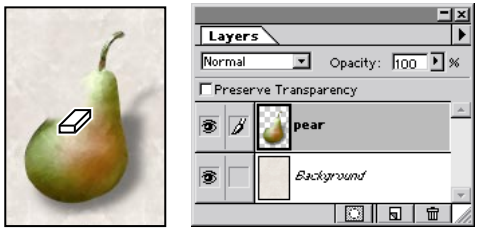
8 Drag in the image. To constrain the line angle to a multiple of 45°, hold down Shift as you drag.

Erasing

The eraser tool and the Auto Erase option for the pencil tool let you replace colors in an image either with the background color or with transparency.

Using the eraser tool

The eraser tool changes pixels in the image as you drag through them. If you're working in the background, or in any other layer with Preserve Transparency on, the pixels change to the background color (see "Choosing the foreground and background colors" on page 214). Otherwise, transparency replaces the color. You can also use the eraser to return the affected area to a state selected in the History palette.



Erasing pixels from layer exposes underlying layer.

To use the eraser tool:

1 Double-click the eraser tool to display its Options palette.

2 Choose the tool type you want to use as an eraser—paintbrush, airbrush, pencil, or block.

To cycle through the eraser tool types, Alt-click (Windows) or Option-click (Mac OS) the eraser tool, or hold down Shift and press E on the keyboard.

3 Specify the opacity, fade-out rate, and stylus options as explained in "Using the Options palette for painting and editing tools" on page 203.

4 Select a brush size as described in "Using the Brushes palette" on page 200.

Note: *When using the paintbrush option, select Wet Edges to erase with a watercolor effect. This option causes the erased effect to build up along the edges of the brush stroke.*

5 To erase to a saved state or snapshot of the image, select Erase to History (see "Painting with a state or snapshot of the image" on page 172).

To use the eraser tool in Erase to History mode, hold down Alt (Windows) or Option (Mac OS) as you drag in the image.

6 Drag through the area you want to erase.

Using the Auto Erase option

The Auto Erase option for the pencil tool ( ) lets you paint the background color over areas containing the foreground color.

To use the Auto Erase option:

1 Specify foreground and background colors as described in "Choosing the foreground and background colors" on page 214.

2 Select and double-click the pencil tool to display its Options palette.

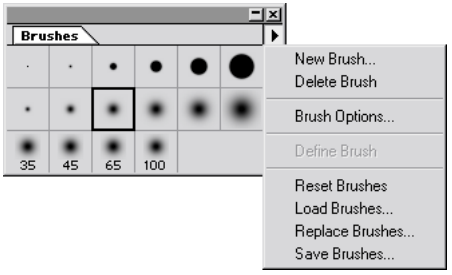
3 Select Auto Erase.

4 Drag over the image.

If you begin dragging over the foreground color, the area is erased to the background color. If you begin dragging from an area that doesn't contain the foreground color, the area is painted with the foreground color.

Using the Brushes palette

The brush sizes and shapes available for painting and editing appear in the Brushes palette. You can add new brushes or delete ones you don't need. You also can use part of an image to create a custom brush shape. Brush settings are retained for each of the painting tools (airbrush, paintbrush, eraser, pencil) and editing tools (history brush, rubber stamp, smudge, focus, toning).



To display the Brushes palette:

Choose Window > Show Brushes.

To choose a brush setting for a painting or editing tool:

1 Select the tool you want to use.

2 In the Brushes palette, click the brush you want to use. When a brush is too large to fit on the palette, it appears as a smaller brush with a number indicating the actual diameter in pixels.

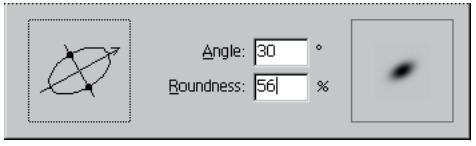
To create a brush:

1 Do one of the following:

• Click in the empty area outside the brush squares in the Brushes palette.

• Choose New Brush from the Brushes palette menu.

The preview box in the lower right corner of the New Brush dialog box shows the current brush tip. The box in the lower left corner shows the current brush angle and roundness. As you enter new options, the brushes in these boxes update.



Brush angle and roundness

2 Set the brush options as described in"Setting brush options" on page 201.

3 Click OK. New brushes are added at the bottom of the palette.

To delete a brush:

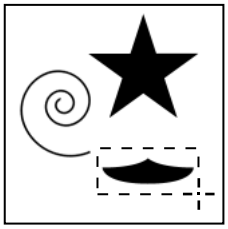
Do one of the following:

• Press Ctrl (Windows) or Command (Mac OS), and click the brush you want to delete.

• Click the brush in the Brushes palette, and choose Delete Brush from the palette menu.

To create a custom brush shape:

1 Select part of an image to use as a custom brush. The brush shape can be up to 1000 pixels by 1000 pixels in size. To be most effective, the shape should appear on a solid white background. If you want to define brushes with soft edges, select brush shapes composed of pixels with gray values. (Colored brush shapes appear as gray values.)



2 Choose Define Brush from the Brushes palette menu.

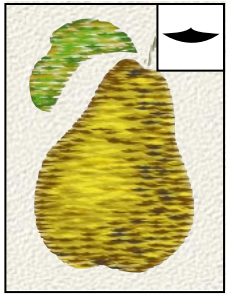
3 Double-click the newly created brush in the Brushes palette to open the Brush Options dialog box.

4 Specify Spacing as described in the next section.

5 To make the brush placement more accurate, make sure that Anti-aliased is selected. Then click OK.

See "Softening the edges of a selection" on page 147 for information on anti-aliasing.

Note: *The Anti-aliased option is not available for large brushes.*



Pear painted with custom brush shown in inset

Setting brush options

You can define a number of options for the default brushes and any brushes you create. For custom brushes, only the spacing and anti-aliased options can be changed.

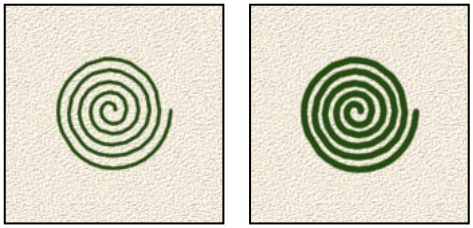
To set brush options:

1 Do one of the following:

- Double-click the brush you want to edit.
- In the Brushes palette, select the brush you want to edit, and choose Brush Options from the palette menu.

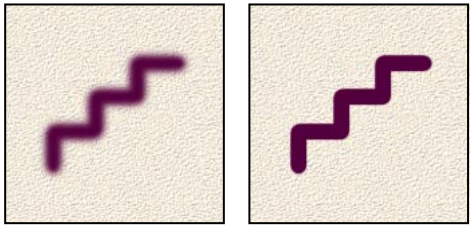
2 Set the options for Diameter, Hardness, Spacing, Angle, and Roundness. Then click OK.

Diameter Controls the size of the brush. Enter a value in pixels or drag the slider.



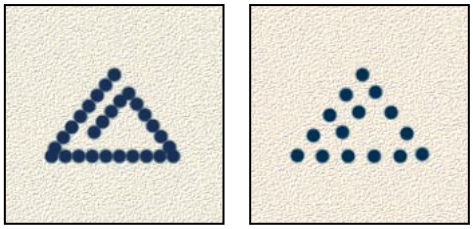
Brush strokes with different diameter values

Hardness Controls the size of the brush's hard center. Type a number, or use the slider to enter a value that is a percentage of the brush diameter.



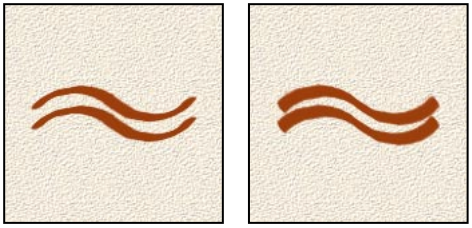
Brush strokes with different hardness values

Spacing Controls the distance between the brush marks in a stroke. To change the spacing, type a number, or use the slider to enter a value that is a percentage of the brush diameter. To paint strokes without defined spacing, deselect this option.



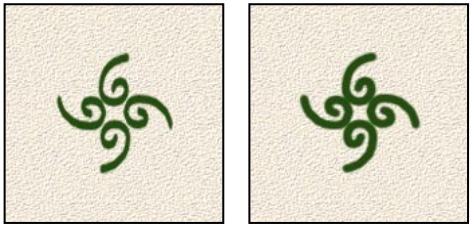
Increasing the spacing makes the brush skip.

Angle Specifies the angle by which an elliptical brush's long axis is offset from horizontal. Type a value in degrees, or drag the horizontal axis in the left preview box.



Angled brushes create a chiseled stroke.

Roundness Specifies the ratio between the brush's short and long axes. Enter a percentage value, or drag the points in the left preview box. A value of 100% indicates a circular brush, a value of 0% indicates a linear brush, and intermediate values indicate elliptical brushes.



Adjusting roundness affects shape of brush tip.

Saving, loading, and replacing brushes

The Brushes palette can hold as many brushes as you want. Creating sets of brushes can help you group related or special brushes and manage palette size. The Adobe Photoshop program folder includes files containing various brush sets.

To save and use custom brush sets:

Choose one of the following commands from the Brushes palette menu:

- Reset Brushes to return to the default brushes. You can either replace the current brush set or append the default brushes to the current set.
- Load Brushes to add brushes stored in a file to the current palette.
- Replace Brushes to replace the current brush set with brushes stored in a file.
- Save Brushes to save a brush set in a file (and in Windows, append an .abr extension to the filename).

Exiting Photoshop saves the current Brushes palette in the Preferences file.

Using the Options palette for painting and editing tools

You specify options for a painting or editing tool by using the Options palette for that tool. See Chapter 8, Editing and Retouching, for information on the editing tools.

Specifying the opacity, pressure, or exposure

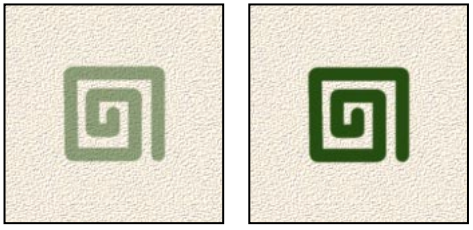
The Options palette lets you specify the opacity, pressure, or exposure for these painting and editing tools:

- You can adjust the opacity used by the gradient fill, pencil, paintbrush, rubber stamp, pattern stamp, and history brush tools.
- You can adjust the pressure of action applied by the airbrush, smudge, blur, sharpen, and sponge tools.
- You can adjust the amount of exposure used by the dodge and burn tools.

To specify opacity, pressure, or exposure:

In the tool's Options palette, enter a value for Opacity, Pressure, or Exposure, or drag the slider.

Opacity, pressure, or exposure can range from 1% to 100%. For transparent paint or a weak effect, specify a low percentage value; for more opaque paint or a strong effect, specify a high value.



Painting with various opacity settings

Specifying the paint fade-out rate

You can specify the rate at which the pencil, paintbrush, airbrush, and eraser fade out from their beginning strokes, simulating actual brush strokes.

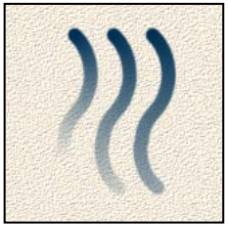
To set a fade-out rate:

1 In the tool's Options palette, for Fade, enter a value for the number of steps of the fade.

Each step is equal to one mark of the brush tip. The value can range from 1 to 9999. For example, entering 10 steps produces a fade in 10 increments.

2 For the pencil, paintbrush, or airbrush tool, specify how the stroke fades:

- Transparent to fade the stroke from the foreground color to transparency.
- Background to fade the stroke from the foreground color to the background color.



Fade-out showing setting of 40, 60, and 80 steps

Specifying stylus pressure options

Adobe Photoshop is compatible with most pressure-sensitive digitizing tablets such as the Wacom® tablets. With Control Panel software for your tablet installed, you can specify the type of effect that results when you vary stylus pressure. These stylus pressure options affect the magnetic lasso, magnetic pen, pencil, paintbrush, airbrush, eraser, rubber stamp, pattern stamp, history brush, smudge, blur, sharpen, dodge, burn, and sponge tools.

To set the effect of different stylus pressures:

Double-click the desired tool to display its Options palette, and select one of the following options:

- Size to have increased pressure create a bigger brush stroke.
- Opacity/Pressure/Exposure to have increased pressure make the paint more opaque or more intense.

• Color if you want light pressure to paint with the background color, making a transition to the foreground color as the pressure increases.

Note: *If the highest pressure of your stylus does not reach 100%, contact your tablet vendor. This problem is caused by the driver software, not Photoshop.*

Selecting a blending mode

The blending mode specified in the Options palette controls how pixels in the image are affected by a painting or editing tool. It's helpful to think in terms of the following colors when visualizing a blending mode's effect:

• The *base color* is the original color in the image.

• The *blend color* is the color being applied with the painting or editing tool.

• The *result color* is the color resulting from the blend.

The following sections describe each of the painting and editing modes.



For a color illustration of blending modes, see page 233.

Normal Edits or paints each pixel to make it the result color. This is the default mode. (Normal mode is called *Threshold* when you're working with a bitmapped or indexed-color image.)

Dissolve Edits or paints each pixel to make it the result color. However, the result color is a random replacement of the pixels with the base color or the blend color, depending on the opacity at any pixel location. This mode works best with the paintbrush or airbrush tool and a large brush.

Behind Edits or paints only on the transparent part of a layer. This mode works only in layers with Preserve Transparency off and is analogous to painting on the back of transparent areas in a sheet of acetate.

Clear Edits or paints each pixel and makes it transparent. This mode is available for the line tool (╲), the paint bucket tool (), the Fill command, and the Stroke command. You must be in a layer with Preserve Transparency off to use this mode.

Multiply Looks at the color information in each channel and multiplies the base color by the blend color. The result color is always a darker color. Multiplying any color with black produces black. Multiplying any color with white leaves the color unchanged. When you're painting with a color other than black or white, successive strokes with a painting tool produce progressively darker colors. The effect is similar to drawing on the image with multiple magic markers.

Screen Looks at each channel's color information and multiplies the inverse of the blend and base colors. The result color is always a lighter color. Screening with black leaves the color unchanged. Screening with white produces white. The effect is similar to projecting multiple photographic slides on top of each other.

Overlay Multiplies or screens the colors, depending on the base color. Patterns or colors overlay the existing pixels while preserving the highlights and shadows of the base color. The base color is not replaced but is mixed with the blend color to reflect the lightness or darkness of the original color.

Soft Light Darkens or lightens the colors, depending on the blend color. The effect is similar to shining a diffused spotlight on the image.

If the blend color (light source) is lighter than 50% gray, the image is lightened, as if it were dodged. If the blend color is darker than 50% gray, the image is darkened, as if it were burned in. Painting with pure black or white produces a distinctly darker or lighter area but does not result in pure black or white.

Hard Light Multiplies or screens the colors, depending on the blend color. The effect is similar to shining a harsh spotlight on the image.

If the blend color (light source) is lighter than 50% gray, the image is lightened, as if it were screened. This is useful for adding highlights to an image. If the blend color is darker than 50% gray, the image is darkened, as if it were multiplied. This is useful for adding shadows to an image. Painting with pure black or white results in pure black or white.

Color Dodge Looks at the color information in each channel and brightens the base color to reflect the blend color. Blending with black produces no change.

Color Burn Looks at the color information in each channel and darkens the base color to reflect the blend color. Blending with white produces no change.

Darken Looks at the color information in each channel and selects the base or blend color—whichever is darker—as the result color. Pixels lighter than the blend color are replaced, and pixels darker than the blend color do not change.

Lighten Looks at the color information in each channel and selects the base or blend color—whichever is lighter—as the result color. Pixels darker than the blend color are replaced, and pixels lighter than the blend color do not change.

Difference Looks at the color information in each channel and subtracts either the blend color from the base color or the base color from the blend color, depending on which has the greater brightness value. Blending with white inverts the base color values; blending with black produces no change.

Exclusion Creates an effect similar to but lower in contrast than the Difference mode. Blending with white inverts the base color values. Blending with black produces no change.

Hue Creates a result color with the luminance and saturation of the base color and the hue of the blend color.

Saturation Creates a result color with the luminance and hue of the base color and the saturation of the blend color. Painting with this mode in an area with no (0) saturation (gray) causes no change.

Color Creates a result color with the luminance of the base color and the hue and saturation of the blend color. This preserves the gray levels in the image and is useful for coloring monochrome images and for tinting color images.

Luminosity Creates a result color with the hue and saturation of the base color and the luminance of the blend color. This mode creates an inverse effect from that of the Color mode.

Using the paint bucket tool

The paint bucket tool ( ) fills adjacent pixels that are similar in color value to the pixels you click.

Note: The paint bucket tool cannot be used with images in Bitmap mode.

To use the paint bucket tool:

1 Specify a foreground color as described in "Choosing the foreground and background colors" on page 214.

2 Select and double-click the paint bucket tool to display its Options palette.

3 Specify the opacity and blending mode as described in "Using the Options palette for painting and editing tools" on page 203.

4 Enter the tolerance for the fill.

The tolerance defines how similar in color a pixel must be to be filled. Values can range from 0 to 255. A low tolerance fills pixels within a range of color values very similar to the pixel you click. A high tolerance fills pixels within a broader range.

5 To smooth the edges of the filled selection, select Anti-aliased. See "Softening the edges of a selection" on page 147.

6 To fill the selection with the foreground color or with a pattern, choose an option for Contents. See "Filling and stroking selections and layers" on page 211.

7 To fill pixels based on the merged color data from all visible layers, select Use All Layers. See "Sampling from all layers" on page 270.

8 Click the part of the image you want to fill. All adjacent pixels within the specified tolerance are filled with the foreground color or pattern.

If you're working on a layer and don't want to fill transparent areas, make sure that Preserve Transparency is selected in the Layers palette. See "Preserving a layer's transparency" on page 269.

Using the gradient tools

The gradient tools create a gradual blend between multiple colors. You can choose from existing gradient fills or create your own. You draw a gradient by dragging in the image from a starting point (where the mouse is pressed) to an ending point (where the mouse is released). The starting and ending points affect the gradient appearance according to the gradient tool used.

The gradient pull-out menu in the toolbox includes these tools:

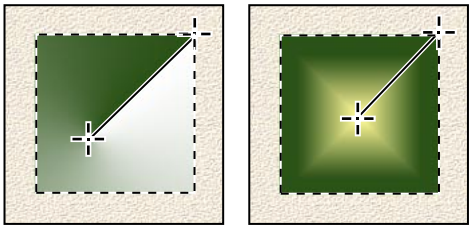
Linear gradient ( ) Shades from the starting point to the ending point in a straight line.

Radial gradient ( ) Shades from the starting point to the ending point in a circular pattern.

Angular gradient ( ) Shades in a counter-clockwise sweep around the starting point.

Reflected gradient ( ) Shades using symmetric linear gradients on either side of the starting point.

Diamond gradient ( ) Shades from the starting point outward in a diamond pattern. The ending point defines one corner of the diamond.



Angle gradient tool, and diamond gradient tool

Note: *The gradient tools cannot be used with images in Bitmap or indexed-color mode.*

To apply a gradient fill:

1 To fill only part of the image, select the desired area. Otherwise, the gradient fill is applied to the entire active layer.

2 Select and double-click the linear gradient, radial gradient, angular gradient, reflected gradient, or diamond gradient tool to display its Options palette.

3 Specify the opacity and blending mode as explained in "Using the Options palette for painting and editing tools" on page 203.

4 To use a transparency mask for the gradient fill, select Transparency. (See "Editing the gradient transparency" on page 210.)

5 To create a smoother blend with less banding, select Dither.

6 To reverse the order of colors in the gradient fill, select Reverse.

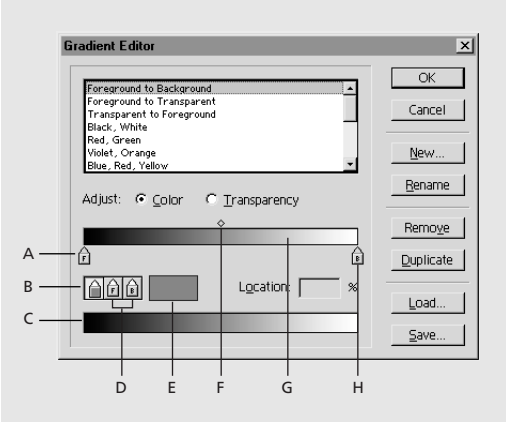
7 Select a gradient fill from the list.

8 Position the pointer in the image where you want to set the starting point of the gradient, and drag to define the ending point. To constrain the line angle to a multiple of 45°, hold down Shift as you drag.

For an explanation of how the starting and ending points affect gradient appearance, see the descriptions before this procedure.

Creating and editing gradient fills

The Gradient Editor dialog box lets you define a new gradient or modify an existing one. You can also add intermediate colors to a gradient, creating a blend between more than two colors.



A. *Starting color stop* ***B.*** *Color selection box* ***C.*** *Preview bar*
D. *Foreground and background selection boxes*
E. *Color swatch* ***F.*** *Midpoint* ***G.*** *Gradient bar*
H. *Ending color stop*

To create or edit a gradient:

1 Double-click a gradient tool to display its Options palette.

2 Click Edit.

3 Make sure that Color is selected for Adjust, and do one of the following:

• To create a new gradient, click New. Enter a name for the gradient, and click OK.

• To base your gradient on an existing one, select it in the list, and click Duplicate. To name the copied gradient, hold down Alt (Windows) or Option (Mac OS) as you click Duplicate.

• To edit an existing gradient, select it in the list.

4 To define the starting color of the gradient, click the left color stop under the gradient bar. The triangle above the stop turns black, indicating that the starting color is being edited.

5 To choose a color, do one of the following:

• Double-click the color stop, or click the color swatch below the gradient bar. Choose a color as described in "Using the Adobe Photoshop Color Picker" on page 218, and click OK.

• Click the foreground selection box to use the current foreground color.

• Click the background selection box to use the current background color.

• Position the pointer over the gradient bar (the pointer turns into the eyedropper), and click to sample a color.

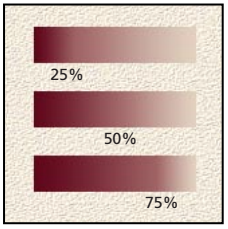
6 To define the ending color, click the right color stop under the gradient bar. Then choose a color as described in the previous step.

7 To adjust the location of the starting point or ending point, do one of the following:

• Drag the corresponding color stop left or right to the location you want.

• Click the corresponding color stop, and enter a value for Location. A value of 0% places the point at the far left end of the gradient bar, a value of 100% at the far right end.

8 To adjust the location of the midpoint (where the gradient displays an even mix of the starting and ending colors), drag the diamond above the gradient bar to the left or right, or click the diamond and enter a value for Location.



Gradients with different midpoint locations

9 Click OK to add the new gradient fill to the list or to update the edited gradient fill.

To add intermediate colors to a gradient:

In the Gradient Editor dialog box, click below the gradient bar to define another color stop. Specify the color and adjust the location and midpoint for the intermediate point as you would for a starting or ending point. To remove an intermediate color, drag the color stop down and off the gradient bar.



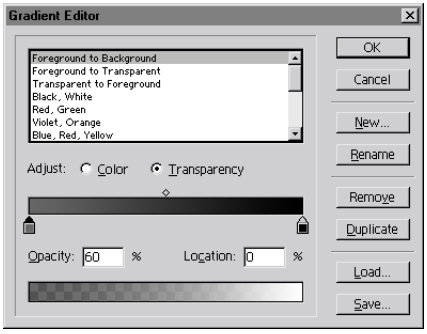
Adding a color



Deleting a color

Editing the gradient transparency

Each gradient fill contains a transparency mask that controls the opacity of the fill at different locations on the gradient. For example, you can set the starting color to 100% opacity and have the fill gradually blend into an ending color with 50% opacity. By default, the transparency mask is set to 100%. Turn off the mask by deselecting Transparency in the Gradient Options palette.



To edit the gradient transparency mask:

1 Double-click a gradient tool to display its Options palette, and click Edit.

2 Select the gradient whose transparency mask you want to edit.

3 For Adjust, select Transparency.

4 To adjust the starting opacity, click the left transparency stop under the transparency gradient bar.

5 For Opacity, enter a value.

In the gradient bar, white represents an opacity of 0%, black an opacity of 100%, and gray an opacity between 0 and 100%. The bar at the bottom of the Gradient Editor dialog box lets you preview the effects of the mask on the gradient fill.

6 To adjust the opacity of the endpoint, click the right transparency stop under the transparency gradient bar. Then set the opacity as explained in the previous step.

7 To adjust the location of the starting or ending opacity, do one of the following:

• Drag the corresponding transparency stop to the left or right.

• Select the corresponding transparency stop, and enter a value for Location.

8 To adjust the location of the midpoint opacity (the point midway between the starting and ending opacities), do one of the following:

• Drag the diamond above the transparency gradient bar to the left or right.

• Select the diamond and enter a value for Location.

9 To add an intermediate opacity to the mask, click under the transparency gradient bar to define a new transparency stop. You can then adjust and move this opacity as you would for a starting or ending opacity. To remove an intermediate opacity, drag its transparency stop down and off the gradient bar.

10 Click OK.

Loading, saving, and deleting gradients

By saving and loading sets of gradients, you can customize the gradient list that appears in the Gradient Tool Options palette and the Gradient Editor dialog box.

To customize the gradient list:

Do one of the following:

• To delete a gradient, select the gradient in the Gradient Editor dialog box, and click Remove.

• To append gradients that have been stored in a file to the current list, click Load in the Gradient Editor dialog box.

• To save gradients in a separate file for later use, select the desired gradients in the Gradient Editor dialog box (Shift-click to select multiple gradients). Then click Save.

• To return to the default gradient list, choose Reset Tool from the menu on the Gradient Tool Options palette. You can either replace the current list or append the default gradients to the current list.

Filling and stroking selections and layers

Photoshop provides a variety of ways to fill a selection or a layer with colors, images, or patterns. You can also paint a border around a selection or a layer using the Stroke command.

To increase the contrast between your image and the surrounding work canvas, you can fill the canvas with a specified color.

To fill a selection or layer using shortcuts:

1 Specify a foreground or background color as described in "Choosing the foreground and background colors" on page 214.

2 Select the area or layer you want to fill.

3 Apply the fill:

• To fill with the foreground color, press Alt+Backspace (Windows) or Option+Delete (Mac OS).

• To apply a foreground color fill only to the areas that contain pixels, press Alt+Shift+Backspace (Windows) or Option+Shift+Delete (Mac OS). This operation preserves the transparency of the layer.

• To fill with the background color, press Ctrl+Backspace (Windows) or Command+Delete (Mac OS).

• To apply a background color fill only to the areas that contain pixels, press Ctrl+Shift+Backspace (Windows) or Command+Shift+Delete (Mac OS).

To fill the work canvas:

1 Set the foreground color you want to use for the canvas. (See "Choosing the foreground and background colors" on page 214.)

2 Select and double-click the paint bucket tool to display its Options palette.

3 For Contents, choose Foreground.

4 Hold down Shift and click in the work canvas area surrounding the image.

To fill a selection or a layer:

1 Specify a foreground or background color as described in "Choosing the foreground and background colors" on page 214.

2 Select the area you want to fill. To fill an entire layer, select the layer in the Layers palette.

3 Choose Edit > Fill to fill the selection or layer.



To display the Fill dialog box, press Shift+Backspace (Windows) or Shift+Delete (Mac OS).

4 For Use, choose an option:

• Foreground Color, Background Color, Black, 50% Gray, or White to fill the selection with the specified color.

• Pattern to fill the selection with a pattern. Filling with patterns is discussed in the following procedures.

• History to restore the selected area to a state or snapshot of the image (see "Painting with a state or snapshot of the image" on page 172).

Note: *If you fill a CMYK image using the Black option, Photoshop fills all the channels with 100% black. This may result in more ink than is allowable by the printer. For best results when filling a CMYK image, use the Foreground option with the foreground color set to an appropriate black.*

5 Specify an opacity and blending mode, as explained in "Using the Options palette for painting and editing tools" on page 203.

6 If you're working in a layer and want to fill only areas containing pixels, select Preserve Transparency. (See "Preserving a layer's transparency" on page 269.)

7 Click OK to fill the selection.

To fill a selection with a pattern:

1 Make a rectangular selection around the part of the image you want to use as the pattern.

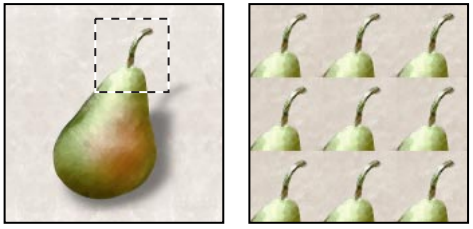
2 Choose Edit > Define Pattern.

3 Select the part of the image you want to fill.

4 Choose Edit > Fill.

5 For Use, choose Pattern and click OK.

The pattern you defined is repeated as tiles within the selection. Each new pattern replaces the current pattern. If you want to reuse patterns, save a file of swatches for defining patterns. You can also use the pattern stamp tool to paint with a pattern (see "Using the rubber stamp tool and pattern stamp tool" on page 190).



Defining a pattern, and filling image with pattern

To use a pattern from the PostScript Patterns folder:

1 Choose File > Open. Each file in the PostScript Patterns folder, which comes with your program, contains a single pattern in the Adobe Illustrator format. You can scale and render these patterns at any resolution.

2 Select the pattern file you want to use, and click Open.

3 Select any rasterizing options. (See"Importing Adobe Illustrator, PDF, and EPS files" on page 55 for these options.)

4 Click OK.

5 Make a rectangular selection around the pattern, or choose Select > All.

6 Choose Edit > Define Pattern. The pattern is defined as an Adobe Photoshop pattern.

7 Open an image, and select the part you want to fill.

8 Choose Edit > Fill.

9 For Use, select Pattern, and click OK.

To stroke a selection or layer:

1 Specify a foreground color as described in "Choosing the foreground and background colors" on page 214.

2 Select the area or layer you want to stroke.

3 Choose Edit > Stroke.

4 Specify the width of the hard-edged border. Values can range from 1 to 16 pixels.

5 For Location, specify whether to place the border inside, outside, or directly over the selection or layer boundaries.

6 Specify an opacity and a blending mode as explained in "Using the Options palette for painting and editing tools" on page 203.

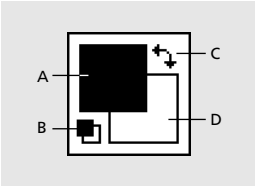
7 If you're working in a layer and want to stroke only areas containing pixels, select the Preserve Transparency option. (See "Preserving a layer's transparency" on page 269.)

8 Click OK to stroke the selection or layer.

Choosing the foreground and background colors

Adobe Photoshop uses the *foreground* color to paint, fill, and stroke selections and the *background* color to make gradient fills and fill in the erased areas of an image. You can designate a new foreground or background color using the eyedropper tool, the Color palette, the Swatches palette, or the Photoshop Color Picker.

The current foreground color appears in the top color selection box in the toolbox, the background color in the lower box. The default foreground color is black, and the default background is white. (If you are viewing an alpha channel, the default foreground is white, and the background is black.)



***A.** Foreground color **B.** Default Colors*
***C.** Switch Colors **D.** Background color*

The Info palette, the Color palette, and the Color Picker let you display color values using a number of color models. (See "Color modes and models" on page 63.)

To reverse the foreground and background colors:

Click the Switch Colors icon in the toolbox.

To return to the default foreground and background colors:

Click the Default Colors icon in the toolbox.

To change the foreground or background color:

1 Do one of the following:

• To change the foreground color, click the top color selection box in the toolbox.

• To change the background color, click the lower color selection box in the toolbox.

2 Choose a color, as explained in "Using the Adobe Photoshop Color Picker" on page 218, and click OK.

To switch between the foreground and background colors, press X on the keyboard.

Using the eyedropper tool

With the eyedropper tool (), you sample color from an image to designate a new foreground or background color. You can sample from the active image or from another image. (When you're using the eyedropper, you can click in a background window without making it the active window.)

You can also specify the area sampled by the eyedropper tool. For example, you can set the eyedropper to sample the color values of a 3-by-3-pixel area under the pointer. Modifying the sample size of the eyedropper affects the color readouts displayed in the Info palette.

To select the foreground or background color using the eyedropper:

1 Click the eyedropper tool ( ).

2 Select a color:

• To select a new foreground color from an image, click the color you want.

• To select a new background color from an image, Alt-click (Windows) or Option-click (Mac OS) the color you want.

As you drag the eyedropper tool, the foreground color selection box changes dynamically. Alt-drag (Windows) or Option-drag (Mac OS) to activate the background color selection box. Release the mouse button to pick the new color.

To use the eyedropper tool temporarily while using any painting tool, hold down Alt (Windows) or Option (Mac OS).

To change the sample size of the eyedropper:

1 Double-click the eyedropper tool to display the Eyedropper Options palette.

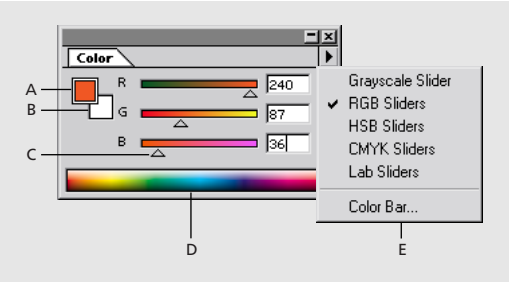
2 Choose an option from the Sample Size menu:

• Point Sample to read the precise value of the pixel you click.

• 3 by 3 Average or 5 by 5 Average to read the average value of the specified number of pixels within the area you click.

Using the Color palette

The Color palette displays the color values for the current foreground and background colors. Using the sliders in the Color palette, you can edit the foreground and background colors according to several different color models. You can also choose a background or foreground color from the spectrum of colors displayed in the color bar.



***A.** Foreground color **B.** Background color **C.** Slider*
***D.** Color bar **E.** Color palette menu*

To display the Color palette:

Choose Window > Show Color.

To edit the foreground or background color using the Color palette:

1 From the Color palette menu, choose the color model you want to use for color readout values. See "Color modes and models" on page 63 for a discussion of these models.

2 To edit the foreground or background color, make sure that its color selection box is active or outlined. To make the foreground or background color selection box active, click the box.

3 To specify a new color:

• Drag the color sliders.

By default, the slider colors change as you drag. If you want to turn off this preview feature to improve performance, choose File > Preferences > General, and deselect Dynamic Color Sliders.

- Enter values next to the color sliders.
- Click the color selection box, choose a color as described in "Using the Adobe Photoshop Color Picker" on page 218, and click OK.

Note: *An exclamation point inside a triangle in the Color palette indicates an out-of-gamut color, that is, a color that cannot be printed using CMYK inks. The closest CMYK equivalent appears next to the triangle. Click the alert triangle to use the CMYK equivalent. (See "Identifying out-of-gamut colors" on page 110.)*

To sample colors from the color bar:

1 To edit the foreground or background color, make sure that its color selection box is active (outlined in black). To make the foreground or background color selection box active, click the box.

2 Position the pointer over the color bar (the pointer turns into the eyedropper), and click to sample a color.

To change the display of the color bar:

1 Choose Color Bar from the Color palette menu.

2 For Style, choose a model, and then click OK. The Current Colors style displays a transition from the current foreground color to the current background color.

To change the display style of the color bar quickly, Shift-click in the color bar until you see the style you want.

Using the Swatches palette

You can choose a foreground or background color from the Swatches palette, or you can add or delete colors to create a custom swatch set. You can also save a set of swatches and reload them for use in another image. Although you can add colors to the Swatches palette, you should manage its size and organization.

To display the Swatches palette:

Choose Window > Show Swatches.

To choose a color:

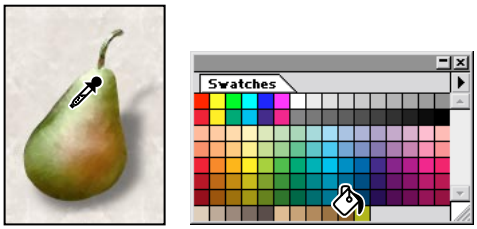
Do one of the following:

- To choose a foreground color, click a color in the Swatches palette.
- To choose a background color, Alt-click (Windows) or Option-click (Mac OS) a color in the Swatches palette.

To add a color to the Swatches palette:

1 Use the eyedropper tool, the Color palette, or the Color Picker to select the color you want to add.

2 Position the pointer over an empty space in the bottom row of the Swatches palette (the pointer turns into the paint bucket tool), and click to add the color.



Color selected from image, and added to Swatches palette

To replace or insert a color in the Swatches palette:

1 Use the eyedropper tool (), the Color palette, or the Color Picker to select the color you want to add.

2 Add a swatch:

- To replace an existing swatch, hold down Shift, position the pointer over a swatch (the pointer turns into a paint bucket), and click the swatch.
- To insert a new swatch, press Shift+Alt (Windows) or Shift+Option (Mac OS), and click a swatch.

To delete a color from the Swatches palette:

Hold down Ctrl (Windows) or Command (Mac OS), position the pointer over a swatch (the pointer turns into scissors), and click.

To return to the default Swatches palette:

1 Choose Reset Swatches from the Swatches palette menu.

2 Return to the default palette:

- Click OK to replace the current swatches with the default set.
- Click Append to attach the default swatches to the end of the current set.

To save and use custom swatch sets:

Choose a command from the Swatches palette menu:

- Reset Swatches to use the default set of swatches. You can either replace the current swatch set or append the default swatches to the current set.
- Load Swatches to append the swatches stored in a file to the current set of swatches. Files containing different swatch sets are included in the Adobe Photoshop program folder.
- Replace Swatches to replace the current swatch set with the swatches stored in a file.
- Save Swatches to save the current swatches in a file.

Exiting the program saves the current Swatches palette in the Adobe Photoshop preferences file.

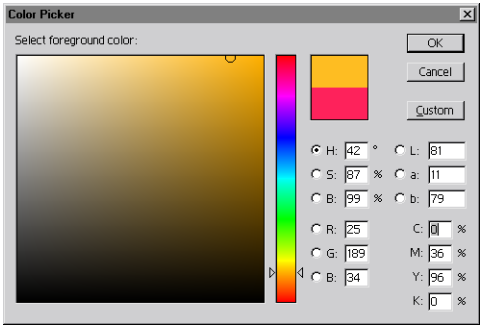
Using the Adobe Photoshop Color Picker

You can use the Adobe Photoshop Color Picker to select the foreground or background color by choosing from a color spectrum or by defining colors numerically. In addition, you can select colors based on the HSB, RGB, Lab, and CMYK color models and choose from several custom color systems (see "Color modes and models" on page 63). By default, the program uses the Adobe Photoshop Color Picker.

To display the Adobe Photoshop Color Picker:

Do one of the following:

- Click the foreground or background color selection box in the toolbox.
- Click the active color selection box in the Color palette.



Specifying a color using the color field and color slider

With the HSB, RGB, and Lab color modes, you can use the color field and the color slider in the Color Picker dialog box to select a color. The color slider displays the range of color levels available for the selected color component (for example, R, G, or B). The color field displays the range for the remaining two components—one on the horizontal axis, one on the vertical.

For example, if the current color is black and you click the red component (R) using the RGB color model, the color slider displays the range of color for red (0 is at the bottom of the slider and 255 is at the top). The color field displays the values for blue along its horizontal axis, for green along its vertical axis.

To choose a color:

1 Click a component next to the HSB, RGB, or Lab values.

2 Select a color:

- Drag the white triangles along the slider.
- Click inside the color slider.
- Click inside the color field.

When you click in the color field, a circular marker indicates the color's position in the field.

As you adjust the color using the color field and color slider, the numerical values change to reflect the new color. The color rectangle to the right of the color slider displays the new color in the top section of the rectangle. The original color appears at the bottom of the rectangle.

Specifying a color using numeric values

In the Adobe Photoshop Color Picker, you can select a color in any of the four color models by specifying numeric values for each color component.

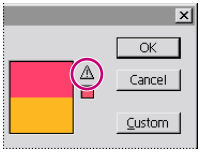
To specify colors using numeric values:

Do one of the following:

- In CMYK color mode (this is the mode PostScript printers use), specify each component value as a percentage of cyan, magenta, yellow, and black.
- In RGB color mode (this is the mode your monitor uses), specify component values from 0 to 255 (0 is black, and 255 is the pure color).
- In HSB color mode, specify saturation and brightness as percentages; specify hue as an angle, from 0° to 360°, that corresponds to a location on the color wheel. (See "Color modes and models" on page 63 for information on the color wheel.)
- In Lab mode, enter a lightness value (*L*) from 0 to 100, and *a* axis (green to magenta) and *b* axis (blue to yellow) values from –128 to +127.

Recognizing nonprintable colors

Some colors in the RGB, HSB, and Lab color models, such as neon colors, cannot be printed, because they have no equivalents in the CMYK model. When you select a nonprintable color, an alert triangle with an exclamation point appears in the Color Picker dialog box and in the Color palette. The closest CMYK equivalent is displayed below the triangle. (See "Identifying out-of-gamut colors" on page 110.)



Color Picker out-of-gamut display

Printable colors are determined by the printing values you enter for the selected ink set in the CMYK Setup dialog box.

To select the closest CMYK equivalent for a nonprintable color:

Click the alert triangle that appears in the Color Picker dialog box or the Color palette.

Choosing custom colors

The Adobe Photoshop Color Picker lets you choose custom colors from the PANTONE® MATCHING SYSTEM®, the TRUMATCH® SWATCHING SYSTEM™, the FOCOLTONE® COLOUR SYSTEM, the TOYO Color Finder™ 1050 system, the ANPA-COLOR™ system, and the DIC Color Guide.

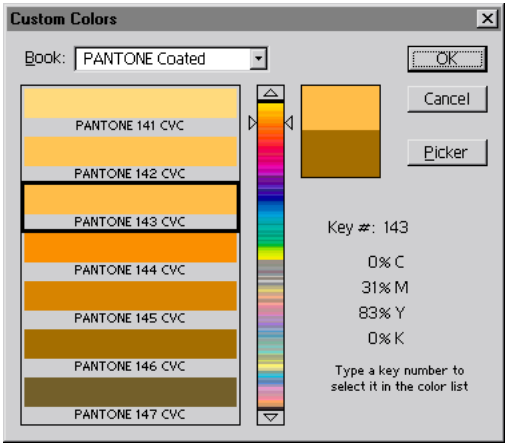
To ensure that the final printed output is the color you want, consult your printer or service bureau and choose your custom color based on a printed color swatch. Manufacturers recommend that you get a new swatch book each year to compensate for fading inks and other damage.

Important: *Photoshop prints custom colors to CMYK, or process color, plates in every image mode except Duotone. To print true spot color plates, create spot color channels. (See "Using spot channels" on page 245.)*

To choose a custom color:

1 Open the Adobe Photoshop Color Picker, and click Custom.

The Custom Colors dialog box displays the color closest to the color currently selected in the Adobe Photoshop Color Picker.



2 For Book, choose a color system described in the next section.

3 Locate the color you want by entering the ink number or by dragging the triangles along the scroll bar.

4 Click the desired color patch in the list.

5 Click OK.

Choosing a custom color system

The Photoshop Color Picker supports various color systems:

PANTONE® Used for printing inks. Each PANTONE color has a specified CMYK equivalent. To select a PANTONE color, first determine the ink color you want, using either the *PANTONE Color Formula Guide 747XR* or an ink chart obtained from your printer. PANTONE books are available from printers and graphic arts supply stores.

You can select from PANTONE Coated, PANTONE Uncoated, PANTONE Process, and PANTONE ProSim custom colors. (Contact PANTONE, Inc. in Carlstadt, New Jersey, U.S.A.)

TRUMATCH Provides predictable CMYK color matching with more than 2000 achievable, computer-generated colors. TRUMATCH colors cover the visible spectrum of the CMYK gamut in even steps. The TRUMATCHCOLORFINDER displays up to 40 tints and shades of each hue, each originally created in four-color process and each reproducible in four colors on electronic imagesetters. In addition, four-color grays using different hues are included. (Contact TRUMATCH Inc. in New York, New York, U.S.A.)

FOCOLTONE Consists of 763 CMYK colors. FOCOLTONE colors help avoid prepress trapping and registration problems by showing the overprints that make up the colors.

A swatch book with specifications for process and spot colors, overprint charts, and a chip book for marking up layouts are available from FOCOLTONE. (Contact FOCOLTONE INTERNATIONAL, Ltd. in Stafford, United Kingdom.)

TOYO Color Finder 1050 Consists of more than 1000 colors based on the most common printing inks used in Japan. The *TOYO Color Finder 1050 Book* contains printed samples of Toyo colors and is available from printers and graphic arts supply stores. (Contact Toyo Ink Manufacturing Co., Ltd. in Tokyo, Japan.)

ANPA-COLOR Commonly used for newspaper applications. The *ANPA-COLOR ROP Newspaper Color Ink Book* contains samples of the ANPA colors. (Contact the Newspaper Association of America in Reston, Virginia, U.S.A.)

DIC Color Guide Commonly used for printing projects in Japan. (Contact Dainippon Ink and Chemicals, Inc. in Tokyo, Japan.)

Using other color pickers

In addition to the default Adobe Photoshop Color Picker, you can use the built-in color picker on your system or a plug-in color picker to select colors. Any plug-in color pickers you install appear under Color Picker in the General Preferences dialog box. For information on installing and using a plug-in color picker, see the documentation that came with the plug-in.

To use the Windows Color Picker:

1 Choose File > Preferences > General.

2 For Color Picker, choose Windows and click OK.

3 Click the foreground or background color selection box in the toolbox.

The Windows Color Picker lets you select colors from an array of basic colors or define up to 16 custom colors based on the HSB or the RGB color model, but it does not alert you to nonprintable colors.

4 To choose a color from the Basic Colors palette, click the color you want.

5 To specify a custom color, click Define Custom Colors to open the Custom Color Selector. This dialog box functions similarly to the Adobe Photoshop Color Picker. Specify a color by using the color field and color slider or by entering numerical values for each color component.

The new color is displayed on the left side of the Color/Solid box. The right side of this box displays the solid color closest to the color you have specified. (You can choose the displayed solid color by double-clicking the right side of the box.)

6 When you are satisfied with the color, click Add to Custom Colors to add it to the Custom Colors palette.

7 To choose a custom color from the Windows Color Picker, click the color you want.

8 Click OK.

(See your Windows documentation.)

To use the Apple Color Picker:

1 Choose File > Preferences > General.

2 For Color Picker, choose Apple, and click OK.

3 Click the foreground or background color selection box in the toolbox.

4 Select a color model from the list at the left of the dialog box.

The Apple Color Picker lets you select colors based on a number of different color models but does not alert you to nonprintable colors.

5 Drag the color sliders, click in the color wheel, click a crayon, or enter numeric values to specify a color.

6 Click OK.

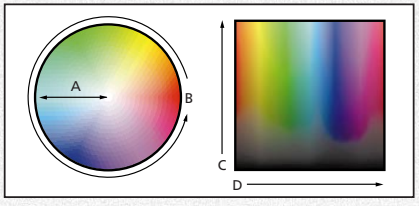
The exact appearance of the Apple Color Picker varies between different system software versions. For more information, see your Mac OS documentation.

To return to the Adobe Photoshop Color Picker after using another color picker:

1 Choose File > Preferences > General.

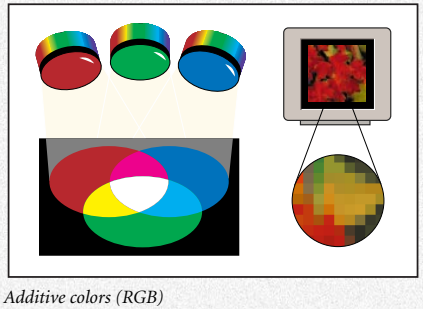
2 For Color Picker, choose Photoshop and click OK.

4-1 HSB Model



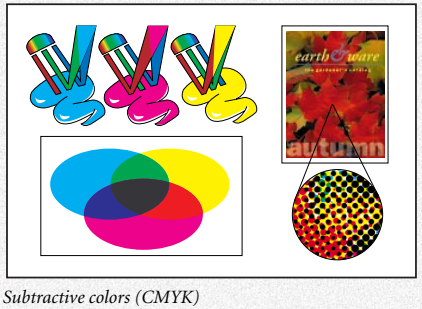
***A.** Saturation **B.** Hue **C.** Brightness **D.** All hues*

4-2 Additive Color



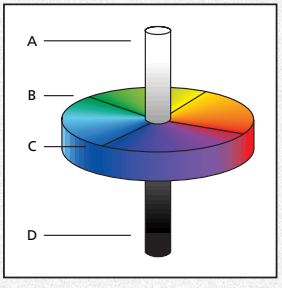
Additive colors (RGB)

4-3 Subtractive Color



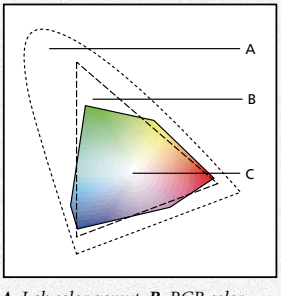
Subtractive colors (CMYK)

4-4 Luminance Model



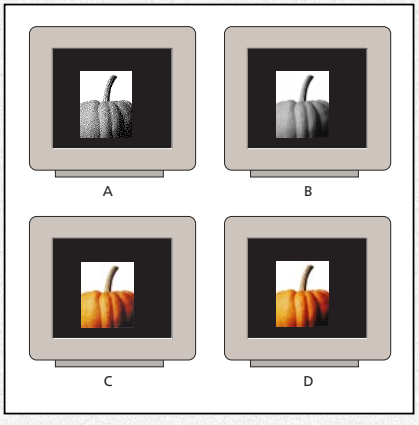
***A.** Luminance=100 (white)*
***B.** Green to red component*
***C.** Blue to yellow component*
***D.** Luminance=0 (black) to red component*

4-5 Color Gamuts



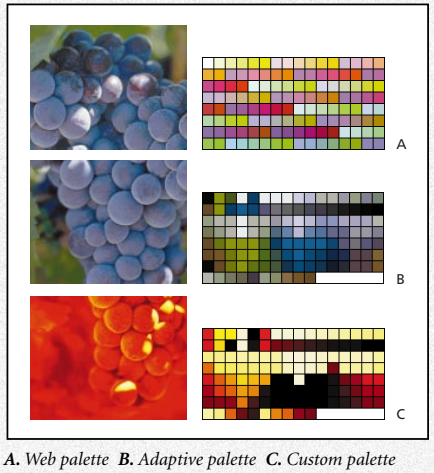
***A.** Lab color gamut **B.** RGB color gamut **C.** CMYK color gamut*

4-6 Pixel Depth



A. *1-bit (Bitmap)* ***B.*** *8-bit (grayscale)*
C. *8-bit (indexed color)* ***D.*** *24-bit (RGB)*

4-7 Color Palettes



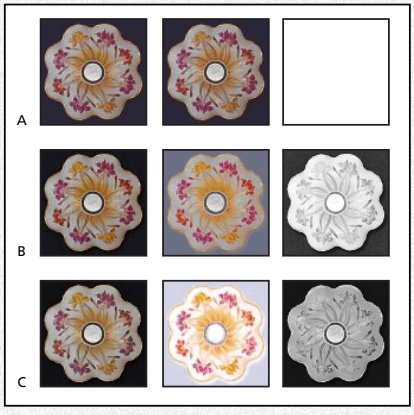
A. *Web palette* ***B.*** *Adaptive palette* ***C.*** *Custom palette*

5-1 Color Proof



A. *Black overprint color bar* ***B.*** *Label*
C. *Registration marks* ***D.*** *Progressive color bar*
E. *Crop mark* ***F.*** *Gradient tint bar* ***G.*** *Star target*

5-2 GCR (Gray Component Replacement)



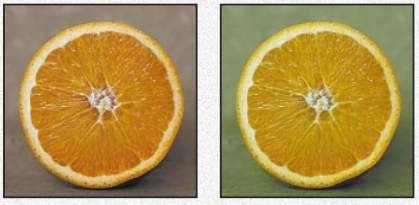
A. *No black generation (Composite image, CMY, K)*
B. *Medium black generation (Composite image, CMY, K)*
C. *Maximum black generation (Composite image, CMY, K)*

6-1 Gamut Warning Color



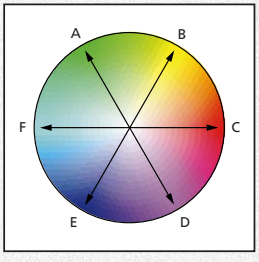
Original image, and preview of out-of-gamut colors

6-2 Color Cast



Contrast improved by setting highlights and shadows to neutral color values (color cast eliminated), and contrast improved by adjusting Levels sliders (color cast retained)

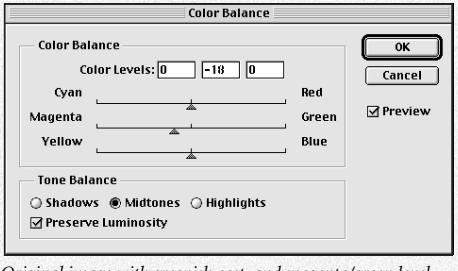
6-3 Color Wheel



A. *Green* ***B.*** *Yellow* ***C.*** *Red*
D. *Magenta* ***E.*** *Blue* ***F.*** *Cyan*

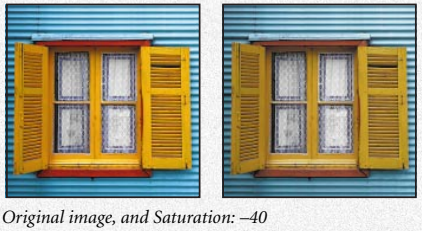
6-4 Adjusting the Color Balance





Original image with greenish cast, and magenta/green level adjusted in midtones

6-5 Hue/Saturation



Original image, and Saturation: –40

6-6 Hue Change



Original image, and with cyan hue adjusted

6-7 Colorize Option



Original image, and colorized (Hue: 108, Saturation: 22)

6-8 Replace Color



Original image, and with colors replaced

8-1 Changing Saturation



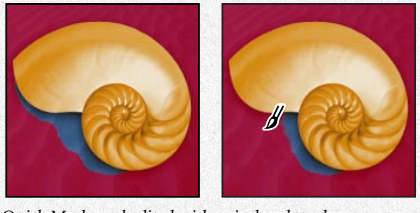
Original image, and increasing saturation of an image

10-1 Quick Mask Mode



Selected area, and Quick Mask mode applied

10-2 Editing a Quick Mask



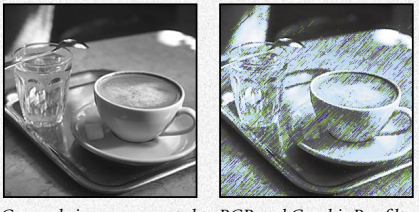
Quick Mask, and edited with paintbrush tool

10-3 Channel Mixer



Original image, and creative color adjustment applied

13-1 Applying Filters to Channels

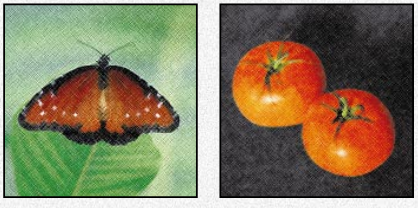


Grayscale image, converted to RGB and Graphic Pen filter applied to green and blue channels

13-2 Using Filters to Improve Consistency

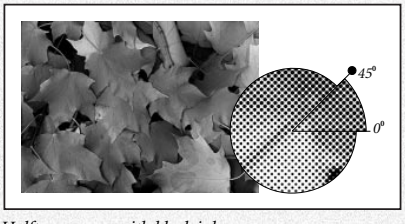


Originals

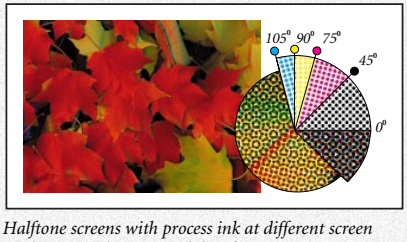


Same filters applied to both images

15-1 Halftone Screens

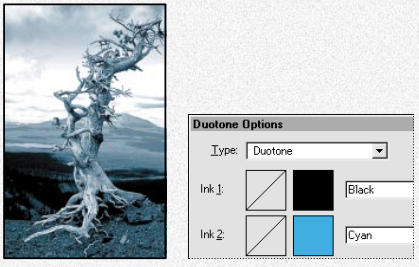


Halftone screen with black ink

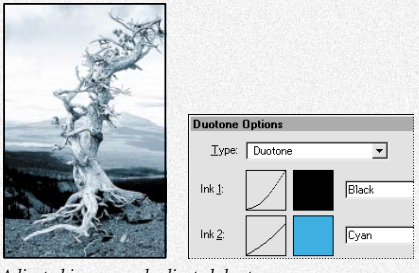


Halftone screens with process ink at different screen angles; correctly registered dots form rosettes

15-2 Duotone Curves



Original image, and default duotone curves



Adjusted image, and adjusted duotone curves

COLOR MODES In addition to determining the number of colors that can be displayed in an image, color modes affect the number of channels and the file size of an image. See "Color channels" on page 67.

Bitmap 12K



Bitmapped images are made up of 1 bit of color (black or white) per pixel, and require the least amount of disk space.

Indexed color 90K



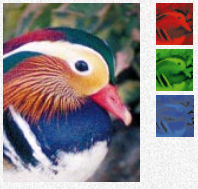
Indexed-color images are single-channel images (8 bits per pixel) that use a color lookup table containing 256 colors. Limited editing is available in this mode.

Grayscale 90K*



Grayscale images are made up of 8 bits of information per pixel and use 256 shades of gray to simulate gradations in color.

RGB color 270K*



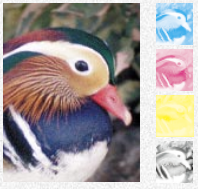
RGB images use three colors to reproduce up to 16.7 million colors on-screen. RGB images are three-channel images, so they contain 24 (8 x 3) bits per pixel.

Duotone 90K



Duotone mode is used for monotones, duotones, tritones, and quadtones. These images are grayscale, single-channel images with 8 bits per pixel.

CYMK color 359K*



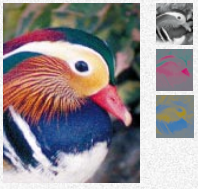
CMYK images consist of the four colors used to print color separations. They are four-channel images, containing 32 (8 x 4) bits per pixel.

Multichannel 90K



Multichannel images have 8 bits per pixel, and are used for specialized printing purposes.

Lab color 270K



Lab images use three components to represent color. They are three-channel images containing 24 (8 x 3) bits per pixel.

*Grayscale, RGB, and CMYK images can also be created with 16-bit channels. Although images with 16-bit channels are significantly larger, they can reproduce finer distinctions in color.

DETERMINING HIGHLIGHT AND SHADOW VALUES Low-key and high-key images may benefit from slightly different target values than those shown on page 114. With a low-key image, you might want to set the highlight to a lower value to avoid too much contrast; with a high-key image, you might want to set the shadow to a higher value to avoid too much contrast. Experiment with shadow Brightness values between 4 and 20 and highlight Brightness values between 96 and 80. See "Setting the highlights and shadows using target values" on page 114.

Low-key image



Original



Highlight set using average-key target brightness values (B: 96)



Highlight set using lower target brightness values (B: 80)

High-key image



Original



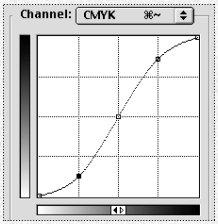
Shadow set using average-key target brightness values (B: 4)



Shadow set using higher target brightness values (B: 20)

USING CURVES FOR TONAL ADJUSTMENTS Curves lets you make precise adjustments to one area of the tonal range while controlling the effect on the others. The first curve shown here is a common curve adjustment used to boost contrast in a CMYK scan: the S-curve. The midpoint of the curve is anchored, then the quartertones are decreased to lighten the highlights, and the three-quartertones are increased to darken the shadows. The inverse of this curve could be used to correct an image with too much contrast. The final two curves demonstrate other typical tonal adjustments in CMYK mode. See "Using the Curves command" on page 120.

Flat image



Midpoint fixed: 1/4 and 3/4 tones adjusted in opposite directions to boost contrast

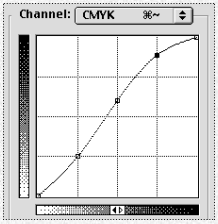


Original



Corrected

Light image



1/4 tone fixed: highlights, midtones, and 3/4 tones adjusted to darken image

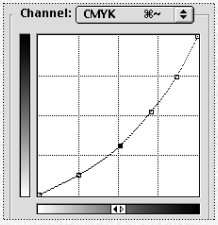


Original



Corrected

Dark image



Entire curve dragged to lighten image with emphasis in midtones



Original



Corrected

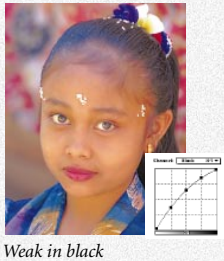
CORRECTING THE COLOR PLATES Once you have identified the color balance problem in an image, it's easy to correct the problem using Curves. These examples show common color balance problems in an image along with the Curves adjustment needed to correct the problem. You can also use the color wheel to help you identify the cause of a color problem. For example, too much red in an image may be caused by too much magenta (as shown in the third example in the second row) or it may be caused by too little of red's opposing color on the color wheel, cyan (as shown in the second example in the second row). Similarly, a green cast is often a sign of too little magenta. Use this page and the color wheel on page 225 to help evaluate the color in your own image. See "Adjusting color balance" on page 123.



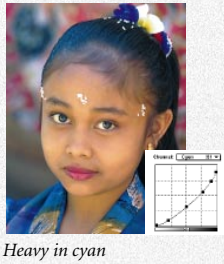
Corrected image



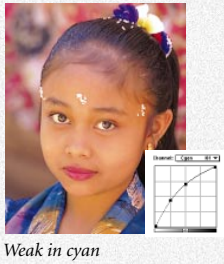
Heavy in black



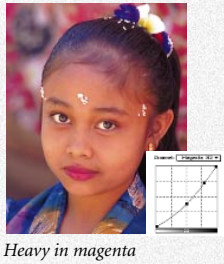
Weak in black



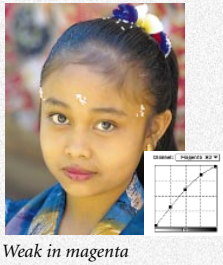
Heavy in cyan



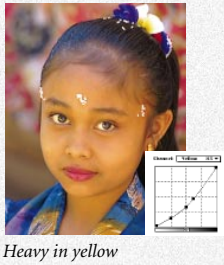
Weak in cyan



Heavy in magenta



Weak in magenta

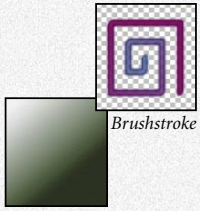


Heavy in yellow



Weak in yellow

BLENDING MODES AND OPACITY The blending modes let you control how pixels in an image affect a painting or editing tool. Using different combinations of modes and opacity, you can produce a variety of effects. For a description of each mode, see "Selecting a blending mode" on page 205.



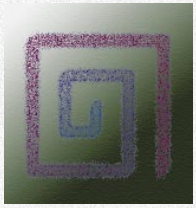
Background



Normal



Normal, 50% opacity



Dissolve



Multiply



Screen



Soft Light



Hard Light



Color Dodge



Color Burn



Darken



Lighten



Difference



Saturation



Color



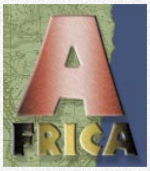
Luminosity

LAYER BLENDING MODES The layer blending modes let you control how the pixels in the layer blend with the pixels in underlying layers. For a description of each mode, see "Selecting a blending mode" on page 205.

Original Images



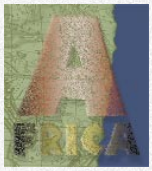
Background



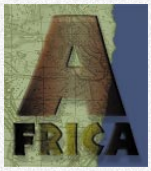
Normal



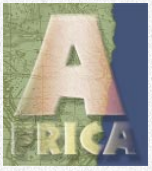
Normal, 70% opacity



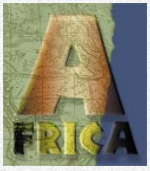
Dissolve



Multiply



Screen



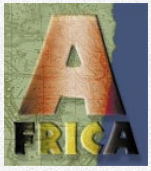
Overlay



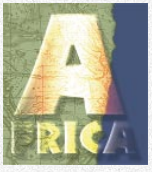
Overlay 50%



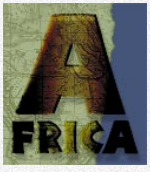
Soft Light



Hard Light



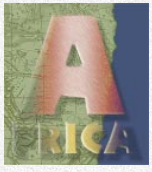
Color Dodge



Color Burn



Darken



Lighten



Difference



Exclusion



Hue



Saturation



Color



Luminosity

JPEG OR GIF? For online display, such as on the World Wide Web, JPEG offers you the best color and the smallest file size. If your image contains line art or requires transparent areas, use the GIF89a Export command. To minimize file size, choose Image > Mode > Indexed Color, and use the fewest number of colors that still give good results. For continuous-tone images, the Adaptive palette gives the best results. See "Saving files in JPEG format" on page 317 and "Exporting images" on page 317.

Original, 248K



JPEG



Quality 10, 135K



Quality 5, 53K



Quality 0, 40K

GIF, adaptive palette, diffusion dither



256 colors, 76K



64 colors, 55K



16 colors, 36K

GIF, adaptive palette, no dither



256 colors, 66K



64 colors, 44K



16 colors, 30K

DUOTONES, TRITONES, AND QUADTONES These examples show sets of process color curves (supplied on the Adobe Photoshop CD-ROM set) applied to the same grayscale image. See "Modifying the duotone curve" on page 340.


Original


Quadtone, CMYK cool


Quadtone, CMYK ext wm


Quadtone, CMYK very wm


Tritone, bmy sepia 1


Tritone, bcy green 2


Tritone, bmc blue 1

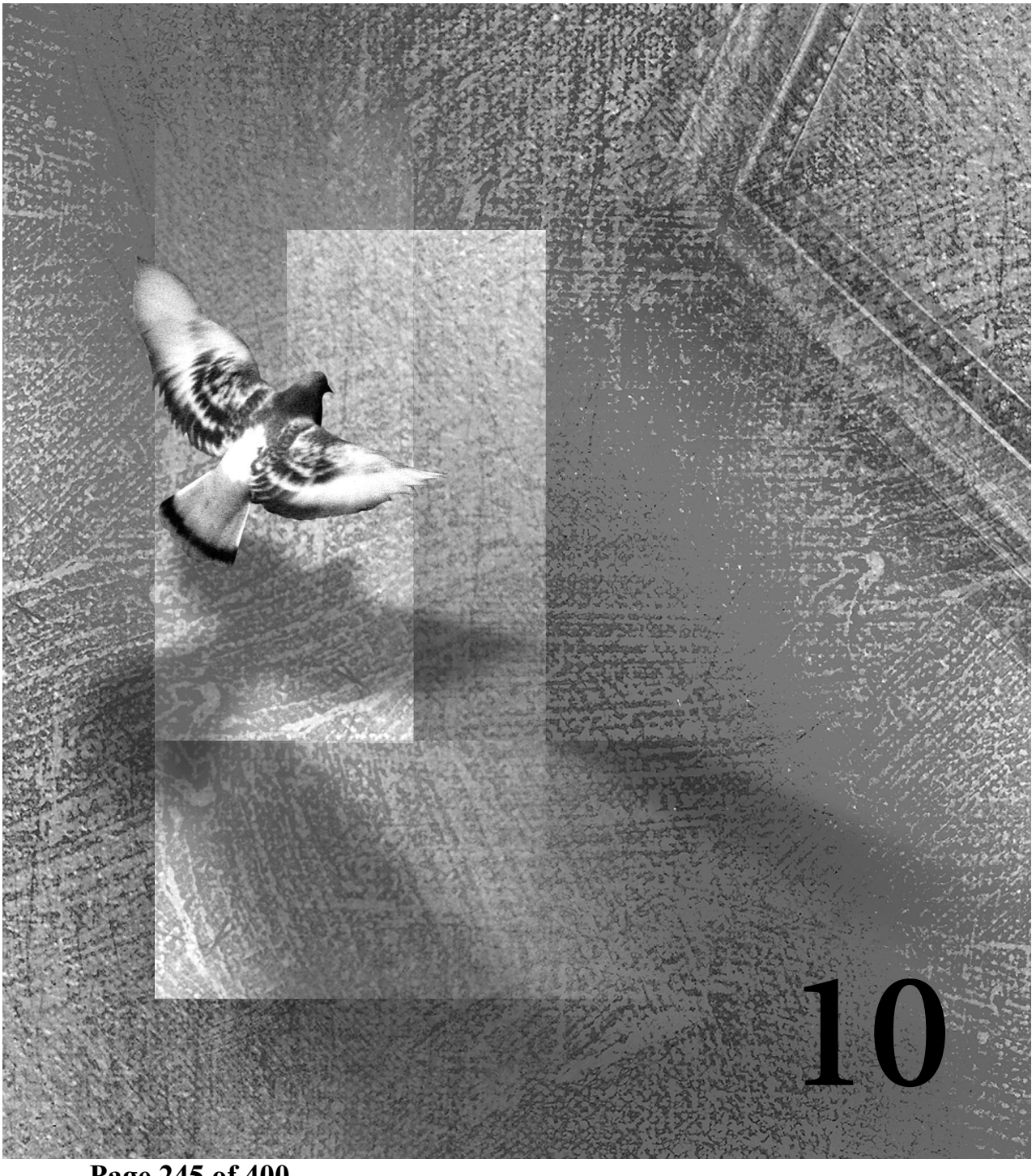

Tritone, bmy red 1

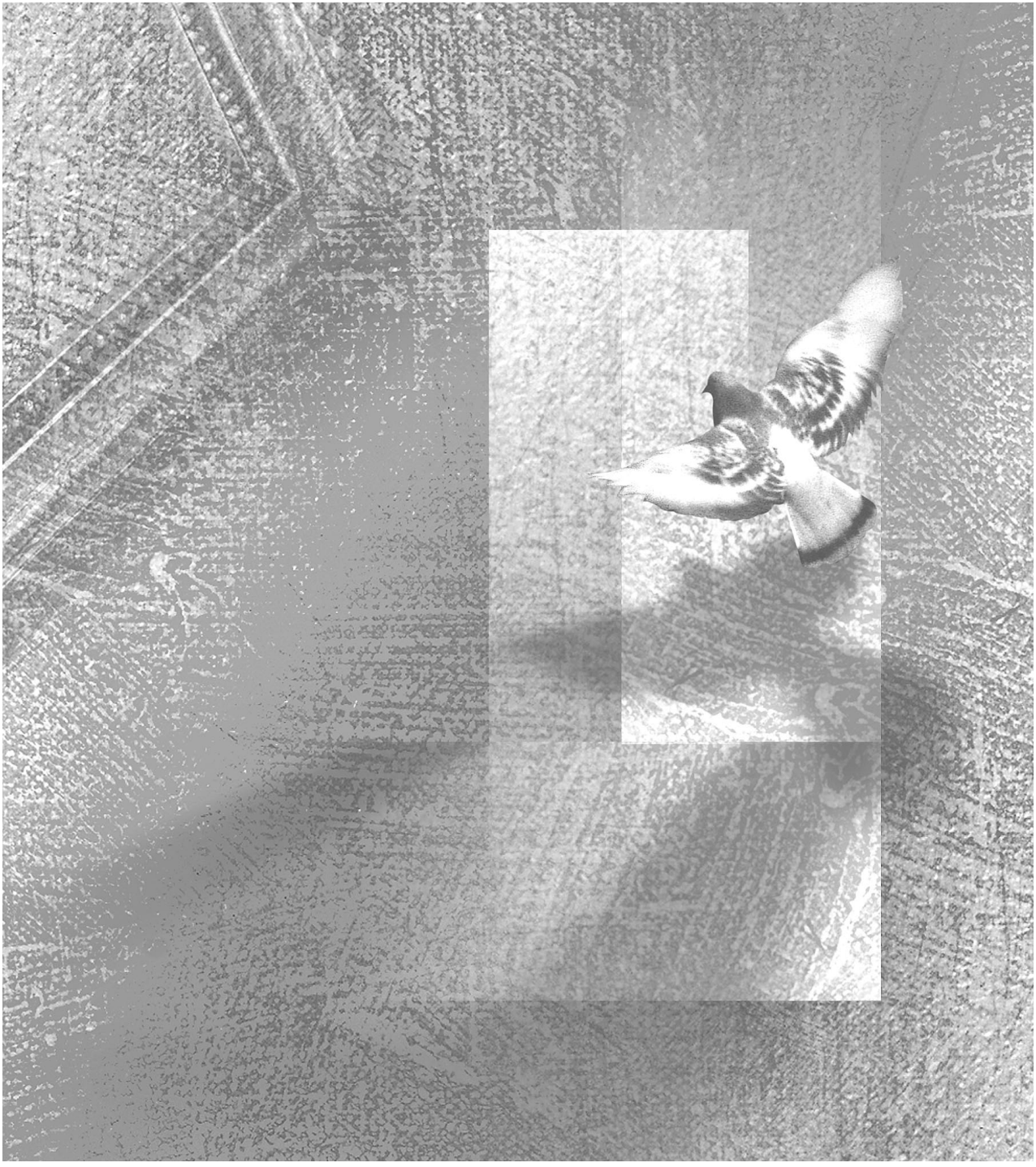

Tritone, bmy brown 1


Duotone, cyan bl 2


Duotone, magenta bl 2


Duotone, yellow bl 3


10



Chapter 10: Using Channels and Masks

In Adobe Photoshop, channels store an image's color information. In addition, channels and masks store selections that let you manipulate and control specific parts of an image in sophisticated ways.

About channels

Color information channels are created automatically when you open a new image. The image's color mode (and not its number of layers) determines the number of color channels created. For example, an RGB image has three default channels: one for each of the red, green, and blue colors plus a composite channel used for editing the image.

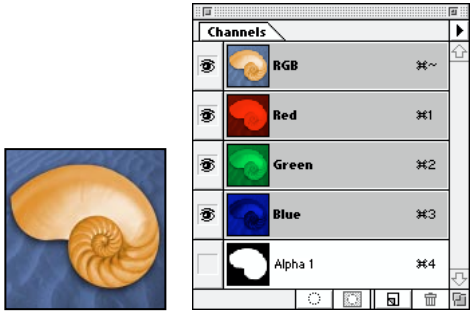


Image (RGB), and channels in Channels palette

Alpha channels store selections as 8-bit grayscale images and are added to the color channels in an image. You use alpha channels to create and store masks, which let you manipulate, isolate, and protect specific parts of an image. An image can have up to 24 channels, including all color and alpha channels.

In addition, spot color channels can be added to an image to let you specify additional plates for printing with spot color inks.

About channels and file size

The file size required for a channel depends on the pixel information in the channel. For example, if the image has no alpha channels, duplicating a color channel in an RGB image increases the file size by about one-third, in a CMYK image by about one-fourth. Each alpha channel and spot color channel also adds to the file size.

Certain file formats compress channel information and can save space, including the TIFF and Photoshop formats (see "Saving and managing channels" on page 243). The size of a file, including alpha channels and layers, appears as the second (right) value in the lower left corner of the window when the Document Size command is chosen. (See "About image size and resolution" on page 42.)

Using the Channels palette

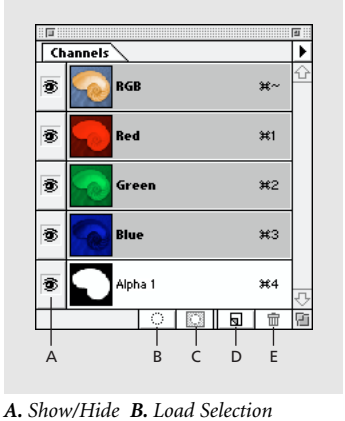
The Channels palette lets you create and manage channels and monitor the effects of editing. The palette lists all channels in the image—a composite channel first (for RGB, CMYK, and Lab images), then individual color channels, spot color channels, and finally alpha channels. Appearing to the left of the channel name, a thumbnail of the channel's contents automatically updates as you edit the channel.

Viewing channels

You can view any combination of individual channels. For example, view an alpha channel and the composite channel together to see how changes made in the alpha channel relate to the entire image. By default, individual channels are displayed in grayscale.

To display the Channels palette:

1 Choose Windows > Show Channels.



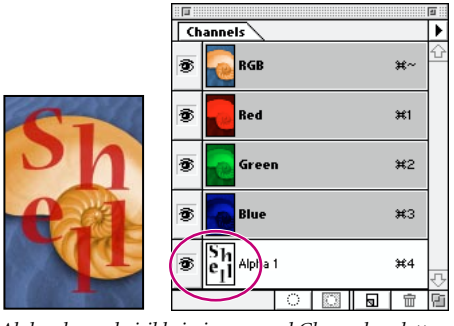
***A.** Show/Hide **B.** Load Selection*
*C. Save Selection **D.** New Channel **E.** Trash*

2 Use the scroll bars or resize the palette to see additional channels.

To select a channel:

Click the channel name. Shift-click to select (or deselect) multiple channels. The names of all selected, or active, channels are highlighted. Editing changes apply to the active channels.

When a channel is visible, an eye icon appears to its left.



Alpha channel visible in image, and Channels palette

These guidelines apply to channels you display:

- In RGB, CMYK, or Lab images, you can view the individual channels in color. (In Lab images, only the *a* and *b* channels appear in color.)
- If more than one channel is visible, the channels always appear in color.
- In alpha channels, selected pixels appear as white (partially selected pixels are gray) by default.

• If you display an alpha channel at the same time as color channels, the alpha channel appears as a transparent color overlay, analogous to a printer's rubylith or a sheet of acetate. To change the color of this overlay or set other alpha channel options, see the procedure to change a channel's options on page 253.

To show or hide a channel:

Click in the eye column next to the channel to show or hide that channel. (Click the composite channel to view all default channels. The composite channel is displayed whenever all the color channels are visible.)

To show or hide multiple channels, drag through the eye column in the Channels palette.

To see individual channels in color:

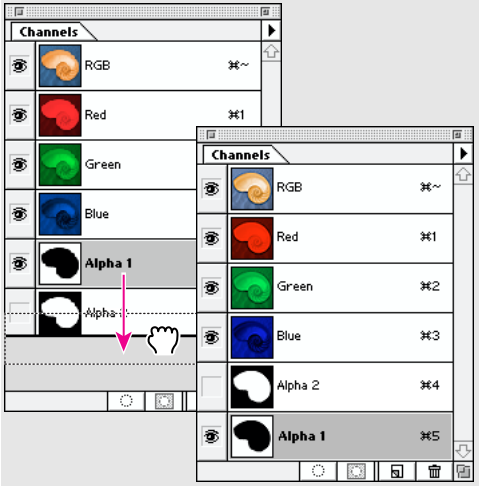
1 Choose File > Preferences > Display & Cursors.

2 Select Color Channels in Color, and click OK.

To change the order of alpha channels:

Drag the channel up or down. When the heavy black line appears in the position you want, release the mouse button.

Whatever the order of alpha channels, the color information channels always appear at the top.



Drag channel in palette, and release to set new position.

To hide or change the size of channel thumbnails to work more efficiently:

1 Choose Palette Options from the Channels palette menu.

2 Select a display option:

• Click a thumbnail size. Smaller thumbnails reduce the space required by the Channels palette—helpful when you're working on smaller monitors.

• Click None to turn off the display of thumbnails.

3 Click OK.

To edit a channel:

Use a painting or editing tool to paint in the image. Paint with white to add to the channel; paint with black to remove from the channel; paint with a lower opacity or a color to add to the channel with lower opacities.

Duplicating channels

You can duplicate any channel within or between images. (You cannot duplicate a channel to a Bitmap-mode image, however.) For example, duplicate an image's channels to make a backup before editing the channel. Or duplicate alpha channels to a new image also to create a library of selections that you can load into the current image one by one—thus keeping the file smaller. If duplicating between images, alpha channels must have identical pixel dimensions (see "Creating new images" on page 54).

To duplicate a channel using the Duplicate command:

1 In the Channels palette, select the channel to duplicate.

2 Choose Duplicate Channel from the Channels palette menu.

3 Type a name for the duplicate channel.

4 For Document, do one of the following:

• Choose a destination. Only images with pixel dimensions the same as the current image are available. To duplicate the channel in the same file, select the channel's current file.

• Choose New to copy the channel to a new image, creating a multichannel image containing a single channel. Type a name for the new image.

5 To reverse the selected and masked areas in the duplicate channel, select Invert.

6 Click OK.

To duplicate a channel by dragging:

1 In the Channels palette, select the channel you want to duplicate.

2 Duplicate the channel:

• To duplicate a channel within an image, drag the channel into the image window or onto the New Channel button ( ) at the bottom of the palette.

• To duplicate the channel into another image, make sure that the destination image is open. Then drag the channel into the destination image window.

Deleting channels

You may want to delete alpha channels you no longer need before saving an image. Complex alpha channels can substantially increase the disk space required for an image.

To delete a channel with no confirmation:

1 Select the channel in the Channels palette.

2 Delete the channel:

• Alt-click (Windows) or Option-click (Mac OS) the Trash button.

• Drag the channel name in the palette to the Trash button.

• Choose Delete Channel from the Channels palette menu.

To delete a channel with confirmation:

1 Select the channel in the Channels palette.

2 Click the Trash button at the bottom of the palette. Then click Yes.

When deleting a channel from a file with layers, regardless of the method you use, Photoshop prompts you first to flatten the visible layers and discard hidden layers (if any) before deleting the channel. This is necessary because removing a color channel converts the image to Multichannel mode, which does not support layers.

Mixing channels

The Channel Mixer command lets you modify a color channel using a mix of the current color channels. With this command, you can do the following:

- Make creative color adjustments not easily done with the other color adjustment tools.
- Create high-quality grayscale images by choosing the percentage contribution from each color channel.
- Create high-quality sepia-tone or other tinted images.
- Convert images to and from some alternative color spaces, such as YCrCb.
- Swap or duplicate channels.



For a color illustration of the Channel Mixer, see figure 10-3 on page 227.

To mix channels in an image:

1 In the Channels palette, select the composite channel.

2 Choose Image > Adjust > Channel Mixer.

3 For Output Channel, choose the channel in which to blend one or more existing (or *source*) channels.

4 Drag any source channel's slider to the left to decrease the channel's contribution to the output channel, to the right to increase it, or enter a value between –200% and +200% in the text box. Using a negative value inverts the source channel before adding it to the output channel.

5 If desired, drag the slider or enter a value for the Constant option. This option adds a channel of varying opacity to the output channel: negative values act as a black channel, positive values act as a white channel.

6 If desired, select Monochrome to apply the same settings to all the output channels, creating a color image that contains only gray values.

Selecting Monochrome is useful for images you plan to convert to grayscale. If you select and then deselect this option, you can modify the blend of each channel separately, creating a handtinted appearance.

Saving and managing channels

As long as you save a file in a format supporting the image's color mode, the color channels will be preserved. But alpha channels are automatically kept only when you save a file in the Adobe Photoshop, Adobe Photoshop 2.0 (Mac OS only), DCS 2.0, PICT, TIFF, or Raw formats. Saving in other formats may cause channel information to be discarded (see "About file formats" on page 321).

Splitting channels into separate images

Choosing the Split Channels command from the Channels palette menu splits the various channels in an image into separate images. The original file is closed and individual channels appear in separate grayscale image windows. The title bar shows the original name plus the channel abbreviation (Windows) or full name (Mac OS). Any changes since the last save are retained in the new images, lost in the original.

Splitting channels is useful when you want to retain the individual channel information in a file format that doesn't preserve channels.

Note: *Only flattened images can be split (see "Flattening all layers" on page 269).*

Merging channels

Multiple grayscale images can be combined into a single image. Some grayscale scanners let you scan a color image through a red filter, a green filter, and a blue filter to generate red, green, and blue images. Merging lets you combine the separate scans into a single, color image.

Note: *You can also blend the data in one or more channels into an existing or new channel (see "Mixing channels" on page 243).*

Images must be in Grayscale mode, have the same pixel dimensions, and be open. (See "Changing the pixel dimensions of an image" on page 49.) The number of grayscale images you have open determines the color modes available when merging channels. For example, you can't merge the split channels from an RGB image into a CMYK image, because CMYK requires four channels and RGB only three.

Note: *If you are working with DCS files that have accidentally lost their links (and so cannot be opened, placed, or printed), open the channel files, and merge them into a CMYK image. Then resave the file as a DCS EPS file.*

To merge channels:

1 Open the grayscale images containing the channels you want to merge.

2 Make one of the images active.

3 Choose Merge Channels from the Channels palette menu.

4 For Mode, choose the color mode you want to create. If an image mode is unavailable, it is dimmed. The number of channels appropriate for the mode appears in the Channels text box.

5 If necessary, enter a number in the Channels text box.

If the number is incompatible with the selected mode, Multichannel mode is automatically selected. This creates a a multichannel image with two or more channels.

6 Click OK.

7 For each channel, make sure that the image you want is open. If you change your mind about image type, click Mode to return to the Merge Channels dialog box.

8 If merging into a multichannel image, click Next, and repeat step 7 to select the remaining channels.

Note: *All channels of a multichannel image are alpha channels.*

9 When finished selecting channels, click OK.

The selected channels are merged into a new image of the specified type, and the original images closed without any changes. The new image appears in an untitled window.

Note: *You cannot split and recombine (merge) an image with spot color channels. The spot color channel will be added as an alpha channel.*

Adding spot colors

Spot colors are special premixed inks used instead of, or in addition to, the process color (CMYK) inks. Each spot color requires its own plate on the press. (Because a varnish also requires a separate plate on press, it is considered a spot color, too.) For information on printing spot color plates, see "Printing color separations" on page 343.

Use the following methods to assign spot colors to an image:

- To apply spot color as a tint throughout the image, convert the image to Duotone mode and apply the spot color to one of the duotone plates. You can use up to four spot colors, one per plate. (See "Using monotones, duotones, tritones, and quadtones" on page 339.)
- To apply spot color to specific areas of the image, create spot channels. The following sections discuss spot channels.

Using spot channels

Spot channels let you add and preview spot colors in an image.

The following guidelines can help you in using spot channels:

- If you need spot color graphics that have crisp edges and knock out the underlying image, consider creating the additional artwork in a page-layout or illustration application.
- You can create new spot channels or convert an existing alpha channel to a spot channel.
- Like alpha channels, spot channels can be edited or deleted at any time. (For more information, see "Using alpha channels" on page 252.)
- Spot colors can't be applied to individual layers.

• Spot colors are overprinted on top of the fully composited image.

• If you print an image that includes spot color channels to a composite printer, the spot colors print out as extra pages.

• You can merge spot channels with color channels, splitting the spot color into its color channel components. Merging spot channels lets you print a single-page proof of your spot color image on a desktop printer.

• The names of the spot colors print on the separations.

• Each spot channel is overprinted in the order in which it appears in the Channels palette.

• You cannot move spot colors above a default channel in the Channels palette except in Multichannel mode.

To move spot color channels in the Channels palette so that they print before other plates, convert the image to Multichannel mode.

To create a spot channel:

1 Choose Window > Show Channels to display the Channels palette.

2 To fill a selected area with a spot color, make or load a selection.

3 Do one of the following:

• Ctrl-click (Windows) or Command-click (Mac OS) the New Channel button (⊡) in the Channels palette.

• Choose New Spot Channel from the Channels palette menu.

If you made a selection, that area is filled with the currently specified spot color.

4 Click the color box and choose a color, as described in "Using the Adobe Photoshop Color Picker" on page 218. By selecting a custom color, your print service can more easily provide the proper ink to reproduce the image. (For more information, see "Choosing custom colors" on page 219.)

5 For Solidity, enter a value between 0% and 100%.

This option lets you simulate on-screen the solidity of the printed spot color. A value of 100% simulates an ink that completely covers the inks beneath (such as a metallic ink); 0% simulates a transparent ink that completely reveals the inks beneath (such as a clear varnish). You can also use this option to see where an otherwise transparent spot color (such as a varnish) will appear.

Important: *The Solidity option only affects the on-screen preview. It has no effect on the printed output.*



Solidity 100% and solidity 50%

6 If desired, enter a name for the spot channel. If you chose a custom color in step 4, the channel automatically takes the name of that color.

Remember that it's important to name spot colors so they'll be recognized by other applications reading your file. Otherwise the file might not print correctly—or print at all.

7 Click OK.

To convert an alpha channel to a spot channel:

1 In the Channels palette, double-click the alpha channel.

2 If needed, rename the channel.

3 Select Spot Color.

4 Click the color box and choose a color, as described in "Using the Adobe Photoshop Color Picker" on page 218.

5 Click OK.

The areas of the channel containing grayscale values are converted to spot color.

6 If desired, choose Image > Adjust > Invert to apply the spot color to the selected area of the channel.

To edit a spot channel:

1 Select the spot channel in the Channels palette.

2 Use a painting or editing tool to paint in the image. Paint with black to add more spot color at 100% opacity; paint with gray to add spot color with lower opacity.

Unlike the Solidity option in the Spot Channel Options dialog box, the Opacity option in the painting or editing tool's Options palette determines the actual density of ink used in the printed output.

To change spot channel options:

1 Do one of the following:

• Double-click the spot channel name in the Channels palette.

• Select the spot channel in the Channels palette, and choose Channel Options from the palette menu.

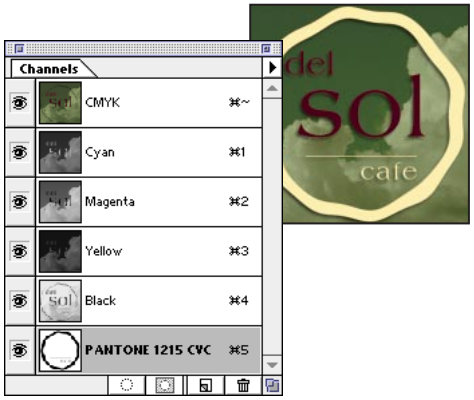
2 Change the channel options as described in the previous procedure, and click OK.

To merge spot channels:

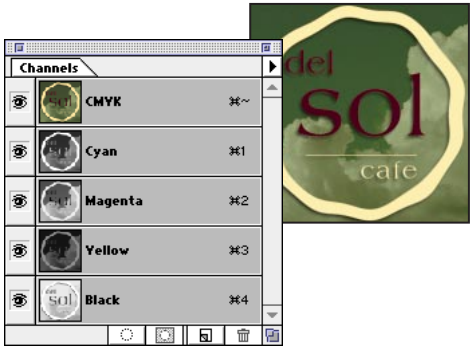
1 In the Channels palette, select the spot channel you want to merge.

2 Choose Merge Spot Channel from the palette menu.

The spot color is converted to and merged with the color channels. The spot channel is deleted from the palette.



Before



After

Merging spot channels flattens layered images. The merged composite reflects the preview spot color information, including the Solidity settings. For example, a spot channel with a solidity of 50% will produce different merged results from the same channel with a solidity of 100%.

In addition, the resulting merged spot channels usually won't reproduce the same colors as the original spot channels, because CMYK inks can't represent the range of colors available from spot color inks.

To export spot channels:

Save the file in DCS 2.0 format. For more information, see "Saving files in Photoshop EPS or DCS format" on page 315.

Adjusting overlapping spot colors

To prevent overlapping spot colors from printing over, or knocking out, the underlying spot color, remove one of the spot colors where they overlap. To help you predict how colors will look when printed, use a printed sample of the overprinted inks to adjust your screen display.

Note: *In some cases, you may want colors to overprint, such as in varnishes and bump plates.*

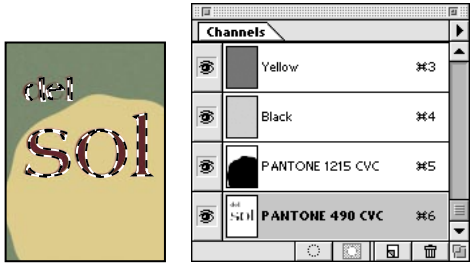
To remove an underlying spot color:

1 In the Channels palette, select the spot channel whose color you want to print.

2 Choose Select > Load Selection.

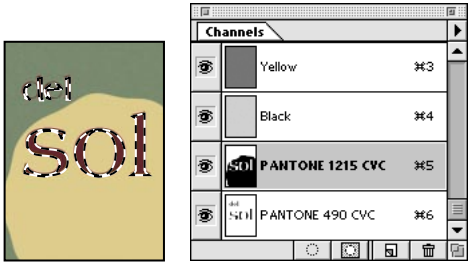
To quickly select an image in a channel, hold down Ctrl (Windows) or Command (Mac OS), and click the channel in the Channels palette.

3 For Channel, choose the spot channel from step 1 and click OK.



4 To create trap when knocking out the underlying color, choose Select > Modify > Expand or Contract depending on whether the overlapping spot color is darker or lighter than the spot color beneath it. For more information on trapping, see "Creating color traps" on page 338.

5 In the Channels palette, select the underlying spot channel that contains areas you want to knock out. Press Delete.



This method can be used to knock out areas from any channels under a spot color, such as the CMYK channels.

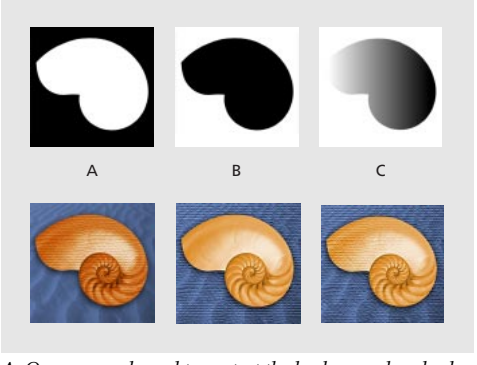
6 If a spot color in one channel overlaps more than one other spot color, repeat this process for each channel that contains areas you want removed.

About masks

Masks let you isolate and protect areas of an image as you apply color changes, filters, or other effects to the rest of the image. When you select part of an image, the area that is not selected is "masked" or protected from editing. You can also use masks for complex image editing such as gradually applying color or filter effects to an image.

In addition, masks let you save and reuse time-consuming selections as alpha channels. (Alpha channels can be converted to selections and then used for image editing.) Because masks are stored as 8-bit grayscale channels, you can refine and edit them using the full array of painting and editing tools.

When a mask channel is selected in the Channels palette, foreground and background colors appear as grayscale values. (See "Using Quick Mask mode" on page 250.)



A. *Opaque mask used to protect the background and color the shell.* ***B.*** *Opaque mask used to protect the shell and color the background.* ***C.*** *Semitransparent mask used to color the background and part of the shell.*

In Photoshop, you can create masks, all stored at least temporarily as grayscale channels, in three ways:

- Quick Mask mode lets you create and view a temporary mask for an image (see "Using Quick Mask mode" on page 250).
- Alpha channels let you save and load a selection to be used as a mask (see "Using alpha channels" on page 252).
- Layer masks let you create a mask for a specific layer (see "Using layer masks" on page 276).

Using Quick Mask mode

Quick Mask mode lets you edit any selection as a mask without using the Channels palette and while viewing your image. The advantage of editing your selection as a mask is that you can use almost any Photoshop tool or filter to modify the mask. For example, if you create a rectangular selection with the marquee tool, you can enter Quick Mask mode and use the paintbrush to extend or contract the selection, or use a filter to distort the edges of the selection. You can also use selection tools, because the quick mask is not a selection.

Start with a selected area and use Quick Mask mode to add to or subtract from it to make the mask, or create the mask entirely in Quick Mask mode. Color differentiates the protected and unprotected areas. When you leave Quick Mask mode, the unprotected areas become a selection.

A temporary Quick Mask channel appears in the Channels palette while you work in Quick Mask mode. However, you do all mask editing in the image window.

To create a quick mask:

1 Using any selection tool, select the part of the image you want to change.

2 Click the Quick Mask mode button ( ) in the toolbox.

For a color illustration of Quick Mask mode, see figure 10-1 on page 227.

A color overlay (similar to a piece of rubylith) covers and protects the area outside the selection. The original selection is left unprotected by this mask. By default, Quick Mask mode colors the protected area using a red, 50% opaque overlay.

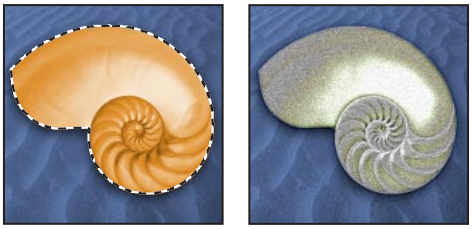
3 To edit the mask, select a painting or editing tool from the toolbox, or select a filter or adjustment command from the menu bar. By default, painting with black adds to the mask, shrinking the selection. Painting with white removes areas from the mask, expanding the selection. Painting with gray or another color creates a semitransparent area, useful for feathering or anti-aliased effects.

For a color illustration of editing a quick mask, see figure 10-2 on page 227.

4 Click the Standard mode button ( ) in the toolbox to turn off the quick mask and return to your original image. A selection border now surrounds the unprotected area of the quick mask.

The selection boundary indicates where 50% of the pixels are selected. That is, if a feathered mask is converted into a selection, the boundary line runs halfway between the black pixels and the white pixels of the mask gradient.

5 Apply the desired changes to the image. Changes affect only the selected area.



Edited mask, and adjustment applied

6 Choose Select > None to deselect the selection, or save the selection as described in the saving procedures on page 252.

To change the Quick Mask options:

1 Double-click the Quick Mask mode button ( ) in the toolbox.

2 Choose from the following display options:

• Masked Areas (the default) to have masked (protected or unselected) areas appear black (opaque), and to have selected areas appear white (transparent). Painting with black increases the masked, protected area; painting with white increases the selected area.

With this option, the Quick Mask button in the toolbox appears as a white circle on a gray background ( ).

• Selected Areas to have masked or protected areas appear white (transparent) and to have selected areas appear black (opaque). Painting with white increases the masked, protected area; painting with black increases the selected area.

With this option, the Quick Mask button in the toolbox appears as a gray circle on a white background ( ).

To toggle between the Masked Areas and Selected Areas options for quick masks, Alt-click (Windows) or Option-click (Mac OS) the Quick Mask mode button.

3 To choose a new mask color, click the color box and choose a new color as described in "Using the Adobe Photoshop Color Picker" on page 218.

4 To change the opacity, enter a value between 0% and 100%.

Both the color and opacity settings affect only the appearance of the mask and have no effect on how underlying areas are protected. Changing these settings may make the mask more easily visible against the colors in the image.

5 Click OK.

Using alpha channels

In addition to the temporary masks of Quick Mask mode, you can create more permanent masks by storing and editing selections in *alpha channels* (see "About masks" on page 249).

An alpha channel has these properties:

- Each image can contain up to 24 channels, including all color and alpha channels.
- All channels are 8-bit grayscale images, capable of displaying 256 levels of gray.
- You can add and delete alpha channels.
- You can specify a name, color, mask option, and opacity for each channel. (The opacity affects the preview of the channel, not the image.)
- All new channels have the same dimensions and number of pixels as the original image.
- You can edit the mask in an alpha channel using the painting and editing tools.
- Storing selections in alpha channels makes the selections permanent, so that they can be used again in the same image or in a different image.

Creating and saving alpha channels

You create a new alpha channel as a mask. For example, you can create a gradient fill in a blank channel, and then use it as a mask. Or you can save a selection to either a new or existing channel.

To create a new alpha channel using current options:

Click the New Channel button ( ) at the bottom of the Channels palette. The new channel is named according to the sequence in which it was created.

To create a new alpha channel and specify options:

1 Do one of the following:

- Alt-click (Windows) or Option-click (Mac OS) the New Channel button ( ) at the bottom of the palette.
- Choose New Channel from the Channels palette menu.

2 Type a name for the channel.

3 Select display options for the channel, as described in steps 2 through 4 of the procedure on Quick Mask options in "Using Quick Mask mode" on page 250. Alpha channel options are identical to Quick Mask options.

4 Click OK.

A new channel appears at the bottom of the Channels palette and is the only channel visible in the image window.

To edit an alpha channel:

Use a painting or editing tool to paint in the image. Paint with black to add to the channel; paint with white to remove from the channel; paint with a lower opacity or a color to add to the channel with lower opacities.

To save a selection to a new channel with default options:

1 Select the area or areas of the image that you want to isolate.

2 Click the Save Selection button ( ) at the bottom of the Channels palette. A new channel appears, named according to the sequence in which it was created.

To save a selection to a new or existing channel:

1 Select the area or areas of the image that you want to isolate.

2 Choose Select > Save Selection.

3 For Document, choose a destination image for the selection.

By default, the selection is placed in a channel in your active image. You can choose to save the selection to a channel in another open image with the same pixel dimensions or to a new image.

4 Choose a destination channel for the selection.

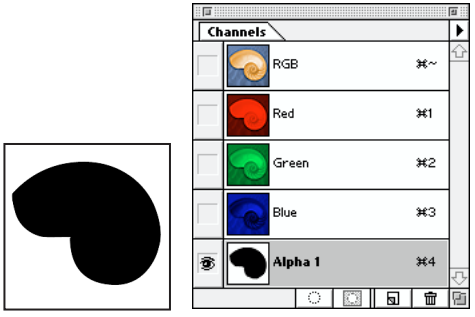
By default, the selection is saved in a new channel. You can choose to save the selection to any existing channel in the selected image or to a layer mask if the image contains layers.

5 If you're saving the selection to an existing channel, select how to combine the selections:

- Replace Channel to replace the current selection in the channel.
- Add to Channel to add the selection to the current channel contents.
- Subtract from Channel to delete the selection from the channel contents.
- Intersect with Channel to keep the areas of the new selection that intersect with the channel contents.

6 Click OK.

7 Select the channel in the Channels palette to see the saved selection displayed in grayscale.



To change options for a channel:

1 Do one of the following:

- Select the channel in the Channels palette, and choose Channel Options from the palette menu.
- Double-click the channel name in the Channels palette.

2 Enter a new name for the channel.

3 Choose display options, as explained in steps 2 through 4 of the procedure on Quick Mask options in "Using Quick Mask mode" on page 250.

See "Using spot channels" on page 245 for information on changing Spot Color channel options.

Note: *You cannot modify options for the default color channels.*

Loading a selection into an image

When you have finished modifying an alpha channel or simply want to use a previously saved selection, you can load the selection into the image.

To load a saved selection using shortcuts:

Do one of the following in the Channels palette:

- Select the alpha channel, click the Load Selection button ( ) at the bottom of the palette, and then click the composite color channel near the top of the palette.
- Ctrl-click (Windows) or Command-click (Mac OS) the channel containing the selection you want to load.
- To add the mask to an existing selection, press Ctrl+Shift (Windows) or Command+Shift (Mac OS), and click the channel.
- To subtract the mask from an existing selection, press Ctrl+Alt (Windows) or Command+Option (Mac OS), and click the channel.
- To load the intersection of the saved selection and an existing selection, press Ctrl+Alt+Shift (Windows) or Command+Option+Shift (Mac OS), and select the channel.

To load a saved selection into an image:

1 Choose Select > Load Selection. For Document, the active filename is selected.

2 For Channel, choose the channel containing the selection you want to load.

3 Click Invert to make the nonselected areas selected and vice versa.

4 If the destination image already has a selection, indicate how to combine the selections. (For information on these options, see step 5 of the procedure on saving a selection to a new or existing channel in "Creating and saving alpha channels" on page 252.)

5 Click OK to load the selection.

To load a selection from another image:

1 Open the two images you want to use.

Note: *The images must have identical pixel dimensions. See "Changing the pixel dimensions of an image" on page 49.*

2 Make the destination image active, and choose Select > Load Selection.

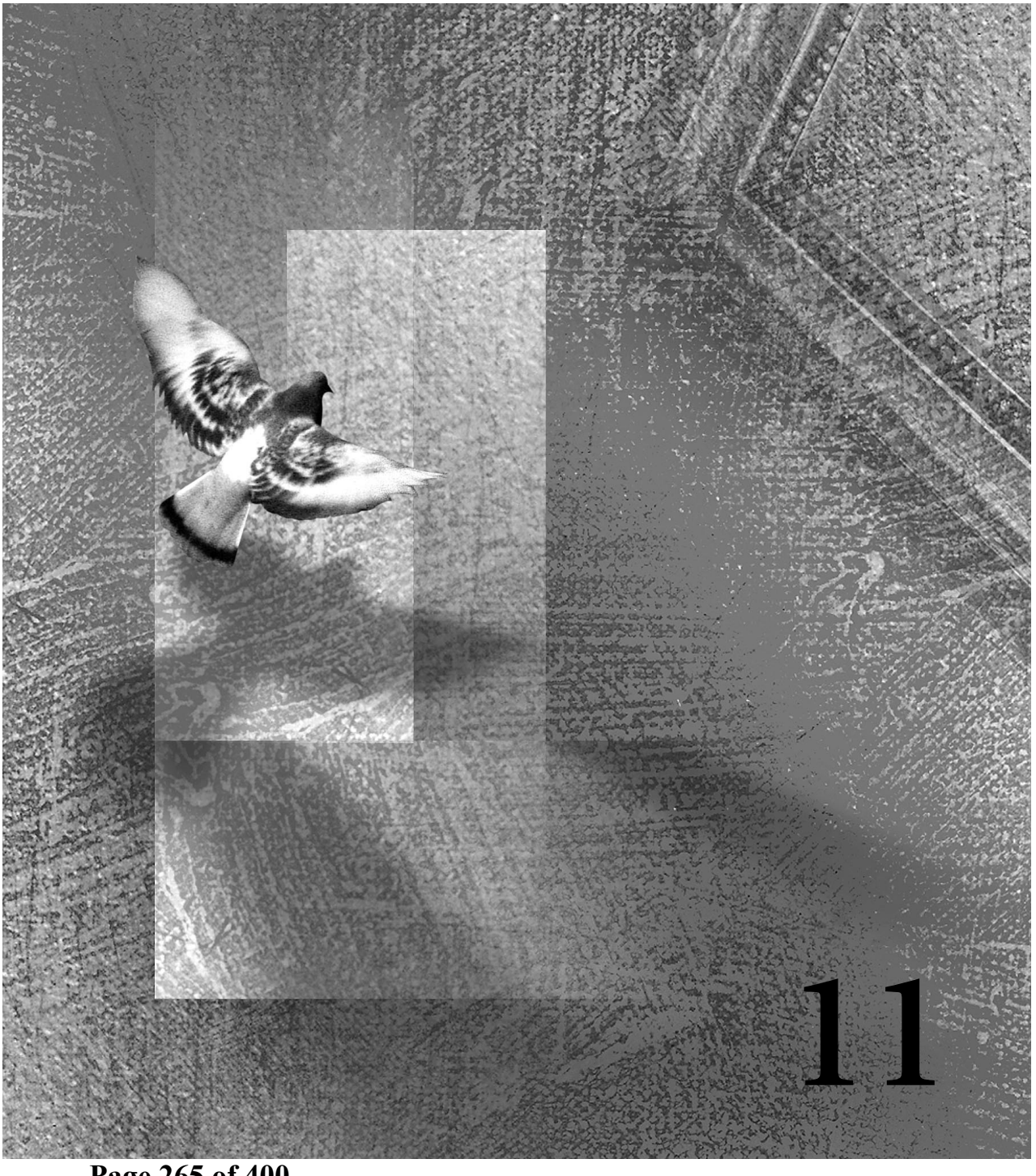
3 For Document, choose the source image.

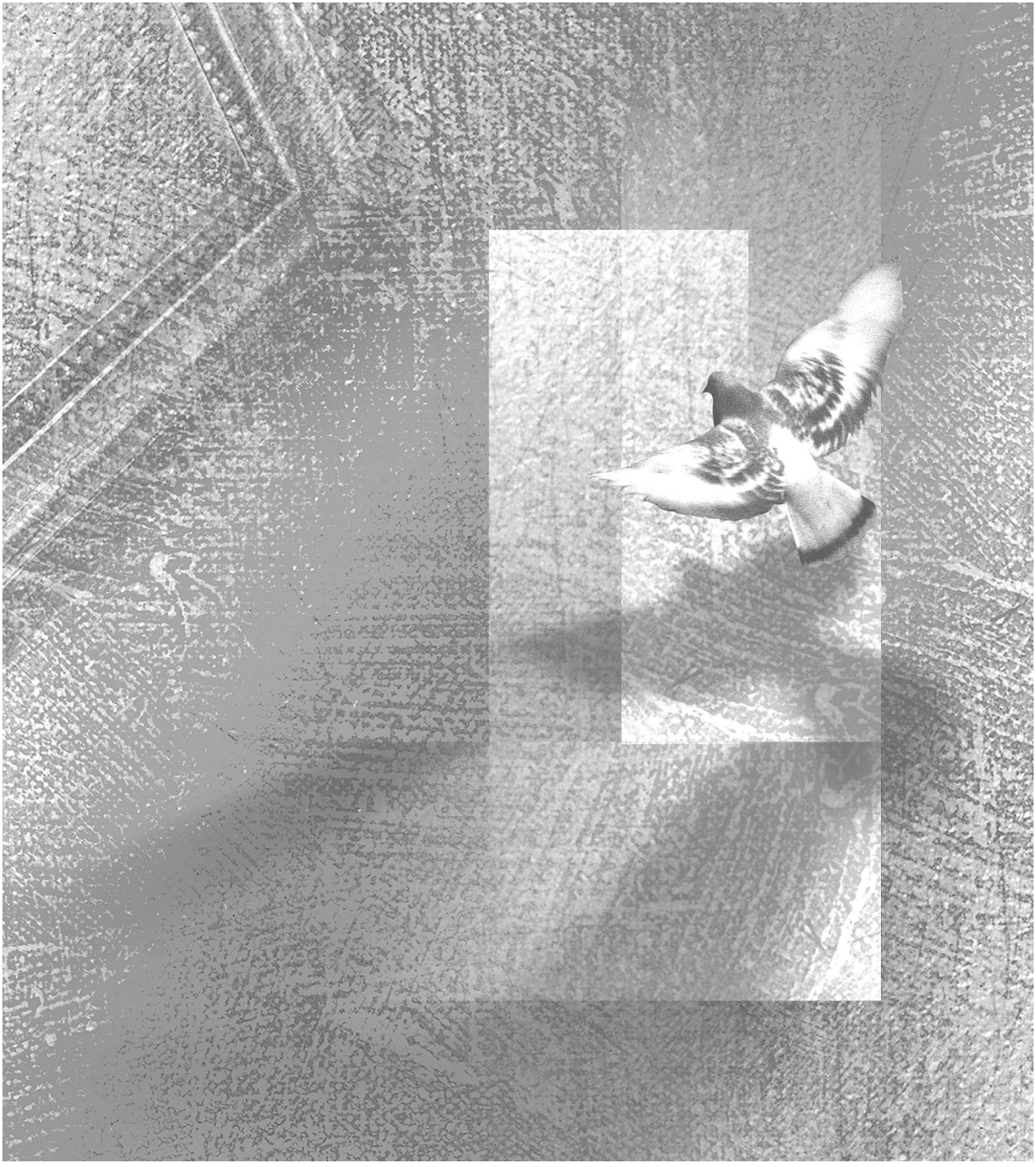
4 For Channel, choose the channel containing the selection you want to use as a mask.

5 Click Invert if you want to make the nonselected areas selected and vice versa.

6 If the destination image already has a selection, indicate how to combine the selections. (For information on these options, see step 5 of the procedure on saving a selection to a new or existing channel in "Creating and saving alpha channels" on page 252.)

7 Click OK to load the selection.


11



Chapter 11: Using Layers

When you create, import, or scan an Adobe Photoshop image, it consists of a background layer, analogous to the base layer of a painting. You can add more layers to the image, allowing you to organize your work into distinct levels.

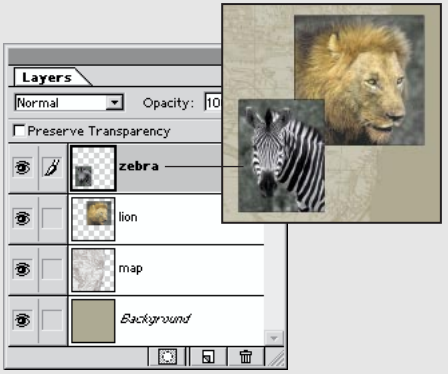
You can draw, edit, paste, and reposition elements on one layer without disturbing the others. Until you combine, or *merge,* the layers, each one remains independent of the other layers in the image. This means you can experiment freely with various graphics, type, opacities, and blending modes. In addition, special features such as layer masks, adjustment layers, and layer effects let you experiment with and apply sophisticated effects to the layers in your image.

Note: *Images created using the Transparent option in the New dialog box are created without a background. Images with no background, as well as images with layers, can be saved only in the Photoshop format.*

Using the Layers palette

The Layers palette lists all layers in an image, starting with the topmost layer. A thumbnail of layer contents appears to the left of the layer name. It is updated as you edit. Use the scroll bars or resize the palette to see additional layers.

UNDERSTANDING LAYERS Think of layers as sheets of acetate stacked one on top of the other. Where there is no image on a layer, you can see through to the layers below. Behind all of the layers is the background. In the illustration below, each animal and the map are on separate layers. The dark texture is the background. All layers in a file share the same resolution, the same number of channels, and the same image mode (RGB, CMYK, or Grayscale).

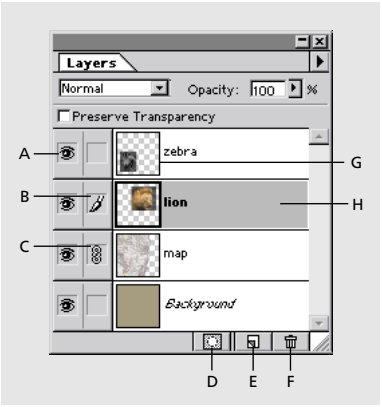


Zebra is on topmost layer.



Transparent areas on a layer let you see through to the layers below.

You use the Layers palette to create, hide, display, copy, merge, and delete layers. (Additional commands appear in the menu.) Changes to an image affect only the highlighted or *active* layer. You select a layer to make it active, and only one layer can be active at a time. The active layer's name appears in the image window's title bar, and a paintbrush icon appears next to the layer in the Layers palette, indicating that the layer can be modified.



***A.** Show/Hide **B.** Paintbrush icon*
***C.** Link/Unlink **D.** New Layer Mask*
***E.** New Layer **F.** Trash **G.** Thumbnail*
***H.** Highlighted layer is active layer.*

To display the Layers palette:

Choose Window > Show Layers.

To select a layer:

Do one of the following:

- In the Layers palette, click a layer to make it active.
- Select the move tool, right-click (Windows) or Control-click (Mac OS) in the image, and choose the layer you want from the context menu. The context menu lists all the layers that contain pixels under the current pointer location.

You can also select layers interactively as you use the move tool (see "Moving selections and layers within an image" on page 176).

Viewing layers

With the Layers palette, you can control whether a layer is visible, whether a preview or *thumbnail* of its contents is displayed, and also how transparency is displayed. Turning off thumbnails or reducing their size can speed performance and save monitor space.

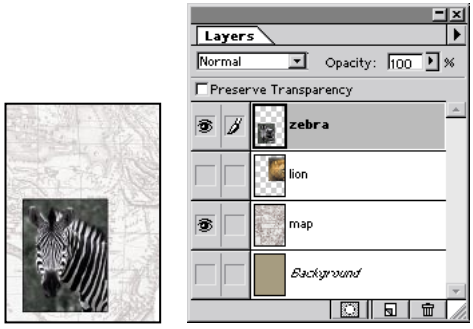
To show or hide a layer:

Do one of the following:

- In the Layers palette, click the eye icon next to a layer to hide that layer. Click in the column again to redisplay the layer.
- Drag through the eye column to show or hide multiple layers.
- Alt-click (Windows) or Option-click (Mac OS) the eye icon for a layer to display just that layer. Alt/Option-click in the eye column again to redisplay all the layers.

Only visible layers are printed. Making layers temporarily invisible can speed performance.

Note: *You can make the active layer invisible. Keep in mind, however, that changes still affect the hidden, active layer.*



Lion layer, and background hidden

To change the display of layer thumbnails:

1 Choose Palette Options from the Layers palette menu.

2 Click a size or click None to turn off the thumbnails, and then click OK.

To change the transparency display:

1 Choose File > Preferences > Transparency & Gamut. By default, the transparent areas of a document appear as a checkerboard pattern.

2 For Grid Size, select a new size for the pattern. If you choose None, transparent areas in the layer appear white.

3 For Grid Colors, select an option:

• Light, Medium, or Dark to specify a gray pattern.

• Any other color from the list to display the checkerboard in that color.

• Custom to choose a color that does not appear in the list. Then click either of the color selection boxes to specify a custom color.

4 Click OK.

Changing the stacking order of layers

The stacking order determines whether a layer appears in front of or behind other layers.

To change the order of a layer:

1 In the Layers palette, select the layer that you want to move.

2 Choose Layer > Arrange, and choose an option from the submenu to arrange the layer:

• Bring to Front to make the layer the topmost layer.

• Bring Forward to move the layer one level up in the stacking order.

• Send Backward to move the layer one level down in the stacking order.

• Send to Back to make the layer the bottommost layer in the image (except for the background).

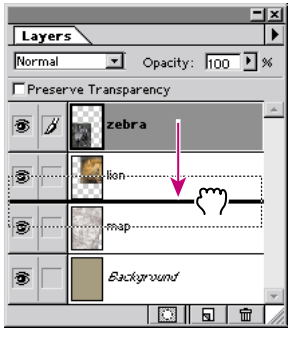
To move a selected layer one level up in the Layers palette, press Ctrl+] (Windows) or Command+] (Mac OS). To move one level down, press Ctrl+[or Command+[. To move to the topmost level, press Ctrl+Shift+] or Command+Shift+]. To move to the bottommost level (above the background), press Ctrl+Shift+[or Command+Shift+[.

To change the order of layers by dragging:

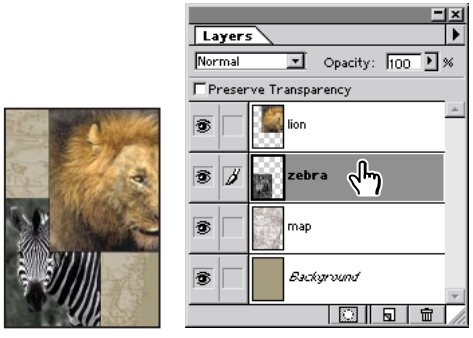
1 In the Layers palette, select the layer that you want to move.

2 Drag the layer up or down in the Layers palette. When the highlighted line appears in the desired position, release the mouse button.





Original image



Zebra layer dragged below Lion layer

Note: *By default, the background cannot be moved from the bottom of the layer list. To move the background, first convert it to a layer as described in the procedure to convert a background into a layer on page 264.*

Linking layers

By linking two or more layers, you can move their contents together. You can also perform the following tasks on linked layers:

- Apply transformations (see "Transforming objects in two dimensions" on page 182).
- Align layer contents (see "Moving and aligning layer contents" on page 265).
- Merge layers (see "Merging layers" on page 268.).
- Create clipping groups (see "Creating clipping groups" on page 275).

To link layers:

1 Select a layer in the Layers palette.

2 Click in the column immediately to the left of any layers you want to link to the selected layer. The link icon appears in the column.

To unlink layers:

In the Layers palette, click the link icons to remove them.

Creating a layered image

Adobe Photoshop lets you create up to 100 layers in an image, each with its own blending mode and opacity. However, the amount of memory in your system may put a lower limit on the number of layers possible in a single image.

Adding layers

Newly added layers appear above the selected layer in the Layers palette. You can add layers to an image in a variety of ways:

- By creating new layers or turning selections into layers.
- By converting a background to a regular layer or adding a background to an image.
- By pasting selections into the image (see "Copying selections or layers" on page 177).
- By creating type using the horizontal type tool or vertical type tool (see Chapter 12, Using Type).

To create a new layer using default options:

Click the New Layer button (◱) at the bottom of the Layers palette. The layer uses Normal mode with 100% opacity and is named according to its order of creation.

To add a new layer and specify options:

1 Do one of the following:

- Choose Layer > New > Layer.
- Choose New Layer from the Layers palette menu.
- Alt-click (Windows) or Option-click (Mac OS) the New Layer button at the bottom of the Layers palette.

2 Name the layer, and select mode, opacity, and fill options as described in "Specifying layer options" on page 271. Then click OK.

To turn a selection into a new layer:

1 Make a selection.

2 Choose Layer > New, and choose a command from the submenu:

- To copy the selection into a new layer, choose Layer Via Copy.
- To cut the selection and paste it into a new layer, choose Layer > New > Layer Via Cut.

The selection contents appear in the same position relative to the image boundaries.



Selection cut and pasted into new layer

To convert a background into a layer:

1 Double-click Background in the Layers palette.

2 Enter a name, opacity, and mode for the layer. See the section, "Specifying layer options" on page 271.

3 Click OK.

To add a background to an image:

Choose Layer > New > Background to create a Background layer filled with the current background color. (See "Choosing the foreground and background colors" on page 214.)

You cannot change the stacking order of a background or apply a blending mode or opacity.

Duplicating layers

You can duplicate any layer (including the background) within the same image. And you can copy any layer (including the background) from one image to another.

When copying layers between images, keep in mind that the printed size of the copied layer depends on the resolution of the destination image. For example, if the source image has a lower resolution than the destination image, the copied layer will appear smaller in the destination image when printed. For more information, see "About image size and resolution" on page 42.

To duplicate a layer in an image:

1 Select the layer in the Layers palette.

2 Duplicate the layer:

• To duplicate and rename the layer, choose Layer > Duplicate Layer or choose Duplicate Layer from the Layers palette menu. Name the duplicate layer, and click OK.

• To duplicate without naming, drag the layer name in the Layers palette to the New Layer button ( ) at the bottom of the palette. The new layer is named according to its order of creation.

To copy a layer between images:

1 Open the two images you want to use.

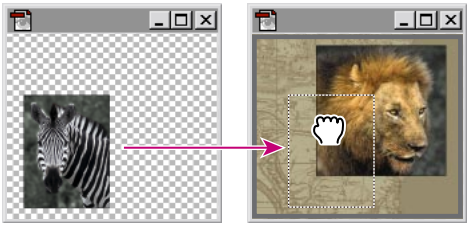
2 In the Layers palette of the source image, select the name of the layer that you want to copy.

3 Copy the layer:

• Choose Select > All to select all of the pixels on the layer that fall inside the canvas boundaries, and choose Edit > Copy. Make the destination image active, and choose Edit > Paste.

• Drag the layer's name from the Layers palette into the destination image.

• Use the move tool (▸+) to drag the layer from the source image to the destination image. The copied layer appears in the destination image where you release the mouse button (and above the active layer in the Layers palette). If the layer you're dragging is larger than the destination image, only part of the layer is visible, but its contents remain available. Use the move tool to drag other sections of the layer into view.



Layer dragged and dropped between images

Hold down Shift as you drag a layer to copy it in the same position it occupied in the source image (if the source and destination images have the same pixel dimensions) or to the center of the destination image (if the source and destination images have different pixel dimensions).

To copy multiple layers into another image:

1 Make sure that both the source and destination images are open, and select one of the layers you want to copy.

2 In the Layers palette, click in the column immediately to the left of any additional layers you want to move. The link icon appears in the column.

3 Use the move tool (▸+) to drag the linked layers from the source image to the destination image.

To duplicate a layer into another image or a new image:

1 If you plan to copy a layer to an existing image, open both the source and destination images.

2 In the source document's Layers palette, select the name of the layer you want to duplicate.

3 Duplicate the layer:

• Choose Layer > Duplicate Layer.

• Choose Duplicate Layer from the Layers palette menu.

4 Type a name for the duplicate layer.

5 For Document, choose a destination for the layer. To create a new document for the layer, choose New, and type a name for the new document.

6 Click OK.

An image created by duplicating a layer has no background.

Moving and aligning layer contents

You can also reposition the contents of individual layers or groups of layers within the image's boundaries.

The Align Linked commands let you align the contents of linked layers to the contents of the active layer or to a selection border. The Distribute Linked commands let you position the contents of linked layers at evenly spaced intervals.

To reposition a layer in an image:

1 In the Layers palette, select the layer that you want to move.

2 Select the move tool (). To activate the move tool when any other tool is selected, hold down Ctrl (Windows) or Command (Mac OS).

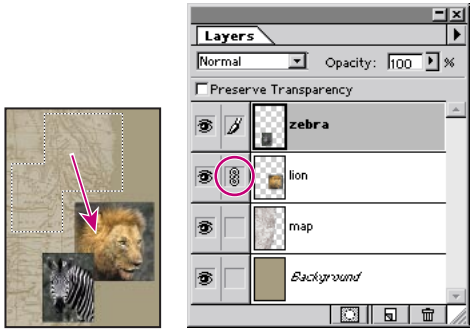
3 Drag anywhere in the image to move the selected layer into the desired position. To constrain the direction of movement to a multiple of 45°, hold down Shift as you drag.

To reposition the layer in 1-pixel increments when the move tool is selected, press the arrow keys on the keyboard. To move the layer in 10-pixel increments (or to move one frame if you're editing a filmstrip file), press Shift and an arrow key.

To reposition multiple layers:

1 In the Layers palette, link the layers you want to move, as described in "Linking layers" on page 262.

2 Use the move tool () to move the linked layers in the image window.



Lion and zebra layers linked and moved

To align or distribute layers:

1 To align layers to a selection border, make a selection.

2 In the Layers palette, specify the layers you want to align or distribute:

- To align a single layer to a selection, make the layer active.
- To align multiple layers to a selection or to the active layer, link together two or more layers.
- To distribute multiple layers, link together three or more layers.

For more information, see "Linking layers" on page 262.

3 To align layers, choose Layer > Align Linked (or Align To Selection if you made a selection), and choose an option from the submenu:

- Top to align the topmost pixel on the linked layers to the topmost pixel on the active layer or the topmost edge of the selection border.
- Vertical Center to align the vertical centermost pixel on the linked layers to the vertical centermost pixel on the active layer or the vertical center of the selection border.
- Bottom to align the bottommost pixel on the linked layers to the bottommost pixel on the active layer or the bottommost edge of the selection border.
- Left to align the leftmost pixel on the linked layers to the leftmost pixel on the active layer or the leftmost edge of the selection border.

• Horizontal Center to align the horizontal centermost pixel on the linked layers to the horizontal centermost pixel on the active layer or the horizontal center of the selection border.

• Right to align the rightmost pixel on the linked layers to the rightmost pixel on the active layer or the rightmost edge of the selection border.



Original, and vertical centers aligned

4 To distribute layers, choose Layer > Distribute Linked, and choose an option from the submenu:

• Top to space the linked layers evenly starting from the top pixel on each layer.

• Vertical Center to space the linked layers evenly starting from the vertical centermost pixel on each layer.

• Bottom to space the linked layers evenly starting from the bottom pixel on each layer.

• Left to space the linked layers evenly starting from the leftmost pixel on each layer.

• Horizontal Center to space the linked layers evenly starting from the horizontal centermost pixel on each layer.

• Right to space the linked layers evenly starting from the rightmost pixel on each layer.

Note: *Photoshop aligns and distributes only those layers whose pixels have greater than 50% opacity. For example, the Align Linked > Top command aligns to the topmost pixel on the active layer that is more than 50% opaque.*

Managing layered images

Adding nontransparent layers to an image increases its file size. To conserve disk space, you can delete layers, merge two or more layers, or flatten all layers in an image into one layer.

To track file size:

Check the values in the Document Sizes box at the lower left corner of the screen (Windows) or the image window (Mac OS). For more information on displaying file size, see "Changing image size and resolution" on page 46.

The first (left) value indicates the size of the file if flattened. The second (right) value shows the estimated file size of the unflattened file, including any layers and channels.

To track the use of the Adobe Photoshop scratch disk (temporary disk space used for storing data when RAM is insufficient), position the pointer over the triangle at the bottom of the image window, hold down the mouse button, and choose Scratch Sizes. (See Using RAM, scratch disks, and system virtual memory in the online guide.)

To delete a layer:

1 Select the layer in the Layers palette.

2 Delete the layer:

• Click the Trash button at the bottom of the Layers palette, and click Yes.

• Choose Layer > Delete Layer.

• Choose Delete Layer from the Layers palette menu.

To delete a selected layer automatically, Alt-click (Windows) or Option-click (Mac OS) the Trash button at the bottom of the Layers palette. You can also drag the layer name in the Layers palette to the Trash button.

Merging layers

Merging layers combines several layers into one and keeps file size manageable. When you've finalized the characteristics and positioning of a layer's contents, you can merge the layer with one or more layers to create partial versions of your composite image. The intersection of all transparent areas in the merged layers remains transparent. You can also merge the layers in a linked group or clipping group. For information on creating clipping groups, see "Creating clipping groups" on page 275.

For information on merging adjustment layers, see "Merging adjustment layers" on page 284.

To merge a layer with the layer below it:

1 Make sure that the two layers you want to merge are visible. Select the top layer of the pair in the Layers palette.

2 Merge the layer:

• Choose Layer > Merge Down.

• Choose Merge Down from the Layers palette menu.

To merge all visible linked layers:

1 Make visible all layers you want to merge, and link them together, as described in "Linking layers" on page 262.

2 Choose Layer > Merge Linked.

To merge a clipping group:

1 Make visible all the layers in the group that you want to merge (any hidden layers in the group are discarded when you merge).

2 Select the base layer in the group.

3 Choose Layer > Merge Group.

To merge all the visible layers in an image:

1 Hide any layers you do not want to merge. Make sure that no layers are linked.

2 Do one of the following:

• Choose Layer > Merge Visible.

• Choose Merge Visible from the Layers palette menu.

To merge all visible layers into a new layer, create a new empty layer, hold down Alt (Windows) or Option (Mac OS), and choose Layer > Merge Visible.

Flattening all layers

In a flattened image, all visible layers are merged into the background, greatly reducing file size. Flattening an image discards all hidden layers and fills the remaining transparent areas with white. In most cases, you won't want to flatten a file until you have finished editing individual layers.

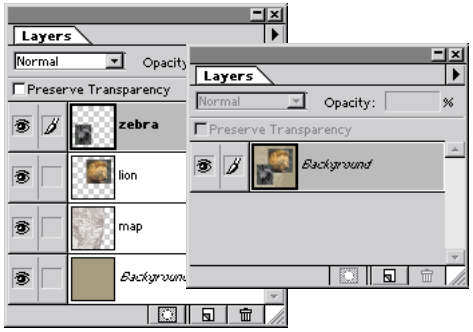
Note: *Converting an image between some color modes flattens the file. Be sure to save a copy of your file that includes all layers if you want to edit the original image after the conversion.*

To flatten an image:

1 Make sure that all the layers you want to keep are visible.

2 Flatten the image:

- Choose Layer > Flatten Image.
- Choose Flatten Image from the Layers palette menu.



Layered file, and flattened file

Saving layered documents

You may want to save two versions of your file—a flattened version for final use and a second version with layers intact for future edits.

The Save a Copy command makes it possible to save a copy to your disk (in this case a flattened copy) without replacing the active window. For more information on saving documents and determining file formats, see "Saving files" on page 311.

Editing layers

A newly created layer is transparent. You can add color values to the layer using the painting and editing tools, and then apply filters or use special effects to modify the layer. All painting and editing occurs on the active layer (and in the active channel).

Preserving a layer's transparency

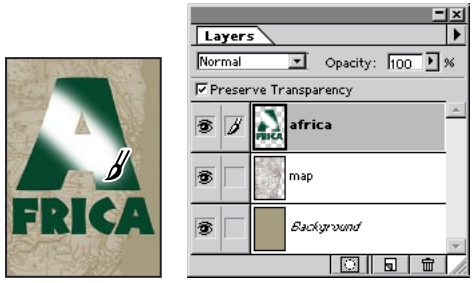
You can confine your painting and editing to those areas of a layer already containing pixels. For example, you may want to edit an object (adding special effects, changing color) without adding pixels to the transparent area outside the object.

To confine editing to the opaque portions of a layer:

1 Select the layer in the Layers palette.

2 Select Preserve Transparency in the Layers palette.

Note: *For type layers, Preserve Transparency is on by default and cannot be turned off.*



Painting with Preserve Transparency on

Sampling from all layers

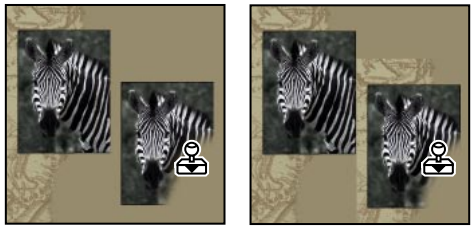
By default, when working with the magic wand, smudge, blur, sharpen, rubber stamp, or pattern stamp tool, you are applying color sampled only from pixels on the active layer. This means you can smudge or sample in a single layer even when other layers are visible, and you can sample from one layer and paint in another one.

Alternatively, you can choose to paint using sampled data from all the visible layers. For example, you can use the rubber stamp tool to clone an area containing pixels from all the visible layers.

To sample from all visible layers:

1 Double-click the magic wand tool (), smudge tool (), blur tool (), sharpen tool (), rubber stamp tool (), or pattern stamp tool () to display its Options palette.

2 Select Use All Layers in the tool's Options palette.



Cloning with zebra layer, and with merged data from all layers

Note: *Unless you are using the rubber stamp tool, painting or editing in a new layer produces the best results when Use All Layers is selected.*

Filling a new layer with a neutral color

Some Adobe Photoshop effects (such as the Lighting Effects filter) cannot be applied to layers with no pixels. Selecting Fill with Neutral Color in the New Layer dialog box resolves this problem by first filling the layer with a preset, neutral color. If no effect is applied, filling with a neutral color has no effect on the remaining layers. The Fill with Neutral Color option is not available for layers that use the Normal, Dissolve, Hue, Saturation, Color, or Luminosity modes. For more information, see "Adding layers" on page 263

Note: *Not all filters produce a visible effect when applied to a layer filled with a neutral color.*

Specifying layer options

The layer options let you change a layer's name and opacity and control how the pixels in the layer blend with the layers underneath. It's important to remember that the opacity and blending modes chosen for a specific layer interact with the opacity and mode settings for the tools you use to paint and edit the pixels on the layer.

For example, suppose you are working on a layer that uses the Dissolve mode and an opacity of 50%. If you paint on this layer using the paintbrush tool set to Normal mode with an opacity of 100%, the paint will appear in Dissolve mode with a 50% opacity because this is the maximum the layer can display.

On the other hand, suppose you are working on a layer created using Normal mode and 100% opacity. If you use the eraser tool with an opacity of 50%, only 50% of the paint will disappear as you erase. For more information on painting blending modes, see "Selecting a blending mode" on page 205.

To choose options for a layer:

1 Do one of the following:

• Double-click the layer's name in the Layers palette. (This method does not apply to most adjustment layers.)

• Select the layer in the Layers palette, and choose Layer > Layer Options.

• Select the layer in the Layers palette, and choose Layer Options from the palette menu.

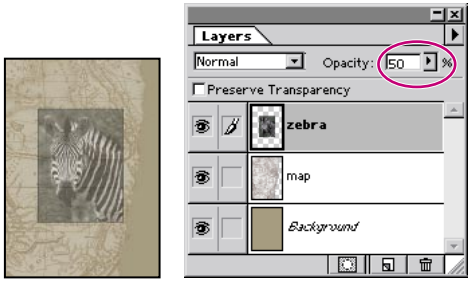
2 If desired, type a new name for the layer.

3 To turn off previewing as you choose layer options, deselect Preview.

4 Click OK.

Specifying opacity

You can change the opacity of each layer using either the Opacity option in the Layer Options dialog box or the Opacity slider in the Layers palette. A layer with 1% opacity appears nearly transparent, one with 100% opacity completely opaque.



Zebra layer with 50% opacity

You cannot change the opacity of an image that has only a background.

To specify opacity for a layer:

Do one of the following:

• In the Layers palette, enter a value for Opacity or drag the slider.

• In the Layer Options dialog box, enter a value for Opacity.

If you have selected a tool without an opacity option in its Options palette, use the following shortcuts to change the opacity of the active layer:

- *Press a number key to set the opacity in multiples of 10% (pressing 1 sets to 10%, pressing 0 sets to 100%).*
- *To specify an exact opacity, type the desired value.*

Specifying layer blending modes

You use layer blending modes to determine how the pixels in a layer are blended with underlying pixels on other layers. By applying modes to individual layers, you can create a variety of special effects.

Note: *There is no Clear blending mode for layers. In addition, the Color Dodge, Color Burn, Darken, Lighten, Difference, and Exclusion modes are unavailable for Lab images.*

For a color illustration of layer blending modes, see page 234.

Specifying a range for blending layers

The sliders in the Layer Options dialog box let you control which pixels from the active layer and which from the underlying visible layers blend and appear in the final image. For example, you can drop dark pixels out of the active layer or force bright pixels from the underlying layers to show through. You can also define a range of partially blended pixels to produce a smooth transition between blended and unblended areas.

To define a range for the blending operation:

1 In the Layer Options dialog box, select a Blend If option:

- Gray to specify a blending range for all channels.
- An individual color channel (for example, red, green, or blue in an RGB image) to specify blending in that channel. For more information, see "Color channels" on page 67.

2 Use the This Layer and Underlying sliders to set the brightness range of the blended pixels—measured on a scale from 0 (black) to 255 (white). Drag the white slider to set the high value of the range. Drag the black slider to set the low value of the range.

3 To define a range of partially blended pixels, hold down Alt (Windows) or Option (Mac OS), and drag one half of a slider triangle. The two values that appear above the divided slider indicate the partial blending range.

Keep the following guidelines in mind when specifying blending ranges:

- Use the This Layer sliders to specify the range of pixels on the active layer that will blend and therefore appear in the final image. For example, if you drag the white slider to 235, pixels with brightness values higher than 235 will remain unblended and be excluded from the final image.

• Use the Underlying sliders to specify the range of pixels in the underlying visible layers that will blend in the final image. Blended pixels are combined with pixels in the active layer to produce composite pixels, while unblended pixels show through overlying areas of the active layer. For example, if you drag the black slider to 19, pixels with brightness values lower than 19 will remain unblended and show through the active layer in the final image.

Using channel calculations to blend layers and channels

You can use the blending effects associated with layers to combine channels within and between images into new images using the Calculations command (on single channels only) and the Apply Image command (on single and composite channels). These commands offer two additional blending modes not available in the Layers palette: Add and Subtract. Although it's possible to combine channels into new combinations by copying channels into layers in the Layers palette, you may find it quicker to use the calculations commands to blend channel information.

The calculation commands perform mathematical operations on the corresponding pixels of two channels (the pixels with identical locations on the image) and then combine the results in a single channel. Two concepts are fundamental to understanding how the calculation commands work:

• Each pixel in a channel has a brightness value from 0 (off or black) to 255 (on or white). The Calculations and Apply Image commands manipulate these values to produce the resulting composite pixels.

• These commands overlay the pixels in two or more channels. Thus, the images used for calculations must have the same pixel dimensions. For information on adjusting an image's pixel dimensions, see "Changing image size and resolution" on page 46.

Using the Apply Image command

The Apply Image command lets you blend one image's layer and channel (the *source*) with a layer and channel of the active image (the *destination*).

To use the Apply Image command:

1 Open the source and destination images, and make active the desired layer and channel in the destination image.

Pixel dimensions must match for the image names to appear in the Apply Image dialog box.

Note: *If the color modes of the two images differ (for example, an RGB and a CMYK image), you can copy a single channel to another channel, but you cannot copy a composite channel to another image's composite channel in another image.*

2 Choose Image > Apply Image.

3 Choose the source image, layer, and channel you want to combine with the destination. To use all layers in the source image, select Merged for Layer.

4 Select Preview to preview the results in the image window.

5 Select Invert to use the negative of the channel contents in the calculation.

6 For Blending, choose the blending option you want to apply.

Descriptions of the Add and Subtract options appear at the end of this section. Other blending options are the same ones listed in the Options palette of the painting and editing tools and in the Layers palette (see "Selecting a blending mode" on page 205).

7 Enter an opacity for the effect's strength.

8 Select Preserve Transparency to apply the results only to opaque areas in the result layer.

9 Select Mask if you want to apply the blending through a mask. Then choose the image and layer containing the mask. For Channel, you can choose any color or alpha channel to use as the mask. You can also use a mask based on the active selection or the boundaries of the chosen layer (Transparency). Select Invert to reverse the masked and unmasked areas of the channel. (See "About masks" on page 249.)

10 Click OK to apply the blending effect.

Using the Calculations command

The Calculations command lets you blend two individual channels from one or more source images. You can then apply the results to a new image or to a new channel or selection in the active image. You cannot apply the Calculations command to composite channels.

To use the Calculations command:

1 Open the source image or images. The pixel dimensions of the images must match for image names to appear in the Calculations dialog box.

2 Choose Image > Calculations.

3 To preview the calculation results in the image window, select Preview.

4 Choose the first source image, layer, and channel. To use all the layers in the source image, choose Merged for Layer.

Select Invert to use the reversed contents, or negative, of the channel. For Channel, choose Gray to get the same effect as converting the image to a grayscale image.

5 Choose the second source image, layer, and channel, specifying further options as described in the previous step.

6 For Blending, choose the blending option you want to apply.

A description of the Add and Subtract options appears at the end of this section. Other blending options are the same ones listed in the Options palette of the painting and editing tools and in the Layers palette (see "Selecting a blending mode" on page 205).

7 Enter an opacity for the effect's strength.

8 Select Mask if you want to apply the blending through a mask. Then choose the image and layer containing the mask. For Channel, you can choose any color or alpha channel to use as the mask. You can also use a mask based on the active selection or the boundaries of the chosen layer (Transparency). Select Invert to reverse the masked and unmasked areas of the channel. (See "About masks" on page 249.)

9 For Result, specify whether to place the blending results in a new image, or in a new channel or selection in the active image.

10 Click OK to perform the calculation.

Calculations blending options

The Add and Subtract blending modes are available only with the Apply Image and Calculations commands. For a description of the remaining blending options, see "Selecting a blending mode" on page 205.

Add Adds the pixel values in two channels. This is a good way to combine nonoverlapping images in two channels.

Because higher pixel values represent lighter colors, adding channels with overlapping pixels lightens the image. Black areas in both channels remain black (0 + 0 = 0). White in either channel results in white (255 + any value = 255 or greater).

The Add option divides the sum of the pixel values by the Scale amount and then adds the Offset value to the sum. For example, if you wanted to find the average of the pixels in two channels, you would add them, divide by 2, and enter no Offset value.

The Scale factor may be any number between 1.000 and 2.000. Entering a higher Scale value darkens the image.

The Offset value lets you lighten or darken the pixels in the destination channel by any brightness value between +255 and –255. Negative values darken the image; positive values lighten the image.

Subtract Subtracts the pixel values in the source channel from the corresponding pixels in the target channel. As with the Add option, the result is then divided by the Scale factor and added to the Offset value.

The Scale factor may be any number between 1.000 and 2.000. The Offset value lets you lighten or darken the pixels in the destination channel by any brightness value between +255 and –255.

Creating clipping groups

In a clipping group, the bottommost layer, or *base layer*, acts as a mask for the entire group. For example, you might have a shape on one layer, a texture on the overlying layer, and some text on the topmost layer. If you define all three layers as a clipping group, the texture and the text appear only through the shape on the base layer and take on the opacity of the base layer.

Note that only successive layers can be included in a clipping group. When you create a clipping group, dotted lines appear between the grouped layers in the Layers palette. The name of the base layer in the group is underlined, and the thumbnails for the overlying layers are indented. Applying a blending mode to an indented layer affects only the blending of the layers within the group. Applying a blending mode to the base layer determines how the entire clipping group blends with the underlying layers.



Clipping group with Layer 1 and lion layers

To create a clipping group:

1 Do one of the following:

• Hold down Alt (Windows) or Option (Mac OS), position the pointer over the solid line dividing two layers in the Layers palette (the pointer changes to two overlapping circles), and click.

• Select a layer in the Layers palette and choose Layer > Group with Previous.

• Link together the desired layers in the Layers palette, as described in "Linking layers" on page 262. Then choose Layer > Group Linked.

The clipping group is assigned the opacity and mode attributes of the bottommost layer in the group.

To remove a layer from a clipping group:

Do one of the following:

• Hold down Alt (Windows) or Option (Mac OS), position the pointer over the dotted line separating two grouped layers in the Layers palette (the pointer changes to two overlapping circles), and click.

• In the Layers palette, select a layer in the clipping group and choose Layer > Ungroup. This command removes the selected layer and any layers above it from the clipping group.

To ungroup all layers in a clipping group:

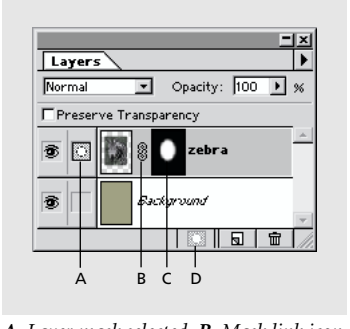
1 In the Layers palette, select the base layer in the clipping group.

2 Choose Layer > Ungroup.

Using layer masks

You can create a *layer mask* to control how different areas within a layer are hidden and revealed. By making changes to the layer mask, you can apply a variety of special effects to the layer without actually affecting the pixels on that layer. You can then apply the mask and make the changes permanent or remove the mask without applying the changes. You can save all layer masks with a layered document.

In the Layers palette, a layer mask appears as an additional thumbnail to the right of the layer thumbnail. This thumbnail represents the grayscale (alpha) channel created by Adobe Photoshop when you add the layer mask. (See Chapter 10, Using Channels and Masks.)



***A.** Layer mask selected **B.** Mask link icon*
***C.** Layer mask **D.** New Layer Mask*

To add a mask that shows or hides the entire layer:

1 If needed, choose Select > Deselect to clear any selection borders in the image.

2 In the Layers palette, select the layer to which you want to add a mask.

3 Do one of the following:

• To create a mask that reveals the entire layer, click the New Layer Mask ( ) button at the bottom of the Layers palette, or choose Layer > Add Layer Mask > Reveal All.

• To create a mask that hides the entire layer, Alt click (Windows) or Option-click (Mac OS) the New Layer Mask button, or choose Layer > Add Layer Mask > Hide All.

To add a mask that shows or hides a selection:

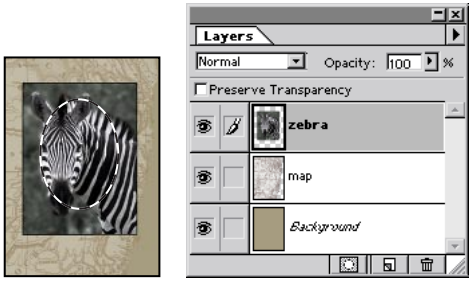
1 In the Layers palette, select the layer to which you want to add a mask.

2 Select the desired area in the image.

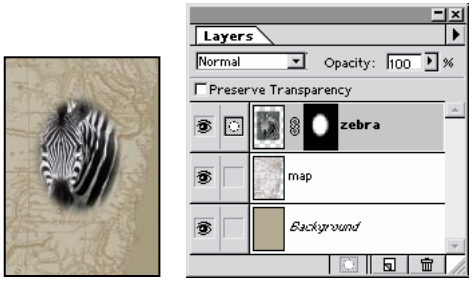
3 Do one of the following:

• To create a mask that reveals the selected area and hides the remaining portion of the layer, click the New Layer Mask button ( ), or choose Layer > Add Layer Mask > Reveal Selection.

• To create a mask that hides the selected area and reveals the remaining portion of the layer, Alt-click (Windows) or Option-click (Mac OS) the New Layer Mask button, or choose Layer > Add Layer Mask > Hide Selection.



Selection



Layer mask revealing selection

For information on viewing the contents of the layer mask channel, see "Viewing layer masks" on page 279.

To edit a layer mask:

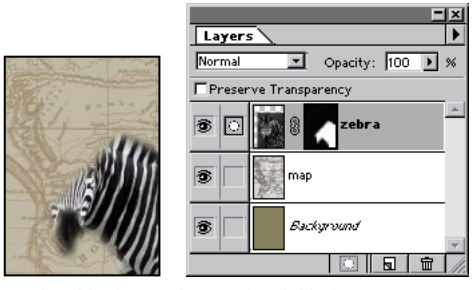
1 Click the layer mask thumbnail in the Layers palette to make it active (the mask icon appears to the left of the layer thumbnail).

2 Select any of the editing or painting tools.

Because the layer mask is a grayscale alpha channel, the foreground and background colors default to grayscale values when the mask is active. As you edit, the mask thumbnail displays the changes.

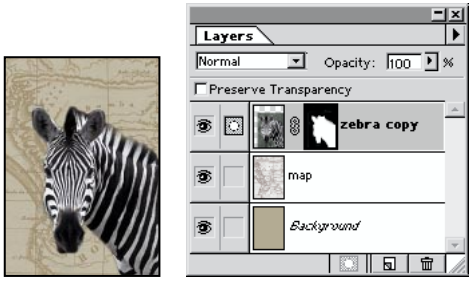
3 Do one of the following:

• To hide the layer and add to the mask, paint the mask with black.



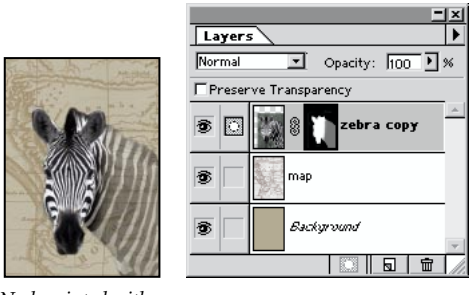
Head and background painted with black

• To reveal the layer and subtract from the mask, paint the mask with white.



Head painted with white

• To make the layer partially visible, paint the mask with gray.



Neck painted with gray

To edit the layer instead of the layer mask, make the layer active by clicking its thumbnail in the Layers palette. The paintbrush icon appears to the left of the thumbnail to indicate that you are editing the layer.

To paste a selection into a layer mask, Alt-click (Windows) or Option-click (Mac OS) the layer mask thumbnail in the Layers palette to select and display the mask channel. Choose Edit > Paste, drag the selection in the image to produce the desired masking effect, and choose Select > Deselect. Click the layer thumbnail in the Layers palette to deselect the mask channel.

Unlinking layers and layer masks

By default, a layer is linked to its layer mask, as indicated by the link icon between the thumbnails in the Layers palette. The layer and layer mask move together in the image when you move either one with the move tool.

You can unlink the layer from its layer mask by clicking the link icon. Unlinking the two lets you move them independently and shift the mask boundaries separately from the layer. To re-establish the link, click between the layer and layer mask thumbnails.

Viewing layer masks

By default, the layer mask channel does not appear in the image. You can view and edit the contents of the mask or temporarily turn off its effects. You can also change the display options for the mask.

To select and display the layer mask channel:

Do one of the following:

- Alt-click (Windows) or Option-click (Mac OS) the layer mask thumbnail to view only the grayscale mask. The eye icons in the Layers palette are dimmed because all layers are hidden. To redisplay the layers, again Alt/Option-click the layer mask thumbnail, or click an eye icon.
- Hold down Alt+Shift (Windows) or Option+Shift (Mac OS), and click the layer mask thumbnail to view the mask on top of the layer in a rubylith masking color. Hold down Alt+Shift/Option+Shift and click the thumbnail again to turn off the color display.

To turn off the layer mask temporarily:

1 Do one of the following:

- Press Shift and click the layer mask thumbnail in the Layers palette.
- Choose Layer > Disable Layer Mask.

A red *X* appears over the layer mask thumbnail in the Layers palette, and the entire underlying layer appears without masking effects.



Layer mask off

2 To turn on the mask, do one of the following:

• Click the layer mask thumbnail in the Layers palette.

• Choose Layer > Enable Layer Mask.

To change the rubylith display for a layer mask:

1 Do one of the following:

• Alt-click (Windows) or Option-click (Mac OS) the layer mask thumbnail to select the layer mask channel; then double-click the layer mask thumbnail.

• Double-click the layer mask channel in the Channels palette.

2 To choose a new mask color, click the color swatch and choose a new color as described in "Using the Adobe Photoshop Color Picker" on page 218.

3 To change the opacity, enter a value between 0% and 100%.

Both the color and opacity settings affect only the appearance of the mask and have no effect on how underlying areas are protected. For example, changing these settings might make the mask more easily visible against the colors in the image.

4 Click OK.

Applying and discarding layer masks

When you have finished creating a layer mask, you can either apply the mask and make the changes permanent or discard the mask without applying changes. Because layer masks are stored as alpha channels, applying and discarding layer masks may help reduce file size. For more information, see "About channels and file size" on page 239.

To apply or discard a layer mask:

1 Click the layer mask thumbnail in the Layers palette.

2 Do one of the following:

• Click the Trash button at the bottom of the Layers palette.

• Choose Layer > Remove Layer Mask.

3 Remove the mask:

• To remove the layer mask and make the changes permanent, click Apply.

• To remove the layer mask without applying the changes, click Discard.

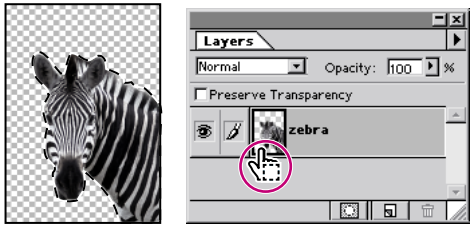
Selecting opaque areas on a layer

By loading a *transparency mask*, you can quickly select all the opaque areas on a layer—that is, the areas within the layer boundaries. This is useful when you want to exclude transparent areas from a selection. You can also load the boundaries of a layer mask as a selection.

To load a layer or layer mask's boundaries as a selection:

Do one of the following:

- In the Layers palette, Ctrl-click (Windows) or Command-click (Mac OS) the layer or layer mask thumbnail.



Layer pixels loaded as selection

- To add the pixels to an existing selection, press Ctrl+Shift/Command+Shift, and click the layer or layer mask thumbnail in the Layers palette.
- To subtract the pixels from an existing selection, press Ctrl+Alt/Command+Option, and click the layer or layer mask thumbnail in the Layers palette.
- To load the intersection of the pixels and an existing selection, press Ctrl+Alt+Shift/Command+Option+Shift, and click the layer or layer mask thumbnail in the Layers palette.

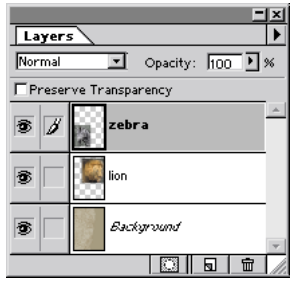
To move all the contents of a layer, you can use the move tool without loading a transparency mask.

Using adjustment layers

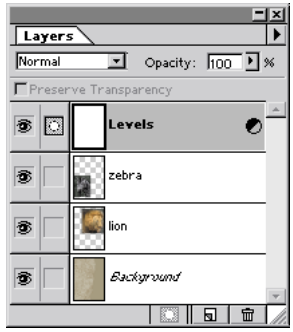
An adjustment layer lets you experiment with color and tonal adjustments to an image without permanently modifying the pixels in the image. The color and tonal changes reside within the adjustment layer, which acts as a veil through which the underlying image layers appear.

When you create an adjustment layer, its effect appears on all the layers below it. This lets you correct multiple layers by making a single adjustment, rather than making the adjustment to each layer separately.

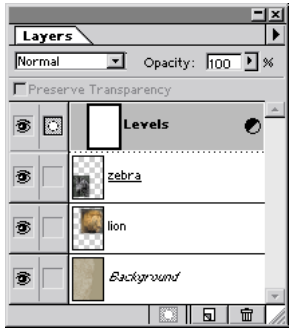
To confine the effects of an adjustment layer to the layers immediately below it, create a clipping group consisting of these layers (see "Creating clipping groups" on page 275).

Original

Levels adjustment applied to image

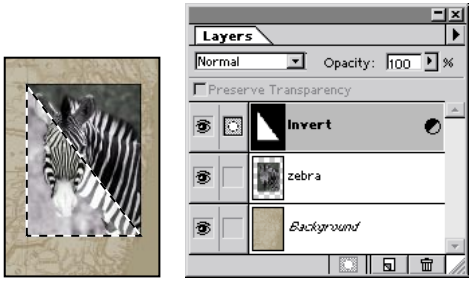



Levels adjustment clipped to zebra layer

Creating an adjustment layer

Adjustment layers have the same opacity and blending mode options as image layers and can be rearranged in order, deleted, hidden, and duplicated in the same manner as well. However, you also specify a color adjustment type for an adjustment layer. Depending on your choice, the dialog box for the selected adjustment command may appear. (See Chapter 6, Making Color and Tonal Adjustments.) The adjustment layer takes the name of the adjustment type and is indicated in the Layers palette by a partially filled circle to the right of the name.

Adjustment layers are also layer masks, as indicated by the mask icon to the left of the layer thumbnail. When an adjustment layer is active, the foreground and background colors default to grayscale values. By painting the adjustment layer, you can apply the adjustment to just portions of the underlying layers.



Adjustment layer with triangular mask added

To create an adjustment layer:

1 To confine the effects of the adjustment layer to a selected area, first make a selection.

2 Do one of the following:

• Ctrl-click (Windows) or Command-click (Mac OS) the New Layer button ( ) at the bottom of the Layers palette.

• Choose Layer > New > Adjustment Layer.

3 In the New Adjustment Layer dialog box, type a name for the layer.

4 For Type, choose the adjustment you want to make.

5 Choose layer options as desired, and then click OK. (See "Specifying layer options" on page 271.)

6 If needed, make the desired adjustments, as described in Chapter 6, Making Color and Tonal Adjustments, and click OK.

To edit an adjustment layer:

1 Do one of the following:

• Double-click the adjustment layer's name in the Layers palette.

• Select the adjustment layer's name, and then choose Layer > Adjustment Options.

2 Make the desired adjustments, and click OK.

Note: *If an adjustment layer has no associated adjustment dialog box (for example, the Invert adjustment), double-clicking the layer's name opens the Layer Options dialog box.*

To edit an adjustment layer mask:

1 Select the adjustment layer in the Layers palette.

2 Select any painting or editing tool.

3 Edit the adjustment layer mask:

• To remove the adjustment effect, paint the adjustment layer with black.

• To display the full effect of the adjustment over the image layers beneath, paint the adjustment layer with white.

• To partially remove the adjustment effect, paint the adjustment layer with gray.

4 Use the following methods to view the adjustment layer mask:

• Alt-click (Windows) or Option-click (Mac OS) the adjustment layer thumbnail to view only the grayscale mask. Alt/Option-click the thumbnail again to redisplay the other layers.

• Hold down Alt+Shift (Windows) or Option+Shift (Mac OS), and click the adjustment layer thumbnail to view the mask in a rubylith masking color. Hold down Alt+Shift/Option+Shift and click the thumbnail again to turn off the rubylith display.

• Shift-click the adjustment layer thumbnail to turn off the masking effects temporarily; click the thumbnail again to turn on the mask.

Note: *If you paint the adjustment layer mask with black or gray, you can modify the boundaries and effects of the mask (by applying a filter, for example). Adjustment layer masks that contain only white values are unaffected by most filters.*

Merging adjustment layers

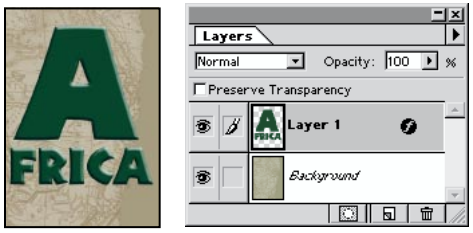
You can merge an adjustment layer with the image layer below it, the layers in its clipping or linking group, or all other visible layers in the image. You cannot, however, merge an adjustment layer exclusively with another adjustment layer. When you merge an adjustment layer with the layer below it, the adjustments become permanent and apply only within the merged layer. (See "Merging layers" on page 268.)

Adjustment layers whose masks contain only white values do not add significantly to the file size. As a result, it is not necessary to merge these adjustment layers in an effort to conserve file space.

Using layer effects

Adobe Photoshop includes a number of automated effects that you can apply to layers, including drop shadows, glows, bevelling, and embossing. When you apply a layer effect, an "f" icon (f) appears to the right of the layer's name in the Layers palette. Layer effects are linked to the layer contents. When you move or edit the contents on the layer, the effects are modified correspondingly. Layer effects are especially useful for enhancing type layers.

Note: *You cannot apply layer effects to a background.*



Layer effect added

To hide or show all layer effects in the image:

Choose Layer > Effects > Hide All Effects or Show All Effects.

Adding layer effects

Photoshop has numerous different effects that you can apply in any combination to a layer.

• The Drop Shadow effect lets you add a shadow that falls behind the contents on the layer.

• The Inner Shadow effect lets you add a shadow that falls just inside the edges of the layer contents, giving the layer a recessed appearance.

• The Outer Glow and Inner Glow effects let you add glows that emanate from the outside or inside edges of the layer contents.

• The Bevel and Emboss effect lets you add various combinations of highlights and shadows to a layer.

To apply a drop shadow or inner shadow:

1 Select the layer you want to use, and choose Layer > Effects > Drop Shadow or Inner Shadow.

2 Specify blending mode, opacity, color, lighting angle, blur, and intensity options, as described in "Specifying options for layer effects" on page 286.

3 Specify the displacement of the shadow from the layer contents:

• For Distance, enter a value or drag the slider.

• Drag the shadow in the image to reposition it. The distance and lighting angle values update as you drag.

4 Click OK.

To apply an outer or inner glow:

1 Select the layer you want to use, and choose Layer > Effects > Outer Glow or Inner Glow.

2 Specify blending mode, opacity, color, blur, and intensity options, as described in "Specifying options for layer effects" on page 286.

3 If you are applying an inner glow, select a glow source option:

• Center to apply a glow that emanates from the center of the layer contents.

• Edge to apply a glow that emanates from the inside edges of the layer contents.

4 Click OK.



Inner glow, and outer glow

To apply bevelling or embossing:

1 Select the layer you want to use, and choose Layer > Effects > Bevel and Emboss.

2 Specify blending mode, opacity, and color options for the highlight and shadow, as described in "Specifying options for layer effects" on page 286.



Outer bevel, and pillow emboss

3 For Style, choose one of the following:

• Outer Bevel to create bevelling along the outside edges of the layer contents.

• Inner Bevel to create bevelling along the inside edges of the layer contents.

• Emboss to create the effect of embossing the layer contents against the underlying layers.

• Pillow Emboss to create the effect of stamping the edges of the layer contents into the underlying layers.

4 Specify lighting angle and blur options, as described in "Specifying options for layer effects" on page 286.

5 For Depth, enter a value or drag the slider. A higher value results in a more accentuated bevel.

6 Select Up or Down to indicate the position of the highlight in relation to the layer contents.

7 Click OK.

To apply additional layer effects:

Do one of the following:

• Choose another layer effect from the menu at the top of the Effects dialog box, or click Prev or Next to cycle through the effects list. Select Apply, and specify options as described in the previous procedures.

• Choose another layer effect from the Layer > Effects submenu, and specify options as described in the previous procedures.

Specifying options for layer effects

When applying layer effects, you can specify a number of common options.

Preview Displays a preview of the layer effect in the image as you change the layer effect settings.

Mode Determines how the layer effect blends with the underlying layers, which may or may not include the active layer. For example, an inner shadow blends with the active layer because the effect is drawn on top of that layer, but a drop shadow blends only with the layers beneath the active layer. In most cases, the default mode for each effect produces the best results. For more information on blending modes, see "Specifying layer blending modes" on page 272.

Opacity Sets the opacity of the layer effect as you enter a value or drag the slider.

Color Specifies the color of a shadow, glow, or highlight as you click the color box and choose a color, as described in "Using the Adobe Photoshop Color Picker" on page 218.

Angle Determines the lighting angle at which the effect is applied to the layer. You can define a global angle that applies to all layer effects in the image; you can also assign a local angle that applies only to a specific layer effect. Using a global angle gives the appearance of a consistent light source shining on the image.



Lighting angle: -45° and 45°

To set a global lighting angle:

Do one of the following:

• In the layer effects dialog box, select Use Global Angle. For Angle, enter a value or drag the slider.

• Choose Layer > Effects > Global Angle. Enter a value or drag the angle radius, and click OK.

The new lighting angle appears as the default for each layer effect that uses the global lighting angle.

To set a local lighting angle:

In the layer effects dialog box, deselect Use Global Angle. For Angle, enter a value or drag the angle radius.

Blur Creates a diffuse, softened effect as you enter a value or drag the slider.

Intensity Adjusts the strength of the effect as you enter a value or drag the slider. A higher value increases the strength of the effect.

Editing and removing layer effects

You can edit the options for the effects you have applied to a layer at any time. You can also copy effects between layers and remove an effect that you have applied to a layer.

To edit the layer effects applied to a layer:

1 Double-click the layer effects icon (ƒ) in the Layers palette.

2 Choose the desired layer effect from the top of the Effects dialog box, or click Prev or Next to cycle through the effects list. Edit options as described in "Adding layer effects" on page 285.

To copy effects between layers:

1 In the Layers palette, select the source layer containing the effects you want to copy.

2 Choose Layer > Effects > Copy Effects.

3 Do one of the following:

• To paste into a single layer, select the destination layer in the palette and choose Layer > Effects > Paste Effects.

• To paste into multiple layers, link the destination layers as described in "Linking layers" on page 262. Then choose Layer > Effects > Paste to Linked.

The pasted effects will replace any existing effects on the destination layer or layers.

To remove a layer effect:

1 In the Layers palette, select the layer containing the effect you want to remove.

2 Do one of the following:

• Hold down Alt (Windows) or Option (Mac OS), and choose the desired layer effect from the Layer > Effects menu. Applied effects have checkmarks next to their command names; removing a layer effect removes the checkmark.

• Choose the desired layer effect from the top of the Effects dialog box, and deselect Apply.

To remove all layer effects applied to a layer:

1 In the Layers palette, select the layer containing the effects you want to remove.

2 Choose Layer > Effects > Clear Effects.

Converting layer effects to layers

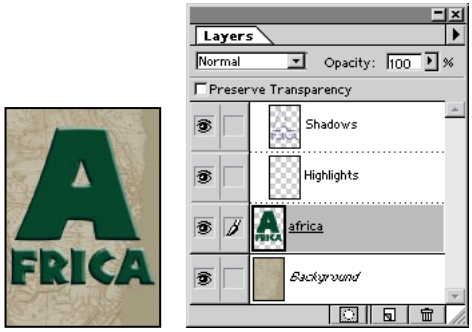
To customize or fine-tune the appearance of layer effects, you can convert the effects to regular image layers. Once you have converted an effect to image layers, you can enhance the effect by painting or applying commands and filters. However, you can no longer edit the effect using the Effects dialog box, and the effect will no longer update as you change the original image layer.

To convert a layer effect to image layers:

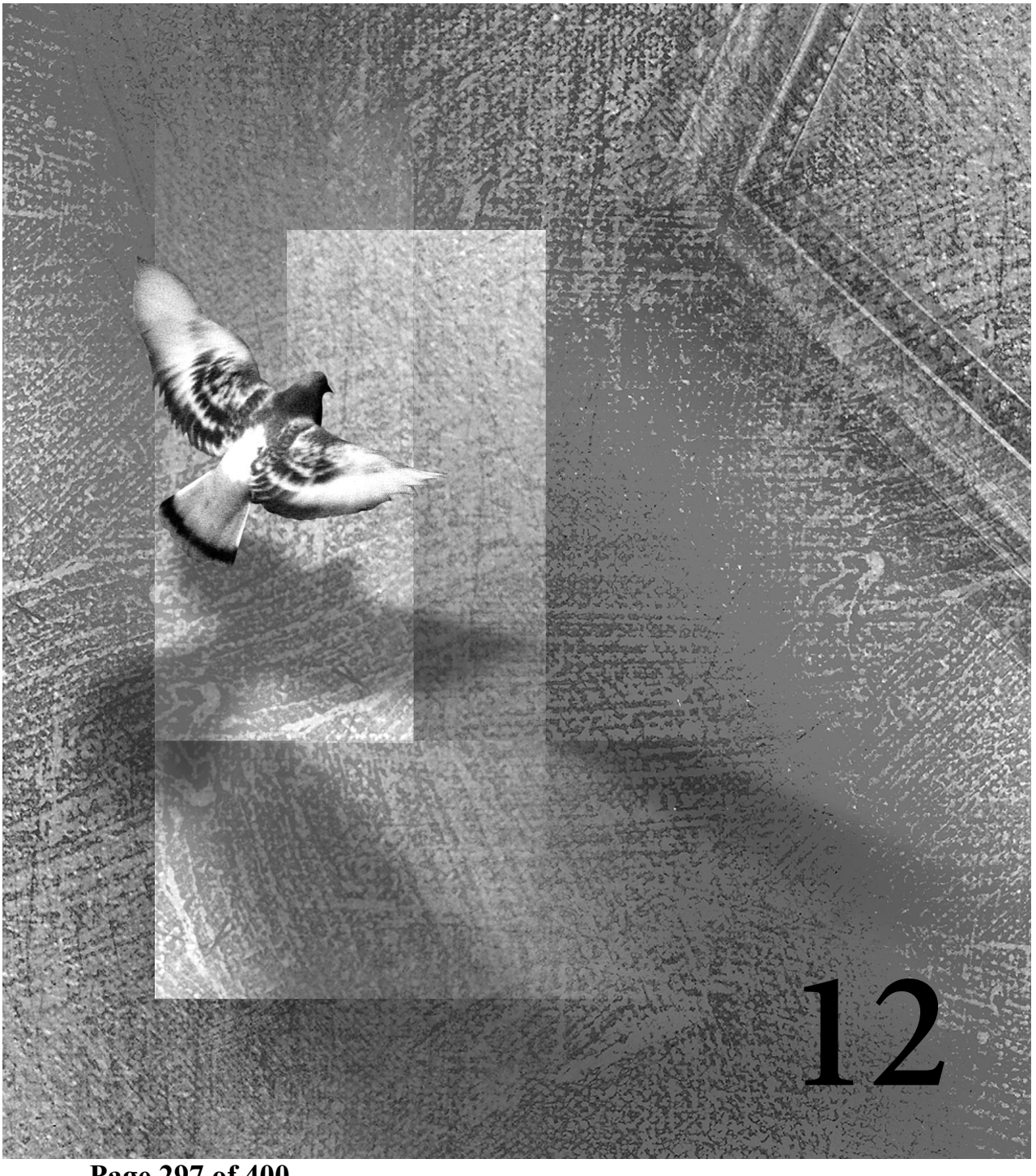
1 In the Layers palette, select the layer containing the effect you want to convert.

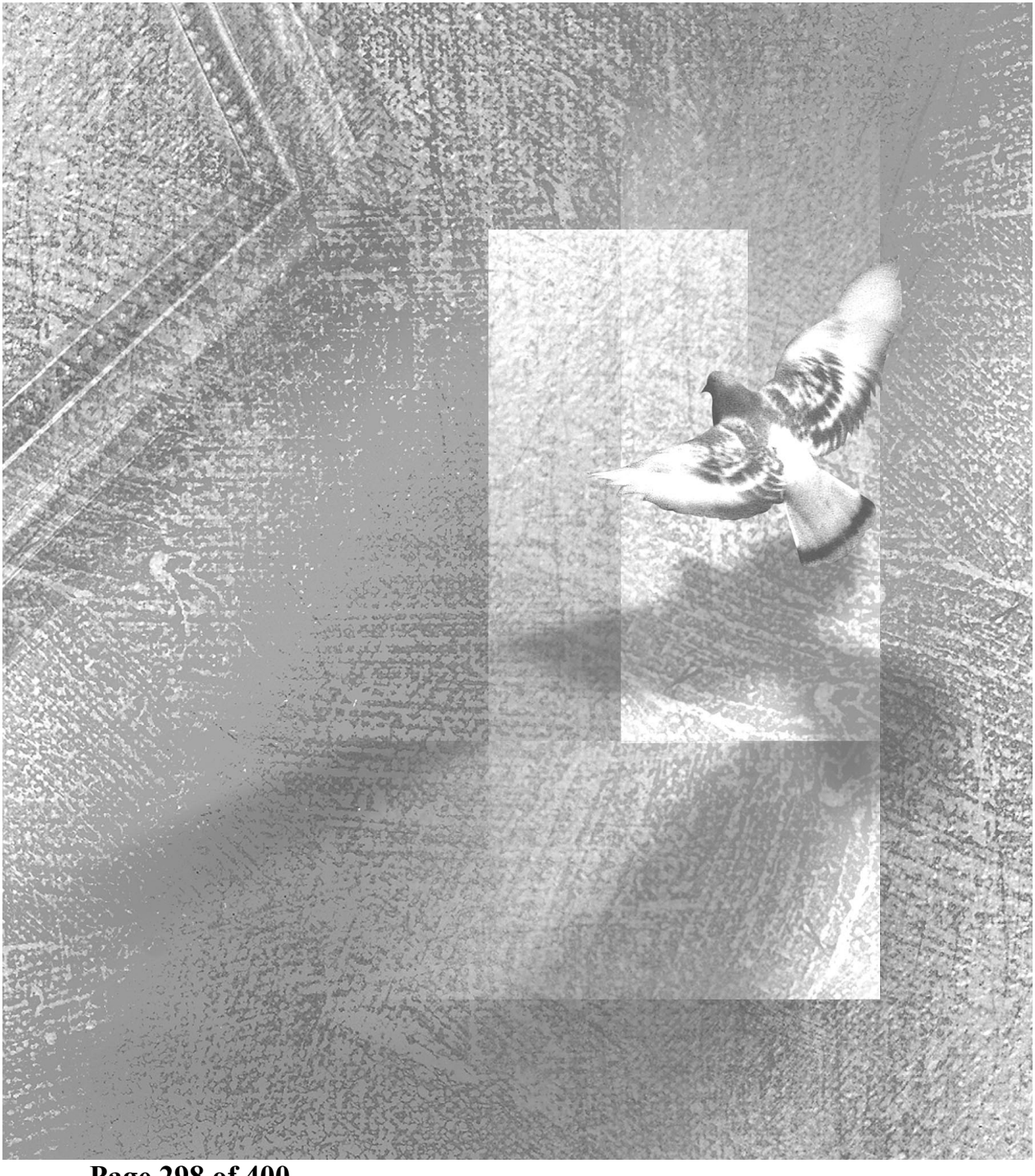
2 Choose Layer > Effects > Create Layer(s).

You can now modify and restack the new layers just like regular layers. Some effects (for example, inner glow) convert to layers within a clipping group.



Layer effect converted to image layers


12



Chapter 12: Using Type

Adobe Photoshop lets you add horizontal and vertical type to an image. You can specify the leading, kerning, tracking, baseline shift, size, and alignment of the type and edit its characters. In addition, Photoshop lets you create type in double-byte fonts, enabling you to create designs that include Chinese, Japanese, and Korean text (if you have the correct system software installed on your system).

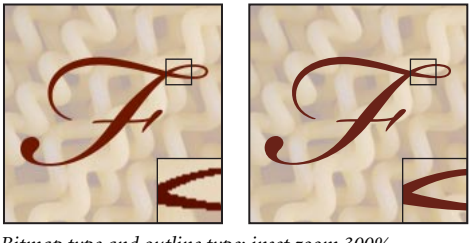
About type

Graphics applications create two different kinds of type:

Outline type Drawing or page-layout programs such as Adobe Illustrator or Adobe PageMaker create outline type. Outline type consists of mathematically defined shapes and can be scaled to any size without losing its crisp, smooth edges. When opening an image that contains outline type, Photoshop rasterizes the type into pixel or bitmap type.

Bitmap type Paint and image-editing programs such as Adobe Photoshop create bitmap type composed of pixels. The sharpness of bitmap type depends on the type size and the resolution of the image. For example, type that has been scaled up in size may show jagged edges. High-resolution images can display higher-resolution (and therefore smoother) type than low-resolution images.

If you want to create scaleable type or text containing many type characters, import your Photoshop image into an application that supports outline type and create the type using that application.



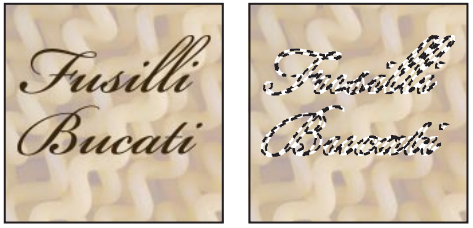
Bitmap type and outline type; inset zoom 300%

Creating type

Use these tools to create type in an image:

• The type (T) and vertical type (IT) tools let you create colored type that is stored in a new type layer. You can edit the text at any time using the type layer.

• The type mask (T) and vertical type mask (IT) tools let you create selection borders in the shape of type. Type selections appear on the active layer, and can be moved, copied, filled, or stroked just like any other selection.



Text created by type tool, and by type mask tool

Entering text

You enter text by selecting a type tool and clicking in the image to set an insertion point. The Type Tool dialog box lets you enter the text and specify formatting attributes.

To enter text:

1 Select the type (T) or vertical type (IT) tool. The pointer changes to an I-beam pointer.

The small line through the I-beam marks the position of the type *baseline.* For horizontal type, the baseline marks the line on which the type rests; for vertical type, the baseline marks the center axis of the type characters.

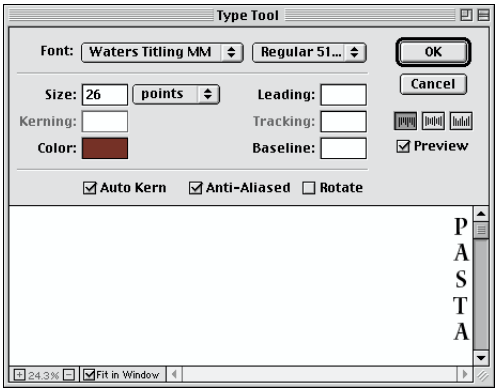
2 Click in the image to set an insertion point for the type.

3 To display a preview of the type in the image, select Preview. (This option is not available for images in multichannel, Bitmap, or indexed-color mode.)

4 Specify type attributes, as described in "Setting type attributes" on page 295.

5 To change the color of the type, click the color box, choose a color as described in "Using the Adobe Photoshop Color Picker" on page 218, and click OK.

6 Click inside the text area at the bottom of the dialog box, and enter your text. To create a line break, press Enter (Windows) or Return (Mac OS) while the cursor is in the text area.



7 To control the display of type in the text area, do any of the following:

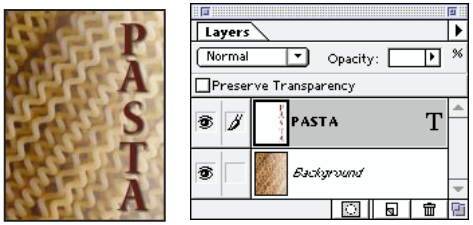
• To resize the text area, drag the lower right corner of the dialog box.

• To change the view magnification, click the zoom buttons at the bottom of the dialog box. Click the percentage value to specify a 100% view.

• To scale the magnification so that the type always fits in the text area, select Fit in Window. Selecting this option makes the zoom buttons unavailable.

8 To adjust the placement of the type, drag the type preview in the image. This option is only available if you have selected Preview.

9 Click OK. The type appears in the image on a new type layer, and a type icon appears next to the layer name.



Important: *A type layer is not created for images in multichannel, Bitmap, or indexed-color mode, because these modes do not support layers. In these image modes, type appears on the background and cannot be edited.*

To create a type selection border:

1 Select the type mask tool (T) or the vertical type mask tool (T).

2 Click where you want the type selection border to appear.

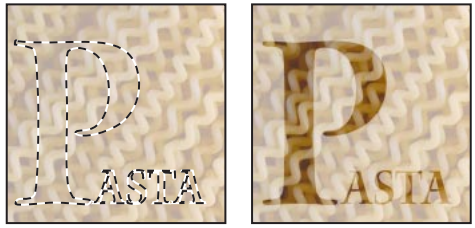
For best results, create the type selection border on a regular image layer, not a type layer.

3 Specify type attributes, as described in "Setting type attributes" on page 295.

4 Click inside the text area at the bottom of the dialog box, and enter the text you want. To create a line break, press Enter (Windows) or Return (Mac OS) while the cursor is in the text area.

To control the display of type in the text area, see the instructions in step 7 of the entering text procedure in "Entering text" on page 292.

5 Click OK. The type selection border appears in the image on the active layer.



Type border, and selection contents adjusted with Levels

Editing type layers

Once you have created type, you can edit the contents, attributes, and orientation at any time by using its type layer. Type layers save with the image. You can move, restack, copy, and change the layer options of a type layer just as for a regular layer (see Chapter 11 for general layers information). You can also apply these commands to a type layer and still be able to edit the text:

• Transformation commands under the Edit menu, except for Perspective and Distort. (To transform just part of the type layer, you must convert the type layer to a regular layer.)

• Layer effects

• Fill shortcuts (see "Filling and stroking selections and layers" on page 211).

To apply the full range of Photoshop effects (such as filters) to a type layer, you can convert the type layer to a regular layer. Converting a type layer makes its contents uneditable as text.

To edit a type layer:

1 Double-click the name of the type layer in the Layers palette.

2 Make the desired changes in the Type Tool dialog box, as described in the procedure for creating a type layer on page 292.

3 Click OK.

To select text:

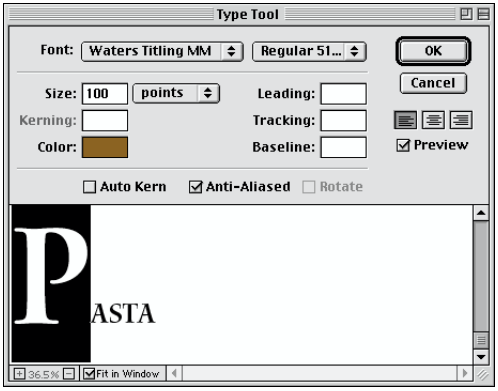
Position the cursor in the text area of the Type Tool dialog box, and do one of the following:

• Drag to select the text you want to change.

• Click to define the beginning of the selected text, and Shift-click to define the end of the selection.

• Position the cursor in a word, and double-click to select that word.

• Press Ctrl+A (Windows) or Command+A (Mac OS) to select all the characters in the text area.



Selecting characters in text area

To change the orientation of a type layer:

1 Select the type layer in the Layers palette.

2 Choose Layer > Type > Horizontal or Vertical to change the orientation of the layer contents.

To convert a type layer to a regular layer:

1 Select the type layer in the Layers palette.

2 Choose Layer > Type > Render Layer.

Setting type attributes

Adobe Photoshop gives you precise control over type attributes, including font, type size, leading, kerning, tracking, baseline shift, alignment, and rotation. In addition, you can specify anti-aliasing for the type. To apply most attribute changes to existing type, you must first select the desired characters.

Choosing a font family

A *font family* is a complete set of characters, letters, and symbols of a particular typeface design. For example, the font used in this paragraph is Minion. In addition to choosing a font, you can choose a type style (for example, Regular, Bold, Italic). The range of available type styles varies with each font.

Note: *In addition to the fonts installed on your system, Photoshop uses font files in the local Fonts folder, located inside the application folder. Installing a Type 1, TrueType, or CID font into the local Fonts folder causes the font to appear in the Photoshop application only.*

To change the font and type style:

1 In the Type Tool dialog box, select the characters you want to adjust, as described in the procedure to select text on page 294.

2 For Font, choose a font family. Choose a type style from the menu to the right of the Font menu.

Choosing a type size and measurement unit

The *type size* determines how large the type appears in the image. The default type size is 12 points, where one PostScript point is equal to 1/72 of an inch in a 72-ppi image. You can switch between using the PostScript and traditional definitions of point size.

To choose a type size and measurement unit:

1 In the Type Tool dialog box, select the characters you want to adjust, as described in the procedure to select text on page 294.

2 In the Type Tool dialog box, enter a value for Size. Choose a measurement unit from the menu.

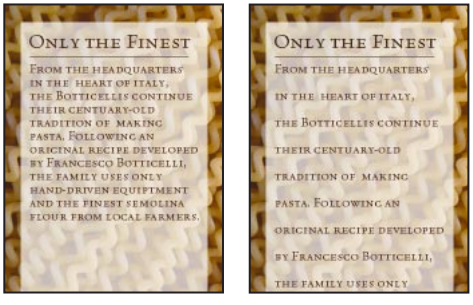
To specify the point size definition:

1 Choose File > Preferences > Units & Rulers.

2 Select an option for Point/Pica Size. Traditional points are slightly smaller than PostScript points.

Specifying leading

Leading specifies the spacing between baselines and is measured in the units you specify in the Type Tool dialog box.



5-point type with 5-point leading, and with 10-point leading

To change the leading:

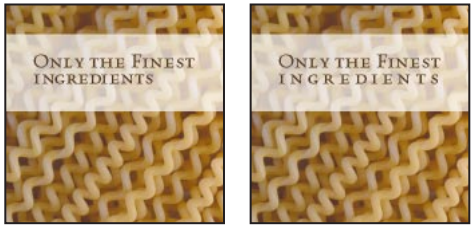
1 In the Type Tool dialog box, select the line of type you want to adjust, as described in the procedure to select text on page 294.

2 For Leading, enter a value.

Specifying kerning and tracking

Kerning controls the spacing between two characters. You can control kerning manually, or you can turn on the kerning built into the font by the font designer (see the following section). *Tracking* inserts uniform spacing between more than two characters in selected type. Use tracking to adjust the spacing of a selected word or of an entire block of type.

Positive kerning or tracking values move characters apart; negative values move characters closer together. Kerning and tracking values are measured in units that are 1/1000 of an *em space.* The width of an em space is relative to the current type size. In a 1-point font, 1 em corresponds to 1 point; in a 10-point font, 1 em corresponds to 10 points. Because kerning and tracking units are 1/1000 em, 100 units in a 10-point font are equivalent to 1 point.



Default, and tracking set to 350

To specify manual kerning:

1 In the text area of the Type Tool dialog box, click to set an insertion point between two characters.

2 Deselect Auto Kern.

3 Enter a kerning value.

To specify tracking:

1 In the Type Tool dialog box, select the desired characters, as described in the procedure to select text on page 294.

2 Enter a tracking value.

Specifying characters with auto-kerning

To use a font's kerning information to space characters better, select the Auto Kern option in the Type Tool dialog box. Many fonts have information about the spacing of character pairs. For example, the spacing between an *A* and a *W* often is less than the spacing between an *A* and an *F*.

For the best performance, choose a specific kerning value rather than auto-kerning until you have finished creating your type. Then select the type and apply auto-kerning to it.

Specifying baseline shift

Baseline shift controls the distance that type appears from its baseline, either raising or lowering the selected type to create superscripts or subscripts.

To specify baseline shift:

1 In the text area of the Type Tool dialog box, select the characters you want to adjust, as described in the procedure to select text on page 294.

2 For Baseline, enter a value.

A positive value moves horizontal type above, and vertical type to the right of, the baseline; a negative value moves type below or to the left of the baseline. Baseline shift is measured in the units you specify in the Type Tool dialog box.



Default, and baseline shift of -10 points

Specifying alignment

Alignment controls the position of each line of type in reference to the insertion point in the image you clicked with the type tool.

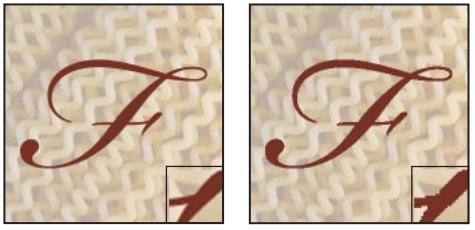
To specify alignment:

1 In the Type Tool dialog box, select a horizontal (vertical) alignment option:

- The left (top) alignment option begins each line of type at the insertion point.
- The center (center) alignment option centers the type around the insertion point.
- The right (bottom) alignment option ends each line of type at the insertion point.

Specifying anti-aliasing

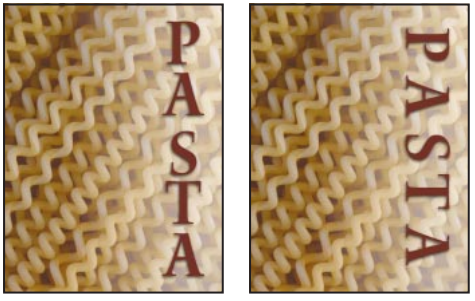
Anti-aliasing lets you produce smooth-edged type by partially filling the edge pixels. As a result, the edges of the type blend into the background. You'll probably want to use anti-aliased type in your images, unless you are working with small type sizes (anti-aliasing can make small type sizes appear blurry).



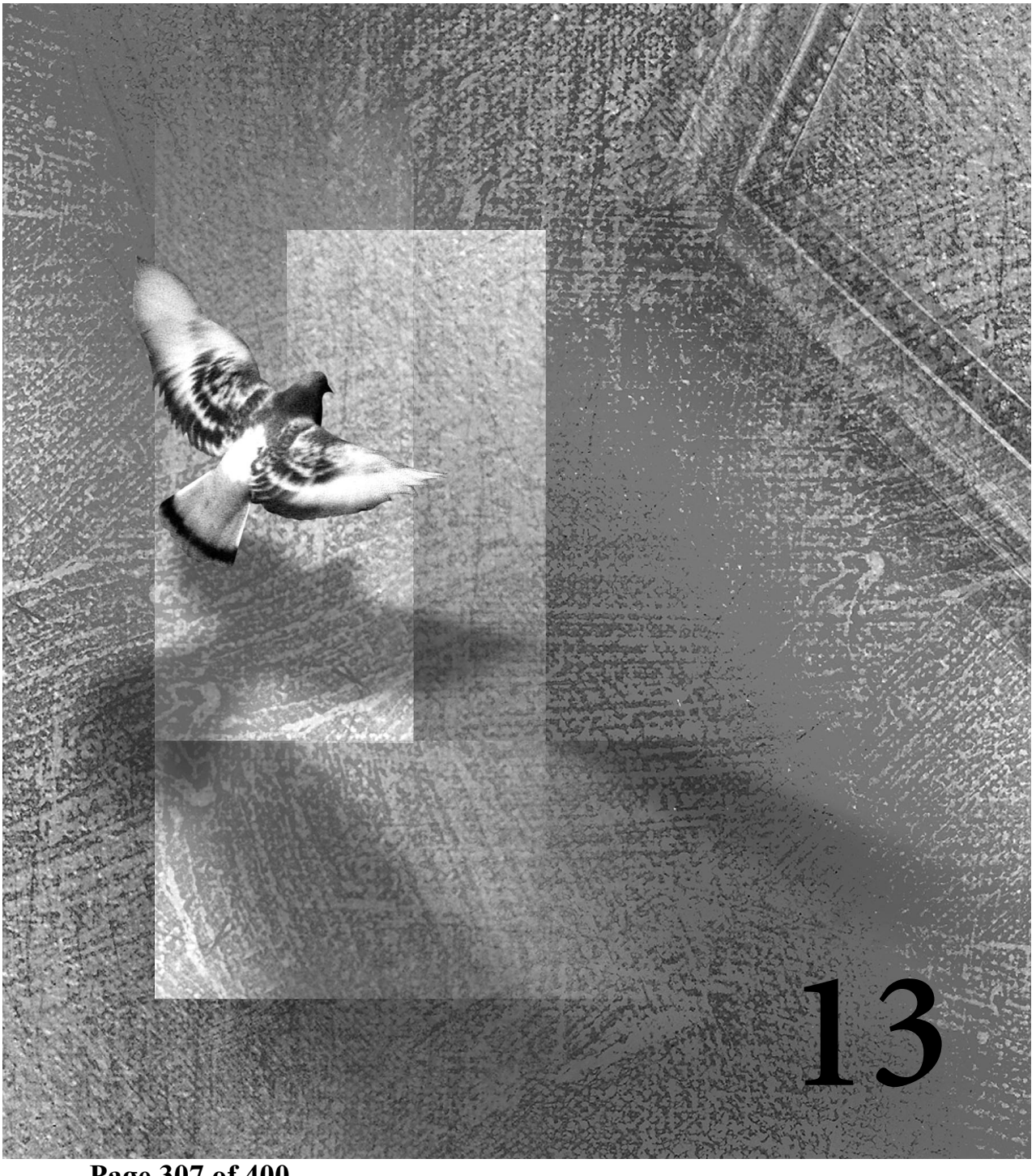
Anti-aliasing on and off; inset zoom 200%

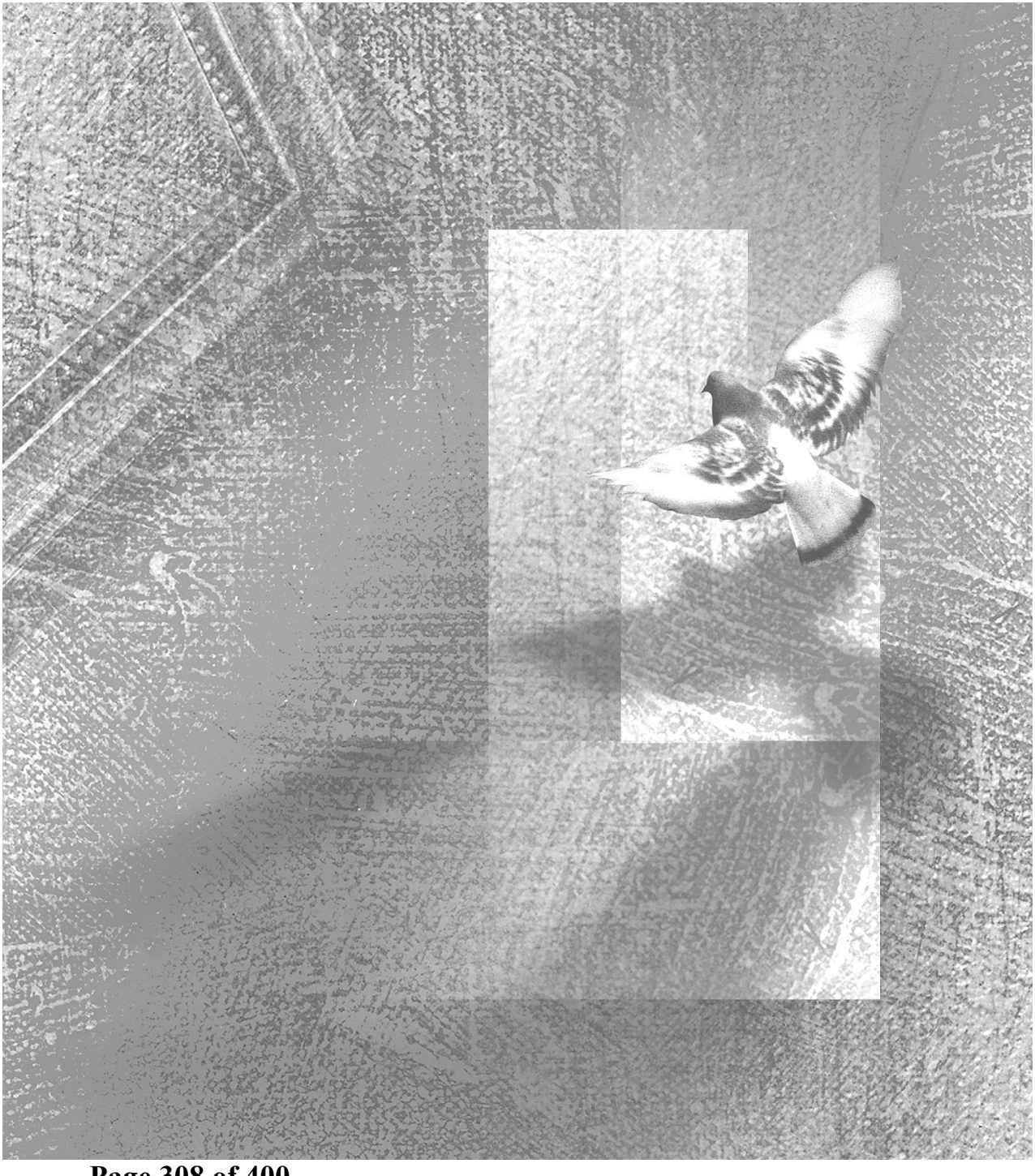
Rotating character direction

When you create vertical type, you can select the Rotate option to rotate the character direction by 90°. The Rotate option does not affect double-byte characters.



Original, and with vertical rotation 90°


13



Chapter 13: Using Filters

Filters let you apply special effects to your images, such as impressionistic or mosaic effects, lighting effects, and distortions. You can also create your own effects using the Custom filter or the Filter Factory (included on the Adobe Photoshop CD-ROM).

For detailed information on individual filters and a gallery of examples, see online help.

Adobe Photoshop also supports plug-in filters developed by non-Adobe software developers. Once installed, plug-in filters appear at the bottom of the Filter menu and work the same as built-in filters.

If you are interested in creating Photoshop-compatible plug-in modules, contact Adobe Systems Developer Support. (See "Using plug-in modules" on page 36.)

Note: *If you have problems or questions about third-party plug-ins, contact the plug-in's manufacturer for support.*

Previewing and applying filters

To use a filter, choose the appropriate submenu command from the Filter menu. These guidelines can help you in choosing filters:

- The last filter chosen appears at the top of the menu.
- Filters are applied to the active, visible layer.
- Filters cannot be applied to Bitmap-mode, indexed-color, or 16-bit per channel images.
- Some filters only work on RGB images.
- Some filters are processed entirely in RAM.
- Applying filters—especially to large images—can be time-consuming. Previewing effects can save time and prevent unintended results. Depending on the filter, you may have a preview window or the option to preview effects on the entire layer.

To save time when trying various filters, experiment on a small, representative part of your image or a low-resolution copy.

To preview and apply a filter:

1 To apply a filter to an area of a layer, select that area. To apply a filter to the entire layer, leave the image unselected.

2 Choose a filter from the submenus in the Filter menu. If a filter name is followed by ellipses (…), a dialog box appears.

3 If a dialog box appears, enter values or select options.

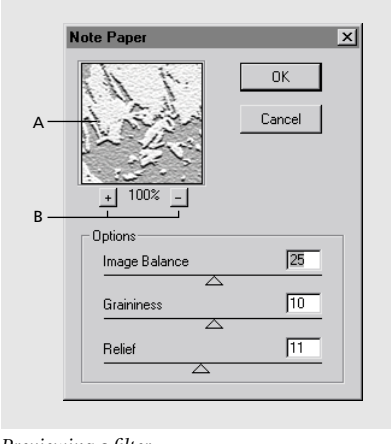
4 If the dialog box contains a preview window, use the following navigation methods to preview the effect:

- Click in the image window to center a specific area of the image in the preview window.

Note: *This does not work with all preview windows.*

• Drag in the preview window to center a specific area of the image in the window.

• Use the + or – button under the preview window to zoom in or zoom out on the preview.



Previewing a filter
A. *Click and drag to move image in preview window.*
B. *Click + to zoom in or - to zoom out on image in preview window.*

A flashing line beneath the preview size indicates that Adobe Photoshop is still rendering the preview.

5 If available, select the Preview option to preview the filter effect on the entire image.

6 Click OK to apply the filter.

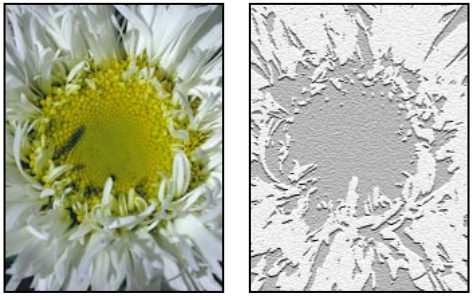
A progress indicator in the status bar (Windows) or progress bar (Mac OS) lets you gauge the time remaining until the filter is applied.

Blending filter effects

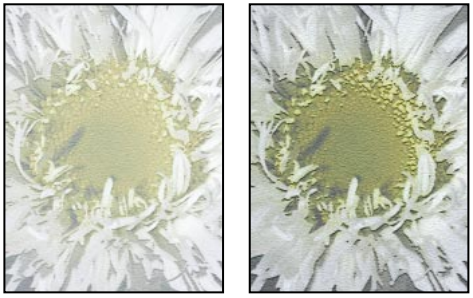
The Fade command fades the effect of a filter, painting tool, or color adjustment. You choose a blending opacity and a mode to determine how pixels are modified. The blending modes available are a subset of those in the painting and editing tools Options palette (excluding the Behind and Clear modes). (See Chapter 6, "Making Color and Tonal Adjustments" for more on color adjustment commands.)

Applying the Fade command is similar to applying the filter effect on a separate layer and then using the layer opacity and blending mode controls. (See "Using adjustment layers" on page 281.)

Note: *The Fade command can also be applied to Brush Strokes filters and any other painting tool.*



Original, and Note Paper filter applied



Screen mode applied using Fade command, and 50% opacity applied using Fade command

To fade the effect of a filter, painting tool, or color adjustment:

1 Apply a filter or an Image > Adjust command to an image or selection.

2 With the affected area still selected, choose Filter > Fade.

3 Select the Preview option to preview the effect.

4 Drag the slider to adjust the opacity, from 0% (transparent) to 100%. (See "Specifying the opacity, pressure, or exposure" on page 203.)

5 For Mode, choose a blending mode. (See "Selecting a blending mode" on page 205.)

Note: *The Color Dodge, Color Burn, Lighten, Darken, Difference, and Exclusion modes do not work on Lab images.*

6 Click OK.

Using filter shortcuts

These techniques can help save time when working with filters:

- To cancel a filter as it is being applied, press Esc or Command-(.) (period) (Mac OS only).
- To undo a filter, press Ctrl+Z (Windows) or Command+Z (Mac OS).
- To reapply the most recently used filter with its last values, press Ctrl+F (Windows) or Command+F (Mac OS).
- To display the dialog box for the last filter you applied, press Ctrl+Alt+F (Windows) or Command+Option+F (Mac OS).

Loading images and textures

To produce their effects, some filters load and use other images, such as textures and displacement maps. These filters include the Conté Crayon, Displace, Glass, Lighting Effects, Rough Pastels, Texture Fill, Texturizer, Underpainting, and Custom filters.

Not all of these filters load images or textures in the same way. See the online help for the Displace filter and Lighting Effects for information on how to load images or textures with these filters.

To load images and textures:

1 Choose the filter you want from the appropriate submenu.

2 For Texture, choose Load Texture, and locate and open a texture image.

All textures must be in the Photoshop format. Most filters use only the grayscale information of a color file.

3 Click OK.

Defining undistorted areas

The Displace, Shear, and Wave filters in the Distort submenu and the Offset filter in the Other submenu let you treat areas undefined by the filter in the following ways:

- Wrap Around fills the undefined space with content from the opposite edge of the image.
- Repeat Edge Pixels extends the colors of pixels along the image's edge in the direction specified. Banding may result if the edge pixels are different colors.
- Available for the Offset filter only, Set to Background fills the selected area with the current background color.

Using texture and glass surface controls

The Conté Crayon, Glass, Rough Pastels, Texturizer, and Underpainting filters have texturizing options. These options make images appear painted onto textures such as canvas and brick or viewed through glass blocks.

To use texture and glass surface controls:

1 From the Filter menu, choose Artistic > Rough Pastels or > Underpainting; Distort > Glass; Sketch > Conté Crayon; or Texture > Texturizer.

2 For Texture, choose a texture type or choose Load Texture to specify a Photoshop file.

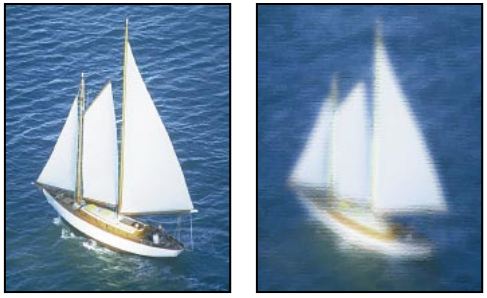
3 Drag the Scaling slider to enlarge or reduce the effect on the image surface.

4 Drag the Relief slider (if available) to adjust the depth of the texture's surface.

5 Select Invert to reverse the surface's light and dark colors.

6 For Light Direction, indicate the direction of the light source on the image.

7 Click OK.

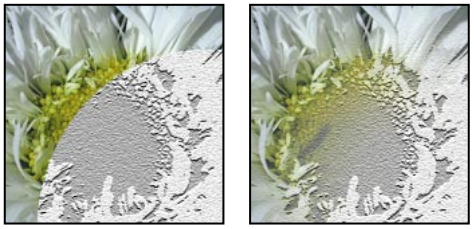


Original, and with Rough Pastels filter applied using Canvas texture

Tips for creating special effects

Try the following techniques to create special effects with filters.

Create edge effects You can use various techniques to treat the edges of an effect applied to only part of an image. To leave a distinct edge, simply apply the filter. For a soft edge, feather the edge, and then apply the filter. For a transparent effect, apply the filter, and then use the Fade command to adjust the selection's blending mode and opacity. (See "Blending filter effects" on page 302.)



Distinct edge and Feathered edge

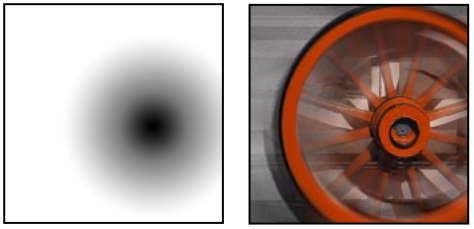
Apply filters to layers You can apply filters to individual layers or to several layers in succession to build up an effect. For a filter to affect a layer, the layer must be visible and must contain pixels—for example, a neutral fill color. (See "Filling a new layer with a neutral color" on page 270.)

Apply filters to individual channels You can apply a filter to an individual channel, apply a different effect to each color channel, or apply the same filter but with different settings.

For a color illustration of applying filters to channels, see figure 13-1 on page 227.

Create backgrounds By applying effects to solid-color or grayscale shapes, you can generate a variety of backgrounds and textures. You might then blur these textures. Although some filters have little or no visible effect when applied to solid colors (for example, Glass), others produce interesting effects. You might try: Add Noise, Chalk & Charcoal, Clouds, Conté Crayon, Craquelure, Difference Clouds, Glass, Grain, Graphic Pen, Halftone Pattern, Mezzotint, Mosaic Tiles, Note Paper, Patchwork, Pointillize, Reticulation, Rough Pastels, Sponge, Stained Glass, Texture Fill, Texturizer, and Underpainting.

Combine multiple effects with masks or with duplicate images Using masks to create selection areas gives you more control over transitions from one effect to another. For example, you can filter the selection created with a mask.



Mask with radial gradient, and Radial Blur filter applied through mask

You can also use the history brush tool to paint a filter effect onto part of the image. First, apply the filter to an entire image. Next, step back in the History palette to the image state before applying the filter, and set the history brush source to the filtered state. Then, paint the image. (See "Reverting to any state of the image" on page 168.)

Improve image quality and consistency You can disguise faults, alter or enhance, or make a series of images look related by applying the same effect to each. Use the Actions palette to record the process of modifying one image, and then use this action on the other images.(See Chapter 16, Automating Tasks.)


For a color illustration of using filters to improve consistency in unrelated artwork, see figure 13-2 on page 228.

Improving performance with filters

Some filter effects can be memory intensive, especially when applied to a high-resolution image. You can use these techniques to improve performance:

- Try out filters and settings on a small portion of an image.
- Apply the effect to individual channels—for example, to each RGB channel—if the image is large and you're having problems with insufficient memory. (With some filters, effects vary if applied to the individual channel rather than the composite channel, especially if the filter randomly modifies pixels.)
- Experiment on a low-resolution copy of your file and note the filters and settings used. Then apply the filters and setting to the high-resolution original.
- Free up memory before running the filter by using the Purge command. For more information, see "Correcting mistakes" on page 167.
- Allocate more RAM to Photoshop. If necessary, exit from other applications to make more memory available to Photoshop.
- Try changing settings to improve the speed of memory-intensive filters, such as Lighting Effects, Cutout, Stained Glass, Chrome, Ripple, Spatter, Sprayed Strokes, and Glass filters. (For example, with the Stained Glass filter, increase cell size. With the Cutout filter, increase Edge Simplicity, or decrease Edge Fidelity, or both.)
- If you plan to print to a grayscale printer, convert a copy of the image to grayscale before applying filters. However, applying a filter to a color image and then converting to grayscale may not have the same effect as applying the filter to a grayscale version of the image.

Choosing a filter effect

The Adobe Photoshop filters fall into 14 general categories. In addition, third-party filters appear at the bottom of the Filter menu.


For information on individual filters within these categories and a gallery of sample effects, see online help.

Artistic filters Apply a painterly or special effect for a fine-arts or commercial project. For example, use the Cutout filter for collages or type treatment. These filters replicate natural or traditional media effects. For information on the Rough Pastels and Underpainting filters, see "Using texture and glass surface controls" on page 304.

Blur filters Soften a selection or an image. Blur filters are useful for retouching. They smooth transitions by averaging the pixels next to the hard edges of defined lines and shaded areas in an image.

Note: *To apply a Blur filter to the edges of a layer, be sure to turn off the Preserve Transparency option in the Layers palette.*

Brush Strokes filters Like the Artistic filters, the Brush Strokes filters give a painterly or fine-arts look using different brush and ink stroke effects. Some of the filters add grain, paint, noise, edge detail, or texture to an image for a pointillist effect.

Distort filters Geometrically distort an image, creating 3-D or other reshaping effects. Note that these filters can be very memory intensive. For information on the Glass filter, see "Using texture and glass surface controls" on page 304. For more on the Displace filter, see "Defining undistorted areas" on page 304 and online help.

Noise filters Add or remove *noise*, or pixels with randomly distributed color levels. This helps to blend a selection into the surrounding pixels. Noise filters can create unusual textures or remove problem areas, such as dust and scratches, from an image. The Add Noise filter can be used to reduce banding in feathered selections or graduated fills or to give a more realistic look to heavily retouched areas.



For more on the Dust & Scratches filter, see the online help.

Pixelate filters Sharply define a selection by clumping pixels of similar color values in cells.



For more on the Color Halftone filter, see the online help.

Render filters Create 3-D shapes, cloud patterns, refraction patterns, and simulated light reflections in an image. You can also manipulate objects in 3-D space, create 3-D objects (cubes, spheres, and cylinders), and create texture fills from grayscale files to produce 3-D-like effects for lighting. For information on the 3D Transform filter, see "Transforming objects in three dimensions" on page 187.



For more information on the Lighting Effects filter, see the online help.



When using the Clouds filter, generate a more stark cloud pattern by holding down Alt (Windows) or Option (Mac OS) as you choose Filter > Render > Clouds.

Sharpen filters Focus blurry images by increasing the contrast of adjacent pixels. They include the Sharpen Edges and Unsharp Mask filters, which find and sharpen areas where significant color changes occur (such as at the edges). The Unsharp Mask filter is commonly used for high-end color correction (see "Step 6: Sharpen the image" on page 128).

Sketch filters Add texture to images, often for a 3-D effect. The filters also are useful for creating a fine-arts or hand-drawn look. Many of the Sketch filters use the foreground and background color as they redraw the image. For information on the Conté Crayon filter, see "Using texture and glass surface controls" on page 304.

For a truer effect when using the Conté Crayon filter, change the foreground color to one of the common Conté Crayon colors (black, sepia, sanguine) before applying the filter.

Stylize filters Produce a painted or impressionistic effect on a selection by displacing pixels and by finding and heightening contrast in an image. After using filters like Find Edges and Trace Contour that highlight edges, you can apply the Invert command to outline the edges of a color image with colored lines or to outline the edges of a grayscale image with white lines. (See "Using the Invert command" on page 130.)

Texture filters Give images the appearance of depth or substance, or to add an organic look. (See "Using texture and glass surface controls" on page 304.)

Video filters Include the NTSC (National Television Standards Committee) Colors filter, which restricts the gamut of colors to those acceptable for television reproduction, and the De-Interlace filter, which smooths moving images captured on video.

Other filters Let you create your own filters, use filters to modify masks, offset a selection within an image, and make quick color adjustments. For more on the Offset filter, see "Defining undistorted areas" on page 304.

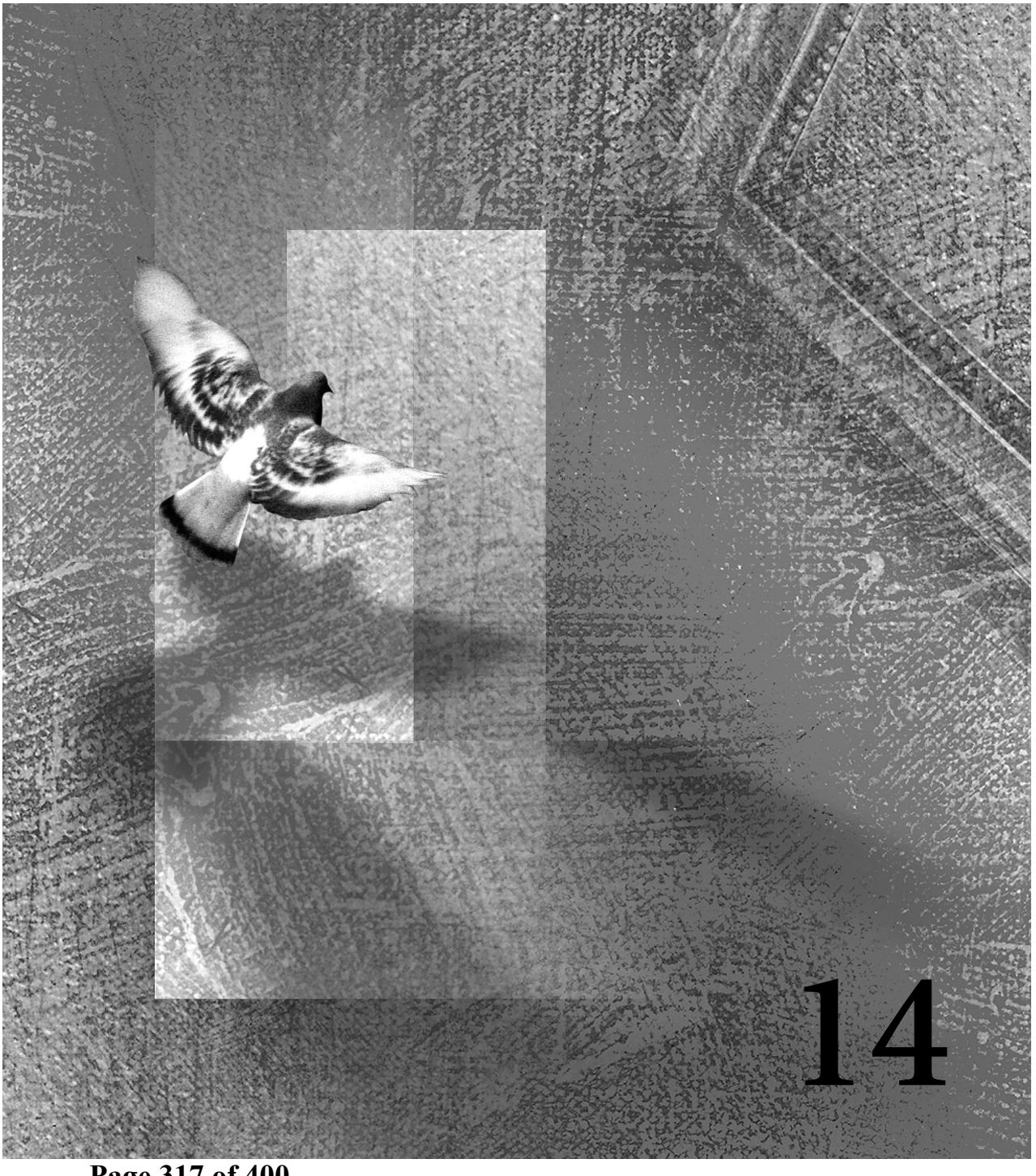


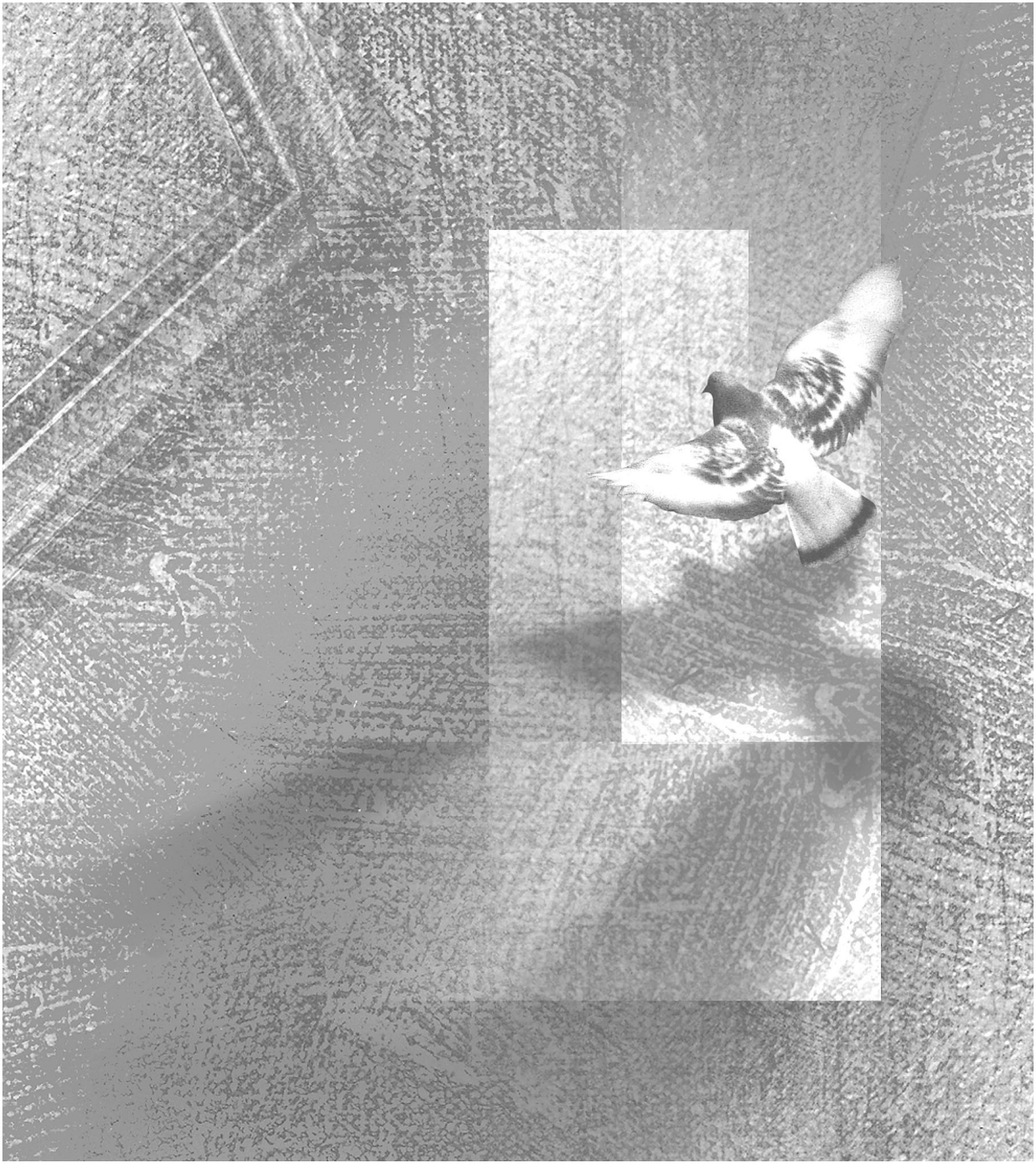
For more information on the Custom filter, see the online help.

Digimarc filters Embed a digital watermark into an image to store copyright information.



For more information on Digimarc filters, see the online help.


14



Chapter 14: Saving and Exporting Images

Adobe Photoshop supports a variety of file formats to suit a wide range of output needs. You can save or export your image to any of these formats. You can also use special Photoshop features to prepare and place images in other applications.

File format and export choices appear in either the Save As or Save a Copy dialog box or in the Export menu.

Saving files

Adobe Photoshop provides several ways to save files:

- The Save command saves the file in its current file format.
- The Save As command lets you save an alternate version of the file in a different format.
- The Save a Copy command lets you save a copy of the file, leaving the original file intact. You can optionally flatten the file copy and exclude non-image data or alpha channels.

To save a file in its current format:

Choose File > Save.

To save a file in a different file format:

1 Choose File > Save As.

2 For Save As (Windows) or Format (Mac OS), choose a format. Unavailable formats are not visible (Windows) or dimmed (Mac OS).

Important: *Only the Photoshop format is available for layered files. In addition, many formats do not support files in certain color modes or files with alpha channels (see "About file formats" on page 321). If you do not see the format you want, flatten the image or use the Save a Copy command. If the format still does not appear, install the format's plug-in module following the instructions in "Using plug-in modules" on page 36.*

3 Type a filename, and choose a location for the file.

4 Click Save.

With some image formats, a dialog box appears. For information on the options available for specific file formats, see "About file formats" on page 321.

To save a copy of a file:

1 Choose File > Save a Copy.

2 For Save As (Windows) or Format (Mac OS), choose a format.

3 To flatten all visible layers, select Flatten Image. (See "Flattening all layers" on page 269.)

4 To remove alpha channels from the image, select Exclude Alpha Channels.

5 To remove data such as paths, guides, grids, thumbnail previews, color and printing ink profiles, and file information (such as captions) from the image, select Exclude Non-Image Data. (This option may be unavailable to some formats.) Excluding non-image data can help reduce the image's file size.

6 Click Save.

To copy an image without saving it to your hard disk, use the Duplicate command (see "Duplicating images" on page 172). To store a temporary version of the image in memory, use the History palette to create a snapshot (see "Making a snapshot of the image" on page 171).

Setting preferences for saving files

The Saving Files Preferences dialog box lets you specify whether to include the following features when saving files:

- Thumbnail image previews appear in the Open dialog box. In Mac OS you can also save desktop icon and low-resolution previews.
- Three-character file extensions append to the names of files and indicate a file's format (for example, .JPG or .jpg for a JPEG file). File extensions are necessary for files that you want to use on or transfer to a Windows system.
- Composited image data refers to a flattened image version that is saved with a layered file. Including flattened data adds to the file size, but lets you open the file in applications that do not support Photoshop layers, such as Adobe Illustrator.

To set saving preferences in Windows:

1 Choose File > Preferences > Saving Files.

2 For Image Previews, choose an option:

- Never Save to save files without previews.
- Always Save to save files with specified previews.
- Ask When Saving to assign previews on a file-by-file basis.

3 For File Extension, choose an option:

- Use Upper Case to append file extensions using uppercase characters.
- Use Lower Case to append file extensions using lowercase characters.

4 To include a flattened version of the file, select Include Composited Image With Layered Files.

Selecting this option makes the file available to applications that can support only the Adobe Photoshop 2.5 file format.

5 Click OK.

To set saving preferences In Mac OS:

1 Choose File > Preferences > Saving Files.

2 For Image Previews, choose an option:

- Never Save to save files without previews.
- Always Save to save files with specified previews.
- Ask When Saving to assign previews on a file-by-file basis.

3 Select one or more of the following preview types:

- Icon to use the preview as a file icon on the desktop.

• Macintosh Thumbnail to display the preview in the Open dialog box.

• Windows Thumbnail to save a preview that can display on Windows systems.

• Full Size to save a 72-ppi version of the file for use in applications that can only open low-resolution Photoshop images. For non-EPS files, this is a PICT preview.

To speed the saving of files and minimize file size, select only the previews you need.

4 For Append File Extension, choose one of the following options:

• Never to save files without file extensions.

• Always to append file extensions to filenames.

• Ask When Saving to append file extensions on a file-by-file basis.

5 To append file extensions using lowercase characters, select Use Lower Case.

6 To include a flattened version of the file, select Include Composited Image With Layered Files.

Selecting this option makes the file available to applications that support only the Adobe Photoshop 2.5 (or earlier) file format.

7 Click OK.

In Mac OS, to append a file extension to the current file only, hold down Option as you choose a file format from the Save As or Save a Copy dialog box.

To display a preview file icon (Windows only):

1 Save the file in Photoshop format with a thumbnail preview.

2 Position the pointer on the filename in the file list, click the right mouse button, and choose Properties from the context menu that appears.

3 Click the Photoshop Image tab.

4 For Icon Thumbnails, select a preview icon, and click OK.

Preview icons appear on the desktop and in file lists (when the view is set to Large Icons).

Adding file information

Adobe Photoshop supports the information standard developed by the Newspaper Association of America (NAA) and the International Press Telecommunications Council (IPTC) to identify transmitted text and images. This standard includes entries for captions, keywords, categories, credits, and origins. The captions and keyword entries can also be searched by some third-party image browsers.

In Windows, you can add file information to files saved in the Photoshop, TIFF, JPEG, EPS, and PDF formats. In Mac OS, you can add file information to files in any format.

To enter information about a file:

1 Choose File > File Info.

2 For Section, choose an attribute. By default, the dialog box opens to the Caption section. See page 314.

3 Choose and fill in any additional sections. To move forward through the sections, click Next; to move backward, click Previous.

4 When you've finished, click OK.

To load, save, or append file information:

In the File Info dialog box, do one of the following:

- Click Load to replace the current information with information stored in a File Info file.
- Click Save to save the current file information in a File Info file for later use.
- Click Append to add information stored in a File Info file to the current file information.

File information sections

The following list describes each of the sections in the File Info dialog box.

Caption Provides headline text and special instructions for the image.

Note: *To print the caption under an Adobe Photoshop image, choose File > Page Setup, and select Caption. Then print as usual. (See Chapter 15, "Printing," for more information.)*

Keywords Provides a way for some image browsers to categorize and search for an image. Type in the text box, and click Add to see your text in the keyword list. To replace a keyword, select the word in the list, type its replacement, and click Replace. To delete a keyword, select the word, and click Delete.

Categories Enter an alphabetic category code of three characters. Where available, the local Associated Press regional registry maintains a list of categories. To include the image in supplemental categories, type the code and click Add. To replace a category, select the code, type its replacement, and click Replace. To delete a category, select the code, and click Delete.

For Urgency, specify the editorial urgency of the image—not its handling priority.

Credits Provides the correct credit for a copyrighted image. Type byline, credit, and source information.

Origin Provides information on the history of the image. The Object Name field contains a short identification (for example, "Montgomery Street"). The date entry can be in any format. To enter the current date in a short text format (for example, Oct. 25, 1998), click Today.

Copyright & URL Provides copyright information not included as part of the IPTC specification. To display a copyright symbol in the image window's title bar, select Mark as Copyrighted. Enter a copyright notice, and specify the URL if information about an image can be found on a Web site. If Photoshop detects a Digimarc watermark in the image, the Copyright & URL section is automatically updated.

Saving Adobe Photoshop files

Adobe Photoshop is the default file format for newly created images—and the only format supporting all available image modes (Bitmap, Grayscale, Duotone, Indexed Color, RGB, CMYK, Lab, and Multichannel), guides, alpha channels, spot channels, and layers (including adjustment layers, type layers, and layer effects).

If you're exporting files to an application that doesn't support the Adobe Photoshop format, use the Save a Copy command to save a duplicate file in a format supported by that application.

Note: *Only files that were created in Adobe Photoshop 5.0 support color samplers, editable type layers, layer effects, spot channels, embedded ICC profiles, and adjustment layers using the version 5.0 Hue/Saturation or Channel Mixer type. If you edit or save a file using an earlier version of Photoshop, these features are discarded.*

Saving Adobe Photoshop 2.0 files (Macintosh only)

Choose the Photoshop 2.0 format to open a file in version 2.0 or to export to an application supporting only Photoshop 2.0 files. Saving in Photoshop 2.0 format flattens your file and discards layer information.

Saving files in Photoshop EPS or DCS format

If you have a PostScript printer, you can use the Encapsulated PostScript (EPS) format to share Photoshop files effectively with many graphic, illustration, and page-layout programs. The Desktop Color Separations (DCS) format, a version of the standard EPS format, lets you save color separations of CMYK or multichannel files. You use the DCS 2.0 format to export images containing spot channels and single alpha channels.

To print EPS and DCS files, you must use a PostScript printer. For more information on the types of files supported by the EPS and DCS formats, see "About file formats" on page 321.

Note: *If you plan to export an image to Adobe Illustrator or Adobe PageMaker for four-color process printing, convert the image to CMYK mode and save it in Photoshop EPS or TIFF format. Saving a CMYK file as TIFF lets you apply color management features to the placed image in Illustrator 7.0 or PageMaker 6.5.*

To save a file in Photoshop EPS or DCS format:

1 Choose File > Save As or Save a Copy, and choose Photoshop EPS, Photoshop DCS 1.0, or Photoshop DCS 2.0 from the format list.

2 For Preview, choose a low-resolution preview type. To share an EPS file between Windows and Macintosh systems, use a TIFF preview. An 8-bit preview option results in better display quality but higher file size than does a 1-bit preview option.

You must save a preview of an EPS image in order to view the image in the destination application.

Note: *To use the JPEG preview option in Mac OS, you must have QuickTime installed.*

3 If you are saving to the DCS format, follow these guidelines when choosing a DCS option:

• The DCS 1.0 format creates five files: one for each color channel in the CMYK image and a fifth master file corresponding to the composite channel. You can choose to include a 72-ppi grayscale or color version of the composite image in the master file. By printing the low-resolution composite from the destination application, you can proof the image. If you plan to print directly to film or want to reduce file size, choose No Composite PostScript. To view the composite file, you must keep all five files in the same folder location.

• The DCS 2.0 format retains spot channels and a single alpha channel in the image. You can choose between saving color channel information as multiple files (as for DCS 1.0) or as a single file. The single-file option saves disk space. You can also include a 72-ppi grayscale or color composite with the image.

4 Specify an encoding method when printing to a PostScript output device:

• ASCII to use the most generic encoding method. Use ASCII encoding if you're printing from a Windows system, or if you experience printing errors or other difficulties.

• Binary to use a faster encoding method that produces a smaller output file and leaves the original data intact. Use Binary encoding if you're printing from a Mac OS system. However, some page-layout applications and some commercial print spooling and network printing software may not support binary Photoshop EPS files.

• JPEG to use the fastest encoding method. JPEG encoding compresses the file by discarding some image data, thus reducing the quality of your printed output; for the best printed results, choose maximum quality compression. Files with JPEG encoding can be printed only on Level 2 (or later) PostScript printers and may not separate into individual plates.

5 Select Include Halftone Screen and Include Transfer Function to save the image's halftone information (including the frequencies and angles of the screens) and transfer function information.

The PostScript language interpreter in some applications can use these screen settings when color separations are generated. You can also choose the Override Printer's Default Functions option in the Transfer Functions dialog box. (See "Compensating for dot gain in film using transfer functions" on page 95.)

6 To display white areas in the image as transparent, select Transparent Whites. This option is available only for images in Bitmap mode.

7 If you are printing to a PostScript printer, select PostScript Color Management to instruct the printer to convert the file data to the printer's color. Select this option only if you have not already converted the file to the printer's color space.

Note: *Only PostScript Level 3 printers support PostScript Color Management for CMYK images. To print a CMYK image using PostScript Color Management on a Level 2 printer, convert the image to Lab mode before saving in EPS format.*

Saving files in JPEG format

When saving in Joint Photographic Experts Group (JPEG) format, you can specify the image quality and compression level. To specify image quality and compression, enter a value between 0 and 10, or choose an option for Quality, or drag the slider. There's always a trade-off between image quality and the amount of compression: higher-quality images use less compression (and more disk space) than lower-quality images.

You can also select a format option for the JPEG file. Select Baseline ("Standard") to use a format recognizable to most Web browsers. The Baseline Optimized format optimizes the color quality of the image and can produce a slightly smaller file size, but is not supported by all Web browsers. The Progressive format causes the image to display gradually as it is downloaded—in a series of scans (you specify how many) showing increasingly detailed versions of the entire image. However, progressive JPEG images files are slightly larger in size, require more RAM for viewing, and are not supported by all applications and Web browsers.

Because the JPEG format discards data, it is important to save JPEG files only once. Edit and save your image in a format that does not discard data (such as the Photoshop format), and save in JPEG format only as a final step.



For a color illustration of images saved as JPEG, see page 235.

Note: *Some applications may not be able to read a CMYK file saved in JPEG format. In addition, if you find that a Java application cannot read your JPEG file (in any color mode), try saving the file without a thumbnail preview.*

Exporting images

Adobe Photoshop includes plug-in modules for creating Graphics Interchange Format (GIF) files for online display and exporting paths to Adobe Illustrator (see "Exporting paths to Adobe Illustrator" on page 328).

The GIF89a Export module lets you convert an RGB or indexed-color image to GIF89a format and assign background transparency to the image. Background transparency lets you place a non-rectangular foreground object on the colored background of a Web page. You can also save indexed-color images as GIF files using the File > Save As command (see "About file formats" on page 321).



For assistance with saving an image with transparency, choose Help > Export Transparent Image. This interactive wizard helps you prepare images for export to the Web.

To use an export module:

Choose File > Export, and select an export format or method from the submenu.

See the following sections for a discussion of the GIF89a export module.

Exporting RGB images to GIF

When you export an RGB image to GIF format, the export module creates a reduced color palette for the image.

For a color illustration of images saved as GIF, see figure on page 235.

Note: *To assign transparency to specific colors in the image, convert to indexed-color mode before exporting to GIF. See "Exporting indexed-color images to GIF" on page 319 for more information.*

To export an RGB image to GIF:

1 To create background transparency, select the foreground object of the image. Copy the selection onto a new, transparent layer. Be sure to hide any layers you don't want included. (See Chapter 11, "Using Layers.")



Original, and selection copied to transparent layer

2 Choose File > Export > GIF89a Export.

3 Select a background transparency preview:

• To preview the background transparency as the gray background color used by most Web browsers, leave the Transparency Index Color box at the default color.

OVERVIEW: PREPARING IMAGES FOR ONLINE DISTRIBUTION

1 Create and composite the image in Adobe Photoshop, and apply color correction to the image (Chapters 6–12).

2 Determine the display dimensions for the on-screen image, based on the monitor resolution and file size needed for the image (Chapter 3).

3 For PDF distribution, save the file as PDF or export to a page-layout application, and convert the final file to PDF. For HTML distribution, save the file in JPEG format (page 317) or export the file in GIF89a format (page 317), depending on your display requirements.

4 For the GIF89a Export module, choose the number of colors and assign background transparency.

• To preview the background transparency as a different color, click the Transparency Index Color box. Choose a color, as described in "Using the Adobe Photoshop Color Picker" on page 218, and click OK.

Note: *The Transparency Index Color is used only to preview the background transparency, and does not affect the final appearance of the file.*



Transparency previewed as default gray, and as blue

4 Specify a color palette:

• For Palette, choose Exact to create a palette using the colors in the image. This option is visible (Windows) or not dimmed (Mac OS) only if the image contains 256 or fewer colors.

• For Palette, choose Adaptive to create a palette using a representative sample of colors in the image. (This gives the best image quality if Exact is unavailable.) Then choose or enter the least number of colors that retains the necessary detail in your image.

The effect on file size of reducing the number of colors varies depending on dimensions and color content. For small-sized images, the effect on file size is insignificant.

• For Palette, choose System to create a palette using the computer's built-in color palette. Then select Use Best Match. The System palette option may produce unexpected results when the image is displayed on an 8-bit monitor using a different built-in palette.

• To use a custom palette, click Load, locate and select a custom palette, and click OK. Then select Use Best Match.

5 To view the color palette and see how the image will appear in the Web browser, click Preview.

To navigate the preview, use the hand tool and zoom tool provided in the preview area. These tools have the same behavior and shortcuts as the hand and zoom tools in the toolbox (see "Viewing images" on page 33). Click OK to close the preview window.

6 If dissatisfied with the results, hold down Alt (Windows) or Option (Mac OS), and click Reset to restore the colors in the image. Repeat steps 4 and 5 as needed.

7 To display the image gradually in increasing detail as it is downloaded, select Interlaced.

8 If the file contains a caption that you want to include as a comment in the GIF header, select Export Caption. (See "Adding file information" on page 313.)

9 Click OK. Choose a location for the exported file, and click Save.

Exporting indexed-color images to GIF

When you export an indexed-color image to GIF, you can assign background transparency to areas in the image. All areas containing the colors you specify are recognized as transparency by Web browsers.

For finer control, you may want to define background transparency using an alpha channel mask instead of assigning transparency to colored areas. For example, you may want to assign background transparency to only part of a colored area, keeping the other part visible on the Web page. See Chapter 10, "Using Channels and Masks," for more information on alpha channels.

Note: *To reduce the number of colors in an indexed-color image, convert the image to RGB mode, and then export the image to GIF using the Exact palette option.*

To export an indexed-color image to GIF:

1 To define background transparency using a mask, select the area of the image you want to remain visible. Then click the Save Selection button ( ) at the bottom of the Channels palette to create an alpha channel based on your selection.

2 Choose File > Export > GIF89a Export.

3 If you created an alpha channel in step 1, choose the channel name for Transparency From. Hold down Alt (Windows) or Option (Mac OS) as you choose the channel name to reverse the mask contents. Skip to step 5.

4 If you did not create an alpha channel in step 1, assign transparency to desired colors in the image:

- To add to the background transparency, click the eyedropper-plus tool ( ), and click the desired areas in the preview or the desired swatches. The selected colors appear highlighted in the swatches.
- To remove a colored area from the background transparency, Alt-click (Windows) or Option-click (Mac OS) the eyedropper-plus tool to toggle to the eyedropper-minus tool. Click the desired color swatch.
- To remove all areas from the background transparency, hold down Alt (Windows) or Option (Mac OS), and click Reset.
- To navigate the image preview, follow the guidelines described in step 5 of "Exporting RGB images to GIF" on page 317.

To activate the eyedropper-minus tool while the eyedropper-plus tool is selected, press Ctrl (Windows) or Command (Mac OS). To activate the eyedropper-plus tool while the eyedropper-minus tool is selected, press Shift.

5 Do one of the following:

- To preview the background transparency as the gray background color used by many Web browsers, leave the Transparency Index Color box at the default color.
- To preview the background transparency as a different color, click the Transparency Index Color box. Specify a color, as described in "Using the Adobe Photoshop Color Picker" on page 218, and click OK.

Note: *The Transparency Index Color is used only to preview the background transparency, and does not affect the final appearance of the file.*

6 Specify Interlaced and Export Caption options, as described in steps 7 and 8 of "Exporting RGB images to GIF."

7 Click OK to export the file. Choose a location for the exported file, and click Save.

About file formats

You can use various file formats to get images into and out of Adobe Photoshop. Graphic file formats differ in the way they represent graphic information—either as vector drawings or as bitmap images. Some formats contain only vector drawings or bitmap images, but many include both in the same file. See Chapter 3, "Getting Images into Photoshop," for information on opening files and on vector and bitmap graphics; see the beginning of this chapter for information on saving files.

About file compression

Many image file formats use compression techniques to reduce the storage space required by bitmap image data. Compression techniques are distinguished by whether they remove detail and color from the image. *Lossless* techniques compress image data without removing detail; *lossy* techniques compress images by removing detail. The following are commonly used compression techniques:

- Run Length Encoding (RLE) is a lossless compression technique supported by the Photoshop and TIFF file formats and some common Windows file formats.
- Lemple-Zif-Welch (LZW) is a lossless compression technique supported by TIFF, PDF, GIF, and PostScript language file formats. This technique is most useful in compressing images that contain large areas of single color, such as screenshots or simple paint images.
- Joint Photographic Experts Group (JPEG) is a lossy compression technique supported by JPEG, PDF, and PostScript language file formats. JPEG compression provides the best results with continuous-tone images, such as photographs.
- CCITT encoding is a family of lossless compression techniques for black-and-white images that is supported by the PDF and PostScript language file formats. (CCITT is an abbreviation for the French spelling of International Telegraph and Telekeyed Consultive Committee.)
- ZIP encoding is a lossless compression technique supported by the PDF file format. Like LZW, ZIP compression is most effective for images that contain large areas of single color.

BMP

BMP is the standard Windows image format on DOS and Windows-compatible computers. The BMP format supports RGB, indexed-color, grayscale, and Bitmap color modes, and does not support alpha channels. You can specify either Microsoft® Windows or OS/2® format and a bit depth for the image. For 4-bit and 8-bit images using Windows format, you can also specify RLE compression.

DCS

Desktop Color Separations (DCS), developed by Quark, is a version of the standard EPS format. The DCS 2.0 format supports multichannel and CMYK files with a single alpha channel and multiple spot channels; the DCS 1.0 format supports CMYK files without alpha channels. Both DCS 1.0 and DCS 2.0 support clipping paths. (See "Saving files in Photoshop EPS or DCS format" on page 315.)

Photoshop EPS

The Encapsulated PostScript (EPS) language file format can contain both vector and bitmap graphics and is supported by virtually all graphic, illustration, and page-layout programs. The EPS format is used to transfer PostScript language artwork between applications. When you open an EPS file containing vector graphics created in another application, Photoshop rasterizes the file, converting the vector graphics to pixels (see "Importing Adobe Illustrator, PDF, and EPS files" on page 55).

The EPS format supports Lab, CMYK, RGB, indexed-color, duotone, grayscale, and Bitmap color modes, and does not support alpha channels. EPS does support clipping paths. For more information on EPS options, see "Saving files in Photoshop EPS or DCS format" on page 315.

EPS TIFF or EPS PICT Preview

These formats, which appear as options in the Open and Open As dialog boxes, let you open files saved in file formats that create previews but are not supported by Adobe Photoshop (such as QuarkXPress®). An opened preview file can be edited and used like any other low-resolution file. EPS PICT Preview is available only in Mac OS.

Filmstrip

The Filmstrip format is used for RGB animation or movie files created by Adobe Premiere®. If you resize, resample, remove alpha channels, or change the color mode or file format of a Filmstrip file in Photoshop, you won't be able to save it back to Filmstrip format. For further guidelines, see the *Adobe Premiere User Guide*.

FlashPix

The FlashPix format, developed by Kodak, is designed to speed the transfer and display of large, high-resolution files in applications that support the FlashPix technology. Although Photoshop is not a FlashPix-optimized application, it can open and save FlashPix files. The FlashPix format supports grayscale and RGB color modes, and does not support alpha channels.

When saving in FlashPix format, you can choose whether to use JPEG compression. See "JPEG" on page 323, for information on JPEG compression options.

GIF

The Graphics Interchange Format (GIF) is the file format commonly used to display indexed-color graphics and images in hypertext markup language (HTML) documents over the World Wide Web and other online services. GIF is a LZW-compressed format designed to minimize file size and electronic transfer time. The GIF format does not support alpha channels.

You can convert files to GIF format using one of the following methods:

- The File > Save As command lets you save a Bitmap-mode, grayscale, or indexed-color image in GIF format and specify an interlaced display. An interlaced image appears gradually in increasing detail as it is downloaded from the Web but can increase the file size. You cannot save alpha channels with the image.
- The GIF89a Export command lets you convert an RGB or indexed-color image to GIF89a format, specify interlacing, and define background transparency. (See "Exporting images" on page 317.) The GIF89a format supports single alpha channels.

IFF

The Amiga™ Interchange File Format (IFF) is used for working with Video Toaster and transferring files to and from the Commodore Amiga system. In addition, this format is supported by a number of paint programs on IBM®-compatible computers. IFF is the best export format to use with DeluxePaint from Electronic Arts. The IFF format supports RGB, indexed-color, grayscale, and Bitmap color modes, and does not support alpha channels.

JPEG

The Joint Photographic Experts Group (JPEG) format is commonly used to display photographs and other continuous-tone images in hypertext markup language (HTML) documents over the World Wide Web and other online services. The JPEG format supports CMYK, RGB, and grayscale color modes, and does not support alpha channels. Unlike the GIF format, JPEG retains all color information in an RGB image but compresses file size by selectively discarding data.

A JPEG image is automatically decompressed when opened. A higher level of compression results in lower image quality, and a lower level of compression results in better image quality. In most cases, the Maximum quality option produces a result indistinguishable from the original. (See "Saving files in JPEG format" on page 317.)

PCX

The PCX format is commonly used by IBM PC-compatible computers. Most PC software supports version 5 of the PCX format. A standard VGA color palette is used with version 3 files, which do not support custom color palettes.

The PCX format supports RGB, indexed-color, grayscale, and Bitmap color modes, and does not support alpha channels. PCX supports the RLE compression method. Images can have a bit depth of 1, 4, 8, or 24.

PDF

Portable Document Format (PDF) is used by Adobe Acrobat, Adobe's electronic publishing software for Windows, Mac OS, UNIX®, and DOS. You can view PDF files using the Acrobat Reader® software included on the application CD-ROM. Identical to PostScript pages, PDF files can represent both vector and bitmap graphics, and can contain electronic document search and navigation features such as electronic links. For more information on PDF and Adobe Acrobat, see the Electronic Publishing Guide included on the Tour & Training CD-ROM.

The Photoshop PDF format supports RGB, indexed-color, CMYK, grayscale, Bitmap, and Lab color modes, and does not support alpha channels. The format supports JPEG and ZIP compression, except for Bitmap-mode files, which use CCITT Group 4 compression when saved as Photoshop PDF. When you open a PDF created by another application, Photoshop rasterizes the file (see "Importing Adobe Illustrator, PDF, and EPS files" on page 55).

PICT File

The PICT format is widely used among Macintosh graphics and page-layout applications as an intermediary file format for transferring files between applications. The PICT format supports RGB files with a single alpha channel, and indexed-color, grayscale, and Bitmap files without alpha channels. The PICT format is especially effective at compressing images with large areas of solid color. This compression can be dramatic for alpha channels with their large areas of white and black.

When saving an RGB image in PICT format, you can choose either a 16-bit or 32-bit pixel resolution. For a grayscale image, you can choose from 2, 4, or 8 bits per pixel. In Mac OS with QuickTime installed, four JPEG compression options are available.

PICT Resource (Mac OS only)

A PICT resource is a PICT file contained in a Mac OS file's resource fork—for example, an applications' splash screen or the contents of the Scrapbook. The PICT Resource format supports RGB files with a single alpha channel, and indexed-color, grayscale, and Bitmap files without alpha channels.

Open a PICT resource by choosing File > Import > PICT Resource. When saving a file as a PICT resource, you can specify the resource ID and resource name. As with other PICT files, you also specify bit depth and compression options.

PIXAR

The PIXAR format is designed specifically for exchanging files with PIXAR image computers. PIXAR workstations are designed for high-end graphics applications, such as those used for three-dimensional images and animation. The PIXAR format supports RGB and grayscale files with a single alpha channel.

PNG

Developed as a patent-free alternative to GIF, the Portable Network Graphics (PNG) format is used for losslessly compressing and displaying images on the World Wide Web. Unlike GIF, PNG supports 24-bit images and produces background transparency without jagged edges; however, some older versions of Web browsers may not support PNG images. The PNG format supports grayscale and RGB color modes with a single alpha channel, and Bitmap and indexed-color modes without alpha channels. PNG uses the saved alpha channel to define transparency in the file; be sure to delete all but the desired alpha channel from your image before saving as PNG.

When saving in PNG format, you can select Adam7 to display the image in increasing detail as it is downloaded. You can also run the image through a filtering algorithm that prepares the image data for optimal compression:

- None compresses the image without a filter, and is recommended for indexed-color and Bitmap-mode images.
- Sub optimizes the compression of images with even horizontal patterns or blends.
- Up optimizes the compression of images with even vertical patterns.
- Average optimizes the compression of low-level noise by averaging the color values of adjacent pixels.
- Paeth optimizes the compression of low-level noise by reassigning adjacent color values.
- Adaptive applies the filter—Sub, Up, Average, or Paeth—best-suited for the image. Select Adaptive if you are unsure of which filter to use.

Raw

The Raw format is a flexible file format for transferring files between applications and computer platforms. This format supports CMYK, RGB, and grayscale files with alpha channels, and multichannel, Lab, indexed-color, and duotone files without alpha channels.



For more information on the Raw format, see online help.

Scitex CT

The Scitex Continuous Tone (CT) format is used for high-end image processing on Scitex computers. Contact Scitex to obtain utilities for transferring files saved in the Scitex CT format to a Scitex system. The Scitex CT format supports CMYK, RGB, and grayscale files, and does not support alpha channels.

CMYK images saved in Scitex CT format often have extremely large file sizes. These files are generated for input using a Scitex scanner. Files saved in Scitex CT format are printed to film using a Scitex rasterizing unit, which produces separations using a patented Scitex halftoning system. This system produces very few moiré patterns and is often demanded in professional color work—for example, ads in magazines.

Targa

The TGA (Targa®) format is designed for systems using the Truevision® video board and is commonly supported by MS-DOS color applications. The Targa format supports 32-bit RGB files with a single alpha channel, and indexed-color, grayscale, and 16-bit and 24-bit RGB files without alpha channels. When saving an RGB image in this format, you can choose a pixel depth.

TIFF

The Tagged-Image File Format (TIFF) is used to exchange files between applications and computer platforms. TIFF is a flexible bitmap image format supported by virtually all paint, image-editing, and page-layout applications. Also, virtually all desktop scanners can produce TIFF images.

The TIFF format supports CMYK, RGB, and grayscale files with alpha channels, and Lab, indexed-color, and Bitmap files without alpha channels. TIFF also supports LZW compression.

When you save an Adobe Photoshop image in TIFF, you can choose to save in a format that can be read either by IBM PC-compatible or Macintosh computers. To compress the file automatically, click the LZW Compression check box; compressing a TIFF file decreases its file size but increases the time required to open and save the file. Adobe Photoshop also reads and saves captions in TIFF files. For information on using captions, see "Adding file information" on page 313.

Placing Photoshop images in other applications

Photoshop provides a number of features to help you use images in other applications. You can use clipping paths to define transparent areas in images you place in page-layout applications. In addition, Mac OS users can embed Photoshop images in many word-processor files.

For assistance with clipping paths, choose Help > Export Transparent Image. This interactive wizard helps you prepare images with transparency for export to a page-layout application.

Using clipping paths

When printing a Photoshop image or placing it in another application, you may want only part of the image to appear. For example, you may want to print or show a foreground object and exclude its rectangular background. A *clipping path* lets you isolate the foreground object and make everything outside the object transparent when the image is printed or placed in another application. Use the following methods to export and print files containing clipping paths:



Image imported into Illustrator without clipping path, and with clipping path

To save a path as a clipping path:

1 Draw and save a path or convert an existing selection into a path. See Chapter 7, Selecting, for information on creating selections and paths.

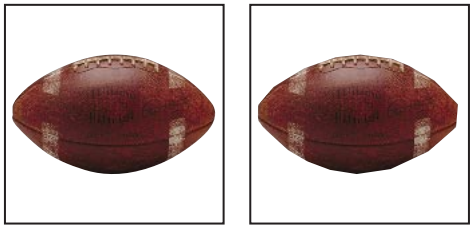
2 Choose Clipping Path from the Paths palette menu.

3 For Path, choose the path you want to save.

4 For good results with most images, leave the flatness value blank to print the image using the printer's default value. If you experience printing errors, enter a new flatness value.

Values can range from 0.2 to 100. In general, a flatness setting from 8 to 10 is recommended for high-resolution printing (1200 dpi to 2400 dpi), a setting from 1 to 3 for low-resolution printing (300 dpi to 600 dpi).

The PostScript interpreter creates curved segments by linking a series of straight line segments. The *flatness* setting for a clipping path determines how closely the straight line segments approximate the curve. The lower the flatness value, the greater is the number of straight lines used to draw the curve and the more accurate the curve.



Flatness: 0.5 and 30

5 Click OK.

If you plan to print the file using process colors, convert the file to CMYK mode. (See "Converting to CMYK" on page 97.)

6 Save the file:

• To print the file using a PostScript printer, save in Photoshop EPS or DCS format as described in "Saving files in Photoshop EPS or DCS format" on page 315, and export to a page-layout application.

• To print the file using a non-PostScript printer, save in TIFF format and export to Adobe PageMaker 5.0 or higher.

Note: *If you import an EPS or DCS file with a TIFF preview into applications such as Adobe Illustrator, the clipping path transparency will not display properly. This display affects the on-screen preview only; it does not affect the printing behavior of the clipping path on a PostScript printer.*

Printing clipping paths

Sometimes an imagesetter has difficulty interpreting clipping paths, or a printer finds the clipping path too complex to print, resulting in a Limitcheck error or a general PostScript error. Sometimes you can print a complex path on a low-resolution printer without difficulty but run into problems when printing the same path on a high-resolution printer. This is because the lower-resolution printer simplifies the path, using fewer line segments to describe curves than does the high-resolution printer.

You can simplify a clipping path in the following ways:

• By manually reducing the number of anchor points on the path (see "Adding, deleting, and converting anchor points" on page 159).

• By increasing the tolerance setting used to create the path (see the following procedure).

To simplify a clipping path with the tolerance setting:

1 Select the path in the Paths palette, and click the Make Selection button at the bottom of the palette to convert the path to a selection.

2 Click the Trash button at the bottom of the palette to delete the original path.

3 Choose Make Work Path from the Paths palette menu, and increase the tolerance setting (4 to 6 pixels is a good starting point).

4 Name and save the work path. Then choose Clipping Path from the Paths palette menu.

Exporting paths to Adobe Illustrator

The Paths to Illustrator command lets you export Photoshop paths as Adobe Illustrator files. This feature makes it easier to work with combined Photoshop and Illustrator artwork or to use Photoshop features on Illustrator artwork. For example, you may want to export a pen tool path and stroke it to use as a trap with a Photoshop clipping path you are printing in Illustrator. You can also use this feature to align Illustrator text or objects with Photoshop paths.

To use the Paths to Illustrator module:

1 In Adobe Photoshop, draw a path or convert an existing selection into a path; then save the path. (See "Drawing freehand paths" on page 151, "Drawing with the pen tool" on page 153, and "Converting between paths and selection borders" on page 163.)

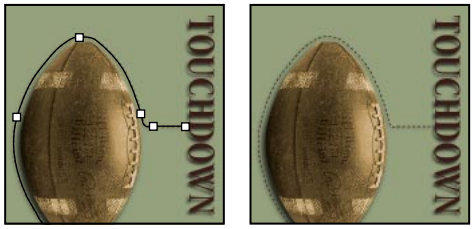
2 Choose File > Export > Paths to Illustrator.

3 Choose a location for the exported path. In Mac OS, for Write, choose the path you want to export.

4 Click Save.

5 Open the path in Adobe Illustrator as a new file. You can now manipulate the path or use the path to align Adobe Illustrator objects.

Note that the crop marks in Adobe Illustrator reflect the dimensions of the Adobe Photoshop image. The position of the path within the Adobe Photoshop image is maintained, provided you don't change the crop marks or move the path.



Path drawn in Photoshop, stroked with dashed line in Illustrator, and imported back to Photoshop

Object linking and embedding (OLE) (Windows 95 and Windows NT 4.0 only)

Photoshop is an OLE 2.0 server, which means it supports embedding or linking an image in an OLE container application (usually a word-processor or page-layout program). For example, you can insert Adobe Photoshop files and selections into other OLE applications such as Adobe PageMaker 6.5 and Microsoft Word 7.0 using copy and paste or other methods.

• Linking lets you place a link in the OLE container file that refers to the Photoshop file on the hard drive.

• Embedding lets you insert the Photoshop file into the OLE container file.

Once in the container application, an image can be double-clicked for editing in Photoshop. When closed in Photoshop, the image is updated in the container application.

To link or embed a selection or image in an OLE application:

Do one of the following:

• Copy a selection in Photoshop, and insert it in your OLE container application using the application's Paste Special command. Refer to your word-processing or page-layout application documentation for more instructions. Pasted selections can only be embedded, not linked.

• Use your OLE container application's Insert Object command to insert a new Photoshop image or existing Photoshop file as an OLE-embedded or OLE-linked object. Refer to your word-processing or page-layout application documentation for instructions.

To insert an unlinked screen-resolution bitmap into an OLE application:

With the move tool (), use the left-mouse button to drag a selection to the OLE container application. When you drop the object, it appears as a 72-ppi bitmap, which cannot be automatically updated in Photoshop.

To modify and update a linked or embedded image in an OLE application:

1 Double-click the linked or embedded image in your word-processor or page-layout application to launch Adobe Photoshop (if it is not already running), and open the image for editing.

2 Modify the image as desired.

3 Do one of the following:

• For embedded images, close the file, or choose File > Update or File > Close & Return to <application name>.

• For linked images, save and close the file.

Note: *You can also modify linked files without first opening the container document. The linked image will be updated the next time you open the document in its OLE container application.*

Embedding Photoshop images in word-processor applications (Mac OS only)

Adobe Photoshop supports the Edit Graphic Object (EGO) AppleEvent, which allows the embedding of Adobe Photoshop images in word-processor files. EGO is a simple solution when a word-processor file has many small images that need updating.

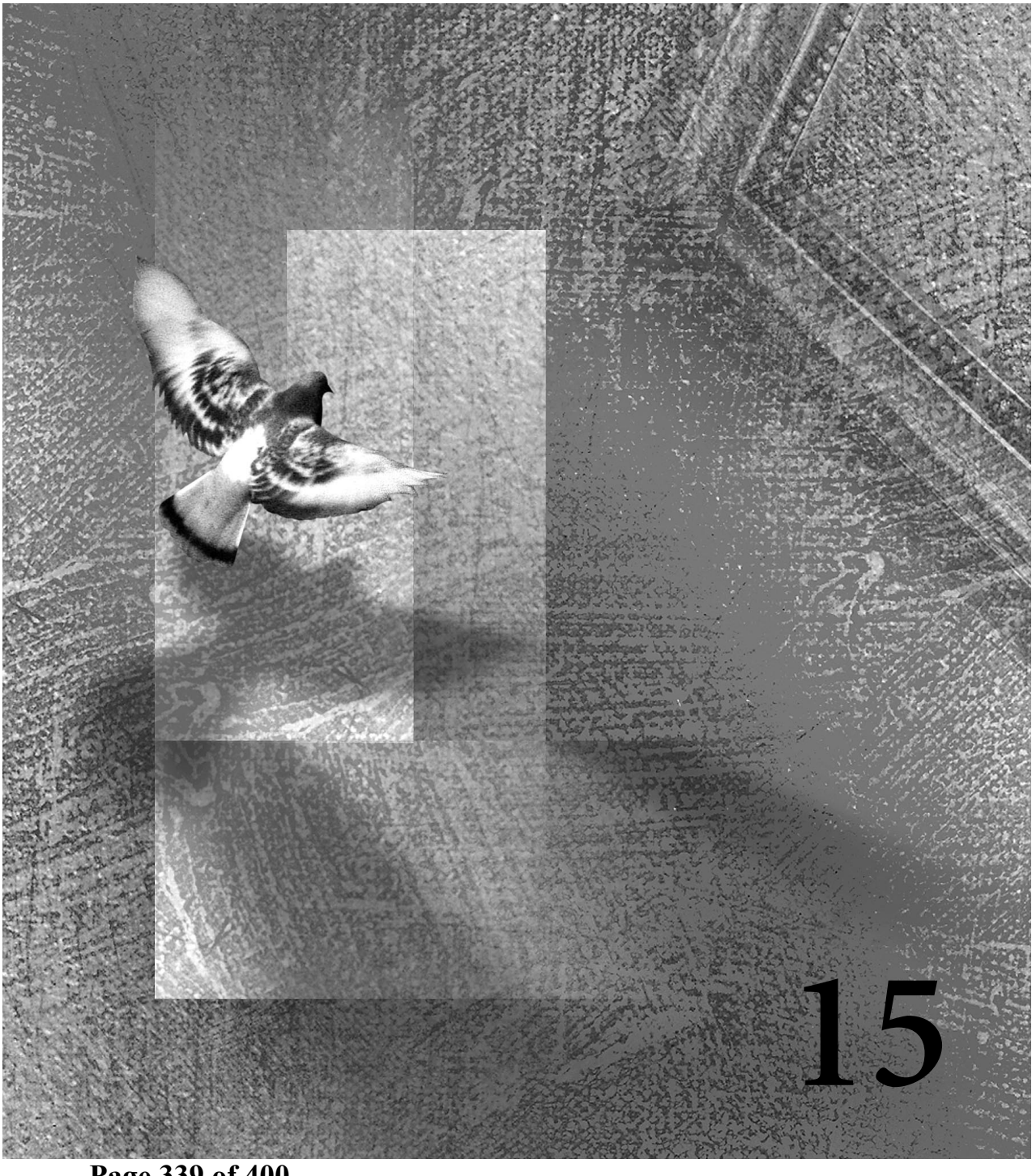
Word-processor applications that work with EGO include Full Write Professional™, Nisus, MacWrite Pro®, WordPerfect®, and Claris® Works™.

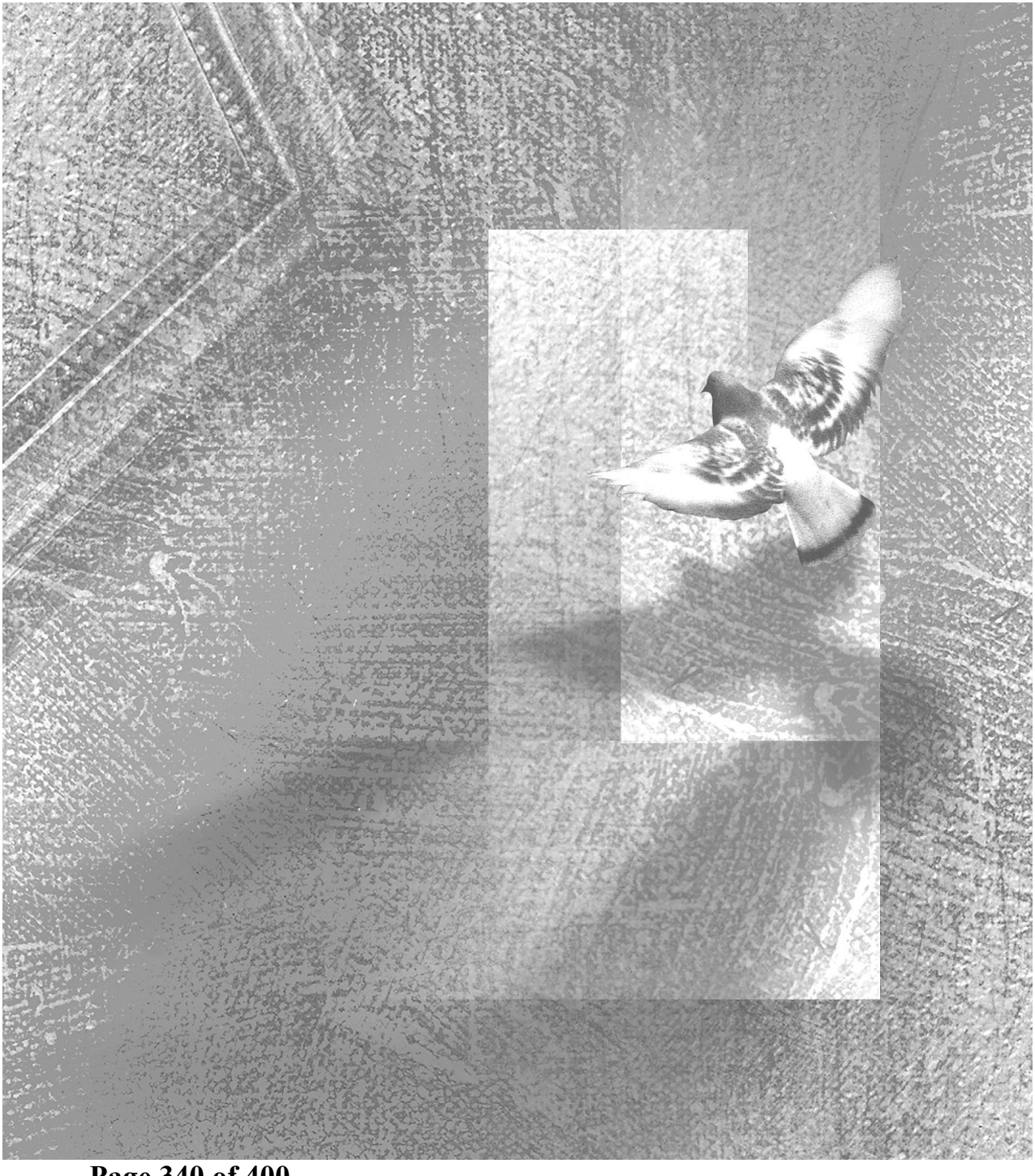
To use the Edit Graphic Object (EGO) AppleEvent to update images in word-processor files:

1 Paste the Photoshop image into your word-processor file.

2 Double-click the image in your word-processor application to launch Adobe Photoshop (if it is not already running), and open the image for editing.

3 When you have finished making changes, close the Photoshop file to update the image in your word-processor application.


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Chapter 15: Printing

In most instances, the default print settings in Adobe Photoshop produce good results. To ensure that your color images on-screen match your printed color images, it's important to make sure that your system is correctly calibrated. Calibrating for variations in monitors, printing inks, and output devices is described in Chapter 5, "Reproducing Color Accurately."

Note: *If you experience difficulties printing from Photoshop, export your image to a page-layout application, and print from that application.*

Printing: an overview

The most common way to print images is to produce a positive or negative image on paper or film and then to transfer the image to a printing plate to be run on a press.

To print any type of image in Photoshop, you first select general printing options, including the halftone screen, and then specify settings for a particular image type. For color separations, you can also adjust how the various plates are generated and create traps. You then print the image as one or several plates. When you print an image containing spot channels on a composite printer, the spot channels are printed as separate pages.

Important: *Photoshop always prints images at the center of the page. To print an image at a different location on the page, export it to a page-layout program and reposition it there, or use the Canvas Size command to increase the canvas size and change the image's placement (see "Increasing the size of the work canvas" on page 59).*

By default, Adobe Photoshop prints a composite of all visible layers and channels. To print an individual layer or channel, make it the only visible layer or channel before choosing the Print command. (See Chapter 10, Using Channels and Masks, and Chapter 11, Using Layers.)

General printing options

Choose File > Page Setup to display general printing options. The exact appearance of this dialog box varies with different printers, printer drivers, and operating systems. The main area of the dialog box contains the standard printing options for paper type, printer effects, reduction and enlargement, and orientation. See your printer documentation for more information on these options.

See the information on previewing the printed page in "Changing image size and resolution" on page 46.

Note: *Labels, crop marks, calibration bars, and registration marks will only print if the paper size is larger than the printed image dimensions.*



For a color illustration of a printed page, see figure 5-1 on page 224.

The Page Setup dialog box may include these options:

Orientation Prints the page using either the Landscape or Portrait setting. Because printing with the Portrait setting is much faster, you may want to rotate your landscape image 90 degrees by using the Rotate Canvas command, and then print using Portrait orientation.

Properties or Options Sets specific options for the printer you have selected. (The button name varies with different operating systems.) For more information on using the printing options, see your printer documentation.

Labels Prints the filename and channel name on the image.

Crop Marks Prints crop marks where the page is to be trimmed. You can print crop marks at the corners, at the center of each edge, or both.

Calibration Bars Prints an 11-step grayscale, a transition in density from 0 to 100% in 10% increments. With a CMYK color separation, a gradient tint bar is printed on the left of each CMY plate, a progressive color bar on the right.

Registration Marks Prints registration marks on the image (including bull's-eyes and star targets), used primarily for aligning color separations and duotones.

Negative Prints an inverted version of the image. Unlike the Invert command in the Image menu, the Negative option converts the output, not the on-screen image, to a negative. If you print separations directly to film, you probably want a negative, although in many countries film positives are common. Check with your print shop to determine which is required. If printing to paper, print a positive.

Emulsion Down Makes type readable when the emulsion is down—that is, when the photosensitive layer on a piece of film or photographic paper is facing away from you. Normally, images printed on paper are printed with emulsion up, with type readable when the photosensitive layer faces you. Images printed on film are often printed down.

To determine the emulsion side, examine the film under a bright light after it has been developed. The dull side is the emulsion; the shiny side is the base. Check whether your print shop requires film with positive emulsion up, negative emulsion up, positive emulsion down, or negative emulsion down.

Interpolation Reduces the jagged appearance of a low-resolution image by automatically resampling up while printing. However, resampling may also reduce the sharpness of the image quality (see "About resampling" on page 48). Some PostScript Level 2 (or higher) printers have interpolation capability. If your printer doesn't, this option has no effect.

Border Lets you print a black border around an image, specifying its width in the unit of measurement you choose.

Caption Lets you print any caption text entered in the File Info dialog box. (See "Adding file information" on page 313.) Caption text always prints as 9-point Helvetica plain type.

Background Lets you select a background color to be printed on the page outside the image area. For example, a black or colored background may be desirable for slides printed to a film recorder. To use this option, click Background, and then select a color from the Color Picker dialog box. This is a printing option only and does not affect the image itself.

Bleed Lets you print crop marks inside rather than outside the image. Use this when you want to trim the image within the graphic. You can specify the width of the bleed.

Transfer Lets you adjust the transfer functions, traditionally used to compensate for dot gain or dot loss that may occur when an image is transferred to film. This option is recognized only when you print directly from Photoshop, or when you save the file as EPS and print to a PostScript printer. Generally, it's best to adjust for dot gain using the settings in the CMYK Setup dialog box, but transfer functions also are useful for compensating for a poorly calibrated output device. (See "Compensating for dot gain in film using transfer functions" on page 95.)

Selecting halftone screen attributes

Halftone screen attributes include the screen frequency and dot shape for each screen used in the printing process. For color separations, you must also specify an angle for each of the color screens. Setting the screens at different angles ensures that the dots placed by the four screens blend to look like continuous color and do not produce moiré patterns.

Before creating your halftone screens, check with your print shop for preferred frequency, angle, and dot settings. (Use the default angle settings unless your print shop specifies changes.)

Note: *Halftone screen attributes are recognized only when you print directly from Photoshop, or when you save the file as EPS and print to a PostScript printer.*

About halftones

Halftone screens consist of dots that control how much ink is deposited at a specific location on-press. Varying their size and density creates the illusion of variations of gray or continuous color. For a process color image, four halftone screens are used: cyan, magenta, yellow, and black—one for each ink used in the printing process.



For a color illustration of halftone screens, see figure 15-1 on page 228.

In traditional print production, a halftone is produced by placing a halftone screen between a piece of film and the image and then exposing the film. In Photoshop, you specify the halftone screen attributes just before producing the film or paper output. For best results, your output device (a PostScript imagesetter, for example) should be set to the correct density limit, and your processor should be properly calibrated. Otherwise results can be unpredictable.

To define the screen attributes:

1 In Mac OS, choose Adobe Photoshop 5.0 from the menu in the Page Setup dialog box.

2 Click Screens (Windows) or Screen (Mac OS).

3 Choose whether to generate your own screen settings:

• Deselect Use Printer's Default Screens to choose your own screen settings.

• Select Use Printer's Default Screens to use the default halftone screen built into the printer. Photoshop then ignores the specifications in the Halftone Screens dialog box when it generates the halftone screens.

4 For a grayscale halftone, enter a screen frequency from 1 to 999.999 for Frequency, and choose a unit of measurement. For Angle, enter a screen angle from –180 to +180 degrees.

5 For a color separation, choose from the following options:

• To manually enter the screen frequency and angle, choose a color of the screen for Ink, and enter the frequency and angle; repeat for each color separation.

• To have Adobe Photoshop determine and enter the best frequencies and angles for each screen, click Auto. In the Auto Screens dialog box, enter the resolution of the output device and the screen frequency you intend to use; click OK. Photoshop enters the values in the Halftone Screens dialog box. Changing these values may result in moiré patterns.

• If you are using a high-resolution output device equipped with PostScript Level 2 (or higher) or an Emerald controller, make sure that the Use Accurate Screens option is selected in the Auto Screens dialog box (or in the Halftone Screens dialog box if you're entering the values manually). The Use Accurate Screen option lets the program access the correct angles and halftone screen frequencies for high-resolution output. If your output device is not equipped with PostScript Level 2 (or higher) or an Emerald controller, this option has no effect.

6 For Shape, choose the dot shape you want. If you want all four screens to have the same dot shape, select Use Same Shape For All Inks.

Choosing Custom from the Shape menu displays the Custom Spot Function dialog box. You can define your own dot shapes by entering PostScript commands—useful for printing with nonstandard halftone algorithms. For information about using PostScript language commands, see the *PostScript Language Reference Manual* published by Addison-Wesley, or consult the imagesetter's manufacturer.

For optimal output on a PostScript printer, the image resolution should be 1.5 to 2 times the halftone screen frequency. If the resolution is more than 2.5 times the screen frequency, an alert message appears (see "About image size and resolution" on page 42). If you are printing line art or printing to a non-PostScript printer, see your printer documentation for the appropriate image resolutions to use.

7 To save your halftone screen settings for use with other Adobe Photoshop files, choose from the following options:

- To save the settings, click Save in the Halftone Screens dialog box. Name and save the settings.
- To save the new settings as the default, hold down Alt (Windows) or Option (Mac OS), and click the —> Default button. To return to the original default settings, hold down Alt/Option and click <—Default.

8 To load settings for use with another Photoshop file, click Load. Locate and select the settings.

Additional printing options

You can also set printing options by using the Print dialog box, which appears when you choose File > Print (Windows), or when you choose File > Print and then choose Adobe Photoshop 5.0 from the dialog box menu (Mac OS). These options let you print only a selected area of an image, print multiple separation files, and transfer image data to the output device in ASCII format. The appearance of this dialog box varies with different printers.

Printing a selected area To print part of an image, use the rectangular marquee tool to select the part of an image you want to print. Then choose File > Print, and select the Print Selected Area option.

Printing separations By default, a single page is printed for CMYK and duotone images. For Space, choose Separations to print a separate page for each color.

Printing with print spoolers and across networks By default, the printer driver transfers binary information to printers. However, some print spooler programs, computer networks, and third-party printer drivers don't support files that are binary or JPEG-encoded, and some PostScript output devices accept binary and JPEG-encoded image data only through their AppleTalk and Ethernet ports, not their parallel or serial ports. In addition, only PostScript Level 2 (or higher) output devices support JPEG encoding. Sending a JPEG-encoded file to a Level 1 output device may result in PostScript language errors.

In these situations, you can transfer the file by selecting ASCII in the Print dialog box. However, ASCII files contain about twice as many characters and require about twice as much time to transfer as binary files.

Converting the color space of images while printing

Photoshop has several color management features to help you print a composite image on a printer.

To convert the color space of an image while printing:

1 Choose File > Print.

2 On the Macintosh, choose Adobe Photoshop 5.0 from the dialog box menu.

3 For Space, choose a color space profile:

• Grayscale, RGB Color, CMYK Color, or Lab Color to have Photoshop convert the image to the specified color mode before the file data is sent to the printer. If you choose a profile other than the image's current mode, Photoshop uses the conversion settings you specify in the Color Settings dialog boxes.

• Any other option (except Separations) to match the file data to the color space of the specified profile or output device.

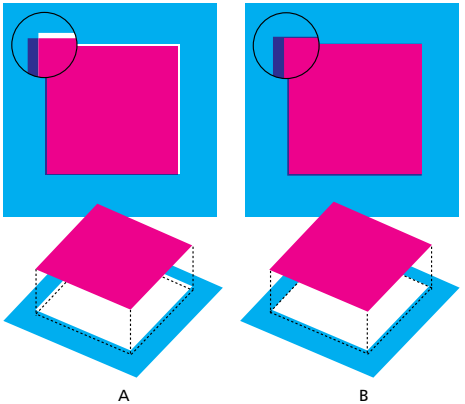
4 Select Printer Color Management to instruct the printer to convert the file data to the printer's color space; for PostScript printers, the option changes to PostScript Color Management. Select this option only if you are printing to an RGB-based printer or if you have not already converted the file to the printer's color space.

Only PostScript Level 3 printers support PostScript Color Management for images using CMYK color space. To print a CMYK image using PostScript Color Management on a Level 2 printer, go back to step 2 and choose Lab Color.

Creating color traps

After you have converted the image to CMYK, you can adjust the color trap. Trap is the overlap needed to ensure that a slight misalignment or movement of the plates while printing does not affect the final appearance of the print job. If any distinctly different colors in your image touch, you may need to overprint them slightly to prevent tiny gaps from appearing when the image is printed. This technique is known as *trapping*. In most cases, your print shop will determine if trapping is needed and tell you what values to enter in the Trap dialog box.

Note: *Trapping does not affect existing spot channels in the image.*



Misregistration with no trap, and misregistration with trap

Keep in mind that trapping is intended to correct the misalignment of solid tints in CMYK images. In general, you should not create trap for continuous-tone images such as photographs. Excessive trapping may generate a keyline effect (or even cross-hair lines) in the C, M, and Y plates. These problems may not be visible in the composite channel and might show up only when you output to film.

Trapping values determine how far overlapping colors are spread outward (not choked) to compensate for misregistration on the press. Adobe Photoshop uses standard rules for trapping:

- All colors spread under black.
- Lighter colors spread under darker colors.
- Yellow spreads under cyan, magenta, and black.
- Pure cyan and pure magenta spread under each other equally.

To create trap:

1 Save a version of the file in RGB mode, in case you want to reconvert the image later. Then choose Image > Mode > CMYK Color to convert the image to CMYK mode.

2 Choose Image > Trap.

3 For Width, enter the trapping value provided by your print shop. Then select a unit of measurement, and click OK. Consult your print shop to determine how much misregistration to expect.

Using monotones, duotones, tritones, and quadtones

Photoshop lets you create monotones, duotones, tritones, and quadtones. Monotones are grayscale images printed with a single, nonblack ink. Duotones, tritones, and quadtones are grayscale images printed with two, three, and four inks. In these types of images, colored inks are used to reproduce tinted grays rather than different colors.

This section uses the term *duotone* to refer to duotones, monotones, tritones, and quadtones.

About duotones

Duotones are used to increase the tonal range of a grayscale image. Although a grayscale reproduction can display up to 256 levels of gray, a printing press can reproduce only about 50 levels of gray per ink. This means that a grayscale image printed with only black ink can look significantly coarser than the same image printed with two, three, or four inks, each individual ink reproducing up to 50 levels of gray.

Sometimes duotones are printed using a black ink and a gray ink—the black for shadows and the gray for midtones and highlights. More frequently, duotones are printed using a colored ink for the highlight color. This technique produces an image with a slight tint to it and significantly increases the image's dynamic range. Duotones are ideal for two-color print jobs with a spot color (such as a PANTONE ink) used for accent.

Because duotones use different color inks to reproduce different gray levels, they are treated in Photoshop as single-channel, 8-bit, grayscale images. In Duotone mode, you do not have direct access to the individual image channels (as in RGB, CMYK, and Lab modes). Instead, you manipulate the channels through the curves in the Duotone Options dialog box.

To convert an image to duotone:

1 Convert the image to a grayscale image by choosing Image > Mode > Grayscale. Only 8-bit grayscale images can be converted to duotones.

2 Choose Image > Mode > Duotone.

3 Select Preview to view the effects of the duotone settings on the image.

4 Specify the type of image, the ink colors, the duotone curves, and the overprint colors for the duotone image. These options are described in the following sections.

5 Click OK.

To apply a duotone effect to only part of an image, convert the duotone image to Multichannel mode—this converts the duotone curves to spot channels. You can then erase part of the spot channel for areas that you want printed as standard grayscale. (See "Using spot channels" on page 245.)

Specifying the duotone type and ink colors

The duotone type—monotone, duotone, tritone, or quadtone—determines how many ink controls are active.



For a color illustration of duotones, see figure on page 236.

To produce fully saturated colors, print darker inks before lighter inks. The order of inks in the duotone dialog boxes affects how Photoshop applies screens, so make sure that inks are specified in descending order—darkest at the top, lightest at the bottom.

To specify the duotone type and its ink color:

1 In the Duotone Options dialog box, for Type specify monotone, duotone, tritone, or quadtone.

2 Click the color box (the solid square) for an ink.

3 Use the color picker or the Custom Colors dialog box to select the ink you want. When you close the dialog box, the ink color appears in the color box and the color name in the text box. (See "Using the Adobe Photoshop Color Picker" on page 218.)

4 If the ink is to be separated on a process color plate, name it "cyan," "magenta," "yellow," or "black."

Modifying the duotone curve

A separate duotone curve specifies how each ink is distributed across the shadow and highlight areas of the image. This curve maps each grayscale value on the original image to the actual ink percentage that will be used when the image is printed. A diagonal curve indicates equal values and even distribution of ink.

To modify the duotone curve for a given ink:

1 To preview any adjustments, select the Preview option.

2 Click the curve box next to the ink color box.

The default duotone curve, a straight diagonal line across the grid, indicates that you are mapping the current grayscale value of every pixel to the same percentage value of the printing ink. At this setting, a 50% midtone pixel prints with a 50% dot of the ink, a 100% shadow with a 100% dot of the ink, and so on.

3 Adjust the duotone curve for each ink by dragging a point on the graph or by entering values for the different ink percentages.

The horizontal axis of the curve graph moves from highlights (at the left) to shadows (at the right). The density of the ink increases as you move up the vertical axis. You can specify up to 13 points on the curve. When you specify two values along the curve, Adobe Photoshop calculates intermediate values. As you adjust the curve, values are automatically entered in the percentage text boxes.

The value you type in a text box indicates the percentage of the ink color that will be used to print that percentage of the image. For example, if you enter 70 in the 100% text box, a 70% dot of that ink color will be used to print the 100% shadow areas of the image.

4 Click Save in the Duotone Curve dialog box to save curves created with this dialog box.

5 Click Load to load these curves or curves created in the Curves dialog box (including curves created using the Arbitrary Map option). See "Using the Curves command" on page 120 for more information on adjusting curves, and "Saving and loading duotone settings" on page 342.

You can use the Info palette to display ink percentages when you're working with duotone images. Set the readout mode to Actual Color to see the ink percentages that will be applied when the image is printed. These values reflect any changes you've entered in the Duotone Curve dialog box. (See "Using the Options palette" on page 29.)



For a color illustration of duotone curves, see figure 15-2 on page 228.

Specifying overprint colors

Overprint colors are two unscreened inks printed on top of each other. For example, when a cyan ink prints over a yellow ink, the resulting overprint is a green color. The order in which inks are printed, as well as variations in the inks and paper, can significantly affect the final results.

To help you predict how colors will look when printed, use a printed sample of the overprinted inks to adjust your screen display. Just remember that this adjustment affects only how the overprint colors appear on-screen, not when printed. Before adjusting these colors, make sure that you have calibrated your system following the instructions in Chapter 5, "Reproducing Color Accurately."

To adjust the display of overprint colors:

1 Choose Image > Mode > Duotone.

2 Click Overprint Colors. The Overprint Colors dialog box displays the combinations that will result when the inks are printed.

3 Click the color swatch of the ink combination you want to adjust.

4 Select the color you want in the color picker, and click OK.

5 Repeat steps 3 and 4 until the overprint inks appear as you want them. Then click OK.

Saving and loading duotone settings

Use the Save and Load buttons in the Duotone Options dialog box to save a set of duotone curves, ink settings, and overprint colors. You can then apply these settings to other grayscale images.

In addition, the Adobe Photoshop program includes several sample sets of duotone, tritone, and quadtone curves. These sets include some of the more commonly used curves and colors and are useful as starting points for creating your own combinations.

Viewing the individual printing plates

Because duotones are single-channel images, your adjustments to individual printing inks are displayed as part of the final composite image. In some cases, you may want to view the individual "printing plates" to see how the individual colors will separate when printed (as you can with CMYK images).

To view the individual colors of a duotone image:

1 After specifying your ink colors, choose Image > Mode > Multichannel.

The image is converted to a multichannel image, with each channel represented as a spot-color channel that can be edited independently. The contents of each spot channel accurately reflect the duotone settings, but the on-screen composite preview may not be as accurate as the preview in Duotone mode.

Important: *If you make any changes to the image in Multichannel mode, you will be unable to revert to the original duotone state. To adjust the distribution of ink and view its effect on the individual printing plates, make the adjustments in the Duotone Curves dialog box before converting to Multichannel mode.*

2 Select the channel you want to examine in the Channels palette.

3 Choose Edit > Undo Multichannel to revert to Duotone mode.

Printing duotones

When creating duotones, keep in mind that both the order in which the inks are printed and the screen angles you use dramatically affect the final output. (See "Specifying the duotone type and ink colors" on page 340.)

Click the Auto button in the Halftone Screens dialog box to set the optimal screen angles and frequencies (see "Selecting halftone screen attributes" on page 335). Make sure that you select Use Accurate Screens in the Auto Screens dialog box if you're printing to an imagesetter equipped with PostScript Level 2 (or higher) or an Emerald controller.

Note: *The recommended screen angles and frequencies for quadtones are based on the assumption that channel 1 is the darkest ink and channel 4 is the lightest ink.*

To print separations of a duotone image, choose File > Print. You do not have to convert duotone images to CMYK to create separations. Converting to CMYK mode converts any custom colors to their CMYK equivalents.

Exporting duotone images to other applications

To prepare a duotone image for exporting to a page-layout application, save the image in EPS format. Keep in mind that it's important to name custom colors so they'll be recognized by the other application. Otherwise the image won't print correctly—or might not print at all.

Printing color separations

Once you've applied the spot color or colors you want to either a duotone or a CMYK image, you can print separations for color in the image. See "Adding spot colors" on page 245 for more information.

If you are printing an image from another application and want to print spot channels to spot color plates, you must first save the file in DCS 2.0 format. DCS 2.0 preserves spot channels and is supported by applications such as Adobe PageMaker and QuarkXPress.

To print separations from Photoshop:

1 Choose File > Print.

2 On the Macintosh, choose Adobe Photoshop 5.0 from the dialog box menu.

3 For Space, choose Separations.

4 Click OK. Separations are printed for each of the colors in the image.

To prepare an image with spot channels for printing from another application:

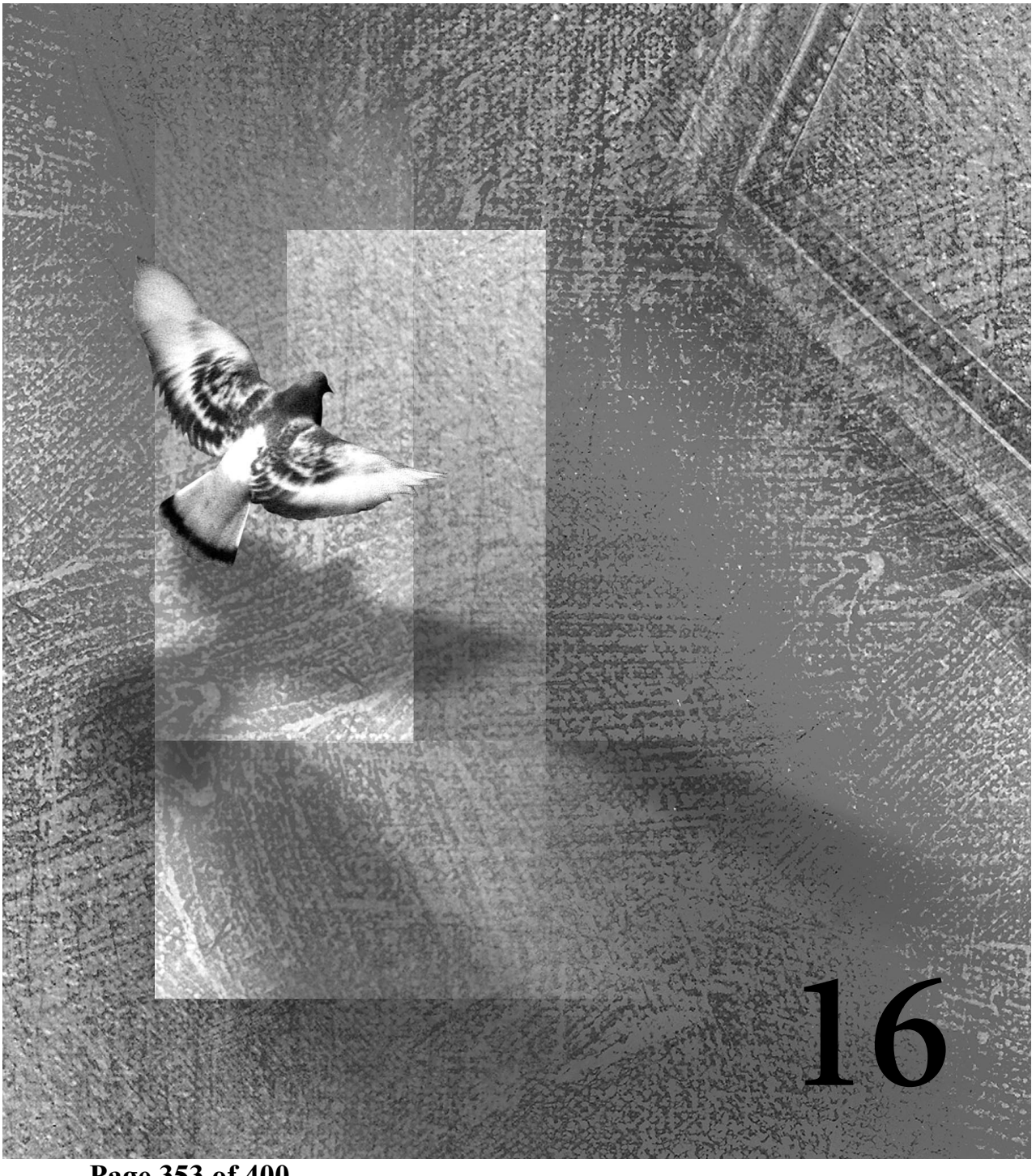
1 In the General Preferences dialog box, select Short Pantone Names. (This step is not necessary if you are exporting to Adobe Illustrator 7.0 or Adobe PageMaker 6.5.)

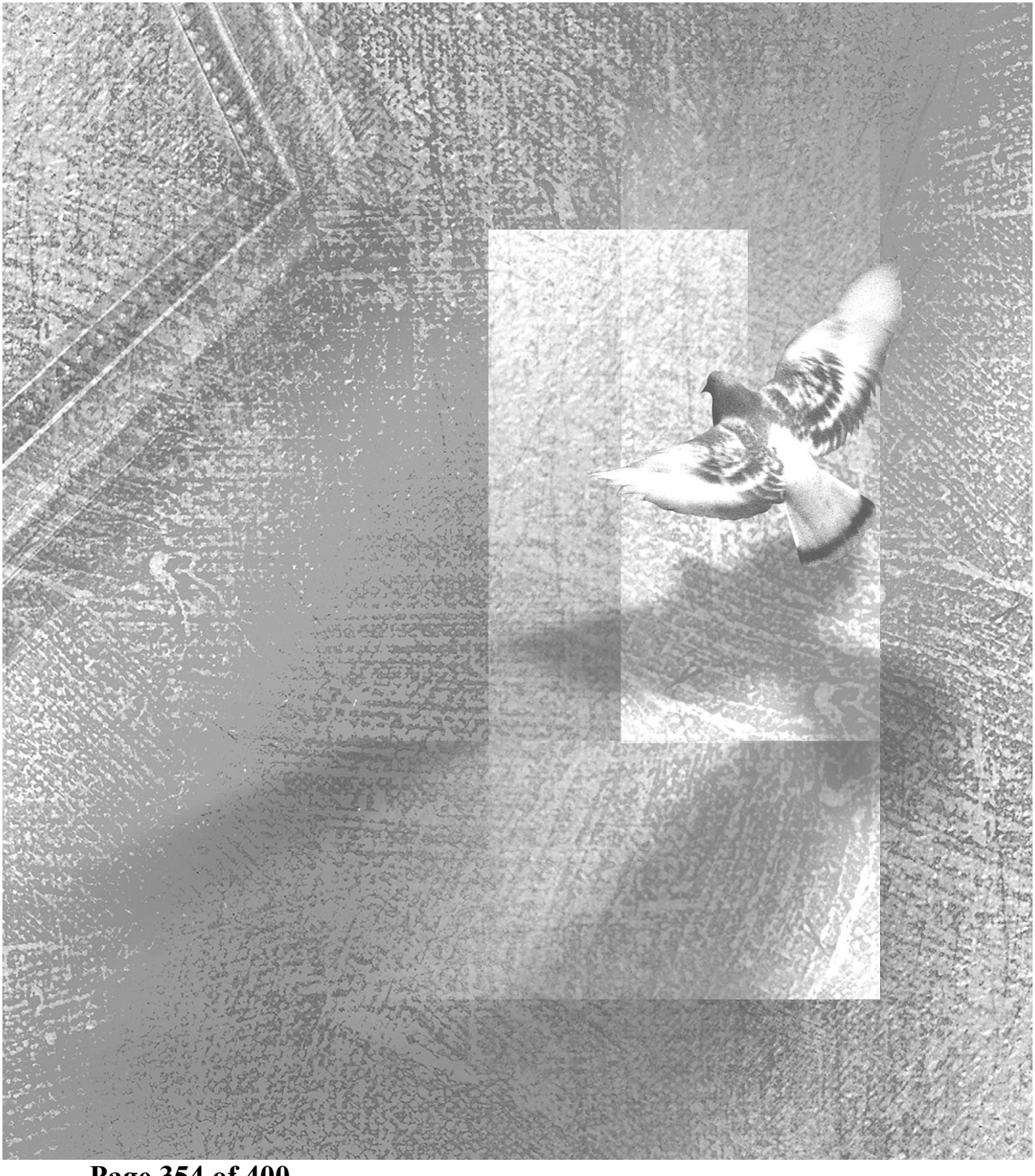
2 If the image is a duotone, convert to Multichannel color mode.

3 Save the image in DCS 2.0 format. Be sure to deselect the Include Halftone Screen and the Include Transfer Function options.

(See "Saving files in Photoshop EPS or DCS format" on page 315.)

4 Open or import the image in the application you will be printing from and set your screen angles. Make sure that you've communicated to the printer the spot color you want for each of the color plates.


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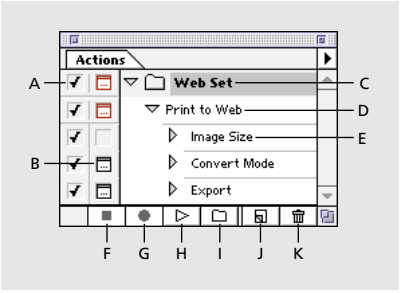
Chapter 16: Automating Tasks

Adobe Photoshop lets you automate tasks by grouping a series of commands into a single *action*. For example, you can create an action that applies a series of filters to reproduce a favorite effect or combine commands to prepare images for online publishing. Actions can be grouped into *sets* to help you better organize your actions. Using the example above, you could create a set of actions, where each action applied a different series of filters. You can use an action on a single file or on a batch (multiple files in the same folder).

You use the Actions palette to record, play, edit, and delete actions. It also lets you save, load, and replace action sets.

To display the Actions palette:

Choose Window > Show Actions.



***A.** Toggles command on or off **B.** Toggles modal control on or off **C.** Set **D.** Action **E.** Recorded command **F.** Stop Playing/Recording **G.** Record **H.** Play **I.** New Set **J.** New Action **K.** Trash*

You can display actions in the Actions palette in either list view or button view. In list view, sets can be expanded to display actions, which in turn can be expanded to display individual commands. Commands can then be expanded to display recorded values.

To display actions as buttons:

Choose Button Mode from the Actions palette menu. Choose Button Mode again to return to the list view.

To expand and collapse sets and commands:

Click the triangle to the left of the set or command in the Actions palette.

Creating and recording actions

When you create an action, Photoshop records the commands (including any specified values) and tools you use, in the order you use them.

The following guidelines can help you in designing actions:

• Most, but not all, commands can be recorded. However, you can allow for commands that cannot be recorded. (For more information, see "Inserting nonrecordable commands" on page 349.)

• The gradient, marquee, crop, polygon, lasso, line, move, magic wand, paint bucket, and type tools, and the Paths, Channels, Layers, and History palettes can be recorded.

• Actions created in Photoshop 4 are compatible with this version of Photoshop, but not vice versa.

• You can record the Play command listed on the Actions palette menu, and record the Batch command listed in the File > Automate menu to cause one action to play another.

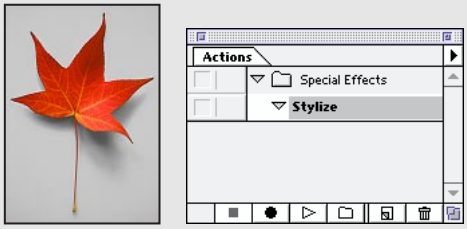
• Modal operations and tools, and any tools that record position use the units currently specified for the ruler. A modal operation or tool is one that requires you to press Enter or Return to apply its effect, such as the transformation commands or the crop tool. Tools that record position include the gradient, magic wand, lasso, marquee, and path tools.

• When recording an action, keep in mind that playback results depend on such variables as the current background and foreground colors, and on file and program settings, such as the image color mode, resolution, and active layer. For example, a 3-pixel Gaussian blur won't create the same effect on a 72-ppi file as on a 144-ppi file. Likewise, Color Balance won't work on a grayscale file.

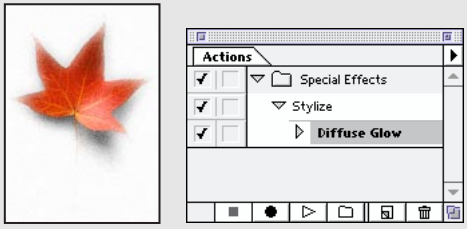
Because Photoshop executes the commands as you record them, it's a good idea to record a complicated action using a copy of a file, and then play the action on the original.

• Until you specifically save a set of actions with the Save Actions command, actions are automatically saved in the file Actions Palette.psp (Windows) or Actions Palette (Mac OS) located in the Adobe Photoshop Settings folder within the Photoshop folder.

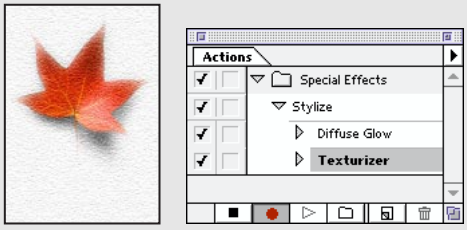
RECORDING AN ACTION



Original when recording started



Diffuse Glow filter recorded



Texturize filter recorded

To create and record an action:

1 Open a file.

2 In the Actions palette, click a set or an item within a set.

3 In the Actions palette, click the New Action button (⊡) or choose New Action from the pop-up menu on the palette.

4 Name the action, assign it to any combination of the Ctrl key (Windows) or Command key (Mac OS), the Shift key, and the Function keys (for example, Ctrl+Shift+F3), and choose a color for its display in the Actions palette.

5 Click Record. The Record button in the Actions palette turns red.

6 To guard against mistakes, record the Save a Copy command at the beginning of the action.

As an option, if your action requires a file to be in a particular mode, choose File > Automate > Conditional Mode Change to change the mode of the image based on its original mode.

7 Choose commands as you want them recorded.

If the command you choose opens a dialog box, clicking OK records the command, clicking Cancel does not record it. If a chosen command is not recorded, it must be inserted in the action. See the section, "Inserting nonrecordable commands."

Important: *When recording the Save As or Save a Copy commands, do not enter a filename. If you enter a filename, Photoshop records the filename and uses that filename each time you run the action. Before saving, however, if you go to a different folder, you can specify a different location without having to specify a filename.*

8 Stop recording by clicking the Stop button.

9 If you want to keep the action for use in future work sessions, save the action (see "Organizing sets of actions" on page 357).

Recording paths

The Insert Path command lets you record a path as part of an action. When played back, the entire path is reproduced as part of the action.

To record a path:

1 Start recording an action.

2 Select a path.

3 Choose Insert Path from the Actions palette menu.

Inserting nonrecordable commands

The painting and toning tools, tool options, view commands, and preferences cannot be recorded. However, many commands that cannot be recorded can be inserted into an action using the Insert Menu Item command.

An inserted command is not executed until the action is played. No values for the command are recorded in the action, so the file remains unchanged when the command is inserted. If the command has a dialog box, the dialog box appears during playback, and the action pauses until you click OK or Cancel. You can insert a command when recording an action or after it has been recorded.

Because you can assign a Ctrl key (Windows) or Command key (Mac OS), Function key, or Shift key combination to an action, the insert feature can re-create the functionality found in the Commands palette, which existed in earlier versions of Photoshop.

To insert a menu item in an action:

1 Choose where to insert the menu item:

• Select an action's name to insert the item at the end of the action.

• Select a command to insert the item at the end of the command.

2 Choose Insert Menu Item from the Actions palette menu.

3 Do one of the following:

• Choose a command from its menu.

• Enter a command in the Insert Menu Item dialog box, and click OK. If you don't know the full name of the command, enter part of it and click Find, then click OK.

• To insert the Undo, Cut, Copy, Paste, or Clear command, enter its name. Choosing any of these commands from the menu applies the command to the action.

4 Click OK.

Inserting stops

You may want to include a stop in your action so that you can perform a task that cannot be recorded (for example, using a painting tool). Once you've made the selection, you can then continue by clicking the Play button in the Actions palette.

You can also display a short message when the action reaches the stop. For example, you can remind yourself what you need to do before continuing with the action. A Continue button can be included in the message box. This way you can check for a certain condition in the file (for example, a selection) and continue if nothing needs to be done. You can insert a stop when recording an action or after it has been recorded.

To insert a stop:

1 Choose where to insert the stop:

• Select an action's name to insert the stop at the end of the action.

• Select a command to insert the stop after the command.

2 Choose Insert Stop from the Actions palette menu.

3 Type the message you want to appear.

4 If you want the option to continue the action without stopping, select Allow Continue.

5 Click OK.

Setting modal controls and excluding commands

After recording an action, you can insert a *modal control*. This lets you pause a command to display its dialog box and specify different values, and to manipulate a modal tool to apply new settings. (A modal tool requires pressing Enter or Return to apply its effect.)

If you do not use a modal control, Photoshop runs the command using the values specified when you first recorded the action (and the dialog box does not appear).

You can also exclude commands that you don't want to include as part of a recorded action or that you don't want to play when running the action.

To set a modal control:

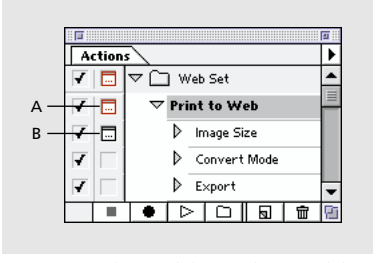
1 Make sure that the Actions palette is in list view. If necessary, deselect Button mode in the Actions palette menu.

2 Do one of the following:

• Click the column to the left of the command name to display the dialog box icon. Click again to remove the modal control.

• To turn on or disable modal controls for all commands in an action, click the column to the left of the action name.

• To turn on or disable modal controls for all commands in an action or set, click the column to the left of the action or set name.



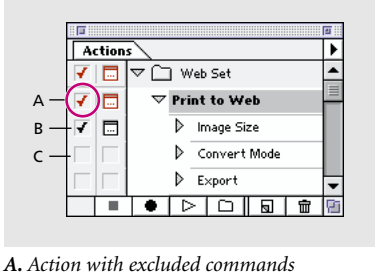
***A.** Action with a modal control **B.** Modal control*

To exclude or include a command:

Do one of the following:

• Click to clear the check mark to the left of the command name. Click again to include the command.

• To exclude or include all commands in an action or set, click the checkbox to the left of the action or set name.



***A.** Action with excluded commands*
***B.** Included command **C.** Excluded command*

Playing actions

When you play an action, Photoshop executes the series of commands as you recorded them. But you can begin with any command, exclude commands, or play a single command in an action. If you have inserted a modal control in your action, you can specify values in a dialog box or reapply a modal tool (any tool that requires you to press Enter or Return to apply it) when the action pauses. (See "Setting modal controls and excluding commands" on page 351.)

In button view, clicking a button executes the entire action—though commands previously excluded are not executed.

To play an action or set on a single file:

1 Open the file.

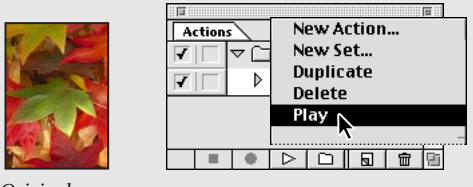
2 Specify what to play:

- To play a set of actions, select the set name.
- To play an entire action, select the action name.
- To play only part of an action, select the command from which you want the action to start.

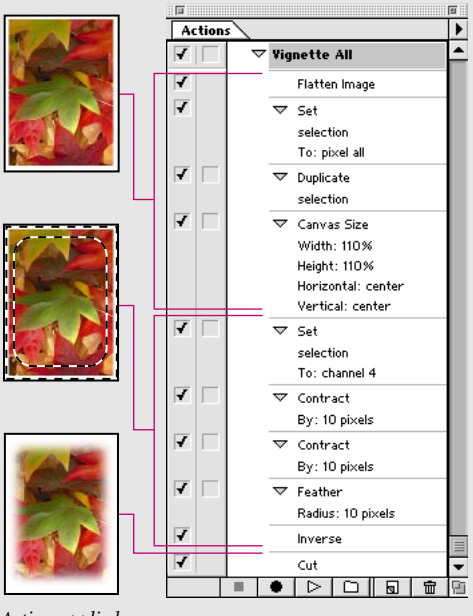
3 To exclude or include a command within an action from play, click the check box to the left of the action name.

4 Click the Play button in the Actions palette or choose Play from the pop-up menu.

APPLYING AN ACTION



Original



Action applied

Note: *Because an action is a series of commands, using the File > Undo command, you can undo only the last command in an action. However, you can undo an entire action by taking a snapshot in the History palette before you play an action, and then selecting the snapshot to undo the action.*

To play a single command in an action:

1 Select the command you want to play.

2 Specify a speed:

• Control-click (Windows) or Command-click (Mac OS) the Play button in the Actions palette.

• Hold down Control/Command, and double-click the command.

• Choose Play from the Actions palette menu.

Slowing actions during playback

Sometimes a long, complicated action does not play properly, but it is difficult to tell where the problem occurs. The Playback Options command gives you three speeds at which to play actions, so that you can watch each command as it is carried out.

To specify how fast actions should play:

1 Choose Playback Options from the pop-up menu.

2 Specify a speed:

• Select Accelerated to play the action at normal speed (the default).

• Select Step by Step to complete each command and redraw the image before going on to the next command in the action.

• Select Pause and enter the amount of time Photoshop should pause between carrying out each command in the action.

3 Click OK.

Batch processing

The Batch command lets you play an action on a folder of files and subfolders. If you have a digital camera or a scanner with a document feeder, you can also import and process multiple images with a single action. Your scanner or digital camera may need an acquire plug-in module that supports actions. (If the third-party plug-in wasn't written to import multiple documents at a time, it may not work during batch-processing or if used as part of an action. Contact plug-in's manufacturer for further information.)

When batch-processing files, you can leave all the files open, close and save the changes to the original files, or save modified versions of the files to a new location (leaving the originals unchanged). If you are batch-processing a folder of files, copy all the desired files to the same level of a folder before starting the batch. If you are saving the processed files to a new location, you may want to create a new folder for the processed files before starting the batch.



For better batch performance, reduce the number of saved history states and deselect the Automatically Create First Snapshot option in the History palette.

To batch-process files:

1 Choose File > Automate > Batch.

2 For Set, choose the desired set.

3 For Action, choose the desired action.

4 For Source, choose Folder to play an action on files (including subfolders) already stored on your computer. Click Choose to locate and select the folder.

5 To ensure that the files are opened from the specified folder, select Override Action "Open" Commands. Any Open commands that were recorded as part of the original action are ignored.

For information on using the Import option to batch-process imported files, see Chapter 3, Getting Images into Photoshop.

6 For Destination, choose an option:

• None to leave the files open without saving changes (unless the action included a Save command).

• Save and Close to save the files in their current location.

• Folder to save the altered files to another location. Click Choose to specify the destination folder.

If you chose Folder, select Override Action "Save In" Commands to ensure that the processed files are saved to the specified destination folder and not to a location recorded with the Save As or Save a Copy commands.



Saving files using the Batch command options always saves the files in the same format as the original files. To create a batch-process that saves files in a new format, record the Save As or Save a Copy command and then Close command as part of your original action. Then choose None for the Destination when setting up the batch process.

7 For Errors, choose an option:

• Stop for Errors to suspend the batch process until you confirm the error message.

• Log Errors to File to record each error in the file without stopping the batch process. If errors are logged to this file, a message appears after processing the files alerting you to review the error file. If you select this option, click Save As and name the error file.



To batch-process using multiple actions, create a new action and record the Batch command for each action you want to use. This technique also lets you process multiple folders in a single batch. To batch-process multiple folders, create aliases within a folder to the other folders you want to process.

Editing actions

You can edit actions in the following ways:

• Rearrange actions, or rearrange commands within an action and their order of execution.

• Add commands to an action.

• Record new commands or new values for actions with dialog boxes.

• Change action options such as the action name, button color, and shortcut key.

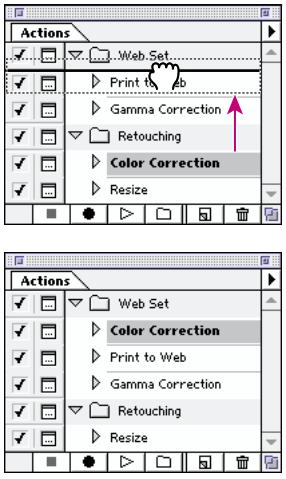
• Duplicate actions and commands. This helps you experiment with changing an action without losing the original version, and for creating an action based on an existing one.

• Delete actions and commands.

• Reset the actions to the default list.

To move an action to a different set:

In the Actions palette, drag the action to a different set. When the highlighted line appears in the desired position, release the mouse button.



Dragging Sharpen command into different set

To rearrange commands within an action:

In the Actions palette, drag the command to its new location within the same action. When the highlighted line appears in the desired position, release the mouse button.

To record additional commands:

1 Do one of the following:

• Select the action name to insert the new command at the end of the action.

• Select a command in the action to insert the command after it.

2 Click the Record button on the Actions palette.

3 Record the additional commands.

4 Click the Stop button to stop recording.

Note: *You can also insert nonrecordable commands (see page 349), or drag commands from other actions (see the procedure for duplicating a set, action, or command on page 356).*

To record an action again:

1 Select an action and choose Record Again from the Actions palette menu.

2 If a modal tool appears, do one of the following:

• Use the tool differently and Press Enter (Windows) or Return (Mac OS) to change the tool's effect.

• Press Enter (Windows) or Return (Mac OS) to retain the same settings.

3 If a dialog box appears, do one of the following:

• Change the values and click OK to record them.

• Click Cancel to retain the same values.

To record a single command again:

1 In the Actions palette, double-click the command.

2 Enter the new values, and click OK.

To change action options:

1 Do one of the following:

• Double-click the action name.

• Select the action, and choose Action Options from the Actions palette menu.

2 If desired, type a new name for the action, choose a color for the action button, or assign a Function key, Shift-Function key, Ctrl-Function key (Windows) or Command-Function key (Mac OS), or Ctrl-Shift-Function key (Windows) or Command-Shift Function key (Mac OS), to the action.

3 Click OK.

To duplicate a set, action, or command:

Do one of the following:

• Alt-drag (Windows) or Option-drag (Mac OS) the action or command to a new location in the Actions palette. When the highlighted line appears in the desired location, release the mouse button.

• Select a single set, action, or command. You can Shift-click, Ctrl-click (Windows) or Option-click (Mac OS) to select multiple items. Then choose Duplicate from the Actions palette menu. The copied sets or actions appear at the bottom of the Actions palette. The copied commands appear after the original command.

• Drag an action or command to the New Action button at the bottom of the Actions palette, or drag a set to the New Set button at the bottom of the Actions palette.The copied action appears at the bottom of the Actions palette. The copied command appears after the original command. The copied Set appears after the original set.

To delete a set, action, or command:

1 In the Actions palette, select the set, action, or command you want to delete. You can Shift-click, Control-click (Windows) or Option-click (Mac OS) to select multiple commands within an action.

2 Do one of the following:

• Click the Trash button on the Actions palette. Click OK to delete the action or command.

• Drag the selection to the Trash button on the Actions palette.

• Choose Delete from the Actions palette menu.

To delete all actions:

Choose Clear Actions from the Actions palette menu. Click OK to delete all the actions.



To delete a selected action or command automatically, Alt-click (Windows) or Option-click (Mac OS) the Trash button.

To reset actions to the default set:

1 Choose Reset from the Actions palette menu.

2 Click Append to add the set of default actions to the current actions in the Actions palette, or OK to replace the current actions in the Actions palette with the default set.

Organizing sets of actions

To help you organize your actions, you can create sets in which to place them and save the sets to disk. You can organize sets of actions for different types of work—for example, such as print publishing and online publishing—and transfer sets to other computers. You can save only the entire contents of the selected set in the Actions palette, not individual actions.

*(*Unsaved actions are automatically saved to a temporary file called Actions Palette.psp (Windows) or Actions Palette (Mac OS) in the Adobe Photoshop Settings folder within the Adobe Photoshop folder. If this temporary file is lost or removed, any unsaved actions you may have created will be lost. Be sure to use the Save Actions command in the Actions palette to save your actions to a separate actions file so you can load them later, and to keep them safe.)

Replacing a saved set of actions replaces all existing actions. Loading a saved set adds to existing actions, with new ones appearing at the bottom of the Actions palette.

To create a new set of actions:

1 In the Actions palette, choose New Set from the pop-up menu.

2 Enter the name of the set, and click OK.

To rename a set of actions:

1 In the Actions palette, choose Set Options from the pop-up menu.

2 Enter the name of the set, and click OK.

To save a set of actions:

1 Select a set.

2 Choose Save Actions from the Actions palette menu.

3 Type a name for the set, choose a location, and click Save. By default, saved actions are saved in the file Default Actions in the Required folder within the Photoshop folder.

To replace a set of actions:

1 Choose Replace Actions from the Actions palette menu.

2 Locate and select the actions file.

3 Click Open.

To load a set of actions:

1 Choose Load Actions from the Actions palette menu.

2 Locate and select the actions file.

3 Click Open.

Using the Automate commands

The Automate commands simplify complex tasks by combining them into one or more dialog boxes. Photoshop includes the following commands (third-party companies may provide additional commands as well):

• Conditional Mode Change changes the color mode of a document to the mode you specify, based on the original mode of the document.



By recording this command in an action, you can ensure that any actions that require an image to be in a specific color mode do not generate unwanted error messages.

• Contact Sheet produces a series of thumbnail previews on a single sheet from the files in the selected folder.

Note: *Make sure that the images are closed before applying this command.*

• Fit Image fits the current image to the width and height you specify, without changing its aspect ratio.

Note: *This will resample the image, changing the amount of data in the image.*

• Multi-Page PDF to PSD converts each page of the PDF document you select to a separate Photoshop file.

To use an automated command:

Choose File > Automate, and then choose any of the commands listed under it.

External automation

Photoshop supports some external automation using OLE Automation under Windows or AppleScript on the Macintosh. Using either of these methods lets you start Adobe Photoshop and execute actions externally.

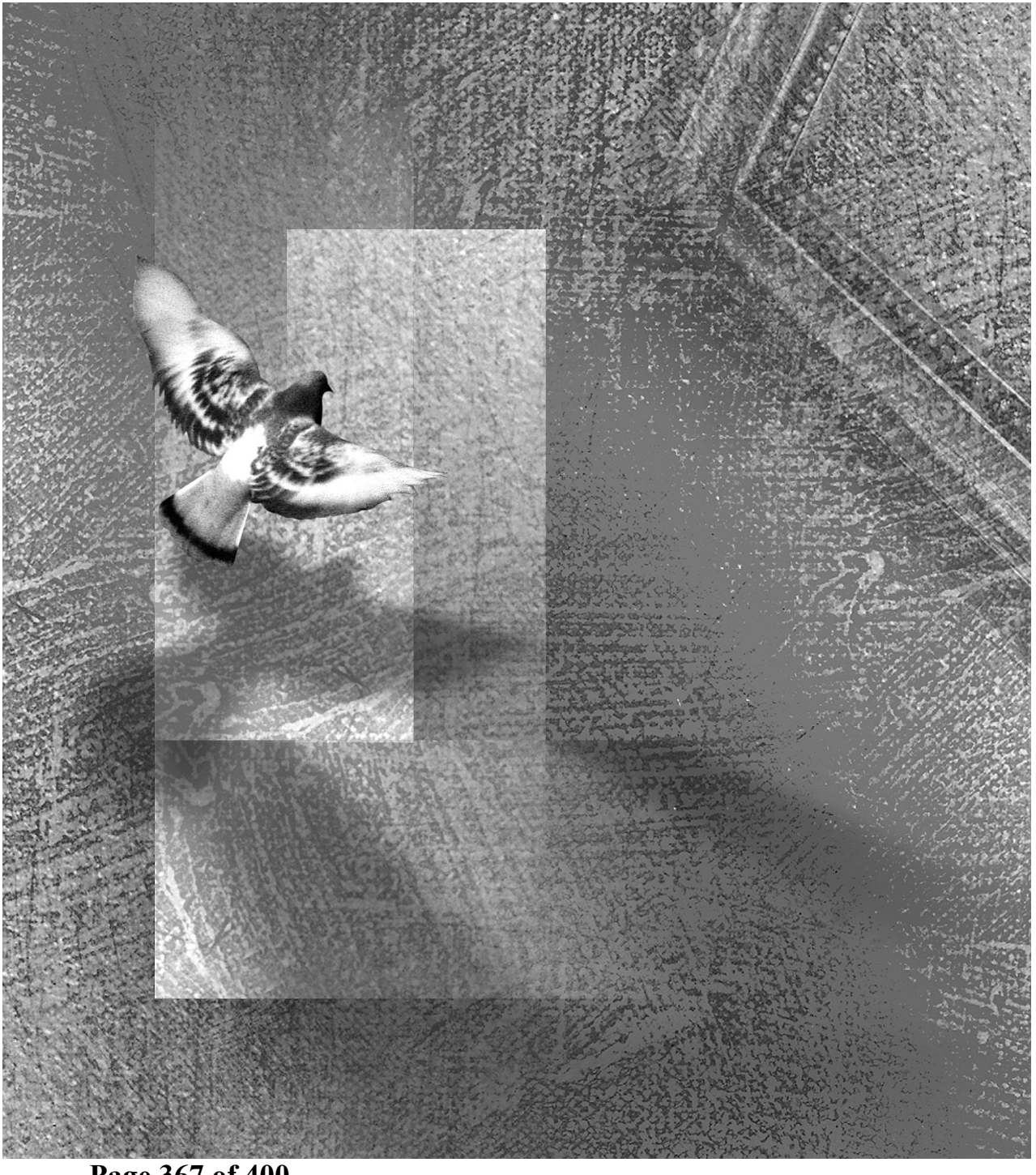
Using external automation lets you perform such tasks as:

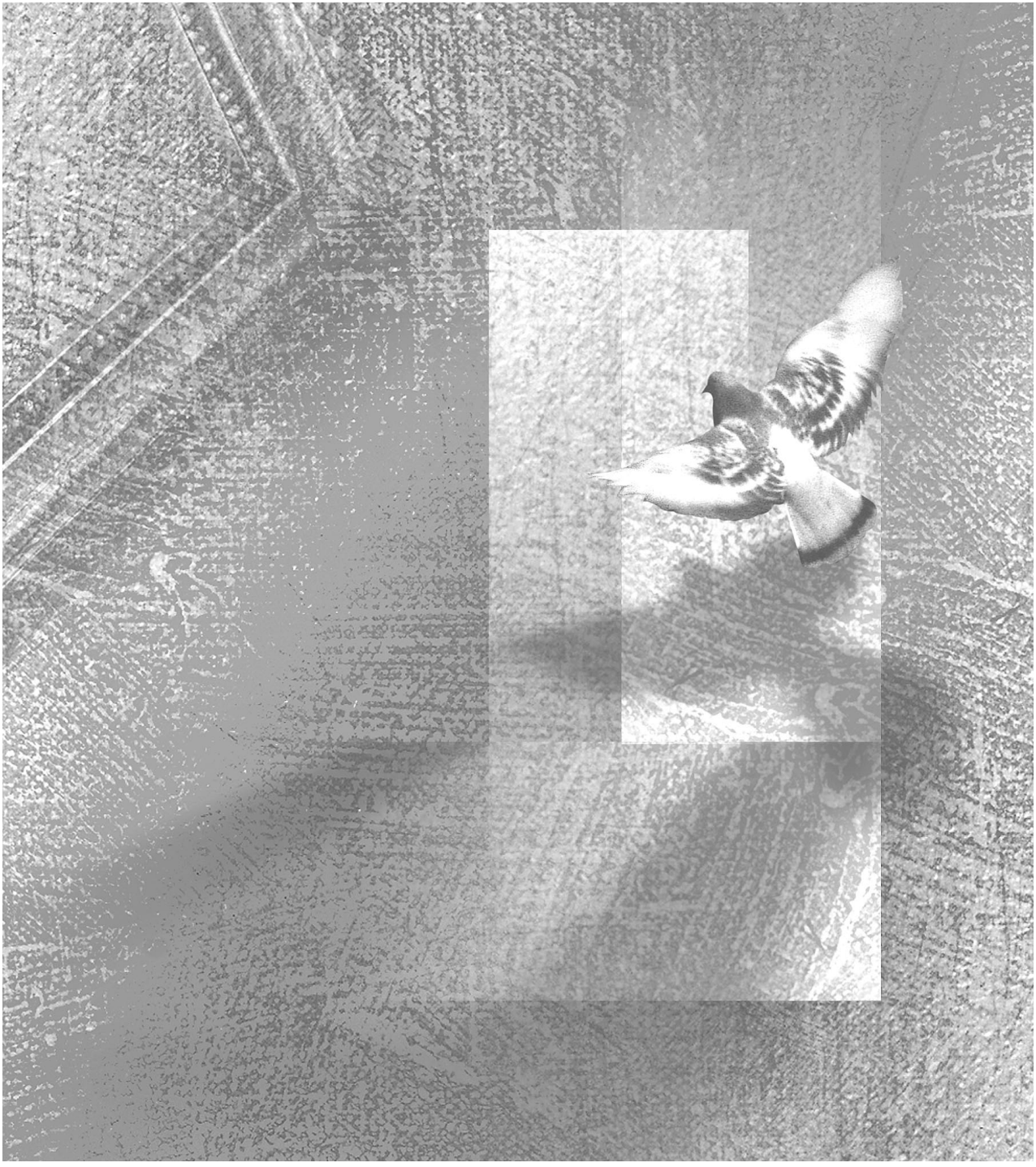
• Having another scriptable application generate a series of files, and having Photoshop batch-process them.

• Having Photoshop batch-process files and save them to your Web site.

• Writing a script that runs an action and then shuts down your computer late at night after you've gone home.

Additional information on OLE and AppleScript is available in the Technical Solutions database on the Adobe Web site. If you have further questions about OLE, contact Microsoft Corporation. For questions about AppleScript, see your Macintosh documentation or contact Apple Computer.





Appendix: Troubleshooting

This appendix contains common solutions to problems you may encounter when using the Adobe Photoshop program. The following areas provide further technical support information:

• For last-minute information not included in this user guide, see the Read Me file installed with the program.

• For a list of technical support resources, see the notice that came with the program.

• For additional information on technical support resources, see the files on the CD-ROM.

• For additional technical and troubleshooting information, browse through the Adobe technical notes on the application CD-ROM.



For information on improving performance, see the online help.

Before you call Adobe Technical Support

There are several steps you can take before calling technical support to receive assistance. Performing these steps can solve many problems and often eliminates the need for telephone assistance.

Reinstall Adobe Photoshop Many operational problems can be solved by simply reinstalling Photoshop.

If you encounter problems installing or reinstalling Photoshop, delete all of your Photoshop applications files, including the preferences file. Do this by using Add/Remove Programs located in the Control Panels Folder (Windows) or by dragging the files to the Trash folder (Mac OS). Then try the following:

• If you are experiencing problems installing from the CD, copy the entire Photoshop installation folder (Photoshop on Windows; Adobe Photoshop® on the Mac OS) to your hard disk and then install from the hard disk after following the instructions in the next paragraphs.

• On Windows, remove all items from the StartUp folder (located in Windows/Start Menu/Programs/StartUp). Then restart in Safemode (Windows 95) or in VGA mode (Windows NT). To display the Windows Startup screen, Press F8 when the message "Starting Windows 95" appears. See your Windows documentation for instructions on deactivating startup software and changing restart options. Reinstall Adobe Photoshop, and then restart Windows again in its normal mode. (Photoshop does not run in Safemode, VGA mode, or with the VGA driver.)

Note: *Although the Photoshop installer (a separate program) can run in Windows 95 "Safe Mode" or in fewer than 256 colors, Photoshop can only run when your Windows video is set to 256 colors or more.*

• On the Macintosh, use the Extensions Manager control panel or a third-party extension manager utility to temporarily turn off all extensions except your CD ROM extension. On most Macintoshes, this is the Apple CD ROM extension. Then reinstall Adobe Photoshop.

Check for new software or setting conflicts Problems with Adobe Photoshop can often be traced to recent installation of new software or utilities that are running at the same time as Photoshop. If you have recently installed new software or changed other system configuration settings, such as your monitor setting, try de-installing the software or restoring your original settings. (If you de-install software, you might need to reinstall Photoshop following the instructions in the previous section. This will ensure that any Photoshop files that might have been damaged by your new software installation are restored.) If the problem disappears, you can try reinstalling the problem software or system utility or contact the manufacturer for a new version and for compatibility information.

Check for the current video driver (Windows only) In Windows be sure you have a current video driver that's written specifically for your video card. To obtain the latest video driver for your hardware, contact the manufacturer of your video card.

Check for a software conflict In Windows, remove items that will launch at startup. Use Windows Explorer to move the shortcut files in the Windows\Start Menu\Programs\Startup folder to a different folder. On the Macintosh, hold down the Shift key and restart the computer to restart with extensions off. (See your Windows or Macintosh documentation for more information on deactivating startup software.)

If the problem disappears after restarting Photoshop, try restarting your computer with selected startup items reactivated until you have identified the problem software. You can then try reinstalling the software, or remove the software and contact the software manufacturer for a new version and for compatibility information.

Deactivate the preferences file To check whether your problem is caused by a corrupted preferences file, quit Adobe Photoshop, deactivate the preferences file, and restart Photoshop.

To deactivate the preferences file in Windows, rename the Adobe Photoshop 5 Prefs.psp and the Color Settings.psp files (located in your Photoshop\Adobe Photoshop Settings directory).

Note: *To make it easier to figure out which files you are seeing, start Windows Explorer and choose View > Options. Then deselect the option Hide MS-DOS file extensions for file types that are registered.*

To deactivate the preferences file on the Macintosh, drag the Adobe Photoshop Prefs file (located in the Adobe Photoshop/Adobe Photoshop Settings folder) to the Trash. If the problem disappears, delete the preferences. If the problem persists, restore the preferences file to its original names (Windows) or location (Mac OS) to preserve your preferences settings.

Check SCSI device connections Make sure that the devices you are using are securely and fully connected to your computer, that they are properly terminated, and that device cords are not damaged. The cause of the problem could be a bad connection.

You can also turn off all power and disconnect all SCSI devices. Then turn on your system and check if the problem disappears when you are no longer using a SCSI device. Test each device in the chain of SCSI devices.

Important: *Be sure to turn off your computer and SCSI devices before connecting, disconnecting, or checking SCSI cable connections. Failure to do so can damage your hardware.*

Remove all Photoshop plug-ins In rare cases, third-party Photoshop plug-ins can conflict with other plug-ins, hardware, or other software on your system. To ensure that the cause of your problem is not a plug-in conflict, temporarily remove all your plug-ins and restart Photoshop. To confirm that no plug-ins are loading, after restarting Photoshop select About Plug-ins from the Help Menu (Windows) or the Apple menu (Mac OS). If About Plug-ins is unselectable (grayed out), no plug-ins are loaded.

Optimize your hard disk Use a disk utility, such as Norton Utilities or Scandisk, to check whether your hard disk contains bad sectors that may be causing the crashes. You can then use a defragmenting utility to optimize the hard drive. (Defragmenting orders data contiguously so that it can be accessed quickly.) For instructions, see the utility's documentation.

Setup and performance problems

Commands don't appear in menus; Filter (or Import or Export) menu and submenus are gray or missing.

Photoshop recognizes only one plug-ins folder at a time. As a result, if you don't put new plug-ins into that folder, Photoshop won't know about them. Similarly, if you put new plug-ins into a folder outside of the current plug-ins folder, and then set Photoshop to recognize the new folder, it will no longer know about the plug-ins in the old plug-ins folder. For convenience, you can nest plug-ins in folders within folders, as long as you select only one plug-in folder at a time.

Choose File > Preferences > Plug-Ins & Scratch Disks, and make sure that you have selected the plug-ins folder containing the modules that you want to use. See "Setting preferences" on page 37, for information on choosing the plug-ins folder.

Operations seem unusually slow, or out-of-memory messages appear frequently.

Your system settings—such as the amount of RAM and use of the system's virtual memory—may be slowing down Adobe Photoshop operations. For information on setting up RAM and virtual memory in Photoshop and for other tips on improving performance, see the section "Improving Performance" in online Help.

Scratch disk full messages appear.

This error usually occurs when you are low on hard drive space, which Photoshop needs to process your images. Choose File > Preferences > Plug-Ins & Scratch Disks to determine where your scratch disks are located. Then use Windows Explorer or the Mac OS Finder to determine the amount of space available on those hard drives. Set the primary scratch disk space to a drive which contains contiguous free space that equals at least 3 to 5 times the size of your document in Photoshop.

For more information on the scratch disk, see Determining the amount of scratch disk space required in the online Help.

Space on hard disk appears lost.

When a Photoshop file is open, the system creates a temporary (.tmp) file to hold the information about the open images. Normally, this temporary file is deleted when you quit the program. However, sometimes when the system crashes the file is not deleted. Undeleted temporary files can cause system, printing, scanning, and saving errors and can take up space unnecessarily on the scratch disk volume.

Note: *Before attempting to delete temporary files, quit Photoshop and any other applications currently running. In the unlikely event that another application uses the .tmp extension for anything other than Windows temp files, these files should not be deleted.*

To restore the hard disk space and fix these problems caused by temporary files in Windows, search for files ending in .tmp on all hard drives from the root directory, including subfolders. Then delete the .tmp files and run the Scandisk utility and a defragmentation utility as described in "Before you call Adobe Technical Support" on page 361. (Note that you will not be able to delete the active Windows .tmp file.) For more information, see your Windows documentation.

To restore the hard disk space and fix these problems caused by temporary files on your Macintosh, empty the Trash to delete the temporary files. For more information, see your Macintosh documentation.

Problems starting Photoshop or opening or saving files (Windows 95 only)

When you start or work in Adobe Photoshop in Windows 95, one of these messages appears:

"Could not launch Photoshop because of a program error"

"Could not open file <*filename*> because of a program error."

"Could not save file <*filename*> because of a program error."

When Photoshop starts, and when it acquires, opens, scans, creates, or saves a file, it checks the default printer driver for information about that printer. For example, it checks for the page size, margins, and imageable area.

If Photoshop can't interpret this information, it displays an error message. This can occur if the printer driver is damaged, if it is incompatible with Windows 95, or if the driver is designed for a non-printer device (such as a fax machine) or for a non-PostScript printer (such as PCL).

To set an appropriate printer driver:

Do one of the following:

- Specify a different default printer. To do so, choose Start > Settings > Printers from the Windows desktop. Then, right-click a PostScript printer other than the current default printer, and choose Set as Default from the pop-up menu. If a PostScript printer driver isn't installed, you can select a non-PostScript printer. However, don't select a non-printer device, such as a fax or modem.
- Install a PostScript printer driver (such as an Adobe PostScript printer driver or Microsoft PostScript printer driver) and set up that printer as your default printer. You don't need a PostScript printer connected to your computer to install a PostScript printer driver. (For more information on installing printer drivers, see your Windows documentation.)
- Remove and reinstall the printer driver for the default printer. For instructions, see the printer driver documentation or contact the printer manufacturer.
- Install an updated version of the printer driver for the default printer. Contact the printer driver manufacturer for availability.

Problems with image appearance

Printed image appears different from image on-screen.

For accurate color printing, it is essential to calibrate your monitor and the Adobe Photoshop program for the various factors that affect the printed output. See Chapter 4, Choosing a Color Mode, and Chapter 5, Reproducing Color Accurately, for more information.

On-screen preview of image appears different after file is flattened.

When displaying an image at less than 100% magnification, the on-screen preview is an approximation of the actual pixels in the image. To maximize Photoshop's performance, this approximation may be made slightly differently with layered files. In most cases, the differences are not noticeable, but files with many adjustment layers or extensive use of blending modes may look different on-screen after flattening. When printed or viewed at 100% or greater magnification, the file will be unchanged. To view a file at 100% magnification, choose View > Actual Pixels.

CMYK colors displayed in the Info palette are different from those specified in RGB mode.

How colors are translated between CMYK and RGB modes is determined by the parameters specified in the Profile Setup, RGB Setup, and CMYK Setup dialog boxes. Depending on the settings of these parameters, CMYK values specified in RGB mode may separate as different values. (If the colors are specified in CMYK mode, they will separate as specified.) See Chapter 4, Choosing a Color Mode, and Chapter 5, Reproducing Color Accurately, for detailed information on color in Adobe Photoshop.

To determine the actual values that will result from a separation in RGB mode, choose Window > Show Colors to display the Colors palette. Be sure to set the Colors palette to the CMYK mode. Use the eyedropper tool to display the color in the Colors palette. (The color values appear next to the sliders.)

Painting tools don't work.

Painting tools work only on the target layer and inside areas that are parts of the current selection or when no part of the layer is selected.

Check to make sure that you are not painting outside a selected area. Check to make sure that you have not previously hidden the edges of the selection by pressing Ctrl/Command+H, or press Q to switch to QuickMask mode, to see which pixels are selected. If you are painting outside a selected area, choose Select > Deselect to deselect everything or Select > Inverse to switch the selected and unselected areas.

You might also be attempting to paint or fill a layer that has the Preserve Transparency option selected. In this case, painting is limited to the areas of the layer that contain pixels. Deselect this option in the Layers palette to edit anywhere on the layer.

The pointer disappears (Mac OS only).

Try either disabling or enabling the Direct Cursors extension in the Extensions folder. To turn off the extension, first create a new folder outside of the Photoshop folder; then drag the Direct Cursors extension out of the Extensions folder (located in the Plug-Ins folder) and into the new folder.

Only 16 pixels are available for the brush size (Mac OS only).

Disabling the Direct Cursors extension restricts the number of pixels available for the brush size. To fix this problem, turn on the Direct Cursors extension by placing it in the Extensions folder within the Plug-Ins folder.

Rectangular space appears around Photoshop images placed in other applications.

All exported Photoshop images are bitmaps on a rectangular grid of pixels. Therefore, by default, white backgrounds and transparent areas are visible when placed in other programs. To correct this problem, you need to create a clipping path for the image and save it in EPS or TIFF with the proper preview option. For more information, see "Using clipping paths" on page 327.

Some applications, such as Microsoft Word, also accept the PNG format. To save a file in PNG format with transparent areas, include an alpha channel that specifies the transparency.

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Kaoru Hollin (p. 42: Bicycle Illustration)

Kim Isola (p. 229: Duck)

Julieanne Kost (p. 32: Purple Flower, p. 46: Candle, p. 71: Grapes, p. 93: White Flowers, p. 107: Pepper, p. 113: Archway, p. 113: Glacier, p. 113: Southwest Ruins, p. 113: Door Knockers, p. 115: Orange, p. 226: Window, p. 128: Lion Door Knocker, p. 131: Cat Statue, p. 137: Button, p. 137: Key, p. 137: Frame, p. 143: Flower Jar, p. 144: Flower, p. 149: Teapot, p. 155: Mug, p. 173: Buttons, p. 177: Star, p. 178: Clouds, p. 182: Orange Leaf, p. 182: Background, p. 187: Bottles, p. 187: Box, p. 199: Pear, p. 225: Plate, p. 231: Strawberries, p. 231: Pumpkins, p. 231: Pomegranate, p. 246: Clouds, p. 257: Lion, p. 257: Zebra, p. 289: Pasta, p. 300: White Flower, p. 302: Sailboat, p. 303: Wheel, p. 346: Leaf, p. 350: Leaves, Filter Gallery in online help)

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