



## User Guide

# Adobe Photoshop<sup>®</sup> version 4.0

## Adobe Photoshop 4.0 User Guide for Macintosh and Windows

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# Introduction

**W**elcome 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 Adobe Photoshop excels as an art production tool, whether you are an art director or electronic publisher 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. The software is equally useful to printers and service bureaus that want to generate color separations, to animators who want to colorize images and produce audiovisual 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 Macintosh and Windows 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 the *Adobe Photoshop Getting Started* booklet. This booklet also provides information on new features in Adobe Photoshop 4.0 and on using the Adobe Type Manager® program with Adobe Photoshop.

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 Macintosh or Windows® documentation.

## Learning Adobe Photoshop

Adobe Photoshop 4.0 includes the following printed and online documentation. For information on troubleshooting and technical support, see Appendix B, "Troubleshooting."

**The Adobe Photoshop Getting Started Guide** contains system requirements, installation instructions, and a description of new features in Adobe Photoshop 4.0.

**The Adobe Photoshop User Guide** contains complete information on using all Adobe Photoshop commands and features.

**The Adobe Photoshop Help system** contains all the information in the Adobe Photoshop user guide, optimized for use online. In addition the Help system includes a description of new features and Adobe Photoshop shortcuts.

**The Adobe Photoshop Tutorials and Beyond the Basics** on the Tutorial CD-ROM contain step-by-step tutorials in PDF format with accompanying QuickTime movies. In addition, the tutorials include a New Features movie and a demonstration movie for the Adobe Photoshop Quick Tour in Chapter 1 of this user guide.

**The Electronic Publishing Guide** on the Tutorials CD-ROM provides an introduction to electronic publishing design issues and to publishing with Adobe Acrobat on the Web and on CD-ROM.

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

**Adobe Online Services** For more information about Adobe products and services, you can use forums on CompuServe and America Online, the Adobe Home Page on the World Wide Web, or the Adobe technical support bulletin board system. To open the Adobe Home Page, use the URL <http://www.adobe.com> once you are on the World Wide Web. To use the Adobe bulletin board, call 1-206-623-6984 (8-N-I, up to 28.8K baud). Forums and BBS availability may vary by country.

# Chapter 1: A Quick Tour of Adobe Photoshop

**T**his interactive tour of Adobe Photoshop provides an overview of key features of the program in approximately one hour.

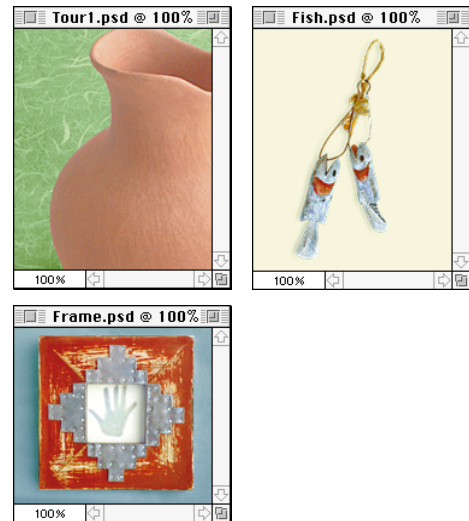
For step-by-step instructions on how to use the individual features introduced in this tour, as well as a movie version of the tour, see the lessons provided on the Tutorial CD. To find complete information about any feature, see the index in this user guide.



You can get images into Adobe Photoshop in a variety of ways. Most projects begin with a scanned image, stock digital art, or are created from scratch using a drawing program, such as Adobe Illustrator, or a painting program, such as Adobe Photoshop. For this tour, you'll use files that were created from all of these sources.

**1** Start Adobe Photoshop.


**2** Choose File > Open, and open the files Tour1.psd, Frame.psd, and Fish.psd, located in the Adobe Photoshop 4.0/Tutorial/Artfiles folder. Arrange the windows so you can work with them easily.

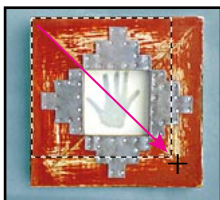



## Selecting

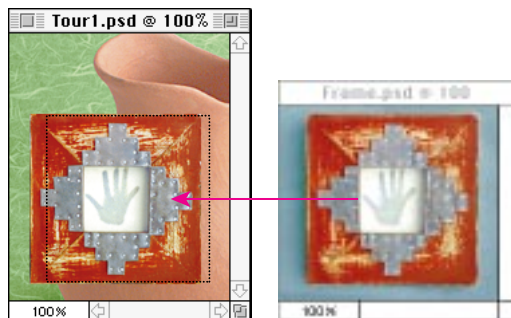
In Adobe Photoshop, you modify part of an image by first selecting that area. You'll begin your tour by making selections in files using the selection tools. (Don't worry. If you make a mistake at any point in the tour, simply choose Edit > Undo, and try again.)

First, you'll make a simple rectangular selection, and drag an image from one document into another.

- 1 Click the Frame.psd window to make it the active window.
- 2 Select the rectangle marquee tool () in the toolbox. Then drag a rectangular selection marquee from one corner of the frame to the opposite corner, to select the image.

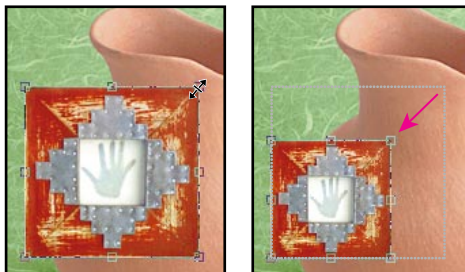


- 3 Select the move tool () in the toolbox. Drag the frame into the Tour1.psd window. The frame is now part of that file.



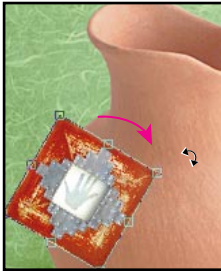
Now you'll resize the frame.

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





**5** Move the pointer outside the selection handles and drag clockwise to rotate the frame about 25°. Press Return (Macintosh®) or Enter (Windows®).



Next, you'll make a selection with the magic wand tool. The magic wand tool selects areas based on their similarity in color.

**6** Select the magic wand tool (⌘); then click the Fish.psd window to make it the active window.

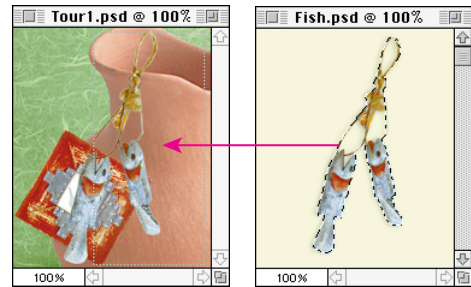
**7** Click the tan background in the image to select it. Notice that the background inside the hooks is not selected.

**8** Choose Select > Similar to add the rest of the background to the selection. You've now selected everything except the fish, string, and hooks.

**9** Choose Select > Inverse to select the fish. The Inverse command selects everything that wasn't selected—in this case, the fish.

**10** Hold down Command + Shift (Macintosh) or Ctrl + Shift (Windows) and drag the image onto the Tour1.psd window. Holding down

Command/Ctrl changes to the move tool, and holding down the Shift key as you drag places the copied image in the center of the artwork.



**11** To rotate the fish image precisely, choose Layer > Transform > Numeric. Select the Rotate option, enter an angle in the Angle text box (we used 320°), and click OK.

**12** Close the Frame.psd and Fish.psd windows.

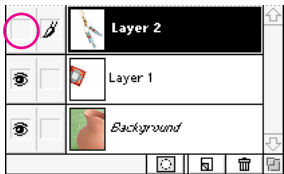
## Layers

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

**1** To display the Layers palette, choose Window > Show Layers. Click the grow box located near the top right of the Layers palette to expand the palette.

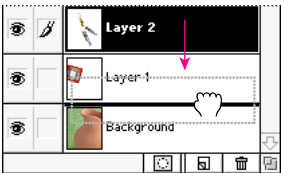
Notice that each layer has a name, as well as a *thumbnail*, or miniature version, of the image on that layer. Photoshop automatically created separate layers for the frame image (Layer 1) and fish image (Layer 2) when you brought them into the Tour1.psd file.

- 2 Click the eye icon next to Layer 2 (the fish layer) to hide the layer. Click again to redisplay the layer.



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

- 3 Drag Layer 2 (the fish layer) until it's between Layer 1 (the frame layer) and the Background layer on the Layers palette. Release the mouse button to set Layer 2 in its new position.

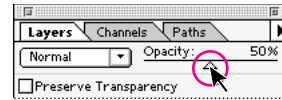


- 4 Click the name Layer 1 in the Layers palette to make it the active layer. A paintbrush icon appears next to the layer thumbnail, indicating that your changes will now affect artwork on that layer only.

- 5 Select the move tool ( ). Then drag the frame toward the top left of the artwork. Because the frame is on its own layer, you can move it separately from objects on other layers.

Now you'll adjust the opacity of Layer 1.

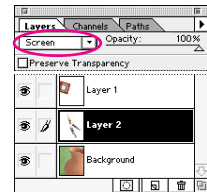
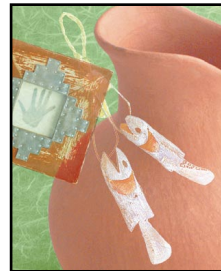
- 6 Drag the opacity slider on the Layers palette to 50%. You can now see other layers through the frame.



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

- 7 Click Layer 2 (the fish layer) in the Layers palette to make it the active layer.

- 8 Choose Screen from the mode menu at the top left of the Layers palette. This blending mode makes the fish look bleached.



## Filters

Photoshop provides a wide variety of filters that let you quickly add special effects to your artwork. In this part of the tour, you'll apply two filters and adjust the color to completely transform the image on the Background layer.

- 1 Click the Background in the Layers palette to make it active .

2 Choose Filter > Brush Strokes > Sprayed Strokes. Click OK to accept the default settings. The Sprayed Strokes filter adds brush strokes to the background.

3 Choose Filter > Artistic > Rough Pastels to make the background look as if it were drawn with pastel chalks. Click OK to accept the default settings.

4 Choose Image > Adjust > Hue/Saturation to adjust the color of the background. Drag the sliders to change the hue (we used +92), saturation (we used +13), and lightness (we used -42). Click OK.



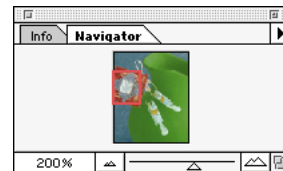
## Painting

The painting tools in Photoshop let you add color to your artwork using preset swatches or colors you create. Next, you'll paint part of the image using the paintbrush tool, and add colored type.

You'll begin by zooming in on the frame with the Navigator palette.

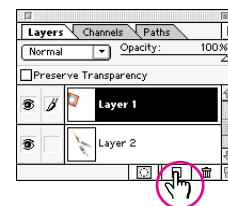
1 Choose Window > Show Navigator. The Navigator palette lets you specify which part of the image to magnify, and gives you precise control over the magnification level, making it easier to select small areas.

2 Drag the zoom slider in the Navigator palette to the right to about 200%. Then drag the red rectangle in the preview box over the frame image. Continue dragging the zoom slider until the frame image fills the Tour1.psd window.



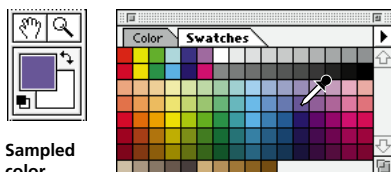
Next you'll create a new layer to paint on.

3 Click Layer 1 (the frame layer) in the Layers palette to make it the active layer. Hold Option (Macintosh) or Alt (Windows) and click the new layer icon on the palette. Holding Option/Alt lets you name the new layer you create.



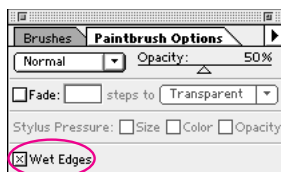
4 Enter Paint in the Name text box and click OK. A new, active layer named Paint is added above Layer 1.

5 Choose Window > Show Swatches to select a paint color from an existing swatch. Click a color in the Swatches palette. This sets it as the *foreground* color—the color you’ll paint with. Notice that the foreground color appears in a swatch near the bottom of the toolbox, along with a swatch representing the background color, which is used when you erase part of an image.



6 Select the paintbrush tool (B). Then choose Windows > Show Brushes and click a small brush in the Brushes palette.

7 Click the Options tab and select the Wet Edges option. The Wet Edges option gives a watercolor effect, by building up the paint along the edges of the brush stroke. Drag the opacity slider to the left to make the paint slightly transparent.



8 Drag the paintbrush tool to paint over the hand.

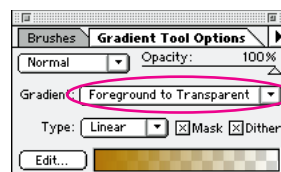


9 Double-click the zoom tool (Z) to return to 100% magnification.

You can also apply a gradient fill to create a blend between two or more colors.

10 Select the rectangle selection tool (M). Drag a small selection marquee from the top right of the image.

11 Select the gradient tool (G). Click a gold swatch in the Swatches palette to select the foreground color. Then choose Foreground to Transparent from the Gradient menu on the Gradient Tool Options palette.

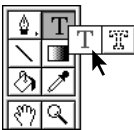


**12** Drag the gradient tool from the top to the bottom of the selection to set the beginning and end of the gradient. Choose Select > None to deselect the gradient.



Now you're ready to create and manipulate some type. You can modify type as you would any other image in Photoshop. In this part of the lesson, you'll begin by selecting a color for the type.

**13** Click a cream-colored swatch in the Swatches palette to select the type's color. Select the type tool (T); then click the image.



**14** Enter "PORT" in the large text box at the bottom of the Type Tool dialog box. Choose a font from the Font menu, enter a point size in the Size text box, and click OK. (We used 22-point Lucida Sans bold font.) The type is automatically placed on a new layer.

**15** Choose Layer > Transform > Rotate 90° CW to rotate the text. Select the move tool ( ) and drag the text on top of the gradient you just created.

**16** Click in the eye column next to the X layer in the Layers palette to add a hand drawn "X" to the type logo.



## Retouching

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

**Note:** You can gain even more control over the tonal range with the Curves dialog box. This dialog box contains options similar to those on high-end color-correction systems. For information on how to set curves, see Chapter 6, "Making Color and Tonal Adjustments."


**1** Click the Plate layer in the Layers palette to make it the active layer.

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

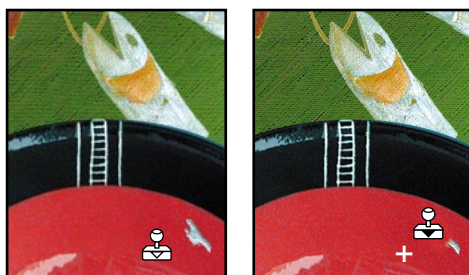
The midtones in the plate need to be more red. To correct them, you'll adjust the mixture of colors in the image with the Color Balance command.

3 Choose Image > Adjust > Color Balance. Select the Preview option, drag the top slider toward Red, and click OK.

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

4 Select the rubber stamp tool () . Click the Brushes tab on the Rubber Stamp Options palette and choose a medium-sized brush.


5 Place the rubber stamp tool over the plate next to the chip. Hold down Option (Macintosh) or Alt (Windows), and click to sample this area. Release Option/Alt. Then drag the rubber stamp tool to paint over the chip.



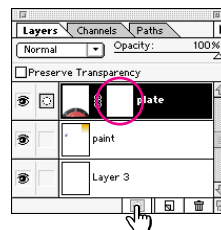
## Masks


Next you'll work with a mask. A *mask* covers the image, so that only the unmasked part shows through and is affected by any changes you apply. Adobe Photoshop provides several ways of creat-


ing and working with masks. In this part of the tour, you'll work with a layer mask, which affects only the image on the same layer as the mask.

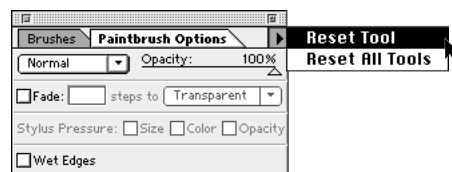
1 Click the Plate layer on the Layers palette. Click the Mask icon () to add a layer mask to the Plate layer. Notice that you can see the plate through the unmasked area.

You can modify the mask by painting on it. Black paint adds to the mask, hiding the plate; white paint removes from the mask, revealing the plate.




2 Select the eraser tool () . Then drag the tool to erase to the black background color, masking the plate.

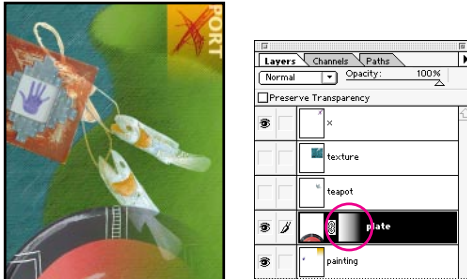
3 Double-click the paintbrush tool () . Choose Reset Tool from the menu on the Paintbrush Tool options palette. Then drag the paintbrush tool to paint with the white foreground color, unmasking the plate.



Next you'll apply a gradient to the layer mask, creating a mask that ranges from opaque to transparent.

**4** Double-click the gradient tool () in the toolbox. Then choose Foreground to Background from the Gradient menu in the Gradient Tool Options palette.

**5** Drag the gradient tool across the plate. Where the gradient is darker, the layer mask is more opaque and hides the plate; where the gradient is lighter, the layer mask is more transparent and exposes the plate.

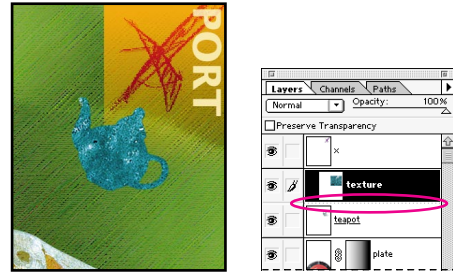


Resulting image

Now you'll use the teapot on one layer as a mask for the texture on the layer above it. Layers connected in this way are called a *clipping group*.

**6** Click the Teapot layer in the Layers palette so you can view the layer. Then click the Texture layer so you can view and make it the active layer.

**7** Choose Layer > Group with Previous to turn the layers into a clipping group.



The solid line separating the layers on the Layers palette changes to a dotted line, indicating the layers are now linked as a clipping group. The texture is now clipped to the teapot.

You can apply blending modes and opacity to clipping groups the same as with layers, but the modes will apply only within the clipping group. That is, the modes will have no effect on any of the layers below the clipping group.





**8** Choose **Overlay** from the mode menu on the Layers palette. This mode lets the highlights and shadows on the teapot image show through the texture, making the texture more realistic.

You've added all the elements to the artwork. At this point, you're ready to save the file.

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

You can save files in a variety of formats, depending on how you plan to use the file. For example, you could save a file in GIF format to place the image on the World Wide Web. (To save in most formats other than Photoshop format, you need to flatten the file into a single layer, as described in chapter 11, "Using Layers.")



Congratulations, you've finished the tour! Go ahead and experiment by creating your own Photoshop artwork as described in the following chapters, or try some of the lessons contained on the Tutorial CD.

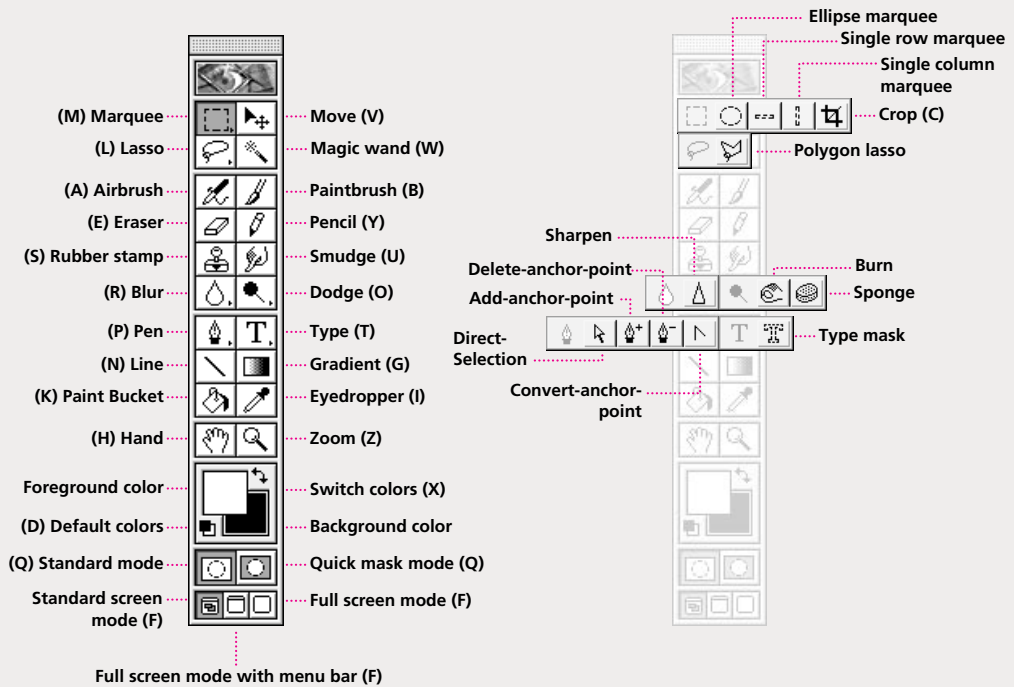


# Chapter 2: Looking at the Work Area

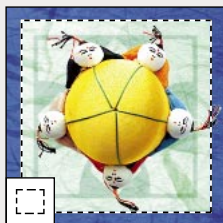
**T**he Adobe Photoshop work area includes the command menus at the top of your screen, the window containing the image you are editing, and a variety of tools and palettes that let you edit images and add elements such as masks,

layers, and channels. You can also add commands and filters to the menus by installing *plug-in modules*, software programs designed to extend the functionality of Adobe Photoshop.

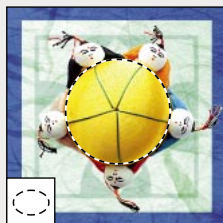
**SELECTING TOOLS** You select a tool from the toolbox by clicking the tool or pressing the shortcut key shown in parentheses in the illustration below. You can select hidden tools by dragging, or Option-clicking (Macintosh) or Alt-clicking (Windows).



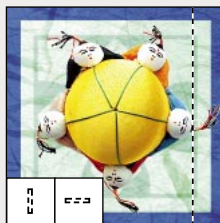
## TOOLBOX OVERVIEW



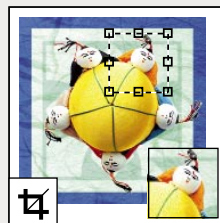
**The rectangular marquee tool** makes rectangular selections.



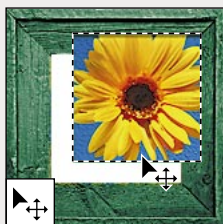
**The elliptical marquee tool** makes elliptical selections.



**The single row and single column marquee tools** make 1-pixel wide selections.



**The crop tool** trims images.



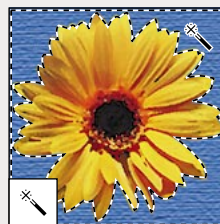
**The move tool** moves selections, layers and guides.



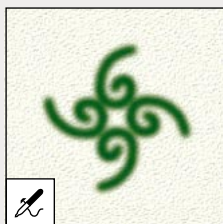
**The lasso tool** makes freehand selections.



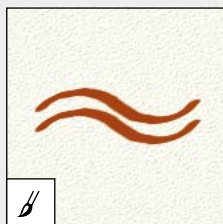
**The polygon lasso tool** makes freehand and straight-edged selections.



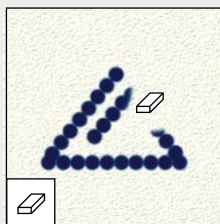
**The magic wand tool** selects similarly colored areas.



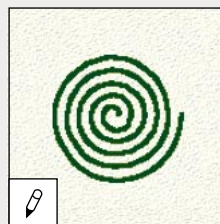
**The airbrush tool** paints soft-edged strokes on an image.



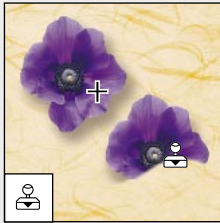
**The paintbrush tool** paints brush strokes on an image.



**The eraser tool** erases pixels and restores parts of a saved image.



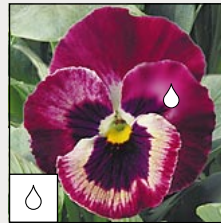
**The pencil tool** draws hard-edged strokes on an image.



**The rubber stamp tool** creates a copy of an image.



**The smudge tool** spreads color across an area of an image.



**The blur tool** blurs hard edges in an image.



**The sharpen tool** sharpens soft edges in an image.



**The dodge tool** lightens areas in an image.



**The burn tool** darkens areas in an image.



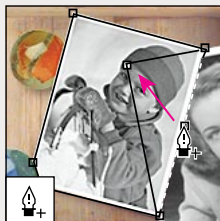
**The sponge tool** changes the color saturation of an area.



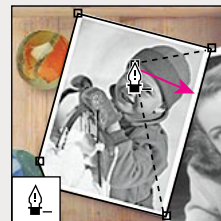
**The pen tool** lets you draw smooth-edged paths.



**The direction-selection tool** lets you select and move paths and parts of paths.



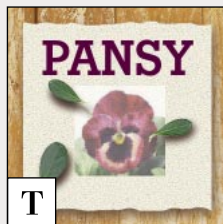
**The add-anchor-point tool** lets you add anchor points to a path.



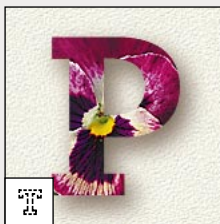
**The delete-anchor-point tool** lets you delete anchor points from a path.



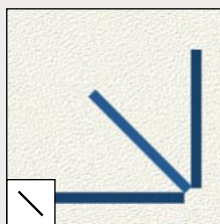
**The convert-anchor-point tool** lets you convert straight line segments to curved segments, and vice versa.



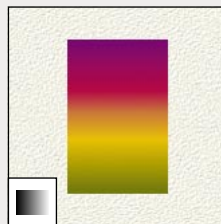
**The type tool** creates type on an image.



**The type mask tool** creates selection borders in the shape of type.



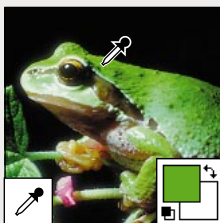
**The line tool** draws straight lines.



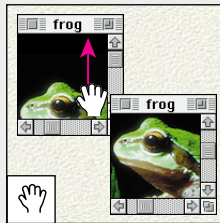
**The gradient tool** fills an area with a gradual transition between one or more colors.



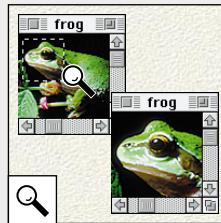
**The paint bucket tool** fills similarly colored areas with the foreground color.



**The eyedropper tool** samples colors in an image.



**The hand tool** moves an image within its window.



**The zoom tool** magnifies and reduces the view of an image.

## Using the toolbox

The tools in the toolbox let you select, paint, edit, and view images. The toolbox also contains controls for choosing the foreground and background colors, creating quick masks, and changing the screen display mode. The settings in the Brushes and Options palettes affect the painting or editing effects of most tools.

For information on the foreground and background color controls, see page 199; for information on the Quick Mask mode control, see page 236.

### To move the toolbox:

Drag the toolbox by its title bar.

## Selecting tools

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

### To select a tool:

Do one of the following:

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




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Use the following shortcuts to select tools:

- To select a tool quickly, press its shortcut key on the keyboard. These keys appear in the illustration on page 17.
  - To cycle through a set of hidden tools, press Option (Macintosh) or Alt (Windows) and click the visible tool, or press the hidden tool's shortcut key repeatedly.
- 

## Using the tool pointers

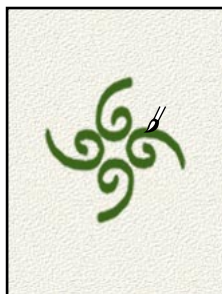
When you select most tools and position the mouse pointer on the image, the pointer matches the tool's icon. This is the default standard tool pointer. The standard marquee, line, and gradient pointers appear as crosshairs.

Each of the default pointers has a different *hot spot*, the point where an effect or action begins. To use a tool with greater accuracy, you can switch to precise pointers, which appear as crosshairs centered around the hot spot. When you're using the painting tools, you can also display the pointer as a brush shape reflecting the current brush size.

### To set the tool pointer appearance:

- 1 Choose File > Preferences > Display & Cursors.
- 2 Do one of the following:
  - 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 as crosshairs.
  - Click Brush Size under Painting Cursors to display the painting tool pointers as brush shapes representing the size of the current brush.
- 3 Click OK.

When you're using the brush size pointer with very small brushes, the brush shape is surrounded by four dots for finer accuracy.



*Standard*



*Precise*



*Brush size*

The Painting Cursors options control the pointers for the eraser, pencil, airbrush, paintbrush, rubber 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, and paint bucket tools.



To change the appearance of some tool pointers, press Caps Lock. Press Caps Lock again to return to your original setting. The following list outlines the pointer changes:

- Standard changes to precise
- Precise changes to brush size (painting tools only)
- Brush size changes to precise (painting tools only)

## Using Palettes

Adobe Photoshop includes a number of palettes to help you monitor and modify images. By default, these palettes appear stacked together in several groups. You can display and hide these palettes as you work with an image.

### To show or hide a palette:

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

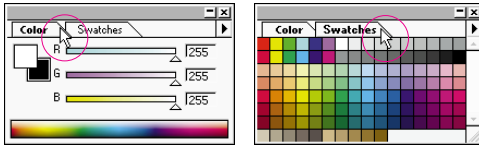
Choosing a Show command displays the selected palette at the front of its group. Choosing a Hide command for a palette in a group hides the entire group.

### Changing the palette display

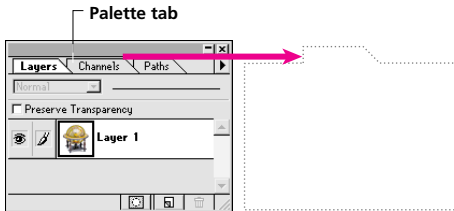
You can change the arrangement and display of palettes and palette groups to optimize the work area on your desktop. Use the following techniques to organize palettes:

- Press Tab to hide or display all open palettes and the toolbox. Press Shift+Tab to hide or display all open palettes, excluding the toolbox.

- To make a palette appear at the front of its group, click the palette's tab.

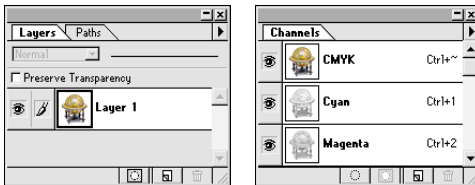


- To move an entire palette group, drag its title bar.
- To rearrange or separate a palette group, drag a palette's tab. Dragging a palette outside of an existing group creates a new group.



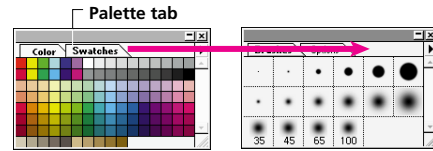
*Click the palette tab...*

*and drag the palette to a new location.*



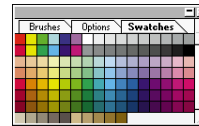
*Palettes are separated.*

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



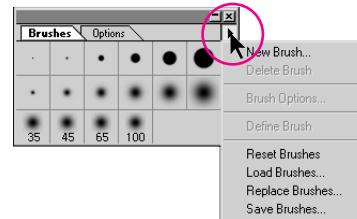
*Click the palette tab...*

*and drag the palette to another group.*



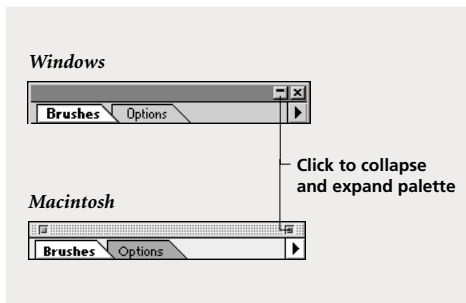
*Palettes are merged.*

- 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 the size box at the lower right corner of the palette (Macintosh) or drag the lower right corner of the palette (Windows). To return the palette to the default size, click the zoom box (Macintosh) or the minimize/maximize box (Windows) in the right of the

title bar. (If you have resized the palette, the first click restores the default size and the second click collapses the palette group.)



- To collapse a group to the palette titles only, Option-click the zoom box (Macintosh) or Alt-click the minimize/maximize box (Windows). You can also double-click a palette's tab. You can still access the palette menu from a collapsed palette.

## Setting the positions of palettes and dialog boxes

Adobe Photoshop saves the positions and groupings of all open palettes and the positions of moveable dialog boxes when you exit the program. If you prefer, you can make Photoshop always start with its default palette positions. You can also restore the palettes to these default positions at any time when working with the program.

### To reset palettes to the default positions:

- 1 Choose File > Preferences > General.
- 2 Click Reset Palette Locations to Defaults.

### To always start 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

Each tool in the toolbox (with the exception of the direct-selection, add-anchor-point, delete-anchor-point, convert-anchor-point, type, and type mask tools) has its own set of options, which appear in the Options palette. The name and appearance of this palette change, depending on the currently selected tool.

The Options palette contains some settings that are common to several tools (such as painting modes and opacity), as well as specialized options like the cloning settings for the rubber stamp tool.

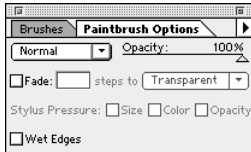
### To display the Options palette:

Do one of the following:

- Choose Window > Show Options.
- Double-click a tool in the toolbox (except the zoom or hand tool) to display the Options palette for that tool.



- Click a tool in the toolbox or press its keyboard shortcut, and press Return (Macintosh) or Enter (Windows) to display the Options palette for that tool.



*Paintbrush options palette*

### To return to a tool's default settings:

Choose from the following:

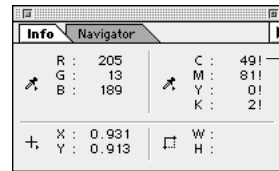
- To return a tool to its default settings, click the tool in the toolbox and choose Reset Tool from the Options palette menu.
- To return all the tools to their default settings, choose Reset All Tools from the Options palette menu.

## Using the Info palette

The Info palette provides information on the selected tool and on the color values of the image area beneath the pointer. Depending on the tool you're using, you can also use the Info palette to measure size, distance, and angle of rotation. In most cases when a tool is in use, the Info palette displays the *x* and *y* coordinates of the pointer's position in the image using the units of measurement you specify.

The Info palette also displays the following information:

- When the Info palette displays CMYK values and the color beneath the pointer is out of the printable CMYK color gamut, the palette displays a small exclamation point next to the CMYK value. See "Identifying Out-of-Gamut Colors" on page 111 for information on adjusting out-of-gamut colors.



Indicates  
out-of-gamut color

- When the marquee tool is in use, 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. This marquee size information is displayed as long as the image contains a selection.
- When the crop tool or zoom tool is in use, 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 the line tool, pen tool, or gradient tool is in use, or when you move a selection, the Info palette displays the *x* and *y* coordinates of your starting position, the change in *X* ( $\Delta X$ ), the change in *Y* ( $\Delta Y$ ), the angle (A), and the distance (D) as you drag.



To use the line tool to measure distances in an image, define a line width of 0 in the Line Tool Options palette.

- When you use the Free Transform, Scale, Rotate, Skew, Distort, or Perspective 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 move the pointer over the pixels in your image while using any of the color adjustment dialog boxes (for example, Curves), the Info palette displays the before and after color values of the pixels. See “Previewing color values” on page 109 for complete information on how to use this feature.

### Customizing the Info palette

The Info palette displays two color readouts. You can change the color mode used for each of these readouts. You can also change the units of measurement used to display distance and size in the Info palette.

#### 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 Separation 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 65 for more information.
- 3 For Second Color Readout, choose one of the display options listed in step 2.
  - 4 For Ruler Units, choose a unit of measurement.
  - 5 Click OK.



To change the measurement units and the color readout modes, click the crosshair or eyedropper icon, respectively, in the Info palette to display a menu with these options.

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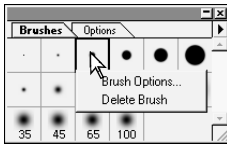
### Using context menus

In addition to the menus that appear at the top of your screen, Adobe Photoshop contains a number of context-sensitive menus. These menu display commands that relate to the active tool, selection, or palette. You can use context menus as a quick way to choose commonly used commands.

#### To display context menus:

- 1 Position the pointer over an image or palette item.
- 2 Do one of the following:
  - On the Macintosh, press Control and hold down the mouse button.

- In Windows, click with the right mouse button.

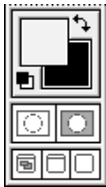


## Viewing images

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

### Controlling the window display

The window controls at the bottom of the toolbox control how image windows in Adobe Photoshop are displayed.



— Window controls

#### To change the display of image windows:

Click one of the following window controls:

- The left window control to display the image in a standard window, with a menu bar at the top and scroll bars on the sides. This is the default mode.

- The center window control to display the image in a full-screen window with a menu bar but with no title bar or scroll bars. To scroll through the image, use the hand tool or the Navigator palette.
- The right window control to display the image in a full-screen window, but with no title bar, menu bar, or scroll bars. To scroll through the image, use the hand tool or the Navigator palette.

### Opening multiple views of the same image

Each image in Adobe Photoshop can have several open windows showing different views. For example, you might want to have multiple windows open for a single image to view the image at different zoom levels. The number of images and windows you can have open depends on the amount of memory you have available. A list of all open windows appears at the bottom of the Window menu.

#### To open additional windows:

Choose View > New View.

### Arranging multiple windows (Windows only)

In Windows, you can control how Adobe Photoshop displays multiple windows on-screen.

#### To arrange multiple windows:

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.

## Moving the view of a image

You can view different areas of an image using the image window scroll bars or the hand tool.

### To scroll with the hand tool:

- 1 Select the hand tool.
- 2 Drag in the image to move the image in its window.



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.

## Magnifying and reducing the view

The zoom tool and the Zoom commands let you magnify and reduce the view of an image. You can also zoom to an exact percentage of the original view by entering values in the zoom percentage view by entering values in the zoom percentage box at the lower left of the window. The image

window's title bar displays the magnification or reduction percentage at all times. You can magnify up to 1600% of the original image view.

**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 page 38 for more information.

### To zoom in:

Do one of the following:

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



Click. . .



to zoom in.

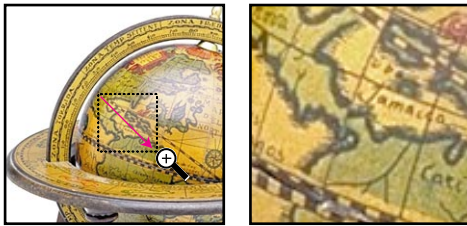
**To zoom out:**

Do one of the following:

- Select the zoom tool. Hold down Option (Macintosh) or Alt (Windows) 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.

**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 part of the image enclosed by the zoom marquee is displayed at the maximum magnification possible.



Press Command+Option+ [=] (Macintosh) or Ctrl+Alt+ [=] (Windows) to zoom in to the maximum magnification. Press Command+Option+ [-]/Ctrl+Alt+ [-] to zoom out to the minimum magnification.

**To magnify or reduce to a specified percentage:**

Enter a percentage value in the zoom percentage box at the lower left of the window.

**To display an image at 100%:**

Do one of the following:

- Double-click the zoom tool.
- Choose View > Actual Pixels.
- Click Actual Pixels in the Zoom Tool Options palette.



Press Command+Option+0 (Macintosh) or Ctrl+Alt+0 (Windows) to display the image at 100%.

**To change the view to fit the screen:**

Do one of the following:

- Double-click the hand tool.
- Click Fit on Screen in the Zoom Tool Options palette.

These options scale the zoom percentage and window size to the largest that can fit on your monitor and still contain the entire image.

**To constrain the window size:**

Deselect Resize Windows To Fit in the Zoom Tool Options palette. Deselecting this option maintains the same window size regardless of the image's magnification, and can be helpful when using smaller monitors or when working with tiled views of an image.

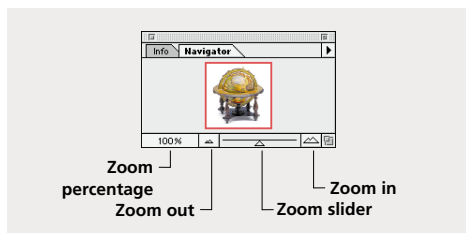


Use the following shortcuts when working with the zoom tools:

- To activate the zoom-in tool, press Command+spacebar (Macintosh) or Ctrl+spacebar (Windows).
- To activate the zoom-out tool, press Command+Option+spacebar/Ctrl+Alt+spacebar.
- To zoom in, press Command+[=]/Ctrl+[=].
- To zoom out, press Command+[-]/Ctrl+[-].

## Using the Navigator palette

The Navigator palette lets you quickly view different areas of an image and change the magnification of your view. This palette displays a thumbnail of the image and a rectangle, the *view box*, representing the boundaries of the image window. You can change the color of the view box from its default red.



### To move the view of the image:

Do one of the following:

- Drag the view box in the Navigator palette.
- Click in the thumbnail. The new view includes the area you click.

### To magnify or reduce the view:

Do one of the following:

- Click the zoom in or zoom out button.
- Drag the zoom slider at the bottom of the palette.
- Enter the percentage of magnification or reduction you want, and press Return (Macintosh) or Enter (Windows).

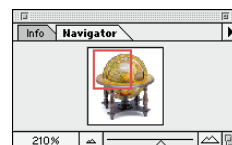


To zoom to the specified percentage and keep the zoom percentage box highlighted, hold down Shift while pressing Return/Enter.

- Hold down Command (Macintosh) or Ctrl (Windows) and drag over the area of the thumbnail that you want to magnify.



210% view of image



View in Navigator palette

### To change the color of the view box:

- 1 Choose Palette Options from the Navigator palette menu.
- 2 Do one of the following:
  - To use a preset color, choose an option for Color.
  - To use a custom color, click the color box, choose a color system as described on page 224, and click OK.
- 3 Click OK.

## Using plug-in modules

Adobe Photoshop plug-in modules are software programs developed by Adobe Systems, and by other software developers in conjunction with Adobe Systems, to extend the functionality of the Adobe Photoshop program. Adobe Photoshop includes plug-in modules for importing and exporting images and for producing special effects.

### Installing plug-in modules

To use a plug-in module that has been developed by Adobe Systems, you must first install it into the plug-ins folder for Adobe Photoshop. To install a third-party plug-in module, follow the installation instructions included with the module. Once installed, the modules appear in the Import or Export menu, as file formats in the Open, Save As, and Save a Copy dialog boxes, or as filters in the Filter submenus.

#### To install an Adobe Systems plug-in module:

Do one of the following:

- On the Macintosh, drag a copy of the module to the Plug-ins folder inside the Adobe Photoshop folder.
- In Windows, copy the module into the PLUGINS subdirectory in the Photoshop directory.

### Setting plug-ins preferences

When you install Adobe Photoshop and include the plug-in modules in the installation, these files are automatically placed in the Adobe Photoshop

Plug-ins folder (Macintosh) or the PLUGINS directory (Window). You can add new plug-ins or move the modules to a new location. If you move the plug-ins to a different location, you must change Photoshop's preference setting so that the program targets the correct plug-ins location.

#### 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. (Make sure you do not select a location inside the Plug-ins/PLUGINS folder.) To display the contents of a folder, click Open (Macintosh); double-click the directory (Windows) to display its contents.
- 3 When you have highlighted the new plug-ins folder, click Select (Macintosh) or OK (Windows).
- 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

Adobe Photoshop includes numerous program settings, which are stored in a *preferences file*. This file is located in the Preferences folder in your System Folder (Macintosh) or in the Prefs subdirectory inside the Photoshop directory (Windows). The settings stored in this file 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.

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

**To restore all of Adobe Photoshop's preferences to their default settings:**

Do one of the following:

- On the Macintosh, open the Preferences folder in the System Folder and drag the Adobe Photoshop 4.0 Prefs file to the Trash.
- In Windows, delete the PHOTOS40.PSP file in the Prefs subdirectory inside the Photoshop directory.

A new Preferences file will be created when you next start Adobe Photoshop.



# Chapter 3: Getting Images into Photoshop

**I**mages can be brought into the Adobe Photoshop program by importing in a variety of file formats; by scanning a photograph, a slide, or an image; or by capturing images from video.

This chapter contains an overview of the basic resolution and file size concepts essential for producing a high-quality image. It also provides instructions on how to create, open, and import images in Adobe Photoshop, how to produce a high-quality scan, and how to adjust the resolution and size of an image.

## About bitmap images and vector graphics

Computer graphics fall into two main categories—*bitmap images* and *vector graphics*. Understanding the difference between these two types of images is useful when you're creating and editing digital images.

### Bitmap images

Bitmap images, also called *raster images*, use a grid, or *raster*, of small squares known as pixels to represent graphics. Each pixel in a bitmap image has a specific location and color value assigned to it. For

example, a 1-inch circle in the lower left corner of the page is made up of the collection of pixels in that location, colored to give the appearance of a circle. When working with bitmap images, you edit groups of pixels rather than objects or shapes. Images created in Adobe Photoshop are bitmap images.

Because they can represent subtle gradations of shades and color, bitmap images are the most common electronic medium for continuous-tone images, such as photographs or images created in painting programs. Bitmap images are resolution-dependent—that is, they represent a fixed number of pixels. As a result, they can appear jagged and lose detail if they are scaled on-screen, or if they are printed at a higher resolution than they were created for.

### Vector graphics

Vector graphics consist of lines and curves defined by mathematical objects called *vectors*. Vectors describe graphics according to their geometric characteristics. For example, when you draw a 1-inch circle in a vector-based program, the program creates the circle based on its shape and size. You can then move, resize, or change the color of the circle without losing the quality of the graphic. Graphics created in Adobe Illustrator® are vector graphics.

Vector graphics are resolution-independent—that is, they are not defined by a fixed number of pixels and so are automatically scaled to appear crisp and sharp on any output device at any resolution. As a result, vector graphics are the best choice for type (especially small type) and bold graphics, such as

logos, which require crisp, clear lines that can be scaled to many sizes.

Note that because computer displays are made up of a grid of pixels, both vector and pixel images are displayed as pixels on-screen. Vector-based programs render their shapes into pixels for display.

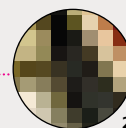
**BITMAP VS VECTOR** A bitmap image consists of pixels, whose color and location on a grid determine the appearance of the image. A vector graphic is defined by mathematical objects called vectors, which determine the geometric characteristics of the graphic. When working with vector graphics, you edit shapes and objects rather than groups of pixels.



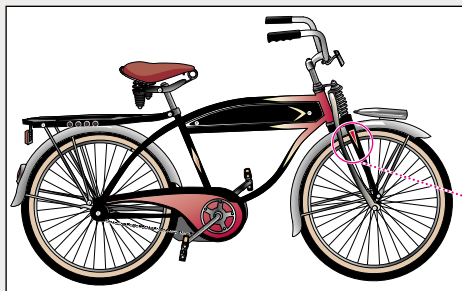
*Bitmap images are good at reproducing the subtle shading found in continuous-tone images, such as photographs. However, bitmap images are resolution dependent and thus can show jagged edges when magnified or printed at a higher resolution than they were created for.*



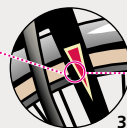
3:1 zoom



24:1 zoom



*Vector graphics display or print at the resolution available on the displaying or printing device. As a result, such graphics enlarge well and are good at reproducing crisp outlines and details.*



3:1 zoom



24:1 zoom

## Determining image size and resolution

In Adobe Photoshop, you determine the size of an image either by specifying pixel dimensions—to determine the size of the image on a monitor or video display, or by specifying print dimensions and image resolution—to determine the maximum size and resolution at which you can print the image.

An understanding of the relationship between pixel dimensions, resolution, and file size is key to understanding how Adobe Photoshop displays and produces output.

### About resolution and image size

Several concepts are important when discussing the characteristics of bitmap images: pixel dimensions, image resolution, output resolution, and screen frequency. The following sections discuss these characteristics. Another type of resolution, called *bit resolution* or *pixel depth*, is important when considering how color is displayed on-screen. For information on bit resolution, see “About pixel depth” on page 72.

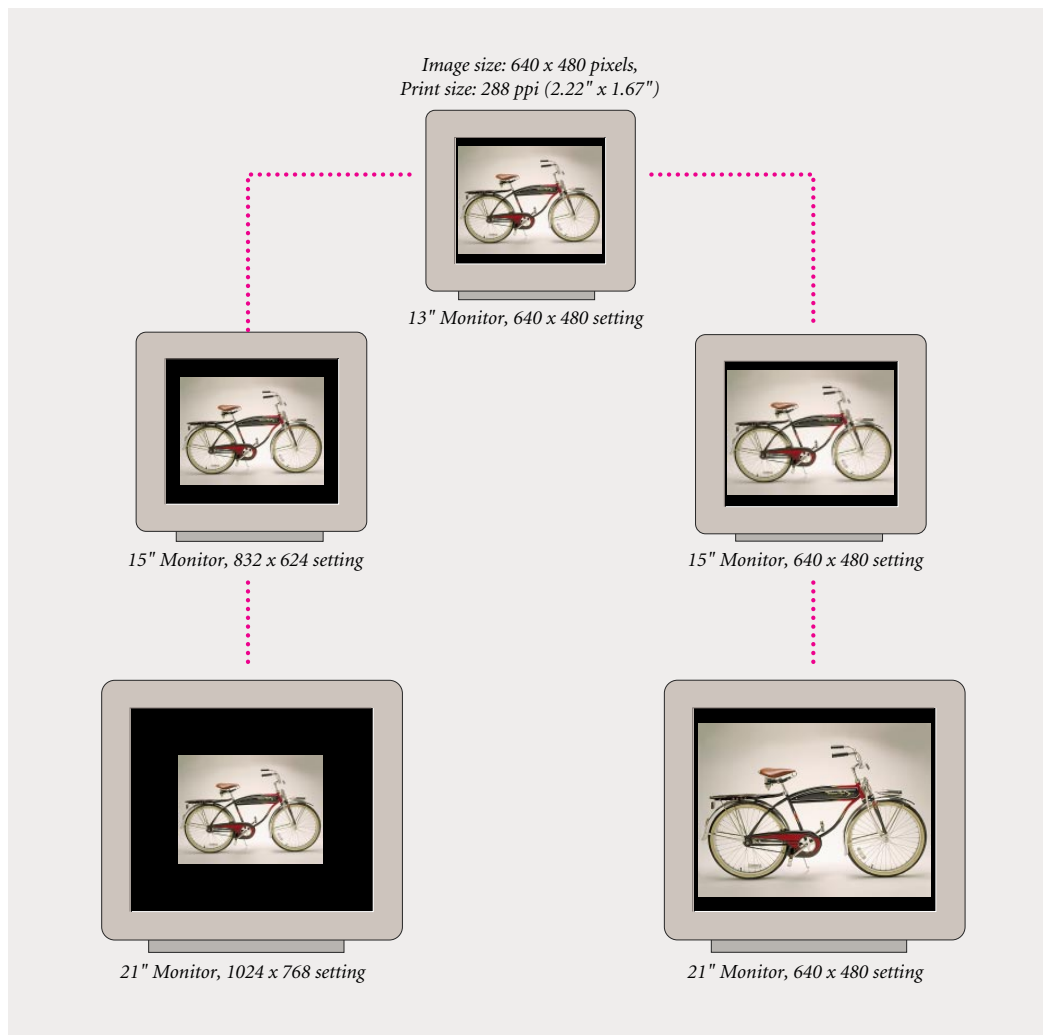
**Pixel dimensions** Every bitmap image contains a fixed number of pixels, measured in pixel height and pixel width (the number of pixels displayed along the height and width of the image, respectively). The total number of pixels determines the file size, or the amount of data in the image. Pixel

dimensions, along with the size and setting of the monitor, determine how large an image appears on-screen. A typical 13-inch monitor displays 640 pixels horizontally and 480 vertically. Larger monitors can usually be set to display a varying number of pixels, for example, from 640 by 480 pixels, at which setting the pixels may be quite large, to 1152 by 870 pixels, at which setting the pixels are small.

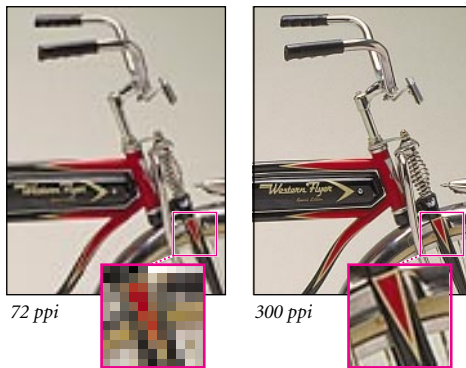
If you’re planning to display an image online (on a Web page, for example), your maximum image size is determined by the lowest pixel dimensions of the monitors used to display your image. For example, if your audience will view your image on a 13-inch monitor, you will probably want to limit the size of your image to 640 by 480 pixels.

**Image resolution** The number of pixels displayed per unit of length in an image is called the *image resolution*, 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 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

**PIXEL DIMENSIONS AND MONITOR RESOLUTION** Regardless of the print size specified for an image, the size of an image on-screen is determined by the pixel dimensions of the image and the monitor size and setting. A large monitor set to 640 by 480 pixels uses larger pixels than a small monitor with the same setting. In most cases, default Macintosh monitor settings are designed to display approximately 72 pixels per inch; default PC monitor settings typically display 96 pixels per inch.



pixels wide x 72 pixels high = 5184). The same image with a resolution of 300 ppi would contain a total of 90,000 much smaller pixels.



72-ppi and 300-ppi images; inset zoom 350%

Because they use more pixels to represent each unit of area, higher-resolution images can usually reproduce more detail and subtle color transitions when printed than lower-resolution images. However, once an image has been scanned or created at a given resolution, increasing the resolution in Photoshop will not usually improve the image quality because in this case, Photoshop must in effect spread the same pixel information across a greater number of pixels.

The proper image resolution to use for an image depends on how you intend to display or distribute the image. Using too low a resolution for a printed image results in *pixelation*—large pixels that produce very coarse-looking output. Using too high a resolution (i.e., pixels smaller than what an output device can reproduce) increases the file size unnecessarily and may increase the time required to print or distribute the image. See

“Image resolution and screen frequency” on page 40 for guidelines on choosing an image resolution.

**Monitor resolution** The pixel setting of the monitor along with the size of the monitor determines the size (and therefore density) of the monitor pixels. When converting printed images to on-screen images and translating image resolution into pixel dimensions, it’s useful to know that the default resolution of a Macintosh monitor is typically 72 dpi; the default resolution of a PC monitor is typically 96 dpi.

In Photoshop, image pixels are translated directly into monitor pixels. This means that when the resolution of an image is higher than the monitor resolution, the image appears larger on-screen than its specified dimensions. For example, when you display a 1-inch-by-1-inch image with a resolution of 144 ppi 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** If you are preparing images for print, it’s important to understand that printer resolution—that is, the number of dots per inch (dpi) that an imagesetter or laser printer produces—is usually proportional to, but not the same as, image resolution—that is, the number of pixels that make up an image and that determine the size of the image on-screen. Most laser printers have output resolutions of 300 to 600 dpi and produce good results with images from 72 ppi to 150 ppi.

**IMAGE RESOLUTION AND SCREEN FREQUENCY** To ensure good-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. For very coarse screens, an even lower resolution may produce good 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.*



170 ppi (2 x 85 lpi)



128 ppi (1.5 x 85 lpi)



354 ppi (2 x 177 lpi)



266 ppi (1.5 x 177 lpi)

*85 lpi: With coarse screens, resolutions at the low end of the range can produce good results.*

*177 lpi: With fine screens, only resolutions at the high end of the range produce good results.*

High-end imagesetters can print at 1200 dpi, 2400 dpi, or higher and produce good results with images from 200 ppi to 300 ppi.

**Screen frequency and image resolution** Many commercial and desktop printers use halftone screens, which consist of printer dots called halftone cells, to print grayscale images and color separations. Screen frequency, also known as screen ruling, refers to the number of halftone cells per inch in a halftone screen, and is measured in lines per inch (lpi).

The relationship between image resolution and screen frequency determines the quality of detail in the printed image. As a general rule, to produce a halftone image of the highest quality, use an image resolution that is 1.5 to 2 times the screen frequency. In some cases, however, depending on the image and the output device, using a lower resolution produces good results. See “Image resolution and screen frequency” on page 40 for more information.

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

## About file size and resolution

The file size of a digital image is measured in kilobytes (K) or megabytes (MB) and is proportional to the total number of pixels in the image.

Although images with more pixels may produce more detail at a given size, they also result in larger file sizes. 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 is four times as large.

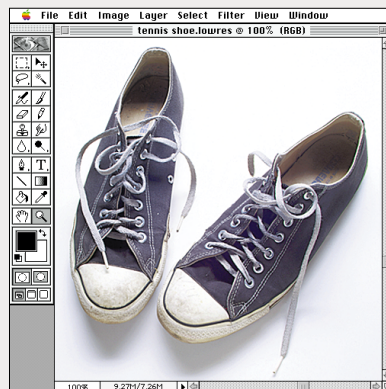
File size is an important factor in determining the disk space you need to store a file and the speed with which you can edit and print a file. Choosing an image resolution needs to be a compromise between capturing all the data you need to produce a good-quality image and keeping file size to a minimum.

Adobe Photoshop supports maximum pixel dimensions of 30,000 by 30,000 pixels per image. For example, if an image is 14 by 14 inches, it can have a resolution of at most 2142 ppi ( $30,000 \text{ pixels} / 14 \text{ inches} = 2142 \text{ ppi}$ ).

**RESOLUTION, FILE SIZE, AND OUTPUT** The file size of an image refers to the total amount of pixel information in the image. A 6-inch-by-6-inch high-resolution image has more pixels, and therefore a larger file size, than a 6-inch-by-6-inch low-resolution image with the same dimensions. In print, a high-resolution image produces more detail than the same image at low resolution. In Photoshop a high-resolution image appears larger on-screen (see page 38). The enlarged on-screen display does not affect the dimensions of the printed image.



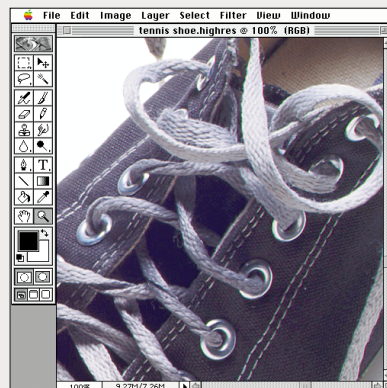
*6 in x 6 in @ 72 ppi; file size 547K*



*100% view on-screen*



*6 in x 6 in @ 300 ppi; file size 7.6 MB*



*100% view on-screen*



## Displaying the file size and resolution of an image

Adobe Photoshop displays the file size for each image in the lower left of the window. You can also display the dimensions, number of channels, and resolution information about a file.

### To display the file size:

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



The file size values appear in the box at the lower left of the window.

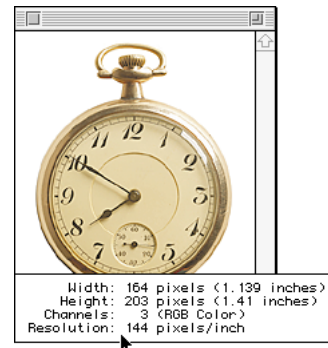
The first value indicates the file size of the final file as it would be sent to the printer, a flattened file that contains no layer data. The second value shows the size of the file including all layers and channels, that is, the file size if the file were saved

with all its layers. For more information on how layers affect file size, see “Keeping track of file sizes” on page 270.

### To display dimensions, channel information, and resolution information:

Press Option (Macintosh) or Alt (Windows), position the pointer over the box in the lower left of the window where the file size is displayed, and hold down the mouse button.

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



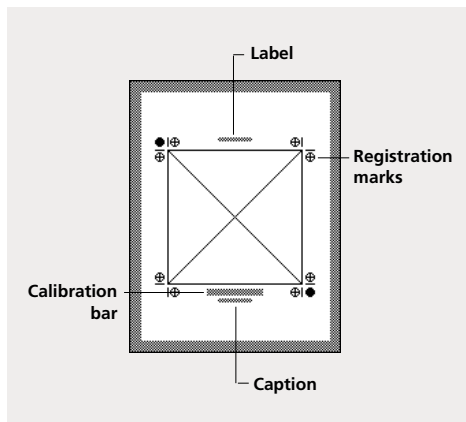
## Previewing the page layout and print size

Before you change the size of an image, you may want to preview how the image will appear on the printed page. You may also want to preview the print size of the image—that is, the physical size that the image will have when printed.

### To preview a page:

Position the pointer over the box in the lower left of the window 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 that you select when you choose File > Page Setup. Options selected in the Page Setup dialog box, including registration marks, calibration bars, labels, and captions, appear as gray boxes.



### To preview the print size:

Choose View > Print Size.

Photoshop adjusts the magnification of the image to display it at its actual printed size, as specified in the Print Size section of the Image Size dialog box. For more information, see “Changing print dimensions and resolution of an image” on page 46.

## About resampling

*Resampling* refers to changing the pixel dimensions (and therefore file size) of an image. In Adobe Photoshop, you can change the pixel dimensions directly, or you can change the pixel dimensions by changing either the print dimensions or the resolution while the Resample Image option is selected (see page 45). When you *down-sample* (or decrease the number of pixels), Photoshop deletes information from the image. When you *resample up* (or increase the number of pixels), Photoshop creates new pixel information based on the color values of the existing pixels. In both cases, Photoshop uses an interpolation method to determine how pixels are added or deleted (see “Choosing an interpolation method” on page 48).

Downsampling and then resampling up to the original resolution causes a deterioration in the quality of the image. This is because once an image has been downsampled, some of the original color information is lost. When Photoshop resamples the image back up, it attempts to reconstruct the file based on the new color information. Because the added pixels are interpolated from the new image data, they can make the image appear blurry or out of focus, resulting in a poorer quality image than the original.

It’s best to scan in or create your image using a high enough resolution so that you don’t need to increase the pixel dimensions from within Adobe Photoshop. If you want to preview the effects of changing the pixel dimensions on-screen, or print

**CHANGING PRINT SIZE** By default, changing the dimensions or resolution of an image changes the number of pixels in the image, a process called *resampling*. Changing the total pixel count will probably result in a loss of quality in the printed image, because Photoshop must determine the color values of the pixels to be added or deleted using an approximation or interpolation method. On the other hand, if you deselect the Resample Image option in the Image Size dialog box, you can actually improve an image's print quality by increasing its resolution. With Resample Image off, Photoshop maintains the total pixel count in an image by adjusting the print dimensions to compensate for the change in resolution and vice versa.

Original file at 11 x 14 @ 72 ppi, file size 2.28 MB

5.5 x 7 @ 72 ppi, file size 585K

5.5 x 7 @ 144 ppi, file size 2.28 MB

Image resampled; total pixel count decreased with loss of quality

No resampling; total pixel count maintained; resolution increased

proofs at different resolutions, resample a duplicate of your original file. See “Duplicating images” on page 174 for instructions.



Original image:  
150 ppi; 214K

Image resampled up to  
300 ppi; 757K

## Changing the pixel dimensions of an image

If you are preparing images for online use, such as for a Web site or a presentation, it’s most useful to specify image size in terms of the image’s *pixel dimensions*, that is, the number of pixels along each edge of the image. See “About resolution and image size” on page 37 for information on pixel dimensions, image resolution, and monitor resolution.

When you change the pixel dimensions of an image, you also change its printed characteristics—either its printed dimensions or its image resolution. See “About resampling” on page 44 for information on how Adobe Photoshop resamples images.

### 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. These methods are described on page 48.

- 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; the old file size appears in parentheses.

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

## Changing the print dimensions and resolution of an image

If you are preparing images for print, it’s most 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 resolution and image size” on page 37 for information on pixel dimensions and resolution.

When you select Resample Image in the Image Size dialog box, Photoshop lets you change the print dimensions and resolution of an image independently of each other. In this case, Photoshop changes the total pixel count of the image to account for the new print dimensions or resolution. If you deselect Resample Image in the Image Size dialog box, Photoshop holds the pixel

count of the image constant and adjusts the resolution as you change the dimensions and vice versa. For the best printed quality, it's generally best to change the dimensions and resolution first with Resample Image deselected. 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 37). 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 Do one of the following:
  - To change only the print dimensions or only the resolution and adjust the total number of pixels in the image proportionately, make sure Resample Image is selected. Then choose an interpolation method. These methods are described on page 48.
  - 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 page 178).

5 For Resolution, enter a value for the new resolution. 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 Option (Macintosh) or Alt (Windows) 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 (see page 40). You can have Photoshop determine a recommended resolution for your image based on your device's screen frequency.

#### **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; it does not 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. For more information on defining screen rulings, see “Selecting halftone screen attributes” on page 333.

4 For Quality, select one of the following options:

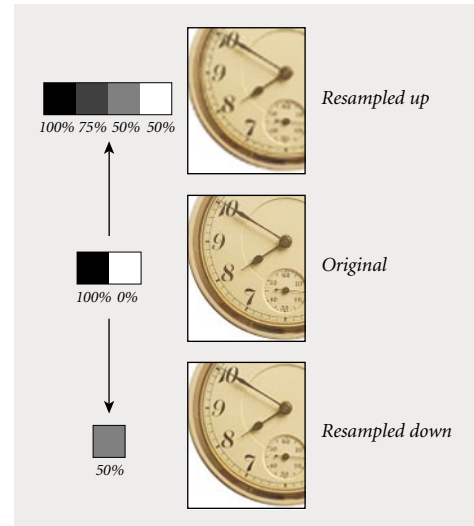
- Draft to produce a resolution that is the same as the screen frequency (no lower than 72 pixels per inch).
- Good to produce a resolution that is 1.5 times the screen frequency.
- Best to produce a resolution that is 2 times the screen frequency.

5 Click OK to enter the recommended resolution in the Image Size dialog box.

## Choosing an interpolation method

When you resample an image using the Image Size command, Adobe Photoshop determines how pixels are added or deleted by using one of three *interpolation methods*. These methods look at the color values of the existing pixels in the image and adjust the color values of the new pixels to accommodate the added or deleted pixels. The more sophisti-

cated interpolation methods attempt to choose color values that better preserve the quality and detail in the original image.



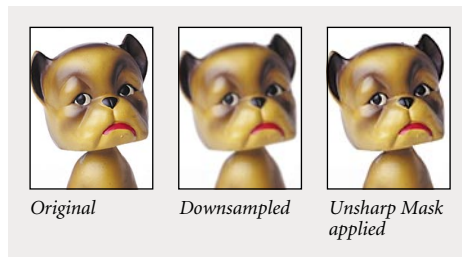
Interpolation applied to black and white pixels and to image

You use the Interpolation setting in the General preferences to specify the default interpolation method used to resample images with the Image > Image Size command and with the Layer > Transform and Free Transform commands. The Image Size command also lets you specify an interpolation method other than the default. For more information, see “Changing the pixel dimensions of an image” on page 46 and “Changing the print dimensions and resolution of an image” on page 46.

### To specify the default interpolation method:

- 1 Choose File > Preferences > General.
- 2 For Interpolation, choose one of the following options:
  - Nearest Neighbor to use the fastest, but least precise, method of interpolation. The lack of precision is evident in the jagged appearance of modified selections, especially when you're distorting or scaling an image or performing multiple manipulations on a selection.
  - Bilinear to use a medium-quality interpolation method.
  - Bicubic to use the most precise form of interpolation. This method results in the smoothest tonal gradations but is also the slowest form of interpolation.

Applying the Unsharp Mask filter to the image after interpolation can help to refocus the image. For detailed instructions for using the Unsharp Mask filter, see "Step 5: Sharpen the image" on page 134.



## Scanning images

Adobe Photoshop software works with any scanner that has an Adobe Photoshop-compatible plug-in module or supports the TWAIN interface. The scanner plug-in modules that you have installed appear in the File > Import submenu. See "Using plug-in modules" on page 31 for more information about using and installing plug-in modules.

Scanner drivers are provided and supported by the manufacturers of the scanners, not Adobe Systems. If you have problems with a scanner or during scanning, make sure that you have the latest version of the driver from the scanner manufacturer. Drivers and Import plug-ins from several major scanner manufacturers are in the Scanner Support folder on the Adobe Photoshop CD-ROM. For more information, see the Read Me file in the Scanner Support folder.

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

### About scan quality

When you scan an image, you make several choices that affect the quality and usefulness of the resulting file. Before you scan an image, be sure to follow the instructions in this chapter for determining the scanning resolution and optimal dynamic range, and for developing a procedure for eliminating unwanted color casts.

## Importing an image using the TWAIN interface

TWAIN is a cross-platform interface for acquiring images captured by certain scanners and frame grabbers. The manufacturer of the TWAIN device must provide a Source Manager and TWAIN Data source for your device; otherwise, the module will not work. Adobe Photoshop supports the current TWAIN, TWAIN32, and TWAIN\_32 standards for scanning.

Windows NT™ and Windows 95 require 32-bit TWAIN source modules, and do not work with the same scanner software as the same scanner did under Windows 3.1 or higher. Some TWAIN source modules also may not work with Adobe Photoshop under Windows 95 because they are 16-bit, while Adobe Photoshop is 32-bit. (To use Photoshop with an older version of the Twain32 module, copy the Twain32.8ba file to the Photoshop\Plugins folder and copy the Twain32.dll file to the Windows folder. To use Twain under the Windows 3.1 operating system, you must also load the Share.exe file before starting Windows.) Contact the scanner manufacturer for information on the availability of TWAIN source modules that are compatible with Windows NT or Windows 95.

### 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 and choose the appropriate Select Source command from the submenu. Then select the device you're using. You do not need to repeat this step for subsequent use 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 to choose the new device.

- 2 Choose File > Import and choose TWAIN - Acquire (Macintosh) or the appropriate TWAIN command (Windows) to use the TWAIN interface.

## Determining the scan resolution

*Scan resolution*, as it is used here and in following sections, is the same as image resolution—that is, the number of pixels per inch in the image when you open the file in Adobe Photoshop. For information on resolution and pixel dimensions, see “About resolution and image size” on page 37.

The scan resolution you use for printed output depends on the quality of output that you need as well as on the resolution of your printer and the size of the original image compared with the final image. See “Image resolution and screen frequency” on page 40 for guidelines on choosing the best resolution for a printed image.

## Scanning using the file size setting

The best way to ensure that you have all the data you need for your Adobe Photoshop image is to create a dummy file that tells you exactly how much data—that is, what file size—you need for your final output.

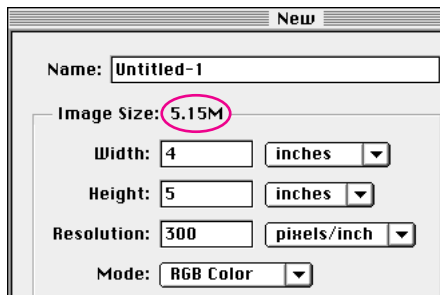
### To calculate the file size before scanning an image:

- 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 work with is selected. For more information, see “Color modes and models” on page 65.

The New dialog box displays the file size above the dimensions. For example, the following dialog box shows the values for a final image that is 4 inches wide and 5 inches high, printed with a 150-line screen using a 2:1 ratio (resolution is set at 300). The file size needs to be 5.15 megabytes.



To produce the scan, enter the resulting file size in your scanner settings. (It does not matter what resolution or image dimensions appear in the scanner settings.)

Once 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.

## Scanning using the resolution setting

If you cannot use file size as the determining factor in choosing your scanner settings, you can calculate a scan resolution using the original and final image dimensions and the screen frequency of your output device.

### To estimate scan resolution:

- 1 Multiply the screen frequency by 2. (2 is the typical ratio of image resolution to screen frequency needed to produce a good-quality image.)
  - 2 Multiply the result in step 1 by the size change factor to get the estimated scan resolution you need.
- For example, suppose you are scanning an image that is 2 inches wide by 3 inches high. You want to produce a final image that is 6 inches wide by 9 inches high. You are using a screen frequency of 85 lpi.

To calculate the scan resolution, you first multiply 85 (the screen frequency) by 2 to get 170. You then multiply 170 by 3 (the ratio of final to original image dimensions) to get a scan resolution of 510 ppi.

Different color separation procedures might require different ratios of image resolution to screen frequency (see page 40). It's a good idea to check with your service provider or printer to finalize your requirement before you scan the image.


## Optimizing the dynamic range of the scan

When scanning an image, keep in mind that the human eye can detect a wider tonal range than can be printed. If your scanner lets you define the black and white points, set the points before scanning the file to produce the best tonal range and capture the widest dynamic range. After opening the file in Adobe Photoshop, use the color correction tools to set the white and black points for the digitized image. See Chapter 6, “Making Color and Tonal Adjustments,” for more information about setting the black and white points for an image.

## Eliminating unwanted color casts

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

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

- 1 Make sure that your monitor has been calibrated following the instructions starting on page 85. This procedure will not work unless your monitor has been calibrated.
- 2 Open a new Photoshop file and use the 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 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. See Chapter 4 for more information on color and color values.
- 6 Use Levels or Curves to correct the color cast (see Chapter 6 for instructions), and then save the dialog box settings.
- 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.

## Opening and importing images

Adobe Photoshop lets you open images in a variety of file formats. You can have multiple image windows open at one time.

Import choices appear in the file format list in the Open dialog box or in the File > Import submenu. If a file format does not appear, install the format's plug-in module, as explained on page 31.

## Opening files

You can open files in the following ways:

- Double-clicking a file's icon on the desktop (Windows 95, Windows NT) or a file's name in a file list opens the file.

- The Open command lets you open files saved in formats that are supported by Photoshop (except for those that use Import modules). On the Macintosh, you can use the Open command to open files in the format that you specify.
- In Windows, the Open As command lets you open a file that has a missing or incorrect file extension, or a file that does not appear in the Open dialog box.
- The Import command lets you open files saved in formats that use plug-in import modules. You can open anti-aliased PICT files and PICT Resource files (Macintosh), Quick Edit versions of Photoshop 2.0, Scitex® CT, uncompressed TIFF files, and files scanned using the TWAIN interface. You also use the Import command to use any third-party import modules you've installed.

#### **To open a file on the Macintosh:**

- 1 Choose File > Open.
- 2 To display all files in the selected folder, select Show All Files. To locate files in other folders, click Find and type the filename.
- 3 To preview files before opening them (if a preview has been saved with the image), select Show Thumbnail. This option requires the Apple® QuickTime extension. Files created with a version of Adobe Photoshop prior to 2.5.1 must be resaved for the preview to appear.
- 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 discussed in the following sections.

For more information on a specific file format, see “About file formats” on page 318.

#### **To open a file in Windows:**

- 1 Choose File > Open.
- 2 For Files of Type, choose one of the following options:
  - All Formats to display all the files in the selected directory.
  - Any individual format to display only files saved in that format.
- 3 Select the file.
- 4 Click Open. In some cases, a dialog box appears, letting you set the open options. The formats requiring an open dialog box are discussed in the following sections.

For more information on a specific file format, see “About file formats” on page 318.

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

Do one of the following:

- On the Macintosh, choose File > Open and select Show All Files. For Format, choose the desired file format and click Open.
- In Windows, choose File > Open As. For Open As, choose the desired 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.*

#### **To use an import module:**

Choose File > Import; then choose the import module from the submenu.

The options for some import modules are discussed in the following sections.

### **Importing Adobe Illustrator files**

You can import files created in Adobe Illustrator™ using the following methods:

- The File > Open command lets you open an Adobe Illustrator file as a new Adobe Photoshop image.
- The File > Place command places an Adobe Illustrator file as a new layer into an existing Photoshop image.
- The Edit > Paste commands lets you paste copied Illustrator artwork into a Photoshop image. You can choose to paste the artwork either as pixels or as a path. For more information, see “Copying between applications” on page 180.

When you open or place an Adobe Illustrator image, Adobe Photoshop *rasterizes* the image. Rasterizing converts the mathematically defined lines and curves of the vector image drawn in Adobe Illustrator to the points (or pixels) displayed on a grid in Adobe Photoshop. For more information, see page 36.

#### **To open an Adobe Illustrator image 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, select Show All Files (Macintosh) or, for Files of Type, choose All Formats (Windows).
- 3 Indicate the desired dimensions, resolution, and mode. To maintain the same height-to-width ratio, select Constrain Proportions.
- 4 Select Anti-aliased to improve the quality of the rasterized image.
- 5 Click OK.

#### **To place artwork from Adobe Illustrator into an Adobe Photoshop image:**

- 1 Open the Adobe Photoshop image in which you want to place the artwork.
- 2 Choose File > Place, and select the file you want to place. Then click Open.

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

- 3 Use the following methods to 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 a corner handle to constrain the proportions.
  - To rotate, position the pointer outside the bounding box (the pointer turns into a curved arrow) and drag.
- 4 To confirm the placement of the artwork, press Return (Macintosh) or Enter (Windows). 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. When placing line art, you can turn off the Anti-alias PostScript option to help maintain the line art's hard edges 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 PhotoCD files

To open PhotoCD files in Adobe Photoshop, choose the Kodak® PhotoCD™ format in the Open dialog box. The PhotoCD plug-in module can open 4096-by-6144-pixel resolution (64Base, 72 MB) images from Kodak Pro PhotoCD disks.

**Note:** *The Kodak Precision Color Management System (KPCMS), required to use the Kodak CMS PhotoCD format, is automatically installed in your System Folder when you install Adobe Photoshop. You cannot save files in the PhotoCD format from Adobe Photoshop.*

The Kodak KCMS PhotoCD plug-in module lets you read Photo YCC data from the disk and convert it to either an Adobe Photoshop RGB or a Lab color space. You can transform both the source image and the destination image using the profiles (or PT) you have installed. Using the Precision CMS application lets you deliver the highest-quality image to Adobe Photoshop.

### To open a Photo CD file:

- 1 Choose File > Open.
- 2 Select the Kodak CMS PhotoCD.
- 3 Select the file, and click Open.
- 4 Choose a resolution.
- 5 Deselect Landscape to open a portrait in its original orientation. (When this option is selected, portrait images are opened in Landscape orientation.)
- 6 Click Source.

The first time you open a PhotoCD file, it opens using the default Source and Destination profiles. After you choose the profiles, they remain selected until you change them.

- 7 Choose a device and a description from the list, and then click OK.
- 8 Click Destination, and for Device, choose RGB or Lab; then click OK.

You can choose other options if you have the profile installed. See the Read Me file for more information.

9 Click Image Info to display scanner information about the image; then click OK.

10 Click OK to open the image.

**Note:** In Windows 3.1 or higher, to read PhotoCD disks reliably, you must disable the Smartdrv.exe CD-ROM disk caching, which is normally started in the Autoexec.bat file. Open the Autoexec.bat file in a text editor and add /u to the end of the Smartdrive.exe line to disable disk caching for all drives; or add -e to the end of the line to disable a specific drive (where E: is your CD-ROM drive letter). For more information about Smartdrive, see your DOS or Windows documentation.

## Opening Raw files

The Raw format is designed to accommodate images saved in undocumented formats, such as those created by scientific applications. Compressed files, such as PICT, LZW, and GIF, cannot be opened using this format. For more information on Raw options, see “About file formats” on page 318.

### To open a file using the Raw format:

- 1 Choose File > Open (Macintosh) or File > Open As (Windows).
- 2 Choose Raw from the file format list and click Open.
- 3 For Width and Height, enter values for the dimensions of the file.

4 To reverse the order of the width and height, click Swap.

5 Enter the number of channels.

6 Select Interleaved if the file was saved with a progressive display option.

7 Select a color depth and, if necessary, a byte order.

8 For Header, enter a value.

9 If you are missing the dimensions or header value, you can have Adobe Photoshop estimate the parameters. Either enter the correct height and width values to estimate the header size, or enter the correct header size to estimate the height and width, and then click Guess.

10 To have Photoshop retain the header when you save the file, select Retain When Saving.

11 Click OK.

## Importing an anti-aliased PICT file (Macintosh only)

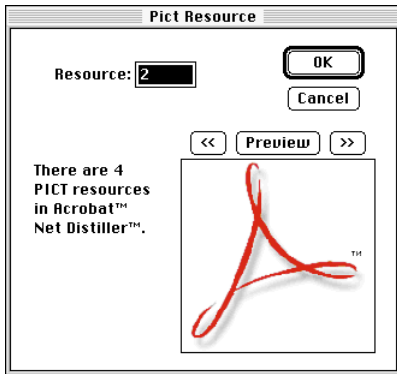
Choose File > Import > Anti-aliased PICT to import object-oriented PICT files, such as those created with MacDraw and Canvas, as soft-edged, or *anti-aliased*, files. Because the entire PICT file must be in memory for this module to operate, you may not be able to use the module with large PICT files.

The Anti-aliased PICT dialog box indicates the current file size and dimensions. To change the image dimensions, enter new values for Width and Height; the file size is updated to reflect the new dimensions. To maintain the same image propor-

tions, select Constrain Proportions. You can choose to open the Anti-aliased PICT file in either Grayscale or RGB mode.

## Acquiring PICT Resources (Macintosh only)

The PICT Resource module lets you read PICT resources from a file—for example, to read resources from another application. For more information, see “About file formats” on page 318. You specify the resources you want to read using the PICT dialog box.



To preview a resource, click Preview; click the arrow buttons to step forward and backward through the resources. Note that the number displayed for Resource refers to the resource’s position in ascending order in the resource fork and not to the resource’s identification number.

**Note:** You can also open a file in the PICT Resource file format by choosing File > Open and, for Format, choosing PICT Resource. Using the Open command, however, automatically opens the first resource in the file in an Adobe Photoshop document and does not display any other PICT resources in the file.

## Opening Quick Edit files

The Quick Edit feature lets you open a portion of a Photoshop 2.0, Scitex CT, or uncompressed TIFF file. Working with Quick Edit files can significantly decrease the time it takes to open large files, especially files over 4 MB. You can also open a section of a file when you don’t have enough RAM to open the entire file or when you want to speed up processing while you’re trying out painting techniques or special effects. You use the File > Export > Quick Edit Save command to save the section back to your original file.

### To use the Quick Edit feature:

- 1 Choose File > Import > Quick Edit.
- 2 Select the file you want to open, and click Open.
- 3 Drag to select an area of the image.

As you drag, the dialog box displays the file size and pixel dimensions of the selection to the right of the image. The following shortcuts can help you to make a precise selection when you’re using the selection marquee:

- Use the arrow keys to move the marquee one pixel at a time.
- Press = on the keyboard to increase the marquee by one pixel; press – to decrease the marquee by one pixel.

#### 4 Click Grid to divide the image into tiles.

To change the grid, click the plus or minus box under the option. For example, to divide the image into strips, decrease the grid to one column. You can use the following shortcuts to move around in the grid:

- Click to select a different tile.
- Press F to move to the first tile, or press N to move in sequence through the tiles.
- Use the arrow keys to move to the right or to the left, or to move up and down in the grid.
- Press Command+A (Macintosh) or Ctrl+A (Windows) to select the entire image.

#### 5 Click OK to open the image.

#### 6 Choose File > Export > Quick Edit Save to save the opened section back to its original file.

## Creating new images

The New command lets you create a blank, untitled Photoshop image.

### 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 parameters, hold down Option (Macintosh) or Alt (Windows) 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 65 for information on modes.

#### 3 For Contents, select one of the following:

- White to fill the background with white, the default background color.
- Background Color to fill the image with the current background color. See page 199 for information on choosing the foreground and background colors.
- 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 305 for more information.

## Cropping an image

Adobe Photoshop provides two ways for you to select part of an image and discard the rest:

- The Image > Crop command discards the area outside of a rectangular selection and keeps the resolution of the resulting image constant.





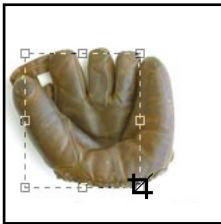
- The crop tool () lets you crop an image by dragging over the area you want to keep. You can also define the size and resolution of the cropped area. The advantage of using the crop tool is that you can rotate and resample the area as you crop.

#### 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. For more information, see page 153.
- 2 Choose Image > Crop.

#### To use the crop tool:

- 1 Position the pointer on the marquee () tool in the toolbox, and drag to select the crop tool () .
- 2 Drag over the part of the image you want to keep.



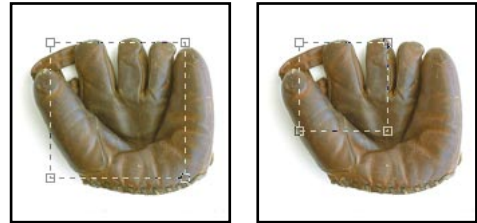
When you release the mouse button, the crop marquee appears as a bounding box with handles at the corners and sides.

- 3 Use the following methods to adjust the crop marquee:

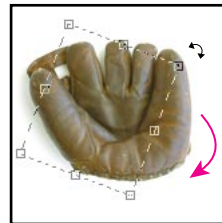
- To move the marquee to another position, position the pointer inside the bounding box and drag.



- 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.



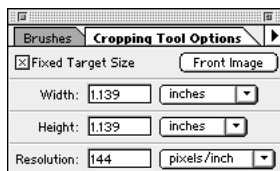
- 4 To crop the image, press Return (Macintosh) or Enter (Windows). To cancel the cropping operation, press Esc.



**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 (C) in the toolbox 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. Note that for Width, the Columns option uses the width and gutter sizes specified in the Rulers & Units preferences (see page 175).
- 5 Enter values for the size and resolution you want for the cropped area.

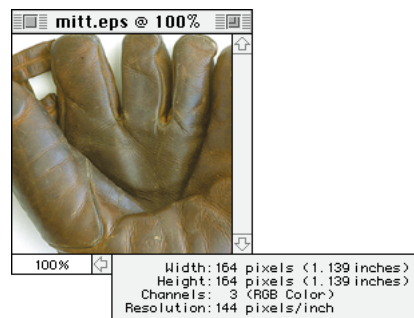


The Fixed Target Size option constrains the pixel count of the image. As a result, if you specify a size but not a resolution, Adobe Photoshop changes the image resolution to compensate for the size change. If you specify a resolution but not a size, Photoshop changes the size to compensate for the change in resolution.

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



The final image has the specified size and resolution.



## Increasing the size of the work canvas

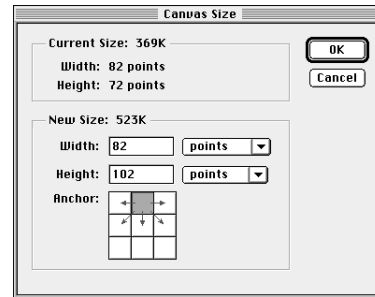
The Canvas Size command lets you add or remove work space, or extra canvas area, around an existing image. You increase the canvas area by specifying the height and width you want the canvas to be.

You can also use the Canvas Size command to crop an image by decreasing the canvas area; however, if you want to adjust the size and resolution of an image, you should use the Image Size command or the crop tool. If you use the Canvas Size command to crop an image, you might inadvertently lose image information that you cannot recover.

### To use the Canvas Size command:

- 1 Choose Image > Canvas Size.
- 2 Choose the units of measurement you want from the menus. Note that for Width, the Columns option uses the width and gutter sizes specified in the Rulers & Units preferences (see page 175).

- 3 Enter the dimensions in the Width and Height boxes. The value above the text boxes reflects the new file size.



- 4 For Anchor, click a square to indicate where you want the existing image to be positioned on the new canvas.

- 5 Click OK.



*Before*



*After*

Added canvas appears in the background color. If the background is transparent, the added canvas is also transparent.



# Chapter 4: Choosing a Color Display Mode

**F**amiliarity 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.

This chapter discusses several accepted standards for describing color and Photoshop's corresponding color modes. The last part of the chapter explains how to optimize the monitor display for systems with limited colors and how to convert images between different color modes.

## Color modes and models

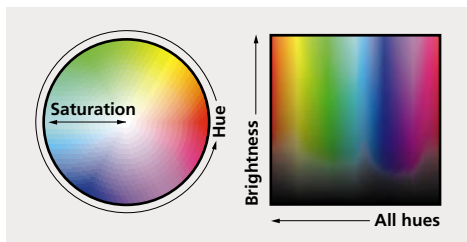
Adobe Photoshop can use a number of color modes for displaying, printing, and storing images. These modes are based on established color models for describing and reproducing color. Three of the most common models are red, green, and blue (RGB); cyan, magenta, yellow, and black (CMYK); and CIE  $L^*a^*b^*$ . Photoshop uses another common model—hue, saturation, and brightness (HSB)—to represent color values in palettes and dialog boxes. In addition to modes based on color models, Photoshop includes modes for specialized color output such as indexed color and duotones. For information on duotones, see “Using monotones, duotones, tritones, and quad-tones” on page 337.

## HSB model

The HSB model is based on the human perception of color. In the HSB model, all colors are described in terms of three fundamental characteristics:

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

In Photoshop, you can use the HSB model to define a color in the Color palette or Color Picker dialog box.

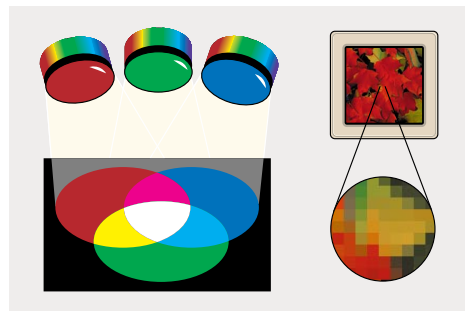


## RGB model

A large percentage of the visible spectrum can be represented by mixing three basic components of colored light in various proportions and intensities. These components are known as the *primary colors*: red, green, and blue (RGB). When the three primary colors overlap, they create the *secondary colors*: cyan, magenta, and yellow.

Since the primary colors combine to create white, they are also called *additive colors*. Adding all the colors together creates white—that is, all the light is reflected back to the eye. Additive colors are used

for lighting, video, film recorders, and monitors. Your monitor, for example, creates color by emitting light through red, green, and blue phosphors.



Additive colors (RGB)

## 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 all components have values of 0, the result is pure black.

RGB is the default mode for new Photoshop images. When working in other color modes, such as CMYK, Adobe Photoshop temporarily converts CMYK data into RGB data because computer monitors display colors using the RGB model.

## CMYK model

While the RGB model depends on a light source to create color, the CMYK model is based on the light-absorbing quality of ink printed on paper. As white light strikes translucent inks, a portion of the spectrum is absorbed. Color that is not absorbed is reflected back to your eye.

In theory, pure cyan (C), magenta (M), and yellow (Y) pigments should combine to absorb all color and produce black; for this reason they are also 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. (The letter *K* is used to avoid confusion, because *B* might also stand for blue.) Combining these inks to reproduce color is called *four-color process printing*.

The additive and subtractive colors are *complementary colors*. Each pair of subtractive colors creates an additive color.



Subtractive color (CMYK)

## CMYK mode

In Photoshop's CMYK mode, each pixel in a CMYK image is assigned a percentage value for each of the process inks. The lightest (highlight) colors are assigned small percentages of process ink colors; darker (shadow) colors have higher percentage values. 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%.

CMYK is the mode to use when preparing an image to be printed using process colors. The process of converting an RGB image into CMYK for this purpose creates a *color separation*. However, if your image started out as an RGB image, it's best to edit the image before converting to CMYK. When working in RGB mode, you can use the CMYK Preview command to simulate the effects of the change without actually changing image data (see page 111). You can also use CMYK mode to work directly with CMYK images that have been scanned or imported from high-end systems.

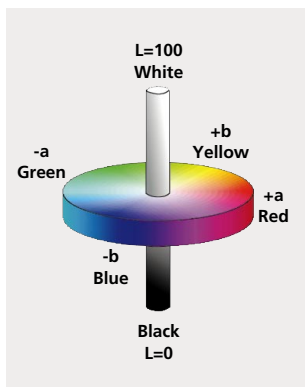
## L\*a\*b model

The L\*a\*b color model is based on the original color 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.

The L\*a\*b model addresses the problem of the variability of color reproduction that results from the use of different monitors or different printing devices. L\*a\*b color is designed to be *device independent*; that is, it creates consistent color regard-

less of the specific device, such as the monitor, printer, or computer, that you use 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, which ranges from green to red, and the *b* component, which ranges from blue to yellow.



L\*a\*b model

## Lab mode

In Photoshop's Lab mode (the asterisks are dropped from the name in Adobe Photoshop), 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.

The Lab mode is used most often when you are working with Photo CD images or when you want to edit the luminance and the color values in an image independently. Lab color is also the recommended color mode for moving images between systems and for printing to PostScript Level 2

printers. To print Lab images to other color PostScript devices, convert the images to CMYK before printing.

Although you might never use Lab color, this color model is an integral part of Adobe Photoshop because it's the internal color model Photoshop uses when converting from one color mode to another.

## Bitmap mode

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 pixel depth of 1. See "About pixel depth" on page 72 for more information.

## Grayscale mode

Grayscale mode uses up to 256 shades of gray to represent an image. In Adobe Photoshop, every pixel of a grayscale image has a brightness value ranging from 0 (black) to 255 (white). The values between 0 and 255 correspond to points on the grayscale spectrum. Grayscale values can also be measured as percentages of black ink coverage (0% is equal to white and 100% is equal to black). Images produced using black-and-white or grayscale scanners are typically displayed in Grayscale mode.

You can convert both Bitmap-mode and color images to grayscale. Grayscale mode lets you convert a color image to a high-quality black-and-white image. In this case, Adobe Photoshop discards all color information in the original



image; the gray levels (shades) of the converted pixels represent the luminosity of the original pixels.

When you convert a grayscale image to an RGB image, the color values for each pixel are assigned that pixel's previous gray value. You can also convert a grayscale image to a CMYK image (for creating process-color quadtones without converting to duotone mode) or to a Lab color image.

### Indexed color mode

An indexed-color image is based on a palette of at most 256 colors. When you convert an image to indexed color, Photoshop builds a color lookup table, which stores and indexes the colors in the image. If a color in the original image does not appear in the table, the program matches the color to the closest color in the color table or simulates the color using the available colors.

Indexed color mode is useful when you want to limit the palette of colors used in an image—for example, when you want to use the image in a multimedia animation application or on a Web page. Using an indexed color table lets you reduce the file size of an image while maintaining the visual quality that you need. For more information on color tables and converting images to indexed color, see “Converting to indexed color” on page 76.

### Multichannel mode

As you might guess from its name, a multichannel image is one that contains multiple channels, each having 256 levels of gray. Multichannel images are

used for specialized printing purposes, such as printing a grayscale image with spot color or converting a duotone for printing in Scitex CT format.

You can convert any image composed of more than one channel to a multichannel image. When you convert to a multichannel image, the original channels are assigned numbers. When you convert a color image to multichannel, the individual color channels are converted to grayscale information that reflects the color values of the pixels in each channel. If you delete a channel from an RGB, a CMYK, or a Lab image, the image is automatically converted to multichannel mode. See page 71 for more information on channels.

Note that you cannot export files or print a color composite from Multichannel mode.

## Color gamuts

The *gamut* of a color system is the range of colors that can be displayed or printed. The spectrum of colors that can be viewed by the human eye is wider than any method of reproducing color.

Among the color models used in Adobe Photoshop, Lab has the largest gamut and encompasses all the colors in the RGB and CMYK gamuts. The RGB gamut contains the subset of these colors that can be viewed on the computer or television monitor (which emits red, green, and blue light). Some colors, such as pure cyan or pure yellow, can't be displayed accurately on a monitor. The smallest gamut is that of the CMYK model, which consists of colors that can be printed using process-color inks. When colors that cannot be printed are displayed on the screen, they are referred to as out-of-

**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. In general, increasing the number of colors or channels in an image also increases the file size.



#### Bitmap 12K

Bitmapped images are made up of one bit of color (black or white) per pixel, and require the least amount of disk space.



#### 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. You can add new channels to a Grayscale image.



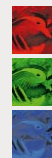
#### Duotone 90K

Duotone mode is used for monotones, duotones, tritones, and quadtones. These images are grayscale, single-channel images with 8 bits per pixel.



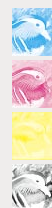
#### Indexed color 90K

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; for extensive editing you should convert temporarily to RGB mode.



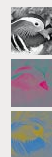
#### RGB color 270K

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.



#### CMYK 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.



#### Lab color 270K

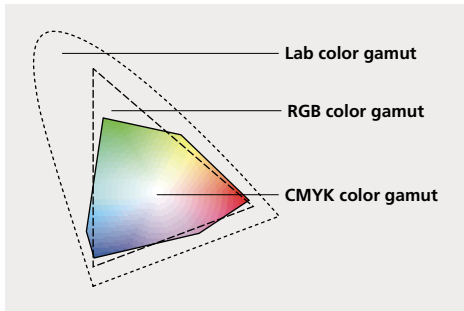
Lab images use three components to represent color. They are three channel images containing 24 (8 x 3) bits per pixel.



#### Multichannel 90K

Multichannel images have 8 bits per pixel, and are used for specialized printing purposes.

gamut colors (that is, they are outside the CMYK gamut). For information on identifying out-of-gamut colors, see page 111.



## About color channels

Every Adobe Photoshop image contains one or more *channels*, which represent information about the color elements in the image. For example, a CMYK image has at least four channels: one for cyan information, one for magenta information, one for yellow information, and one for black information. In this sense, a channel is analogous to a plate in the printing process in which a separate plate is used to apply each layer of color. In addition, extra channels can be added to an image for storing and editing masks; these additional channels are sometimes called *alpha channels*. See Chapter 10, “Using Channels and Masks” for more information.

An image can have up to 24 channels. By default, Bitmap-mode, grayscale, duotone, and indexed-color images have one channel; RGB and Lab mode images contain three channels; and CMYK images contain four channels. You can add chan-

nels to all image types except Bitmap-mode images. For information on these image types and other distinctions, see the chart on page 70.

## Measuring color values in the Info palette

You can determine the color values of any part of your image using the Info palette. Depending on your Info palette setup, 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 to express color values using the HSB, RGB, CMYK, or Lab models or Grayscale mode without changing the mode of the image itself. For more information on measuring color with the Info palette, see “Previewing color values” on page 109 and “Customizing the Info palette” on page 26.

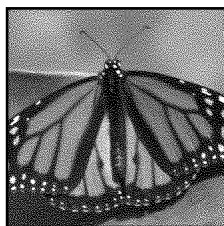
## Adjusting the monitor display

Although the RGB color model used by computer monitors is capable of displaying a large portion of the visible spectrum, the video system that sends data to a monitor often limits the number of colors that can be displayed at one time. By understanding the way color data is measured in digital files and on-screen, you can adjust Photoshop’s preferences to offset the limitations of your video system.

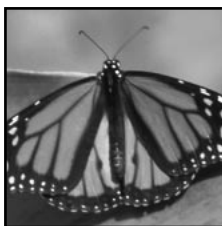
Understanding how color is measured digitally will also help you when choosing a file format for your images. For more information, see Chapter 13, “Saving and Exporting Images.”

## About pixel depth

*Pixel depth*, also called bit resolution or color depth, measures how much color information is available for each pixel in an image. Greater pixel 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 pixel depth of 1 has two possible values: black and white. A pixel with a pixel 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 pixel depth range from 1 to 24 bits per pixel.



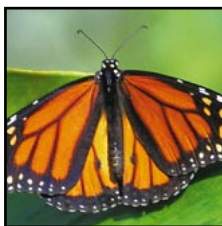
1-bit (Bitmap)



8-bit (Grayscale)



8-bit (indexed color)



24-bit (RGB)

## Color display options for 8-bit color displays

Each image mode in Adobe Photoshop uses a different *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 video card displays only 256 different colors at one time. For example, an RGB image can display 16.7 million colors in any image at one time. However, if the monitor can display only 256 of the 16.7 million colors, Adobe Photoshop uses a technique called *dithering* to simulate the 257th color and each additional color thereafter. Dithering adjusts adjacent pixels of different colors to give the illusion of a third color, which simulates the display of colors that are not in the current color palette.

By default, Adobe Photoshop uses pattern dithering to display colors not in the current color palette, which can result in a distinctive pattern of darker or lighter areas in the image. In contrast, diffusion dithering spreads out the inaccuracy in representing a pixel's color to the surrounding pixels and eliminates distinctive patterning. Diffusion dithering, however, can cause visual inconsistencies when only part of a screen is redrawn (for example, when you scroll, edit, or paint). However, when you print the image, the on-screen dithering effects will not be printed. You can set this and other display options in the Preferences dialog box.

**To select a color display option:**

- 1 Choose File > Preferences > Display & Cursors.
- 2 Choose either or both of the following options:
  - Use System Palette to make the display of inactive images more accurate.
  - Use Diffusion Dither to minimize dither patterns produced by dithering.

## Converting from one mode to another

When you convert an image from one mode to another, the transition between modes creates a permanent change to the color values in the image. For example, when you convert an RGB image to CMYK mode, the color values in the RGB gamut that are outside the CMYK gamut are adjusted to fall within the CMYK gamut. Consequently, it's best to convert to another mode only after doing 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). If you think you may need an image for more than one purpose, save a backup copy of that image before converting it.

For information on converting to Bitmap, Grayscale, or Indexed color mode, see the following sections. For information on converting to CMYK, see “Converting to CMYK” on page 99,

“About calibration” on page 84, and “Adjusting the black generation and separation types” on page 97.

**Important:** *Converting an image between certain modes flattens the image. Be sure to save a copy of your image that includes all layers if you want to be able to edit the original version of the image after the conversion.*

**To convert an image to another mode:**

Choose Image > Mode and choose the mode you want from the submenu. Images in certain modes cannot be converted directly to other modes. Modes not available for the active image appear dimmed in the menu.

The following mode conversions cause a file to be flattened:

- 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 to Bitmap mode

To convert a color image to Bitmap mode, you must first convert it to grayscale. This removes the hue and saturation information from the pixels and leaves the brightness values. 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 to Bitmap mode if necessary to export the image to another application.

**To convert a grayscale image to Bitmap mode:**

- 1 Open the grayscale image; then 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. The other conversion methods are described in “Additional bitmap conversion options” on page 75.

**Specifying a halftone screen for a Bitmap-mode image**

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

**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 is the ruling of the halftone screen. 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 and 150. Check with your print shop for the correct screen frequency to use.

- 4 Enter a value for the screen angle in degrees. Values can range 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*



*Halftone screen conversion:  
53 lpi, 45° angle, round dot*

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

### Additional bitmap conversion options

Like the Halftone Screen option, the other four bitmap conversion options determine the quality of the Bitmap-mode image, ranging from a high-contrast image to a textured or halftone-screen effect for output on non-PostScript printers. These methods are described in the following sections.

**50% Threshold** Converts pixels with gray values above the middle gray level (128) to white, and converts pixels below the middle gray level 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** Uses an error-diffusion process to convert the image. The program starts at the pixel in the upper left corner of the image and evaluates its gray-level value. If the value is above middle gray (128), the pixel is changed to white. If the value is below 128, the pixel is changed to black. There is some error in the conversion because the original pixel is usually not pure between black and white, and the conversion changes it to either a black or a white value. The amount of error is transferred to surrounding pixels before they are converted. In this way, the error is diffused

throughout the image. The result is a grainy, film-like texture. This option is useful for viewing images on a black-and-white screen.



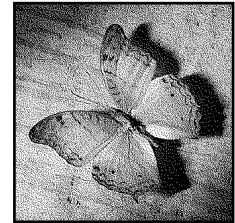
*Original grayscale image*



*50% Threshold conversion method*



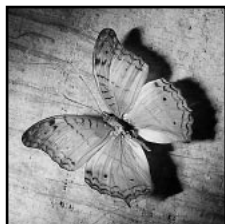
*Pattern Dither conversion method*



*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 a selection with a pattern” on page 216).

You can create a pattern that represents the texture you want and then screen the grayscale image to apply the texture to the image. If you want the pattern to cover the entire image, create a pattern that is as large as the image; otherwise, the pattern will be tiled. For example, if you apply a 1-inch-by-1-inch pattern to an image that is 4 inches by 4 inches, the pattern appears as 16 squares. Adobe Photoshop comes with several self-tiling patterns that can be used as halftone screen patterns (see “Using Postscript patterns to fill a selection” on page 217).



*Original grayscale image*



*Custom Pattern conversion method*

Because the Custom Pattern option simulates dark and light colors by making the halftone pattern thicker and thinner, respectively, you might have to take some special steps to prepare the pattern for the conversion. Choose a pattern that lends itself to these thickness variations; such a pattern typically has a variety of gray shades. One way to prepare a black-and-white pattern for conversion is to convert the image to grayscale and then apply the Blur More filter to the pattern several times. This technique blurs the lines within the pattern, creating thick lines that taper from dark gray to white.

## Converting a Bitmap-mode image to grayscale

A Bitmap-mode image converted to grayscale consists of one gray level (black). Since few editing options are available in Bitmap mode, you might convert a Bitmap-mode image to a grayscale image for editing and then convert it back to a Bitmap-mode image to export it to other applications. However, keep in mind that the appearance of a Bitmap-mode image edited in grayscale mode may change when you convert it back to Bitmap mode.

### To convert a Bitmap-mode image to grayscale:

- 1 Choose Image > Mode > Grayscale.
- 2 Enter a value for the size ratio.

The size ratio is the factor by which you want to scale down the size of the image. For example, to reduce the size of the 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 lets you generate multiple shades of gray from an image scanned on a 1-bit scanner.

## Converting to indexed color

At times, you might want to convert an RGB image to an indexed-color image to edit an image's color table or to export an image to an application that supports only 8-bit color. This is useful, for example, for multimedia animation applications and World Wide Web pages. When you convert an RGB image to indexed color, all but 256 colors are deleted from the image.



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

- 1 Choose Image > Mode > Indexed Color.
- 2 Select the desired palette, color depth, and dither methods. These options are described in the following sections.
- 3 Click OK.

## Specifying a palette

Eight palette types are available for converting an image to indexed color. Choose Image > Mode > Color Table to view the results of each palette option.

**Exact** Uses exactly the same colors for the palette as those that appear in the RGB image. Since all the colors in the image are present in the image's palette, there is no dithering. This option is available only if 256 or fewer colors are used in the RGB image.

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

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

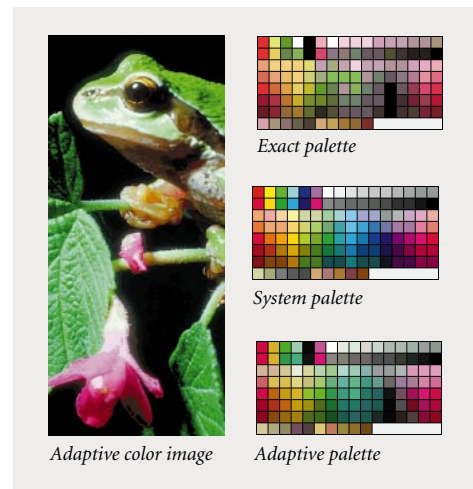
**Web** Uses the palette most often used by Web browsers to display 8-bit images.

**Uniform** Creates a palette based on a uniform sampling of colors from the color spectrum. For example, if you choose an 8-bit color depth, Adobe 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 ( $6 \times 6 \times 6 = 216$ ). To create a uniform

palette composed of fewer colors, choose a lower color depth. The total number of colors displayed in the image corresponds to the perfect cube (8, 27, 64, 125, or 216) nearest to the chosen color depth.

**Adaptive** Creates a palette by sampling colors from the more commonly used areas of the color spectrum that appears in the image. For example, if you have an RGB image that has only the colors green and blue, the resulting palette is made up primarily of green and blue colors. Because the colors in most images are concentrated in particular areas of the spectrum, this table can be useful.

To control more precisely how the Adaptive palette is built, select a part of the image that contains the colors you want to use in the palette before you make the conversion. When you have an active selection in the image, Adobe Photoshop weights the conversion toward the colors in the selection.



**Custom** Lets you create your own palette. When you select this option, the program displays the Color Table dialog box. You can then edit the color table and save it for later use or click Load to load a previously created color table. Editing a color table is described in “Manipulating the color table of an indexed-color image” on this page.

**Previous** Converts the image by using the custom palette from the previous conversion. This option makes it easy to convert a number of images using the same custom palette. This option is available only after you have converted an image using the Custom or Adaptive option.

### Specifying the color depth

When you choose the Uniform or Adaptive palette, you can specify the *color depth* (also known as pixel depth), or the number of bits of color information per pixel, for the indexed-color image. The color depth you choose 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; if you choose 6 bits per pixel, the image is composed of 64 colors; if you choose 8 bits per pixel, the image is composed of 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 choose to 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 a less structured method than does the Pattern option to dither colors.
- **Pattern:** Adds random pixels in patterns to simulate the colors that are not in the color table. This option is available only when you’re using the Macintosh System palette.

### Manipulating the color table of an indexed-color image

When you convert an RGB image to an indexed-color image, or when you work in an original indexed-color image, you might want to change one or more colors in the table. You can also model the colors after a predefined color table. Each indexed-color image has its own color table, and you can save a color table for reuse with other indexed-color images.

There are two types of indexed-color images: those with a limited number of colors (fewer than 256), and pseudocolor images (grayscale images that display variations in gray levels with color rather

than shades of gray). Pseudocolor images are often used in scientific and medical applications. The color table editing features discussed in the following sections are most useful with pseudocolor indexed images. These features can also be used to produce special effects with indexed-color images that have a limited number of colors.

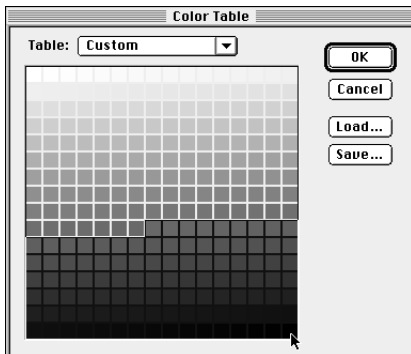
**Note:** If you just want to change the colors in an image, choose *Image > Adjust*, and use the color correction commands in the submenus. See Chapter 6, “Making Color and Tonal Adjustments,” for a description of these commands.

## Editing colors in the indexed color table

To edit a color table, you select the colors you want to change. Although our example shows the editing of a color table for a pseudocolor image, the following procedure applies to all indexed-color images.

### 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.



Midtone and highlight range selected in dialog box

- 4 Choose the color you want, as explained on page 225, and click OK.

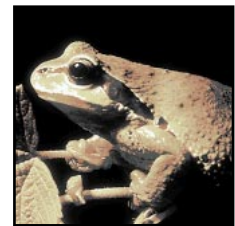
If you are changing a range of colors, Adobe Photoshop creates a gradient in the color table between the starting and ending colors. The first color you choose in the Color Picker is the beginning color for the range. When you click OK, the Color Picker reappears so you can choose the last color in the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



Original



Midtones and highlights edited in color table

## Choosing a color-table option

Your indexed color table can be modeled after one of six predefined color tables. You select a predefined color table from the Table menu in the Color Table dialog box.

- Custom: Used whenever the table is not one of Adobe Photoshop software’s built-in color tables.
- Black Body: Displays a transition of colors based on the different colors a blackbody radiator emits as it is heated—from black to red, orange, yellow, and white.

- **Grayscale:** Displays a smooth transition from black to white in 256 levels of gray.
- **Spectrum:** Displays a smooth transition between the colors that result when white light passes through a prism: violet, blue, green, yellow, orange, and red.
- **Macintosh System:** Displays the standard Macintosh 256-color system palette.
- **Windows System:** Displays the standard Windows 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 are changed 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 “Saving, loading, and replacing swatches” on page 221 for more information.*

# Chapter 5: Reproducing Color

**M**ost of the difficulties of accurately reproducing colors from a software program stem from the fact that the total set of colors, or the *gamut*, produced by the red, green, and blue phosphors of a computer monitor or video display is different from the gamut of the cyan, magenta, yellow, and black inks used in tra-

ditional printing. But how colors appear in your final artwork may vary not only with the type of output—that is, from print to on-screen; it may also vary dramatically between output devices and software programs—that is, from monitor to monitor, printer to printer, or page layout program to photo-retouching program.

**CALIBRATING IN ADOBE PHOTOSHOP** to ensure that your color on-screen in Photoshop matches your printed color, you first calibrate your monitor and then adjust Photoshop's setting to match your printing environment.



1. Calibrate your monitor.



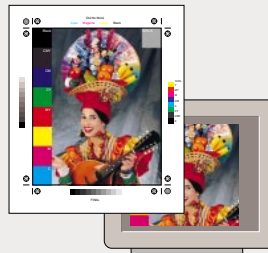
2. Enter Monitor Setup information (page 87).



3. Enter Printing Inks Setup information (page 89).



4. Print a preprepared CMYK proof (page 90).



5. Adjust Printing Inks settings to match the proof. (page 91).

This chapter explains how to use Adobe Photoshop's color calibration and separation tools to ensure as close a match as possible between your colors on-screen in Photoshop and in your final artwork. If you are preparing artwork for color separations, it's important that you follow the steps for calibration and separation provided in this chapter. If you are preparing artwork for online use, Photoshop's calibration tools can still be used to ensure consistent color between different software programs or between similar monitors in similar environments. See "Ensuring consistent color on-screen" on page 102 for more information on using Photoshop's calibration tools for on-screen color display.

## About calibration

*Calibration* is the process of adjusting your monitor and the Adobe Photoshop color conversion settings to compensate for factors that affect both the on-screen image and its conversion to printed output.

The monitor calibration tools included with Adobe Photoshop affect how colors appear on your monitor. The settings in the color calibration dialog boxes in Photoshop—Monitor Setup, Printing Inks Setup, and Separation Setup—determine how the program converts colors between RGB and CMYK modes. For this reason, these settings affect the actual color values in the image only when you convert between RGB and CMYK modes.

Although this is true for both the Macintosh and Windows versions of Photoshop, important differences exist in the way monitor calibration affects the appearance of images on these platforms:

- The Macintosh version of Photoshop provides a Gamma control panel whose settings offer global monitor calibration. On the Macintosh, adjusting the Monitor Setup options affects how an image is displayed in CMYK mode (as it is converted to RGB color for display on the monitor) but not how the image is displayed in RGB mode.
- The Windows version of Photoshop does *not* offer global monitor calibration, but instead affects the monitor display only *within* Photoshop. The Gamma control in the Calibrate dialog box measures your monitor's behavior and then uses the result of the measurement to adjust the impact of the gamma setting in the Monitor Setup dialog box. In Windows, therefore, adjusting the Monitor Setup options affects how an image is displayed in RGB mode but not in CMYK mode.

In contrast, the Printing Inks and Separation Setup settings affect only the conversion to CMYK mode.

**Note:** *In addition to affecting how colors are converted between CMYK and RGB modes, the settings in the Monitor Setup dialog box affect the overall brightness display of all images.*

## Step 1: Calibrate your monitor

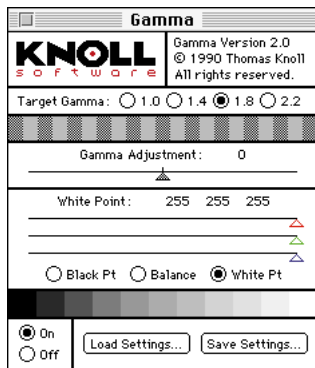
The Photoshop calibration tools let you calibrate the gamma, the color balance, the white and black points of color, and the grayscale monitors. These settings help you eliminate color cast in your monitor display, ensure that your monitor grays are as neutral as possible, and standardize the display of images on different monitors so that images look the same with different monitor and video-card combinations.

If you are using a Macintosh and have a third-party monitor calibration utility installed, such as the Radius™ Calibrator or Daystar's Colorimeter 24, you should use either that utility or the Adobe Photoshop gamma tools, not both. A third-party calibration program updates Macintosh Photoshop's color space descriptor file; therefore using both systems will miscalibrate the monitor. If you are using third-party calibration, you can skip steps 4 through 12 of the following procedure. After step 3, enter the gamma value provided by your utility in the Gamma text box of the Monitor Setup dialog box.

### To calibrate your monitor:

- 1 Make sure your monitor has been turned on for at least a half hour so that the monitor display has stabilized.
- 2 Set the room lighting at the level that you plan to maintain; then adjust the brightness and contrast controls on your monitor. Because changes in these factors can dramatically affect your display, you should close your room off from external light sources and tape down the monitor and room lighting controls once they have been set.
- 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. If you need help changing your background color, refer to the manual for your operating system.
- 4 Depending on your platform, do one of the following:
  - On the Macintosh, choose Control Panels from the Apple menu, and double-click the Gamma control panel. Use the On and Off buttons to turn the Gamma software on and off. If you turn off the Gamma software, the monitor's default values are used.

- In Windows, choose File > Color Settings > Monitor Setup.



**Note:** If you do not see the Gamma control panel on the Macintosh, locate the Gamma file in the Goodies > Calibration folder inside the Adobe Photoshop folder. Drag the Gamma icon into the Controls Panels folder in the System Folder, and restart your Macintosh.

5 Click a target gamma at the top of the control panel (Macintosh), or type a value for Gamma in the Monitor Setup dialog box (Windows). A target gamma of 1.8 is recommended for printing CMYK images, because it closely matches printer dot gain. If you're sending your output to an RGB device (for example, a monitor, film recorder, or RGB printer), use a higher target. Images intended for video should have a target gamma of 2.2, which is the typical gamma of most television sets. If you plan to print or display the image using another application or on another platform, use a gamma of 1.8; that value is the closest match for uncorrected gamma.

6 Windows only: If you changed the gamma value in step 5, click OK; then choose File > Color Settings > Monitor Setup to reopen the Monitor Setup dialog box.

7 Windows only: Click Calibrate in the Monitor Setup dialog box. You can preview the effects of calibration on an open Photoshop image at any time by clicking Preview in the Calibrate dialog box.

8 Hold up a white piece of paper similar in color to the stock on which you will print. Click White Pt, and drag the three slider triangles until the monitor white matches the paper as closely as possible. This process lets you compensate for the bluish tint found in most monitor displays.

For maximum accuracy, view the paper under controlled lighting, such as a light box or a combination of fluorescent and tungsten light bulbs.

9 Adjust the gamma by dragging the Gamma Adjustment slider until the solid gray areas match the patterned gray areas in the gamma strip above the slider.

10 Adjust the color balance by clicking Balance and dragging the three slider triangles until the gray areas in the strip below the sliders become a neutral gray. This adjustment controls the monitor's mixture of red, green, and blue, and it compensates for color casts in the monitor.

11 Adjust the black point by clicking Black Pt and dragging the three slider triangles until no color tint appears in the shadow tones in the lower strip and you can see a distinct gradation between each pair of swatches.



12 If necessary, readjust the color balance and then the gamma.

13 When you've finished making adjustments, close the Gamma control panel (Macintosh) or the Calibrate dialog box (Windows).

14 Save the settings. See "Saving and loading custom gamma settings" on page 87.

## Recalibrating

Once you have calibrated your monitor, you should not have to recalibrate 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 will need to recalibrate the system. For this reason, it's recommended that you tape down your monitor's brightness and contrast controls after calibrating the monitor, and that you maintain consistent room lighting conditions.

## Calibrating multiple monitors (Macintosh only)

If you are using more than one monitor, you can drag the Gamma control panel onto the next screen and repeat the calibration steps for each monitor. When calibrating multiple monitors, it can be helpful to open an image with a wide dynamic range and a good selection of colors. For example, you can use the *Ole No Moire* image located in the Goodies > Calibration > Separation Sources folder inside the Adobe Photoshop folder. Create another window for the image by choosing Window > New Window, and drag the image to the second monitor. Use the image to determine when the calibration is correct.

## Saving and loading custom gamma settings

You can save and load custom gamma settings for paper stocks with different tints. You can also save gamma settings for different monitors. To reuse the gamma settings, use the Save Settings and Load Settings buttons in the Gamma control panel (Macintosh) or in the Calibrate dialog box (Windows).

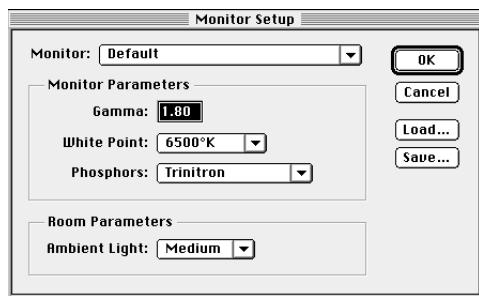
## Step 2: Enter the Monitor Setup information

Once you have calibrated your monitor, enter your monitor specifications in the Monitor Setup dialog box. Adobe Photoshop uses the information in the Monitor Setup dialog box to account for factors affecting the monitor display: the target gamma and white point, the type of phosphors in the monitor, and the room lighting conditions.

In addition to affecting the overall monitor display, the Monitor Setup information is used to determine how the program converts colors between modes. This means that Monitor Setup options will affect how an RGB image is converted to CMYK mode as well as the on-screen display of CMYK (or duotone) colors (Macintosh) or RGB images (Windows). If you change these settings after you have converted an image to CMYK mode, only the display is affected. You must revert to the original RGB image and then reconvert the image to CMYK for these changes to affect the separation data. (See "Converting to CMYK" on page 99.)

**To enter Monitor Setup information:**

- 1 Choose File > Color Settings > Monitor Setup.



- 2 For Monitor, select the monitor you are adjusting. If your monitor is not listed as an option, choose the Default option or contact your monitor manufacturer to determine which monitor option you should select for your monitor to emulate.

- 3 For Gamma, type a value appropriate for your platform:

- On the Macintosh, type the value that you selected for Target Gamma in the Gamma control panel. If you are using a third-party utility, enter the gamma value set by that device.
- In Windows you should have already entered a value here. If not, go back to “Step 1: Calibrate your monitor” on page 85.

- 4 For White Point, select a setting.

If you are using a third-party monitor calibration device, choose the white point value established by that device; otherwise, leave this value at the default value of 6500K. If you don't see the value you need, select Custom, and type in your own values.

- 5 For Phosphors, select a monitor type.

If the correct type is not in the drop-down list, choose Custom, and enter the red, green, and blue chromaticity coordinates as specified by your monitor manufacturer. This option accounts for the different red, green, and blue phosphors used by monitors to display color.

- 6 For Ambient Light, select a setting:

- Select High if your room lighting is brighter than the on-screen image. Because the High setting has no effect on RGB-to-CMYK conversion, you should also select High if you are using hardware monitor calibration that accounts for ambient lighting.
- Select Low if your room lighting is not as bright as the screen.
- Select Medium if your room and monitor light levels are about the same.

Remember that it is important to maintain consistent room lighting.

**Saving and loading monitor settings**

Use the Save and Load buttons in the Monitor Setup dialog box to save and load the settings for different monitors or different lighting environments. You might also want to save the monitor settings if you are using different gamma settings for output devices or if you work with images from other computers.

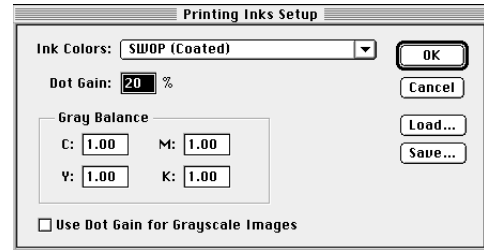
### Step 3: Enter the Printing Inks Setup information

The Printing Inks Setup dialog box lets you specify the properties of the inks and paper stock used to reproduce your color plates. Adobe 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 on the advice of your print shop, you might need to return to the Printing Inks dialog box to adjust for dot gain, ink characteristics, and color casts. For more information on dot gain, see “About dot gain and gray balance” on page 91.

As with the information in the Monitor Setup dialog box, Adobe Photoshop uses information in the Printing Inks Setup dialog box when converting color values between modes. If you change the Printing Inks Setup settings after you have converted an image to CMYK mode, only the display is affected. You must revert to the original RGB image (choose File > Revert) and then reconvert the image for the changes to affect the separation data. See “Converting to CMYK” on page 99 for more information on how the printing inks settings affect mode conversions.

To specify the printing inks:

1 Choose File > Color Settings > Printing Inks Setup.



2 For Ink Colors, select an ink type (or printer).

The default color values used in the color separation calculations are designed to produce quality separations using SWOP (Specifications for Web Offset Publications) inks on coated paper. These inks differ slightly from those used in Europe, as well as from the pigments used in color wax transfer printers such as the Tektronix® Phaser™ II Printer. 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 looks like, what printed magenta looks like, and so on, given a certain set of inks and paper stock.

**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 will print ink hues that are very similar from printer to printer. The amount of dot gain, however, can vary quite a bit from machine to machine. While it may not be necessary to recalibrate the printing ink colors for a different printer of the same type, you may need to change the dot gain setting in the Printing Inks Setup dialog box.

If you choose Custom for Ink Colors, the Ink Colors dialog box appears. See “Setting the characteristics of custom ink colors” on page 94 for information about entering values in this dialog box.

### 3 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. You can change this value if your print shop has provided a different value for estimated dot gain. See “Step 5: Calibrate the screen image to the proof” on page 91 for more information on dot gain.

4 When working with grayscale images (or with an individual channel in a color image), click Use Dot Gain for Grayscale Images if you want the on-screen display to reflect the expected dot gain.

See “Compensating for dot gain in grayscale and duotone images” on page 92 for more information about this option.

## Step 4: Print a color proof

Once you have calibrated your monitor and have entered the settings for printing inks, you print a CMYK image, called a *proof*. 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 *Ole No Moire* (Macintosh) or *testpic.jpg* (Windows) CMYK image included with the Adobe Photoshop software, or you can create your own CMYK

image. For this step, do not use an RGB image that has been converted to CMYK in Adobe Photoshop; you must use a file whose CMYK values have been assigned directly in CMYK mode.



Color proof

### To create your own CMYK proof document:

- 1 Create a new Adobe Photoshop document in the CMYK mode.
- 2 Create a set of swatches in the document. Include the following swatches:
  - 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)

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.

## Step 5: Calibrate the screen image to the proof

After examining the color proof, you may need to adjust some additional calibration settings to make the image on-screen exactly match the proof. In particular, you may need to adjust the calibration settings in the Printing Inks Setup dialog box to compensate for dot gain, custom ink characteristics, and color casts.

### About dot gain and gray balance

Dot gain or loss is a change in the size of the specified halftone dots caused by the ink bleeding or spreading as it is absorbed by the paper. A 50% halftone screen, for example, may show an actual density of 55% on the printed image when read with a densitometer. Dot gain can also be the result of an imagesetter miscalibrated during the imaging process.

The dot gain estimate in the Printing Inks Setup dialog box represents dot gain for the specified paper stock for the midtones (that is, the 50%

pixels). Adobe Photoshop then uses this value to create a dot gain curve that adjusts for dot gain throughout the image.

The default dot gain estimate reflects the expected dot gain between film and final output. (Printers typically tell you the expected dot gain between the color proof and the final output, which is usually between 2 and 5%.)



*Color proof: no dot gain*



*Printed image: with dot gain*

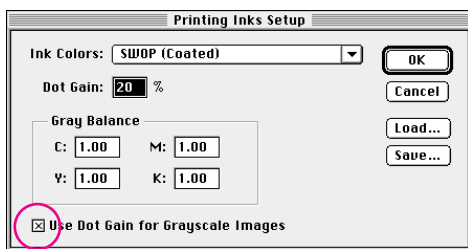
Changing the dot gain makes the image appear lighter (if you enter a lower percentage) or darker (if you enter a higher percentage) on the screen. It does not affect the actual data in the image until Adobe Photoshop uses the setting to adjust the CMYK percentages for dot gain during the conversion process.

The gray balance settings in the Printing Inks Setup dialog box let you control the levels of CMYK colors individually to compensate for color casts. A color cast may appear in the image if one of the process inks has a dot gain higher than the others.

## Compensating for dot gain in grayscale and duotone images

Adobe Photoshop provides two ways to compensate for dot gain in grayscale images, duotone images, and individual channels of a color image:

- Select Use Dot Gain for Grayscale Images in the Printing Inks Setup dialog box. This option adjusts the display to reflect the dot gain. If the image appears too dark, use the Curves or Levels dialog box to compensate for the adjustment on an image-by-image basis. See Chapter 6, “Making Color and Tonal Adjustments,” for more information on these dialog boxes.



- Use the Transfer Functions dialog box to compensate for dot gain when the image goes to film. Use this method if the image has a good on-screen appearance but poor printed quality. Transfer functions don't let you view the results of the adjustment on your screen; however, they provide the most precise control over dot gain and let you adjust the dot gain to specific values throughout the image. See “Compensating for dot gain using transfer functions” on page 92 for more information.

## Compensating for dot gain in color images

To determine the correct dot gain, include a calibration bar with your proof by choosing File > Page Setup and selecting the Calibration Bars option. Using a reflective densitometer, take a reading at the 50% mark of the printed calibration bar; then add that value to your printer's estimate of the expected dot gain between proof and final output; then enter that value in the Dot Gain text box in the Printing Inks Setup dialog box. 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.

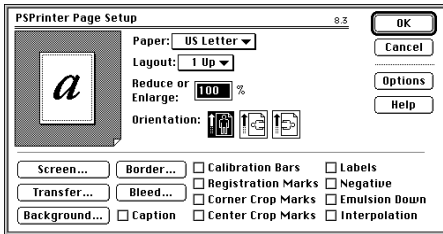
## Compensating for dot gain using transfer functions

*Transfer functions* are used traditionally to compensate for dot gain due to a miscalibrated imagesetter. In addition, you can use transfer functions when you want precise control over the dot gain values throughout an image. Unlike the Dot Gain value in the Printing Inks Setup dialog box, transfer functions let you specify up to 13 values along the grayscale to create a customized dot gain curve.

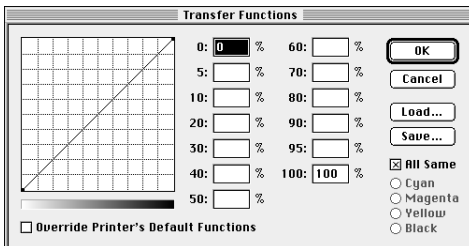
**Note:** Adobe Systems strongly recommends that you calibrate your imagesetter using the manufacturer's calibration software or a third-party imagesetter calibration device, such as Precision Color by Kodak. If you are using a service bureau, verify that the imagesetter is not off by more than 1 percentage point.

### 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 have specified a 50% dot, and your imagesetter prints it at 58%, you know that you have an 8% dot gain in your 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 that 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 might be too small to hold ink; beyond a certain density level, the shadow dots might fill into solid black, removing all the 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 EPS format” on page 309 for more information.

### Changing the default transfer function settings

Use the Save and Load buttons in the Transfer Functions dialog box to use transfer function settings with other Adobe Photoshop documents.

#### To save the current transfer function settings as the default:

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

#### To load the default transfer function settings:

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

## Setting the characteristics of custom ink colors

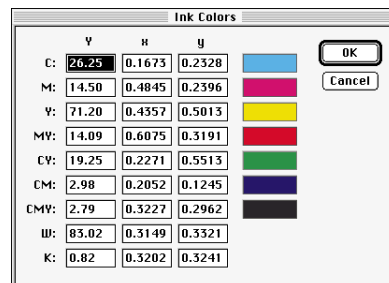
In most cases, the Ink Colors options in the Printing Inks Setup dialog box accurately provide the necessary compensations for various printing inks. In some situations, however, you might want to adjust the ink colors further by using a color proof. For example, you might be using ink sets that are not listed for Ink Colors. When you change these settings, you change the profile of the inks used by Adobe Photoshop during the color separation.

**Note:** The Ink Colors options reflect the calibrations of some of the most commonly used ink sets and color printers. If your printer is not listed, contact your printer manufacturer to find out whether a set of Adobe Photoshop color patch values for your printer is available.

### To adjust for custom ink colors:

- 1 Choose File > Color Settings > Printing Inks.
- 2 For Ink Colors, select Custom.

The Ink Colors dialog box displays the various combinations of CMYK and the CIE coordinates used to generate them. CIE coordinates are an international color definition standard that is supported by PostScript Level 2.



The Ink Colors dialog box defines colors as Y (lightness), x, and y values. The current ink sets are calibrated for viewing conditions of 6500K (D65), 2°.

**3** Using your printed CMYK proof, take a reading of the color values using a spectrophotometer or a colorimeter; then enter those values in the Ink Colors dialog box.

Alternatively, you can click the color patch of the ink color you want to adjust and then adjust the color on-screen until it matches the patch on the color proof; then click OK.

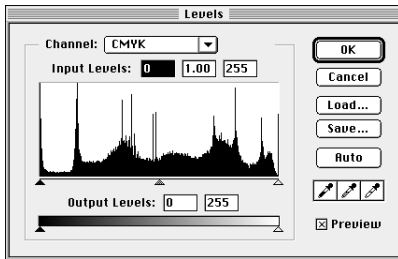


## Compensating for color casts

The Gray Balance text boxes in the Printing Inks Setup dialog box let you compensate for color casts in a printed image by adjusting the gamma of the individual channels. These color casts are typically due to nonuniform dot gain between the printing inks. Nonuniform dot gain can be caused by the order in which the inks are printed, the screen angles of a given ink screen, or the specific properties of the inks themselves. For example, cyan ink, which is often printed first, tends to have higher dot gain values than do the other process inks.

### To adjust the gray balance:

- 1 With the calibration image in CMYK mode, choose Image > Adjust > Levels.



- 2 For each ink in the Channel menu, adjust the Input Levels gamma slider (the gray middle triangle) until the image on-screen matches the color proof.

- 3 Write down the gamma value for each channel (the gamma level is in the middle text box above the Input Levels histogram); then click Cancel to close the Levels dialog box without modifying the image. Because you are calibrating your system, not just the balance of an individual image, you want to change the overall gray balance used in the Adobe Photoshop color conversion process.

- 4 Choose File > Color Settings > Printing Inks Setup, and enter the values for the channels in the Gray Balance text boxes; then click OK. If the existing values are not all 1.0, multiply the new values by the old values.

Once again, keep in mind that changing the settings in the Printing Inks dialog box affects the display of images while in CMYK mode, as well as the conversion from RGB to CMYK. It has no effect on the separation data if you change the settings while an image is in CMYK mode; to affect separation data, you must reconvert the image from its original mode to CMYK.

## Saving and loading printing inks settings

Use the Save and Load buttons in the Printing Inks Setup dialog box to save these settings for use with other Adobe Photoshop images.

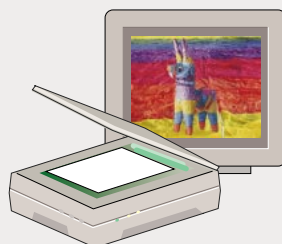
## Adjusting Separation Setup

The settings in the Separation Setup dialog box (along with the settings in the Printing Inks dialog box) control how the CMYK plates are generated. The separation settings include the method used for black generation and undercolor removal and the total ink limit for the press.

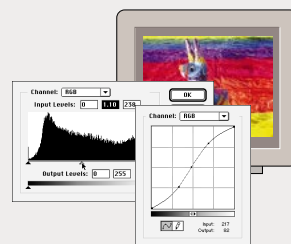
**CREATING A COLOR SEPARATION** Producing a high-quality color separation from Adobe Photoshop requires an understanding of several aspects of Photoshop including calibrating, scanning, color correction and printing.



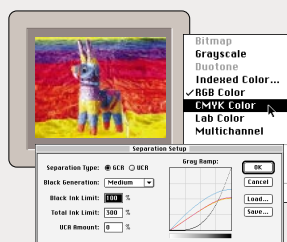
1. Calibrate your monitor and Adobe Photoshop (pages 85–87).



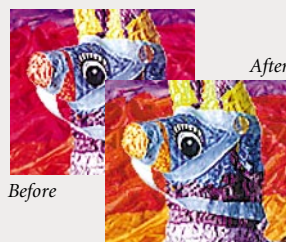
2. Scan or import your image (Chapter 3).



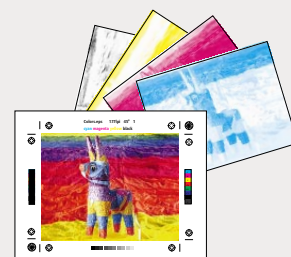
3. Make overall tonal and color adjustments (Chapter 6). Edit and composite the image as desired (Chapters 6, 7–12).



4. Adjust the Separation Setup settings and convert the image to CMYK mode (pages 95–99).



5. Fine-tune the color corrections (Chapter 6).



6. Apply color trap if necessary and print from Photoshop or your page layout application (Chapter 14).

When Adobe Photoshop converts an RGB image to the CMYK mode, the program converts the RGB values to CMYK values using information in the Monitor Setup, Printing Inks Setup, and Separation Setup dialog boxes. The Monitor Setup and Printing Inks Setup settings help ensure the closest match possible between the color you see on the screen and the color that will appear in the final

output. The Separation Setup settings determine the precise CMYK values chosen for a given RGB color. Once an image is in CMYK mode, Adobe Photoshop performs an internal conversion dynamically to display the CMYK colors on an RGB monitor. For more information on the conversion process, see “Converting to CMYK” on page 99.

Adobe Photoshop stores the Separation Setup and Printing Inks Setup settings in a separation table. These settings are used for all future conversions until the settings in either dialog box change. For more information on separation tables, see “Using color separation tables” on page 100.

## About black generation and separation types

Color separation is based on the principle of translating the three additive colors—red, green, and blue—into their subtractive counterparts—cyan, magenta, and yellow. In theory, equal parts of cyan, magenta, and yellow combine to subtract all light 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 overlap, and they add black ink.

A given color can be translated from RGB mode to CMYK mode in an infinite number of ways. Pre-press operators typically use one of two “styles” of color translation: undercolor removal (UCR) or gray component replacement (GCR).

In UCR, the black plate is used to add depth to shadow areas and to neutral colors. In GCR, more black ink is used over a wider range of colors. GCR separations tend to reproduce dark, saturated colors somewhat better than UCR separations do, and GCR separations maintain gray balance better on the press. The type of separation you should use is determined by the paper stock you are using and the requirements of your print shop.

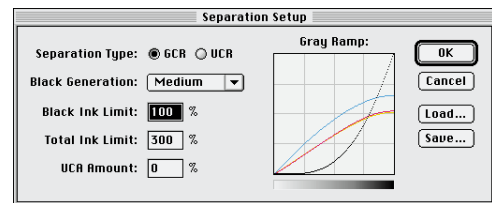
## Adjusting the black generation and separation types

In most cases, the Adobe Photoshop color separation defaults produce excellent results. Depending on your printer’s specifications, however, you might want to use the Separation Setup dialog box to adjust how the CMYK plates are generated by modifying the black generation, setting new ink limits, and changing the undercolor removal method. If you have already converted the image to CMYK mode, you must reconvert the image after adjusting the Separation Setup options.

**Note:** Because non-PostScript color printers (such as HP Deskjet, Canon® Bubblejet™, and Epson® Color Stylus™) generate their own black values, the Separation Setup settings have no effect on this type of output.

### To open the Separation Setup dialog box:

Choose File > Color Settings > Separation Setup.



The Separation Setup dialog box displays a graph showing how the neutral colors in the image (that is, colors with equal parts of cyan, magenta, and yellow—sometimes called a *gray ramp*) will separate, given the current values of the Separation Setup parameters. 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. This is because a small extra amount of cyan is required to produce a true neutral.

## Choosing the separation type

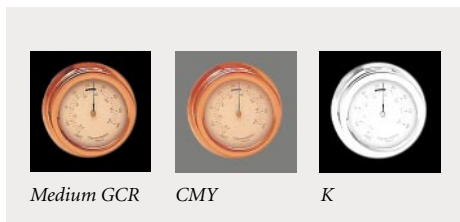
By default, Adobe Photoshop uses the GCR type of color separation. Click UCR if you want to use undercolor removal. Check with your print shop to find out which type of separation to use.

## Choosing the degree of black generation

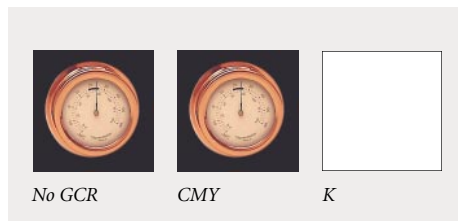
For GCR separations, you choose the degree of black generation, set ink limits, and indicate undercolor addition.

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

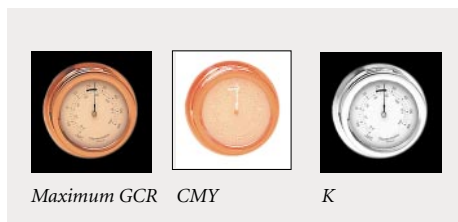
- The Light and Heavy settings decrease and increase the effect of the Medium setting (the default). In most cases, Medium produces the best results.



- None generates the color separation using no black plate.



- Maximum maps the gray value directly to the black generation value. This option is useful for images that contain 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 Setup dialog box. The total ink limit is the maximum ink density that your press can support. By default, the Black Ink Limit is 100%; the Total Ink Limit is 300%. Check with your print shop to find out if you should adjust these values. Note that in the Separation Setup graph, these limits determine the cutoff points for the CMYK curves.

### Using undercolor addition

The UCA (undercolor addition) Amount in the Separation Setup dialog box is used to add color (CMY) after removing some of the black (K) component in the shadow areas. This produces rich, dark shadows in areas that might have appeared flat if they were printed with only black ink. UCA can also prevent the posterization that can occur if there is a lot of 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%.

### Saving and loading Separation Setup settings

You can use the Save and Load buttons in the Separation Setup dialog box to save settings for black generation and undercolor removal. This is particularly useful when you are creating custom black generation curves. The most recent black generation curve is saved by default in your Preferences file. Use the Save and Load buttons to save and load additional curves.

### Converting to CMYK

To print a color separation, you convert an RGB, an indexed-color, or a Lab image to a CMYK image. (You do not have to convert a Lab image to CMYK mode if you're printing to a PostScript Level 2 color printer, because the PostScript Level 2 color printer interprets and prints the 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. Before converting, save a copy of your RGB or indexed color image in case you want to reconvert the image. It's best to avoid converting between RGB and CMYK mode multiple times as each conversion requires recalculating the color values, which results in less accurate colors due to rounding.

## About CMYK conversion

Adobe Photoshop uses the Lab color mode when converting color values from one mode to another. Because Lab provides a system for defining color values in all modes, using Lab as an intermediate mode for color conversion ensures that colors are not altered in the conversion process (other than the necessary clipping of out-of-gamut colors; see “Color gamuts and color models” on page 69 for more information). For more information on the L\*a\*b color model, see page 67.

For example, when converting an RGB image to CMYK, Photoshop first converts the RGB color values to Lab mode by using the information in the Monitor Setup dialog box. Adobe Photoshop then uses the information in the Printing Inks Setup and Separation Setup dialog boxes to build a color table before converting the image to CMYK mode. Once the image is in CMYK mode, Adobe Photoshop must convert the CMYK values back to RGB so that the image can be displayed on an RGB monitor.

**Note:** *The conversion for screen display does not affect the actual data in the file. This conversion is performed on a copy of the data during the conversion process.*

## Preparing for CMYK conversion

Adobe Photoshop lets you preview CMYK colors prior to making the conversion. With an RGB image active, choose View > CMYK Preview. See “Previewing CMYK colors” on page 111 for more information on using this command. You can also check for and correct any out-of-gamut colors before making the conversion, using the Gamut

Warning command in the View menu. See “Identifying out-of-gamut colors” on page 111 for more information.

## Using color separation tables

Because conversion to CMYK depends on settings in other dialog boxes (Monitor Setup, Printing Inks Setup, and Separation Setup), you may need to change these settings occasionally to get the results you need for different print shops, different printing devices, different inks, or different paper. Adobe Photoshop lets you save the settings of two of these dialog boxes (Printing Inks Setup and Separation Setup) in a single file known as a table. You can then reuse the table for separating similar images.

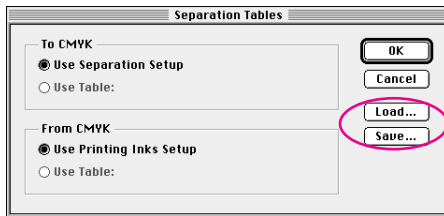
**Note:** *Separation tables include only the settings from the Printing Inks Setup and Separation Setup dialog boxes. They don’t include the settings from the Monitor Setup dialog box.*

You use the options in the Separation Tables dialog box when you’re converting an RGB image to a CMYK image. If you make changes to the table, you will have to reconvert the original RGB image again to see the changes.

### To save a color separation table:

- 1 Choose File > Color Settings > Printing Inks Setup. Enter the settings you want to use and click OK. For more information, see “Step 3: Enter the Printing Inks Setup information” on page 89.
- 2 Choose File > Color Settings > Separation Setup. Enter the settings you want to use and click OK. For more information, see “Adjusting Separation Setup” on page 95.

3 Choose File > Color Settings > Separation Tables.



4 Click Save. Navigate to the location you want and type a name for your new separation table. Then click OK.

#### To load a saved separation table:

1 Choose File > Color Settings > Separation Tables.

2 Click Load.

3 Select the table you want to use from the Directory dialog box, and click OK.

In the Separation Tables dialog box, the Use Table option is selected, and the name of the table appears in the option.

4 Click OK to use the table in the CMYK conversion. The table settings will be used the next time you convert an image to CMYK.

Loading a separation table overrides any options you may have changed in the Printing Inks Setup or Separation Setup dialog boxes. To use the dialog box settings again, you must choose File > Color Settings > Separation Tables and select the Use Separation Setup option (in the To CMYK section) or the Use Printing Inks Setup (in the From CMYK section) or both.

**Note:** You can use Efi color tables to separate an image in Photoshop. (Note that this is not the same as the Efi color database in Cachet or QuarkXPress® 3.3.) If you use EfiColor for Photoshop separation tables, you can save TIFF and EPS Adobe Photoshop files with metric color tags for use with QuarkXPress 3.3. To save a file with metric color tags, choose File > Preferences > Saving Files, and then select Save Metric Color Tags.

### Building separation tables using printer profiles

The Apple ColorSync® Manager (Macintosh) or Kodak ICC Color Management (Windows) modules let you build separation tables based on the profiles of various color printers. When you build separation tables in this way, Photoshop does not use the Separation Setup and Printing Inks Setup dialog boxes when converting to and from CMYK mode; instead, the program uses the separation and printing ink information provided by the chosen printer profile.

The color management modules map the colors in the Photoshop image to the color gamut, or range of printable colors, of the profiled printer. You can choose the method (called *rendering intent*) that is used to translate the colors to the printed gamut.

**To build color separation tables using printer profiles:**

- 1 Choose File > Color Settings > Separation Tables.
- 2 Click Build Tables Using Apple Color Sync (Macintosh) or Build Tables Using ICC Profiles (Windows).

**Important:** For the Macintosh, Apple ColorSync must be installed in order to see the Build Tables option in the Separation Tables dialog box. For instructions about how to install the Apple ColorSync software, see the Photoshop 4.0 Read Me file.

- 3 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.
- 4 For Render Intent, choose one of the following options:
  - Default to use the default rendering intent of the chosen profile.
  - Perceptual 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 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.
- 5 Click Build.

## Ensuring consistent color on-screen

In addition to using Photoshop's calibration tools to ensure consistent color between on-screen and printed output, you can use the same tools to help ensure consistent color between different software programs or between similar monitors in similar conditions.

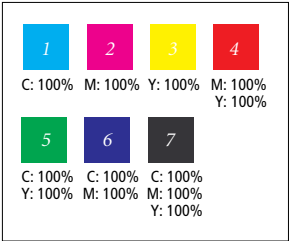
### Calibrating for on-screen presentation

If you are using Photoshop to prepare files that will be used with other graphics applications and viewed on-screen (not separated and printed), you may need to take steps to ensure consistent color between Photoshop and other graphics programs. You can achieve this by adjusting Photoshop's representation of the four process colors (cyan, magenta, yellow, and black).



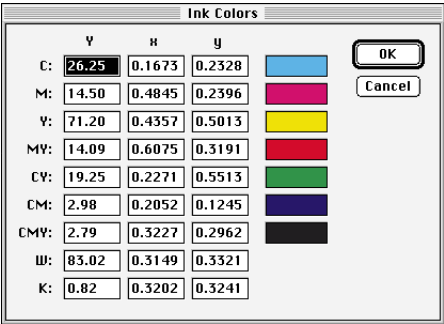
**To ensure consistent color between Photoshop and another software program:**

1 In the graphics application, create a new file and draw 7 boxes. Fill the boxes as shown below.

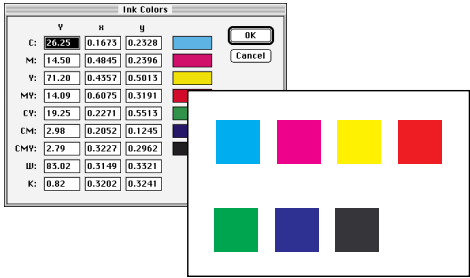


2 With this window open, start Photoshop. Don't open any files.

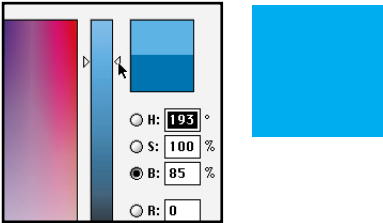
3 Choose File > Color Settings > Printing Inks Setup. For Ink Colors, choose Custom.



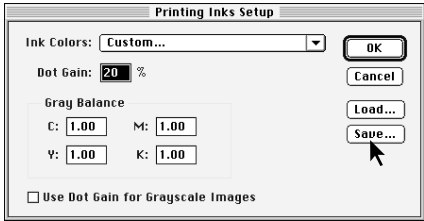
4 Align this dialog as close as possible to the graphics application window so you can compare colors.



5 Click on the Cyan box in the Photoshop dialog to display the color picker. Adjust the color to match Box 1 in the graphics application window. Click OK. Repeat step 5 for each of the 7 color boxes.



6 In Printing Inks Setup dialog box, click Save. Name your custom ink setup file and click OK.



### **Calibrating for online distribution (Windows only)**

Although you can never precisely predict the appearance of images on other computer monitors, the following technique will help you achieve as consistent results as possible with images viewed on similar computers and environments.

#### **To calibrate for online distribution:**

- 1** Open a typical image with a wide range of colors (for example, the testpic.jpg image included in the Adobe Photoshop software package) both in Photoshop and in your viewing program or Web browser.
- 2** Arrange the application windows side by side so you can see the image in each application.
- 3** Follow the steps under “To calibrate your monitor:” on page 85, clicking Preview frequently to see the results of your changes in the Calibrate dialog box.
- 4** When the images in each application closely match, save the settings and click OK.

# Chapter 6 : Making Color and Tonal Adjustments

**O**ne of the biggest challenges that designers face today is figuring out how to get the color in their printed artwork to look the way they want it to look—or even how to predict what the printed colors will look like. What used to be, and often still is, the job of prepress technicians and color experts has now fallen into the hands of graphic designers and other studio artists. And in spite of all the warnings about calibration and separation settings in the literature, it's hard to resist the impulse to believe that the final printed piece will look like the image on-screen. The reality is, if your system isn't calibrated or you haven't yet separated the image, the printed colors and the on-screen colors may not even be close.

## Using the Adobe Photoshop color correction tools

All of the 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 over the ranges of values. 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. Curves, on the other hand, replicates

high-end color correction systems and lets you isolate 16 ranges of pixel values between pure highlight and pure shadow.

## Using color adjustment commands

For most color adjustment tools, you choose a command from the Image > Adjust submenu or create an adjustment layer of a particular type. All the available adjustment layer types have equivalents in the Image > Adjust submenu. The difference is that the commands on the Adjust submenu only apply to the selected layer, whereas the adjustment layer applies to all visible layers below it. Moreover, unlike commands on the Adjust submenu, which permanently alter the pixels in the selected layer, adjustment layers let you experiment with different settings without affecting the underlying data. For more information, see “Using adjustment layers” on page 267.

Most color adjustment tools have a dialog box associated with them.

### 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 Command (Macintosh) or Ctrl (Windows) and click the New Layer button in the layers palette. 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 Option (Macintosh) or Alt (Windows) to change the Cancel button to the Reset button, and then click Reset.

## Previewing color adjustments

In most cases, when you make color changes to a selection, Adobe Photoshop displays the changes throughout the entire screen. The program modifies the video card's color lookup table (VLUT) in response to the changes you specify. Color table animation, also called video table lookup, is controlled by the video card, not by Adobe Photoshop. Color table animation allows faster previewing of color adjustments when you are making changes to a Photoshop image; however, it does not always preview the image accurately.

**Note:** On most systems running Windows, color table animation works only if the monitor is set to 256 colors. For color table animation to work in 24-bit mode with Windows, you must have installed a color table animation extension, supplied by your video card manufacturer, in the PLUGINS directory.

You can display an accurate preview by selecting the Preview option in one of the color adjustment dialog boxes. When you select Preview, you turn off the color table animation; only the image or the selected area of the image is shown with the color correction. This allows you to see accurately the effect of color adjustments on a selected area.



Image with Preview option off



Image with Preview option on

### To turn on previewing and deactivate color table animation:

Select the Preview option in any color correction dialog box.

The color table animation is deactivated, and Adobe Photoshop displays the effects of the changes on the current selection only.

### To turn off color table animation:

- 1 Choose File > Preferences > Display & Cursors.
- 2 Deselect Video LUT Animation and click OK.

## Previewing with a 24-bit or 32-bit video card (Macintosh only)

The color table animation feature can cause problems 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.

### To reset the video mode to preview changes using a 24-bit or 32-bit video card:

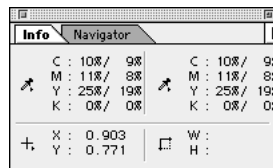
- 1 Choose Control Panels from the Apple menu, and double-click Monitors.
- 2 Click one of the other color display options (such as 256 Colors), and perform a preview to see the results.
- 3 Click your original color display option.
- 4 Close the Control Panel.
- 5 In Photoshop, choose File > Preferences > Display & Cursors and deselect Video LUT Animation; then click OK.

Although you will be able to preview changes correctly with the Preview option selected, you will not be able to turn the color table animation off and on by clicking the Preview option in the dialog box.

## Previewing color values

You can use the Picker palette and the Info palette to preview the color values of pixels affected by the color adjustments you're making.

When you move the pointer over an area of your image that contains pixels while working with one of the color adjustment dialog boxes, the Info palette displays two values. 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.

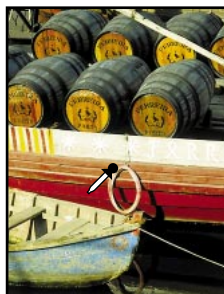


### To use the Info palette to preview color changes:

- 1 Choose Window > Show Info. (See “Customizing the Info palette” on page 26 for information on the Info palette display options.)
- 2 Open a color adjustment dialog box (see “Using color adjustment commands” on page 107).
- 3 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 you have chosen in the Eyedropper Options palette.

**Note:** While a color adjustment dialog box is open, the eyedropper tool is automatically active 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.

The Info palette displays the before and after color values at the location under the pointer.

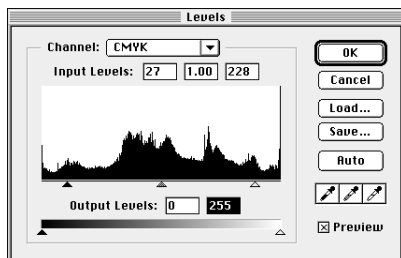


Adjusted image

**Before and after levels adjustment**

Info		Navigator	
C:	27% / 20%	C:	27% / 20%
M:	99% / 100%	M:	99% / 100%
V:	96% / 100%	V:	96% / 100%
K:	13% / 3%	K:	13% / 3%
X:	0.441	M:	
Y:	0.962	H:	

Info palette



Levels dialog box

#### To use the Color palette to preview color values:

- 1 Choose Window > Show Color.
- 2 Open a color adjustment dialog box (see “Using color adjustment commands” on page 107).
- 3 Click the pixel you want to preview. The color values of the pixel after the adjustment has been made are shown in the Picker palette.



To cancel color changes without closing a color adjustment dialog box, hold down Option (Macintosh) or Alt (Windows) to change the Cancel button to the Reset button, and then click Reset.

## 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 the color corrections you make using those dialog boxes and let you apply the corrections to other images.

#### To apply a color correction adjustment to another image:

- 1 Click the Save button 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 the Load button. Locate and open the saved color correction file.
- 4 Click OK to apply the corrections to the image.

## Performing corrections in CMYK vs. RGB mode

You can perform all tonal and color corrections in either RGB or CMYK mode. If your image is intended for video display, you may never convert it to CMYK mode. Conversely, if you began with a CMYK scan, you won't perform any corrections in RGB mode. If you are working with an RGB image that you intend to separate, Adobe recommends that you perform most of your color corrections in RGB mode, and then use CMYK mode for fine-tuning as necessary. If you are concerned with precise CMYK values, however, or if you want to adjust the CMYK plates directly, you may still prefer to perform your color corrections in CMYK mode.

Keep in mind the following when deciding whether to perform color corrections in RGB or CMYK mode:

- Working in RGB mode requires significantly less memory and, therefore, improves performance.
- Performing corrections in RGB mode ensures device-independence: that is, the corrections you make to the image are preserved regardless of the monitor, computer, or output device you use. If any of these devices change, you simply need to change the appropriate Monitor Setup and Printing Inks Setup options, and then reconvert the RGB image to CMYK. Note, however, that converting multiple times back and forth between RGB and CMYK modes is not recommended because color values are rounded in the conversion process.

- Certain types of separations are difficult to correct. For example, if your image has been separated using the Maximum Black Generation option in the Separation Setup dialog box, it will be difficult, if not impossible, to make any corrections that require a significant increase in the C, M, or Y components. In this case, 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 > CMYK Preview.

Adobe Photoshop does not perform an actual conversion; instead the program temporarily displays the CMYK equivalent of the colors in the image by using the current separation and calibration values in the Color Settings dialog boxes.



Monitor CMYK colors as you edit in RGB mode by choosing View > New View to open a second window. Set CMYK Preview on in one window and leave it off in the other.

---

### Identifying out-of-gamut colors

The *gamut* of a color system is the range of colors that can be displayed or printed in that system. An out-of-gamut color in Adobe Photoshop is a color that can be displayed in the RGB or HSB color

models but can't be printed because it has no equivalent in the CMYK model. See "Color gamuts" on page 69 for more information on color gamuts.

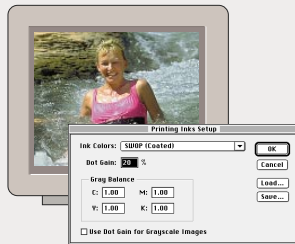
Adobe Photoshop automatically brings all out-of-gamut colors into gamut when you convert an image to CMYK. In some cases, however, you

might want to identify the out-of-gamut colors in an image or correct them manually before converting to CMYK.

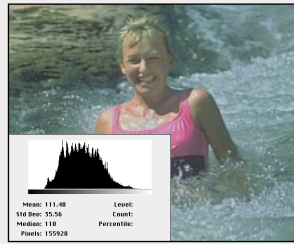
In RGB mode, Photoshop identifies out-of-gamut colors in the following ways:

- When you move the pointer over an out-of-gamut color, an exclamation point appears next to the CMYK values in the Info palette.

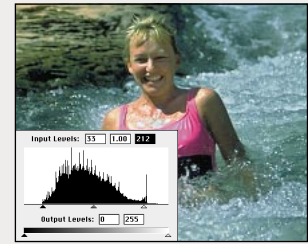
**COLOR CORRECTION FOR HIGH-END PRINTING: AN OVERVIEW** To ensure consistent color in four-color separations, it's important to follow these steps in order. See Chapter 4 for more information on producing a color separation. You may not need to perform all of these steps on every image.



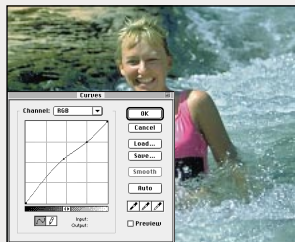
1. Calibrate  
(page 114)



2. Check the scan quality  
(page 114)



3. Set the highlights and shadows  
(page 116)



4. Adjust the midtones  
(page 123)



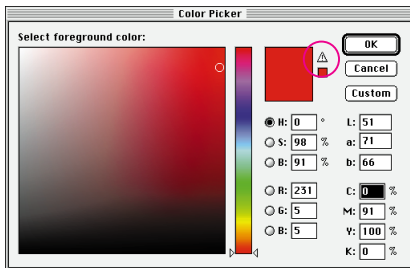
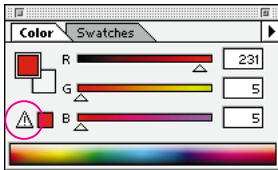
5. Adjust the color balance and  
fine-tune (page 126)



6. Apply Unsharp Mask  
(page 134)



- When you select an out-of-gamut color, an alert triangle appears in both the Color Picker and the Color palette, and the closest CMYK equivalent is displayed next to the triangle. To select the CMYK equivalent, click the triangle or the color patch. You can also use the CMYK Preview command in the Mode menu to preview colors in CMYK. See the previous section on “Previewing CMYK colors” on page 111 for more information.



*Out-of-gamut color indicators*

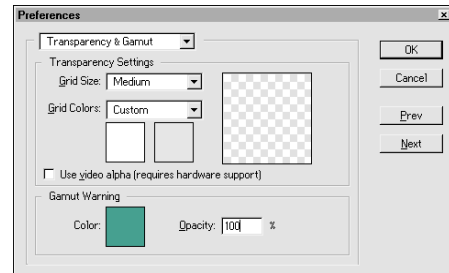
You can also quickly identify all out-of-gamut colors in an RGB image by using the Gamut Warning command.

#### **To turn on and off the display 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 swatch 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. Then click OK.



*Original image*



*Previewing out-of-gamut colors in image*

***Note:** Because the gamut warning is generated using the current separation table, make sure that you set the Printing Inks values and Separation Setup values before you use these out-of-gamut procedures. For more information, see “Step 5: Calibrate the screen image to the proof” on page 91 and “Adjusting Separation Setup” on page 95.*

## Step 1: Calibrate your system

The process of calibration helps to ensure two things: that the on-screen image matches your printed output as closely as possible, and that your artwork produces consistent color from image to image and from separation to separation.

If your monitor isn’t calibrated, or if the appropriate Printing Inks Setup dialog box options aren’t selected, the on-screen image may look vastly different from the printed image. If you’re truly a color expert, this may still be okay; by printing a full-color proof, such as the calibration image supplied with Adobe Photoshop, you can abstract the necessary color corrections. For example, if there’s too much magenta in the printed red—even though the red looks good on-screen—you can estimate how much magenta needs to be removed and then remove it using Photoshop—even though the red on-screen may become a bit orange.

Using this abstract, color-expert method, however, requires that you either print a full-color proof each time any element in your environment changes (including lighting), or you print a proof of each image before you begin correcting. For this reason, Adobe strongly recommends that you take the time to calibrate your monitor and your soft-

ware using the step-by-step instructions in Chapter 4. Performing this task once up front and becoming familiar with the calibration and separation options will save you both time and money.

## Step 2: Check the scan quality and tonal range

Although you can use Photoshop to correct certain scanning flaws, if not enough detail has been captured in the original image, it’s difficult if not impossible to produce high-quality printed output. See “Scanning images” on page 49 for information on making a scan.

A *histogram* is a graphic representation of the number of pixels at each brightness level in an image. You can use the histogram to verify that the image contains enough detail to make a good correction. Too little detail in an image may be the result of a bad scan or photograph, or it may be caused by too many color corrections, which result in loss of pixel values. If you think that an image may have been over-corrected, revert to the original image before applying the color correction procedures described in this chapter.

The histogram also gives you a quick picture of the tonal range of the image, also known as the image *key type*. An image whose detail is concentrated in the shadows is known as a low-key image; an image whose detail is concentrated in the high-lights is known as a high-key image. Identifying the tonal range of the image helps determine the appropriate tonal corrections.

**LOOKING AT THE HISTOGRAM** The histogram gives you a picture of how the pixels values in an image are distributed, and whether the image contains enough detail in the highlights, midtones, and shadows to produce a good correction.

Shadows      Midtones      Highlights

Mean: 55.05      Level:  
Std Dev: 37.49      Count:  
Median: 54      Percentile:  
Pixels: 275204

The histogram

Enough detail  
for correction

Not enough detail  
for correction

Average-key image

High-key image

Low-key image

Corrected image

Corrected image

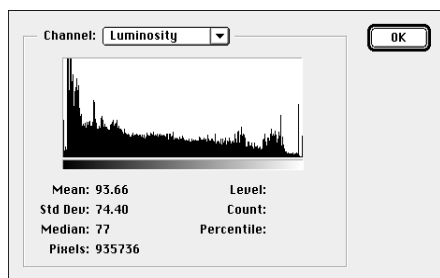
Corrected image



To determine whether enough information has been captured in the scanning process, check the pixel values of your high-light and shadow areas in the Info palette. In general, RGB highlight values of about 240 and shadow values of about 10 indicate that the scan contains enough detail to produce high-quality output.

### To check the histogram for an image:

- 1 Open the image you want to examine, and 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 that value.

**Note:** If part of the image is selected, the histogram represents only the selected pixels.

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 in the image or selected area.

**2** For RGB, CMYK, and indexed-color images, choose an option from the Channel menu. You can plot either the luminance of the composite channel (with the Luminance option) or the luminance of the pixels in the individual channels.

**3** To view information about a specific point on the histogram, move the pointer to that point in the histogram. 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 below that level (Percentile).

## Step 3: Set the highlight and shadow values

The first task in professional tonal correction is to assign values to the extreme highlight and shadow pixels in the image, so that the overall tonal range provides 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 set highlights and shadows in Adobe Photoshop using several different methods.

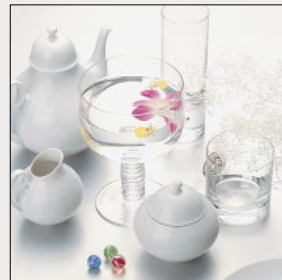
**DETERMINING TARGET VALUES** High-key and low-key images may benefit from slightly different target values than those shown on page 119 and page 120. With a low-key image, you might want to set the highlight to a lower value to avoid too much contrast; with a high-key image, you might want to set the 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.



*High-key image*



*Shadow set  
using average-key  
target brightness  
values (B: 4)*



*Shadow set  
using higher  
target brightness  
values (B: 20)*



*Low-key image*



*Highlight set  
using average-key  
target brightness  
values (B: 96)*



*Highlight set  
using lower  
target brightness  
values (B: 80)*



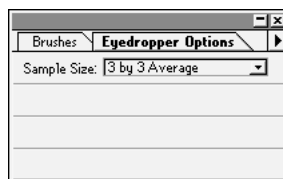
Use an adjustment layer for each of the color correction techniques described in these steps. Adjustment layers let you easily experiment with different color corrections settings and combinations of settings without affecting the underlying pixel values. See on “Using adjustment layers” on page 267 for more information.

## 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 their lightest and darkest areas of detail in the image. When identifying these areas of the image, it’s important to identify a truly representative highlight and shadow area so that the tonal range is not expanded unnecessarily to include extreme pixel values that don’t give the image detail.

### To set the highlight and shadow using target values:

1 Double-click the eyedropper tool, and set the Sample Size option in the Eyedropper Options palette to 3 by 3 Average. This option tells Adobe Photoshop to display the average value of each 3-by-3-screen-pixel area and ensures that you get a truly representative sample of an area in the image rather than a single screen-pixel value.



2 Do one of the following:

- 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 109.)
- Use Threshold mode in the Levels dialog box to identify the highlight area in the image (see page 120).

Note that your goal in this step is to identify a representative highlight area in the image—a printable highlight—and not an area that is simply pure

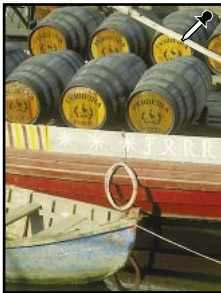
white with no detail, such as a spot of glare in the image. White with no detail, also called *specular* white, is reproduced by printing no ink on paper.



Selecting the specular highlight area

Info Navigator			
R:	255	C:	2%
G:	251	M:	1%
B:	229	Y:	14%
		K:	0%
X:	34.8	W:	
Y:	52.0	H:	

Values in representative highlight area



Selecting the representative highlight area

Info Navigator			
R:	249	C:	4%
G:	229	M:	10%
B:	192	Y:	28%
		K:	0%
X:	1.007	W:	
Y:	0.233	H:	

Values in representative highlight area

3 Open the Levels dialog box or Curves dialog box, as described under “Using color adjustment commands” on page 107, and 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 2.

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.

<input checked="" type="radio"/> H:	<input type="text" value="0"/>	°	L:	<input type="text" value="98"/>
<input type="radio"/> S:	<input type="text" value="0"/>	%	a:	<input type="text" value="0"/>
<input type="radio"/> B:	<input type="text" value="96"/>	%	b:	<input type="text" value="0"/>
<input type="radio"/> R:	<input type="text" value="245"/>		C:	<input type="text" value="5"/>
<input type="radio"/> G:	<input type="text" value="245"/>		M:	<input type="text" value="3"/>
<input type="radio"/> B:	<input type="text" value="245"/>		Y:	<input type="text" value="3"/>
			K:	<input type="text" value="0"/>

Target printable highlight values

**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 “Determining target values” on page 117.

4 Click OK in the Color Picker dialog box when you’ve entered the values; then click the highlight area that you identified in step 2. If you accidentally click the wrong highlight, hold down Option (Macintosh) or Alt (Windows) 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, such as any pixels in a spot of glare, become specular white. The Info palette shows the values both before and after the color adjustment.

5 Now use the Info palette to help identify a representative shadow area in the image. (Don't click the area yet.)

6 Double-click the black eyedropper tool in the Levels or Curves dialog box, and enter a target shadow value. In a typical situation where you are 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.

☐ H:  °

☐ S:  %

☐ B:  %

☒ R:

☐ G:

☐ B:

L:

a:

b:

C:  %

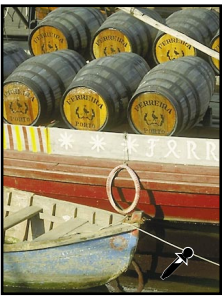
M:  %

Y:  %

K:  %

Target printable shadow values

7 Click OK when you've entered the values; then click the shadow area that you identified in step 5.



After setting shadows

Before and after

Info	Navigator	
R: 18 / 17		C: 64% / 65%
G: 21 / 21		M: 47% / 46%
B: 11 / 11		Y: 63% / 62%
		K: 89% / 90%
X: 1.097		W:
Y: 1.146		H:

To use Threshold mode to identify the lightest and darkest areas in the image:

1 Open the Levels dialog box (“Using color adjustment commands” on page 107). Make sure that the Preview option is deselected.

**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 108 for more information.

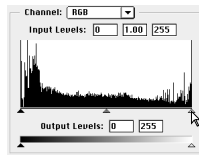
2 Hold down Option (Macintosh) or Alt (Windows) and drag the white or black Input Levels triangle.



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 of the image if you are dragging the black slider. If you have a channel of a color image selected in the Levels dialog box, the black area indicates where none of the given color component exists.



*To see a high-contrast preview of highlight or shadow areas...*



*hold down Option/Alt and move one of the Input Levels triangles.*

3 Slowly drag the slider to the center of the histogram to identify the light or dark areas in the image.

## Setting the highlights and shadows using the Levels sliders

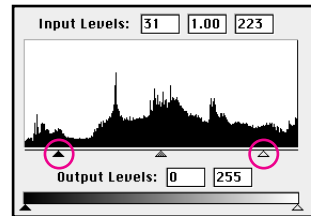
An alternative way to set the highlights and shadows in an image that shows a lack of pixels on either end of the histogram is simply to move the Levels input sliders to the first group of pixels on both ends of the histogram. Doing so maps these pixels—the darkest and lightest pixels in each

channel—to black and white. The corresponding pixels in the other channels are adjusted proportionately so as not to affect the color balance.

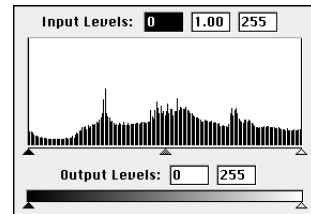
Using the Levels sliders to set highlights and shadows is less exact than assigning target values, but it often gives good results. In addition, because it doesn't affect the color balance of the image, this method is preferable if you want to maintain a color cast in the highlights and shadows.

### To set the highlights and shadows using the Levels sliders:

1 Reopen the Levels dialog box if necessary, and drag the input Levels sliders to the edge of the first group of pixels on either end of the histogram. Then click OK.



2 To view the new histogram, reopen the Levels dialog box. Notice that 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.

Notice that although both adjustments improved the contrast in the image, setting the highlights and shadows to neutral color values also eliminated the color cast, whereas adjusting the Levels sliders did not affect the color balance.



*Image corrected by setting white and black points: color cast eliminated*



*Image corrected by moving Levels sliders: color cast retained*

In this example, eliminating the color cast by assigning target values was useful. However, in another image—for example, one without neutral highlights—using the Levels sliders to set the high-

lights and shadows might produce better results precisely because it does not affect the color balance.

## Setting the highlights and shadows automatically

The Auto Levels command and Auto buttons in the Levels and Curves dialog boxes perform the equivalent of the Levels slider adjustment automatically: that is, these features automatically define the lightest and darkest pixels in each channel as white and black and then redistribute the intermediate pixel values proportionately.

In general, the Auto feature gives good results when a simple contrast adjustment is needed to an image with an average distribution of pixel values; however, this feature does not provide the more precise control that can be achieved by adjusting the Levels or Curves controls manually.

### To set the black and white points automatically:

- 1 Open the Levels or Curves dialog box, as described under “Using color adjustment commands” on page 107, and then click Auto.

By default, the Auto feature clips the white and black pixels by 0.5%—that is, when identifying the lightest and darkest pixels in the image, it ignores the first 0.5% of either extreme. This clipping of color values ensures that the program bases its white and black values on truly representative light and dark pixels rather than on a single extreme pixel value in the image.

**To change the amount of white and black values clipped:**

- 1 Hold down Option (Macintosh) or Alt (Windows), and click the Auto button in the Levels or Curves dialog box.
- 2 In the Auto Range dialog box, enter the percentage of extreme highlight pixels and extreme shadow pixels you want the Auto feature to ignore; then 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 adjust the midtones or otherwise fine-tune the contrast. Most often, this step is not necessary with average-key images; setting the highlights and shadows typically redistributes the midtone pixel values appropriately. When pixel values are concentrated on either end of the grayscale, however, further adjustments to the midtones are often needed.

In addition, you can use the gray eyedropper button in the Levels or Curves dialog box to set the intermediate points along the grayscale and eliminate color casts in the midtones. (See “Setting the highlights and shadows using target values” on page 118 for a description of how the eyedropper buttons work.) For precise control over midtone adjustments, however, it is recommended that you adjust the Levels midtone slider or Curves.

## Adjusting the Levels sliders

The Levels sliders let you make gradual adjustments to the brightness, contrast, and midtones in an image. Adjusting the midtones lets you 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 107).

The Levels dialog box displays a histogram of the image. (See “Looking at the histogram” on page 115 for more information.)

- 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.

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 when the cyan and magenta channels are selected. The menu also contains the individual channels for the selected combination.

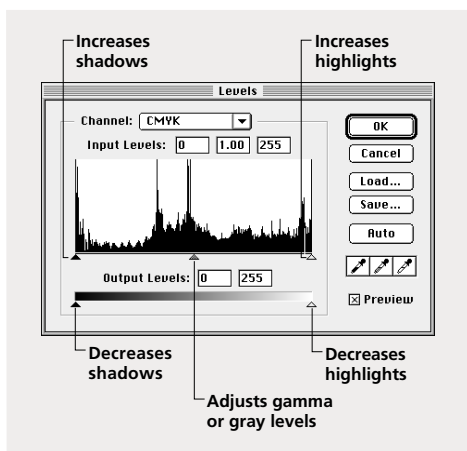
For more information on choosing channels, see “Using the Channels palette” on page 230.

- 3 Adjust the contrast:

- Use the Input Levels slider controls directly below the histogram to increase the contrast in the image. The black triangle controls the shadows, the gray triangle controls the midtones, and the

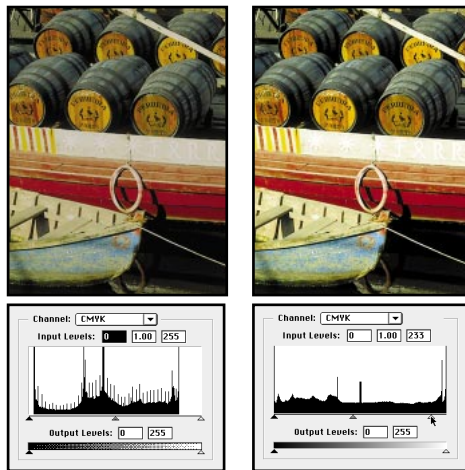
white triangle controls the highlights. You can also enter values directly into the Input Levels text boxes.

- Use the Output Levels slider controls at the bottom of the Levels dialog box to reduce the contrast in the image. The black triangle controls the shadows, and the white triangle controls the highlights. You can also enter the values directly into the Output Levels text boxes.



For example, suppose your image contains pixels that cover the entire 0-to-255 scale and you want to increase the contrast in the image. 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, and pixels with

lower brightness values are mapped to corresponding lighter values. This lightens the image and increases the contrast in the highlight areas.



*Original*

*Contrast increased in highlights*

On the other hand, suppose you want to decrease the contrast of 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 and decreases the contrast in the highlight areas.

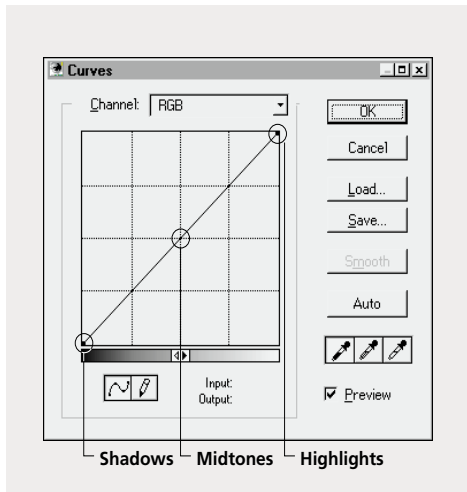
## Using Curves

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.

#### To use the Curves dialog box:

- 1 Open the Curves dialog box (see “Using color adjustment commands” on page 107).



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). The diagonal line that appears by default shows the current relationship between the input and output values: no pixels have been mapped to new values, so all pixels have the identical input and output values.

**Note:** By default, Curves displays brightness values from 0–255 with shadows (0) on the left in RGB mode and percentages from 0–100 with highlights (0) on the left in CMYK mode. To reverse the curve and change the display at any time, click the double arrow below the curve.

- 2 If you’re working in an image with more than one color channel, choose the channel 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 opening the Curves dialog box. The Channel menu then displays the abbreviations for the target channels—for example, CM when the cyan and magenta channels are selected. The menu also contains the individual channels for the selected combination.

For more information about choosing channels, see “Using the Channels palette” on page 230.

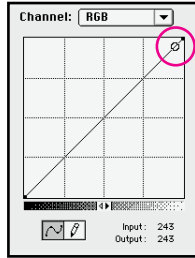
- 3 Move the pointer to the image to the area you want to correct, and hold down the mouse button.

A circle appears to mark the pixel’s position on the graph, and the output and input values are displayed at the bottom of the dialog box. This step identifies the portion of the curve you want to adjust.

Note that the circle does not appear if you have more than one channel selected in the Curves dialog box (see step 2).



*Clicking in the image...*

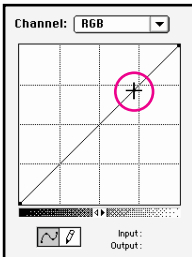


*displays the pixel values and location on the curve.*

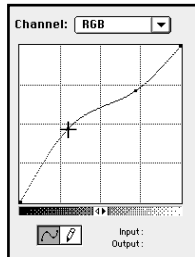
4 Click any points on the curve that you want to remain fixed. For example, if you want to adjust the midtones while minimizing the effect on the highlights and shadows, click the quarter and three-quarter points on the curve.

You can add up to 15 points to the curve to lock those values as you make adjustments. To remove a fixed point from the curve, drag it off the graph.


5 Drag the curve until the image looks as you want it.



*Click to fix a point on the curve...*



*and then drag to adjust.*

 To make the Curves grid finer, hold down Option (Macintosh) or Alt (Windows), and click the grid. Option/Alt-click again to make the grid larger.

### 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.

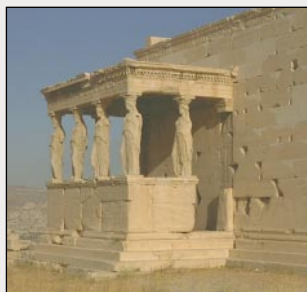
The pencil pointer appears automatically when you move into the graph. To constrain the curve to a straight line, hold down Shift and click to define the endpoints of the curve. You can create a negative of an image, for example, by holding down Shift and clicking the upper left corner of the graph and then the lower right corner.

- 3 If desired, click Smooth to smooth the curve you've drawn.

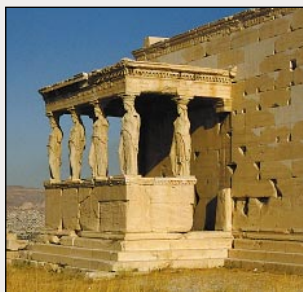
## Step 5: Adjust the color balance

With the tonal correction complete, you can accurately examine and diagnose any problems with color in the image, such as a color cast or oversaturated or undersaturated colors.

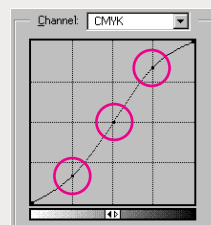
**USING CURVES FOR TONAL ADJUSTMENTS** Curves lets you make precise adjustments to one area of the tonal range while controlling the effect on the others. The first curve shown here is a common curve adjustment used to boost contrast in a CMYK scan: the S-curve. The midpoint of the curve is anchored; then the quartertones are decreased to lighten the highlights, and the three-quarter tones are increased to darken the shadows. The inverse of this curve could be used to correct an image with too much contrast. The other two curves shown here are examples of two other typical tonal adjustments in CMYK mode using Curves.



*Flat image*



*Corrected image*



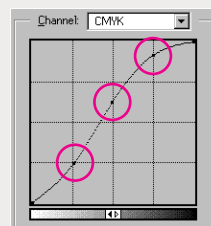
*Midpoint fixed; 1/4 and 3/4 tones adjusted in opposite directions to boost contrast*



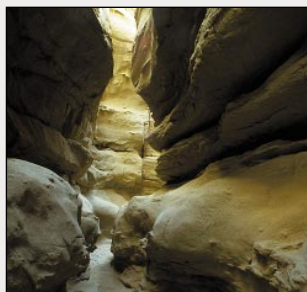
*Light image*



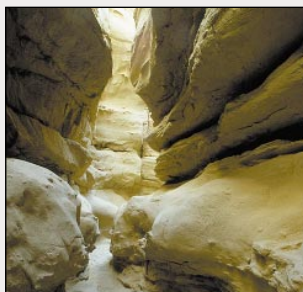
*Corrected image*



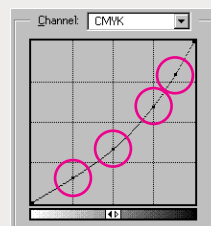
*1/4 tone fixed; highlights, midtones and 3/4 tones adjusted to darken image*



*Dark image*



*Corrected image*



*Entire curve dragged to lighten image with emphasis in midtones*





You can modify the color balance in an image using the Color Balance or Selective Color command or by applying Levels or Curves to the individual channels of a color image.

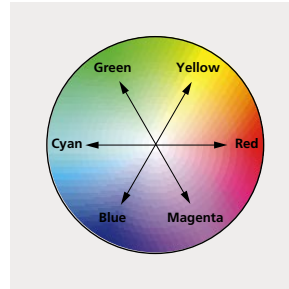
Once again, Curves offers the most precise control over pixel distribution within a channel. The commands Hue/Saturation, Replace Color, and Selective Color offer additional control over specific color components and attributes. For examples of corrections of specific color imbalances, see “Correcting the color plates” on page 129.

### About adjusting color balance

When adjusting the individual color components in an image, it’s important to understand that every color adjustment affects the overall color balance in the image, and that there are numerous ways to achieve similar effects. If you’re not yet used to adjusting individual color components in an image, it helps to keep a diagram of a color wheel on hand as you work.

You can use the color wheel to help predict how changing one color component will affect the other colors in the image and to help translate color changes between RGB and CMYK models. For example, you can decrease the amount of any color in an image by increasing the amount of the opposite color on the color wheel—and vice versa. Similarly, you can increase and decrease a color by

adjusting the two adjacent colors on the color wheel, or even by adjusting the two colors adjacent to the opposite color on the color wheel.



*The color wheel*

For example, you can decrease the magenta in an image by decreasing the amount of magenta directly, or you can decrease the *proportion* of magenta by adding cyan and yellow to the image.

You can even combine these two corrections to help minimize the effect of the adjustments on the overall saturation.

Similarly, if you’re working with 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 that contains less magenta. How you choose which adjustment is appropriate for your image depends on the image and on the particular effect you want



**CORRECTING THE COLOR PLATES** Once you can identify 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.



*Corrected image*

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 lower left corner of this page) or it may be caused by too little of red's opposing color on the color wheel, cyan (as shown in the upper right corner of this page). Similarly, a green cast is often a sign of too little magenta. Use this page and the color wheel on page 128 to help evaluate the color in your own 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*

## 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 must be viewing the composite channel to use the Color Balance command. See “Using the Channels palette” on page 230.

### To adjust the levels of a particular color in an image:

- 1 Open the Color Balance dialog box, as described under “Using color adjustment commands” on page 107.
- 2 Do one of the following:
  - Click Shadows, Midtones, or Highlights to select the tonal range on which you want to focus the changes.
  - With RGB images, click Preserve Luminosity to prevent changing the brightness values in the image as well as changing the color. This option maintains the tonal balance in the image.
- 3 Drag a triangle toward a color if you want to increase that color in the image; drag the triangle away from the color if you want to decrease the color.

The values at the top of the Color Balance dialog box 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  $+100$ .

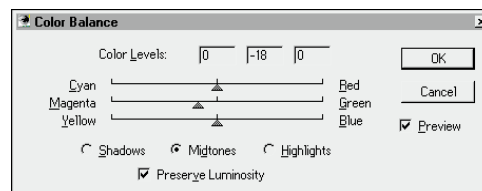
The following illustrations show the effects of adjusting the cyan/red level in the midtones.



Original image: greenish cast



Color balance adjusted in midtones

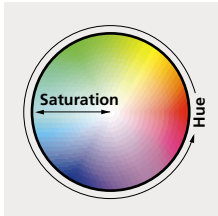


Midtone values for corrected image

## 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, the Hue/Saturation command is based 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 the diameter of the color

wheel. You can also use the Colorize option to add color to a grayscale image you have converted to RGB or to create a monotone effect.



*Hue/saturation*

#### **To adjust an image using Hue/Saturation:**

**1** Open the Hue/Saturation dialog box, as described under “Using color adjustment commands” on page 107.

Along the left side of the dialog box are six color swatches of the additive and subtractive colors in the order in which they appear on the color wheel: red, yellow, green, cyan, blue, and magenta. For Lab images, four swatches are displayed: yellow, green, blue, and magenta.

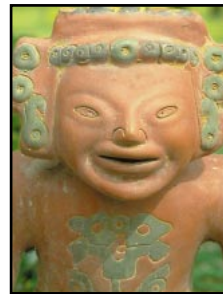
In addition, the Sample swatch at the bottom of the dialog box lets you monitor the adjustment’s affect on a selected color (by default, the foreground color). Click a color in the image to change the swatch color.

**2** Select the button next to the color component you want to adjust, or select Master to adjust all colors at once.

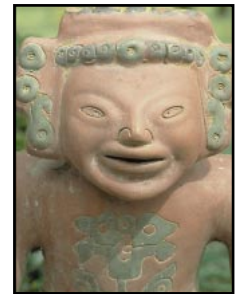
**3** Drag the Hue slider until the colors appear the way you want them. You can also type a value into the Hue text box.

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 a clockwise rotation; a negative value indicates a counterclockwise rotation.

**4** Drag the Saturation triangle to the right to increase the saturation; drag to the left to decrease the saturation. This shifts the color away from or toward the center of the color wheel, relative to the beginning color values of the selected pixels.



*Original image*



*Saturation: -40*

**5** Drag the Lightness slider to the right to increase the lightness; drag to the left to decrease the lightness. Values can range from -100 to +100.

**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 under “Using color adjustment commands” on page 107.
- 3 Click Colorize. The image is converted to shades of red, the 0° point on the color wheel, at 100% saturation. Note that the lightness value of each pixel does not change.
- 4 Use the Hue slider to select the new color.
- 5 Use the Saturation and Lightness sliders to adjust the saturation and lightness of the pixels; then click OK.



*Grayscale image converted to RGB*



*Colorize option; Hue:13, Saturation: 43*

**Using the Replace Color command**

The Replace Color command lets you create a mask based on specific colors and then adjust the hue, saturation, and lightness values to correct the color. The Replace Color mask is temporary and does not create a selection in the image.

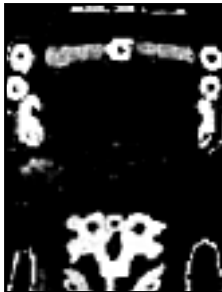
**To adjust and replace a color:**

- 1 Choose Image > Adjust > Replace Color.
- 2 Choose from the following options:
  - Selection to display the mask in the preview box. Masked areas appear black; partially masked areas (that is, areas covered with a semitransparent mask) appear as varying levels of gray according to their opacity.
  - Image to display the image in the preview box. This option is useful when you are working with a magnified image or when you have limited screen space.
- 3 Click in the image or in the preview box to select areas for the mask. Shift-click to add areas, and Option-click (Macintosh) or Alt-click (Windows) to remove areas.
- 4 Adjust the tolerance of the mask by using the slider or by entering a Fuzziness value. Like the Tolerance option for the magic wand and paint bucket tools, 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.

6 Click OK to replace the color.



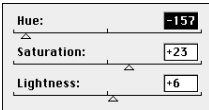
Color selected



Selection in Replace Color dialog box



Selected color adjusted using the hue, saturation and lightness sliders in Replace Color dialog box



### Using the Selective Color command

Adobe Photoshop lets you make color corrections by using a technique called *selective color correction*. 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 pri-

mary color components in an image. Selective color correction is based on a table similar to the following:

SELECTIVE COLOR CORRECTION						
	Red	Yellow	Green	Cyan	Blue	Magenta
Cyan	0%	0%	95%	95%	99%	26%
Magenta	8%	0%	0%	0%	76%	63%
Yellow	55%	100%	100%	0%	5%	0%
Black	0%	0%	0%	0%	0%	0%

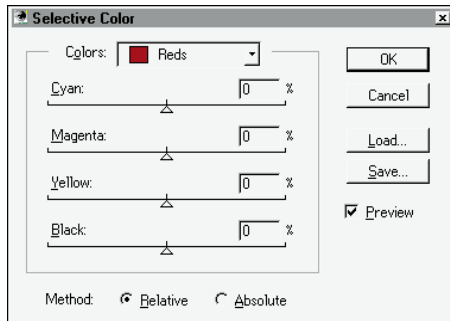
This table shows the amount of each process ink used to create each primary color. By increasing and decreasing the amount of a process ink in relation to the other process inks, you can modify the amount of a process color in any primary color *selectively*—that is, without affecting any other primary colors. You can use selective color correction, for example, to dramatically decrease the cyan in the green component of an image while leaving the cyan in the blue component unaltered.

Like the other color correction tools, the Selective Color command enables you to correct imbalances in the color as well as adjust colors to suit your preferences.

**Note:** You must be viewing the composite channel to use the Selective Color command. See “Using the Channels palette” on page 230.

**To use the Selective Color command:**

1 Open the Selective Color dialog box, as described under “Using color adjustment commands” on page 107.



2 Choose the color you want to adjust from the Colors menu at the top of the dialog box. The color sets are the primary additive and subtractive colors plus whites, neutrals, and blacks.

3 Select a correction method.

- Relative adjusts the existing CMYK values. 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%.

Note that you cannot adjust pure white using the Relative option, because it contains no existing color components.

- Absolute adjusts 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%.

4 Drag the sliders to increase or decrease the components in the selected color.

## 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 in the original photograph or scan, and it compensates for blurring that occurs during the resampling and printing process. Applying the Unsharp Mask filter is recommended whether your final destination is print or online.

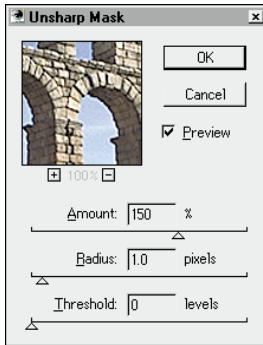
The Unsharp Mask filter locates every two adjacent pixels with a difference in brightness values that you specify, and then increases the pixels' contrast by an amount that you specify. In addition, you specify the number of surrounding pixels to which the sharpening effect is applied.

When sharpening an image, it's important to understand that the effects of the Unsharp Mask filter are far more pronounced on-screen than in high-resolution output. If your final destination is print, use the samples in this chapter to help determine what dialog box settings will work best for your image.

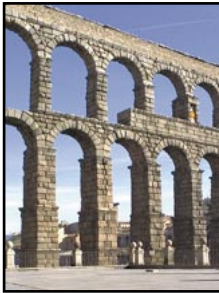


**To sharpen an image using the Unsharp Mask filter:**

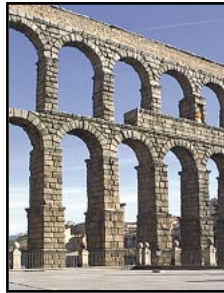
- 1 Choose Filter > Sharpen > Unsharp Mask.
- 2 In the Unsharp Mask dialog box, select the following options:



- Choose an Amount to determine how much the contrast of pixels is increased. For high-resolution printed images, an amount between 150% and 200% is recommended.



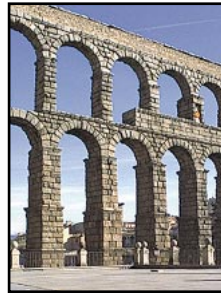
*Before Unsharp Mask filter*



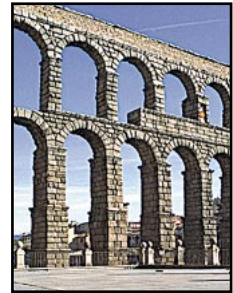
*Unsharp Mask: Amount 150%; (Radius 1; Threshold 0)*

- Choose a Radius to determine the number of pixels surrounding the edge pixels that are affected by the sharpening. For high-resolution images, a Radius between 1 and 2 is recommended.

In the examples shown here, only the edge pixels in the first image have been sharpened, whereas the higher radius value sharpened a wider band of pixels in the second image. This effect is much less noticeable in the high-resolution printed version than on-screen because a two-pixel radius represents a smaller area in the printed image.



*Radius 1 (Amount 150%, Threshold 0)*



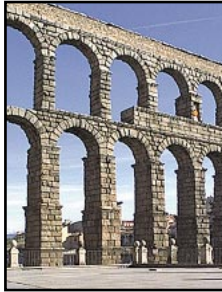
*Radius 2 (Amount 150%, Threshold 0)*

- Choose a Threshold to determine how different the brightness values between two pixels must be before they are considered edge pixels and are sharpened by the filter. For images with fleshtones and other areas in which you want to avoid introducing noise, experiment with Threshold values between 2 and 20. The default Threshold value (0) sharpens all pixels in the image

In the example shown here, notice that increasing the Threshold eliminates much of the noise in the bricks and the ground.



Unsharp Mask: Amount  
150%; Radius 1;  
Threshold 10



Unsharp Mask: Amount  
150%; Radius 1;  
Threshold 0



If you find that applying the Unsharp Mask filter makes already bright colors in your image appear overly saturated, convert the image to Lab mode and apply the filter to the L channel only. This technique will sharpen the image without affecting the color components.

## Using the Variations command for generalized tonal and color adjustments

The Variations command lets you visually adjust the color balance, contrast, and saturation of an image or selection. This command is most useful when you're working in an average key image that doesn't require precise color adjustments.

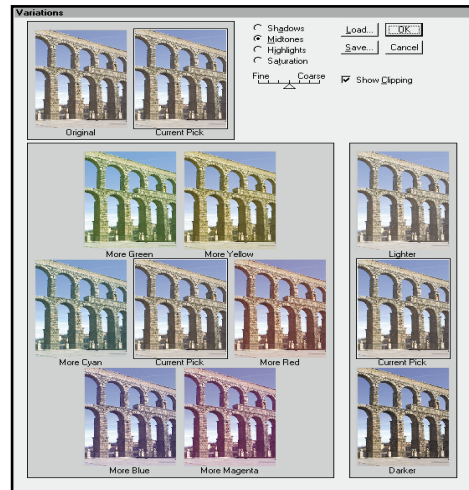
### To use the Variations command:

1 Open the Variations dialog box, as described under "Using color adjustment commands" on page 107.

**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 31 for more information.

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 Choose the following options:





**UNSHARP MASKING** Until you are familiar with the printed results of applying the Unsharp Mask filter, use the examples in this chapter to help determine what dialog box settings are best for your image. Because of the resolution limitations of your monitor, the effects of the filter are much more dramatic on-screen than they are in your final output.

Notice how the default Threshold value of 0 adds noise to the skintones of this image and makes the skin appear grainy; higher Threshold settings sharpen the edges of the figure without affecting the skintones. Increasing the Threshold also lets you increase the Amount without adding noise to areas that need less sharpening.



*Original image*



*USM 200, Radius 1,  
Threshold 0*



*USM 200, Radius 2,  
Threshold 0*



*USM 300, Radius 1,  
Threshold 15*

- Deselect Show Clipping if you do not want to see a neon preview of the areas in the image that will be clipped—that is, converted to pure white or pure black when the adjustment is applied. Clipping does not occur when you adjust midtones.
  - Select Shadows, Midtones, or Highlights to indicate whether you want to adjust the dark, middle, or light areas of the selection, respectively.
  - Select Saturation to change the degree of hue in the image. Note that if the Show Clipping option is selected, and the image shows clipping after the adjustment, you have exceeded the maximum saturation for the color.
  - Use the Fine/Coarse slider to determine the amount of each adjustment. Moving the slider one tick mark to the right or left doubles the adjustment amount.
- 3 Adjust the color and brightness as follows:
    - To add a color to the image, click the appropriate color thumbnail.
    - To subtract a color, click its opposite, located in the opposite position on the color wheel (see page 128); for example, to subtract cyan, click the red thumbnail.
  - 4 Click the thumbnails on the right of the dialog box to adjust the brightness in the image.

Note that 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—highlights, shadows, and midtones—at once and so is not recommended for high-end output. You cannot work in individual channels with this command.

### To use the Brightness/Contrast dialog box:

- 1 Open the Brightness/Contrast dialog box, as described under “Using color adjustment commands” on page 107.
- 2 Drag the sliders to adjust the brightness and contrast.

Dragging to the left decreases the level; dragging 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 tools

The Invert, Equalize, Threshold, and Posterize commands also change the colors or brightness values in an image. In most cases, these commands provide dramatic overall effects that are applied to the selected layer. These commands are typically used for color enhancement and for producing special effects rather than for color correction.

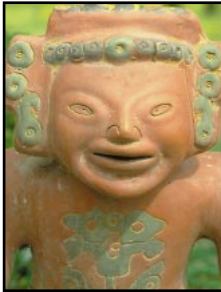
### Using the Invert command

The Invert command creates a negative of an image. You might use this command to make a positive image negative or to make a positive from a scanned negative.

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 is changed to 250.

**To invert an image:**

Choose Image > Adjust > Invert.



*Original image*



*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, Adobe Photoshop finds the brightest and darkest values in the image and averages all the brightness values 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.

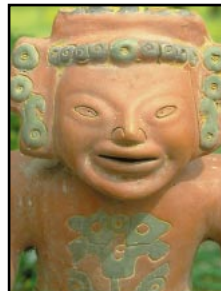
**To equalize the brightness values of pixels:**

- 1 Choose Image > Adjust > Equalize.

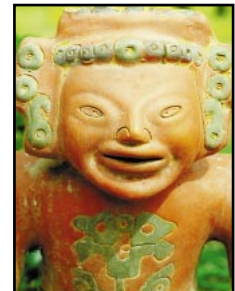
If you have an area of the image selected, the Equalize dialog box appears.

- Select **Selected Area Only** to equalize only the pixels in the selection.
- Select **Entire Image Based on Area** to equalize the pixels in the entire image based on the pixels in the selected area.

- 2 Click OK to equalize the image or the selection.



*Original image*



*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. All pixels darker than the threshold are converted to black.

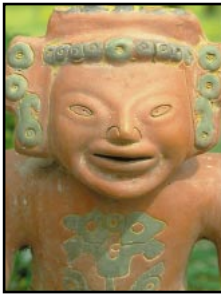
**To use the Threshold command:**

- 1 Open the Threshold dialog box, as described under “Using color adjustment commands” on page 107.

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.

**Note:** On the Macintosh, the Video LUT Animation option in the Display & Cursors preferences must be on to preview the Threshold adjustment. See “Previewing color adjustments” on page 108 for more information.



Original image



Threshold command  
applied: 70

## Using the Posterize command

The Posterize command lets you specify the number of tonal levels (or brightness values) for an image and then maps pixels to the level that is the closest match. This command is useful for creating special effects, such as large, flat areas in a photograph. The effects of this command are most evident when you reduce the number of gray levels in

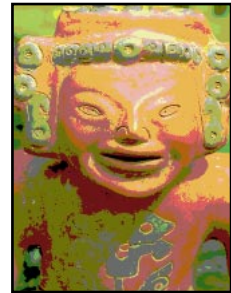
a grayscale image; however, you can also use this command to produce some interesting effects in color images. Posterize can also be useful for reducing the number of colors in an image you want to distribute over the Web.

### To specify the number of levels in an image:

- 1 Open the Posterize dialog box, as described under “Using color adjustment commands” on page 107.
- 2 Enter the number of levels you want; then click OK.
- 3 When you’ve finished making adjustments, click OK.



Original image



Posterize command  
applied: 4 levels of color

# Chapter 7: Selecting

**T**o modify part of an image in Adobe Photoshop, you must first select the area you want to edit. A selected area is indicated by its surrounding selection border, also called a selection marquee. Once you have made a selection, you can move, copy, paint, or apply numerous special effects to the selected area. You can also use alpha channels to save selections as masks for your artwork. See Chapter 8 for information on editing selections; see Chapter 10 for information on masks.

This chapter provides an overview of the basic selection tools and methods in Adobe Photoshop. It also explains how to adjust and refine selections by increasing or decreasing the selected area, softening the edges of a selection, and deselecting a selected area.



Area selected

## Making selections

Adobe Photoshop provides a variety of ways to select parts of images. The marquee tool and the lasso tool let you make selections by dragging, while the magic wand tool and the Color Range

command make selections based on the color of the targeted areas. When you use a selection tool, the options for that tool appear in the Options palette. When you make a new selection, it replaces the existing selection in the image.

You can also use the pen tool to make precisely shaped selections using paths. Paths and the pen tool are discussed later in this chapter.

**Note:** When making a selection in a file that contains layers, make sure that the layer you want is the active layer.

### 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 246.

2 Choose **Select > All**.





This command selects all the pixels that fall inside the boundaries of the canvas.

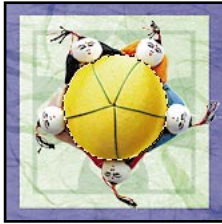
### To deselect selections:

Do one of the following:

- Click anywhere in the image outside the selected area using any selection tool (except the magic wand, single column marquee, single row marquee, or polygon lasso tool).
- Choose **Select > None**.

## Using the marquee tool

The marquee tool ( /  /  / ) lets you select rectangular or elliptical areas by dragging over an area of the image. By default, the marquee is dragged from its corner.



*Elliptical selection*



*Rectangular selection*

### To use the marquee tool:

**1** Drag to select one of the following marquee tools from the toolbox:

- Rectangle marquee to make a rectangular selection.
- Ellipse marquee to make an elliptical selection.
- Single row or single column marquee to define the selection marquee as a 1-pixel-wide row or column.



To switch between the rectangle and ellipse marquees quickly, Option-click (Macintosh) or Alt-click (Windows) the marquee tool, or press M.

**2** If you've selected the rectangle or ellipse marquee, choose one of the following options for Style in the Marquee Options palette:

- Normal to determine the proportions of the marquee by dragging.

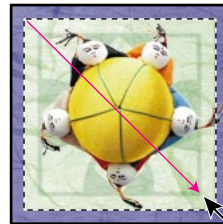
- Constrained Aspect Ratio to set a height-to-width ratio for the marquee. Enter the values (including decimal values) for the aspect ratio. For example, to draw a marquee that is twice as wide as it is high, you would enter 2 for the width and 1 for the height in the marquee.

- Fixed Size to specify set values for the marquee's height and width. Enter the pixel values for the fixed-size marquee 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. For a file that has 72 pixels per inch, for example, you need 72 pixels to make 1 inch. See "About resolution and image size" on page 37 for information on image resolution.

**3** To define a feather edge as you make a selection, enter a pixel value for Feather. See "Softening the edges of a selection" on page 153 for more information.

**4** To make a selection, do one of the following:

- If you're using the rectangle or ellipse 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 selection marquee from its center, begin dragging; then hold down Option (Macintosh) or Alt (Windows), and continue to drag.



*Dragging from corner*



*Dragging from center*

- If you're using the Single Row or Single Column marquee, click near the area you want to select; then drag the marquee to the exact location. If no marquee is visible, increase the magnification of your image view (see page 28).



To adjust the position of a rectangular or elliptical marquee, first drag to create the marquee, keeping the mouse button depressed; then hold down the spacebar and continue to drag.

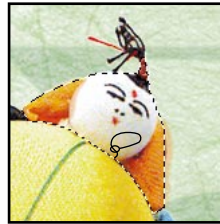
## Using the lasso tool

The lasso tool (⌶) lets you make a selection by dragging a freehand outline around an area. You can also constrain all or part of the outline to straight-edged segments.

### To use the lasso tool:

- 1 Double-click the lasso tool to open its Options palette.
- 2 To define a feathered edge as you make a selection, enter a pixel value for Feather.
- 3 To turn off anti-aliasing, deselect Anti-aliased. See “Softening the edges of a selection” on page 153 for more information on feathering.

- 4 To draw a freehand selection border, drag around the area in the image.



*Freehand selection with lasso tool*

- 5 To draw a straight-edged selection border, start dragging; then hold down Option (Macintosh) or Alt (Windows), and click where you want the segments to begin and end.

You can switch between drawing a freehand and straight-edged selection border while making a selection. When you release the mouse without holding down Option/Alt, Photoshop closes the selection border.

## Using the polygon lasso tool

The polygon lasso tool lets you make a selection outline by clicking to set straight-edged segments and Option-dragging (Macintosh) or Alt-dragging (Windows) to draw freehand segments.

### To use the polygon lasso tool:

- 1 Drag to select the polygon lasso tool in the toolbox.
- 2 To define a feathered edge as you make a selection, enter a pixel value for Feather in the Options palette.
- 3 To turn off anti-aliasing, deselect Anti-aliased.



See “Softening the edges of a selection” on page 153 for more information on feathering.

**4** Click in the image to set the starting point for the selection.

**5** Position the pointer where you want the first straight segment to end, and click. Continue clicking to set endpoints for subsequent straight segments.



**6** To draw a freehand segment, hold down Option (Macintosh) or Alt (Windows) and drag. When you are finished with the freehand segment, release Option/Alt and the mouse button.

**7** Continue to click and Option/Alt-drag to finish making the selection. Double-click to close the selection border.

## Using the magic wand tool

The magic wand tool (⌘) lets you select portions of an image based on the color similarities of adjacent pixels. This tool can be useful for selecting a consistently colored area (for example, a red flower) without having to trace the outline with the lasso tool. When you use the magic wand tool,

Adobe Photoshop determines whether the adjacent pixels are within the color range, or *tolerance*, that you specify.

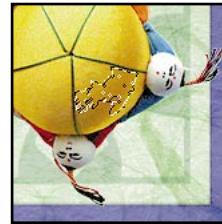
**Note:** You cannot use the magic wand tool on an image in *Bitmap mode*.

### To use the magic wand tool:

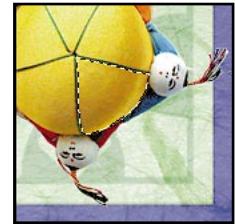
**1** Double-click the magic wand tool to display its Options palette.

**2** For Tolerance, enter a value in pixels.

The tolerance can range from 0 to 255. Enter a low tolerance value to select colors very similar in color value to the pixel you click. Enter a higher tolerance to select a broader range of colors.



Tolerance: 30



Tolerance: 60

**3** To turn off anti-aliasing, deselect Anti-aliased.

**4** To select colors using data from all the visible layers, select Sample Merged. If you leave Sample Merged deselected, the magic wand tool only selects colors from the active layer.

**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 within an existing selection or within an entire image. You can choose from a preset range of colors or you can build the selection by sampling colors from the image.

Unlike the other selection tools in Adobe Photoshop, the Color Range command can operate on an existing selection. This feature lets you select subsets of colors. For example, to select colors containing both cyan and green (that is, to exclude blue from a cyan selection), you can select Cyans in the Color Range dialog box, click OK, and then reopen the Color Range dialog box and select Greens. Note that you must click OK and then reopen the Color Range dialog box to modify a selection. If you want to replace a selection, be sure to deselect everything before applying the Color Range command.

### To select a color range using sampled colors:

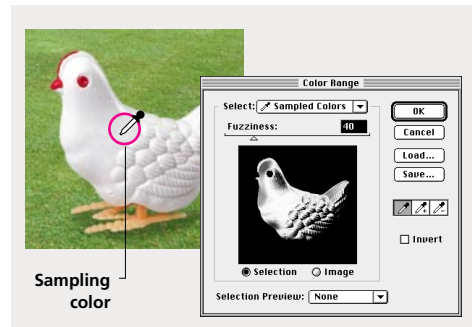
- 1 Choose Select > Color Range.
- 2 For Select, choose Sampled Colors.

Leave the preview area set to Selection when you want to see the selection as you build it. Select Image when you want to preview the entire image. For example, if you're working in a magnified view of the image and the area you want to sample is not visible, you can preview the entire image as you build the selection. Then switch back to the Selection option to see any changes to the selection.

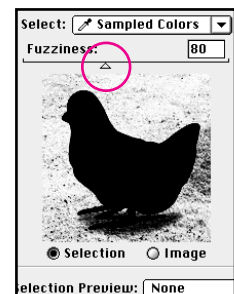


To toggle between the Image and Selection previews in the Color Range dialog box, press Command (Macintosh) or Ctrl (Windows).

- 3 Position the pointer over the image or the preview area, and click to sample the colors you want to include in the selection.

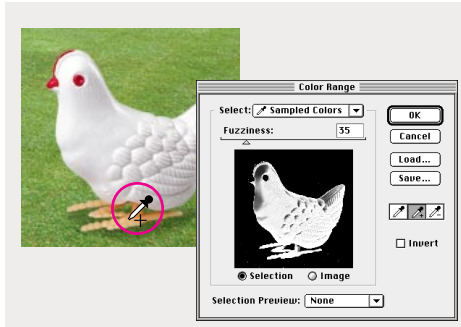


- 4 Adjust the range of colors using the Fuzziness slider or by entering a value. To decrease the range of colors selected, decrease the fuzziness. The Fuzziness option works like the Tolerance option in the Magic Wand and Paint Bucket Options palettes.



5 To adjust the selection, do one of the following:

- Select the plus eyedropper from the Color Range dialog box, and click in the preview box or in the image to add colors to the selection.



- Select the minus eyedropper from the Color Range dialog box, and click in the preview box or in the image to remove colors from the selection.



To activate the plus eyedropper temporarily, hold down Shift. Hold down Option (Macintosh) or Alt (Windows) to activate the minus eyedropper.

6 To preview the selection in the image window, choose an option for Selection Preview. See step 4 of the following procedure for a discussion of these options.

7 Click OK to make the selection.



### To select a range using preset colors:

1 Choose Select > Color Range.

The Color Range dialog box contains a preview area that shows either the selection you're making or the image you're working in.

2 For Select, choose a color or tonal range. Note that the Out-of-Gamut option works only on RGB and Lab images. (An out-of-gamut color is an RGB color that cannot be printed using process color printing. See "Color gamuts and color models" on page 69 for more information.)

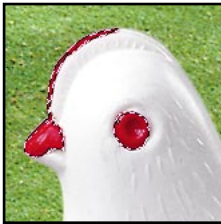
3 Click Selection to display the selected areas in the preview area.



4 To preview the selection in the image window, choose one of the following options 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 236.)

5 Click OK to make the selection.



*Red in image selected*

**Note:** If a message appears stating “No pixels are more than 50% selected,” the selection border will not be visible.

#### To save and load color range settings:

Use the Save and Load buttons in the Color Range dialog box to save the settings used to create a color selection and then reuse those settings.

## Adjusting selections

Adobe Photoshop provides a variety of ways for you to adjust and refine your selections. You can refine a selection based on color similarity, or you can adjust the selection borders and add or subtract selections. You can also invert selections to select all the areas that were previously unselected. Before adding to or subtracting from a selection, make sure you have the same feather and anti-aliased settings in the Options palette that you used when you made the original selection so that the new selection border appears uniform.

### Moving a selection border

You can easily move a selection border so that it encloses a different area of the image. This feature is useful for fine-tuning selections that are slightly misplaced.

#### To move just the selection border:

- 1 With any selection tool selected, position the pointer inside the selection border (the pointer becomes the selection pointer).
- 2 Drag the selection border to the location you want.



*Original selection border*



*Selection border moved*



Use the following methods to control the movement of a selection:

- To constrain the direction of movement to a multiple of 45°, begin dragging; then hold down Shift as you continue to drag.
- To move the selection in 1-pixel increments, use the arrow keys on the keyboard.
- To move the selection in 10-pixel increments, hold down Shift and press an arrow key.

## Adding to a selection

You can add to an existing selection or select more than one area of an image at a time. The resulting selection contains all the pixels in both the original and the new selection.

### To add to a selection:

- 1 Make a selection.
- 2 With any selection tool selected, hold down Shift and select the area you want to add to the selection.



Original selection using rectangle marquee tool



Selection extended using polygon lasso tool

## Subtracting from a selection

You subtract from an existing selection by selecting the area you want to subtract. The resulting selection contains all the pixels in the original selection that are not in the new selection.

### To subtract from a selection:

- 1 Make a selection.
- 2 With any selection tool selected, hold down Option (Macintosh) or Alt (Windows) and select the area you want to subtract from the selection.



Original selection using rectangle marquee tool



Subtracted selection using polygon lasso tool

## Selecting parts of selections

You can use any selection tool to select a portion of an existing selection. The area that intersects the original selection and the new selection becomes the resulting selection.

### To select a portion of an existing selection:

With a selection tool selected, press Option+Shift (Macintosh) or Alt+Shift (Windows) and drag over the areas of the original selection you want to keep.

## Using the Grow and Similar commands

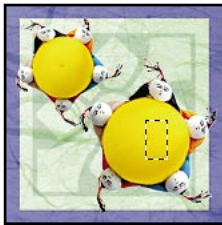
The Grow and Similar commands let you expand a selection to include areas similar in color to the current selection. These commands use the tolerance specified in the Magic Wand Options palette to define the color range of pixels to be included in the expanded selection.

**Note:** You cannot use the Grow and Similar commands on images that are in Bitmap mode.

### To extend a selection based on color:

Do one of the following:

- Choose Select > Grow to include adjacent pixels that fall within the specified tolerance range.

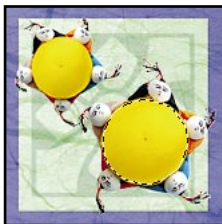


Original selection

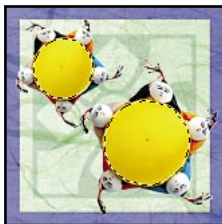


Grow command applied

- Choose Select > Similar to include pixels throughout the image, not just the ones next to the selection, that fall within the specified tolerance range.



Original selection



Similar command applied

You can choose either command more than once to increase the selection in increments.

## Smoothing a selection

In some instances, making a color-based selection leaves stray pixels both inside and outside the selected area. You can clean up a selection by using the Smooth command to include or eliminate stray pixels in the selection. Smoothing is especially effective when you are blending, cloning, or making other changes that you want to appear seamless in the final selection.

### 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 the area around each pixel to find any unselected pixels that fall 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 of the pixels in the range are selected, any unselected pixels are added to the selection. If most of the pixels are unselected, any selected pixels are deleted from the selection.

**Note:** The relationship between physical distance and pixel distance varies, depending on the resolution of the image. For example, 5 pixels is a longer distance in an image with a resolution of 72 ppi than it is in an image with a resolution of 300 ppi. See “About resolution and image size” on page 37 for more information.

## Expanding and contracting a selection border

Once you have made a selection, you can modify it by expanding or contracting the selection border.

### To expand a selection border:

- 1 Choose Select > Modify > Expand.
- 2 For Expand By, enter a pixel value between 1 and 16 and click OK.

The selection border is increased by the specified number of pixels.

### To contract a selection border:

- 1 Choose Select > Modify > Contract.
- 2 For Contract By, enter a pixel value between 1 and 16 and click OK.

The selection border is decreased by the specified number of pixels. If part of the selection border runs along an edge of the image, that part is not affected by the Contract command.

## Selecting a border around an area

You can define a selection and then select an area of a specified width framing the original selection.

### To select an area around an existing selection border:

- 1 Choose Select > Modify > Border.

- 2 Enter a value between 1 and 64 pixels for the width of the border, and click OK.



*Original selection*



*Border: 5 pixels*

## Inverting a selection

Sometimes it is more convenient to select part of an image by first selecting the parts you don't want and then inverting the selection. For example, if you want to select an object that is placed against a solid-colored background, you can use the magic wand tool to select the background first and then invert to select the foreground object.

### To select the unselected parts of an image:

Choose Select > Inverse. You can choose Inverse again to return to the original selection.



*Background selected*



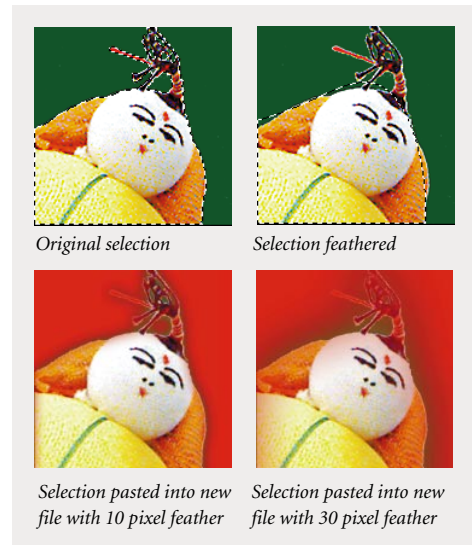
*Inverse command selects everything but the background*

## Softening the edges of a selection

In some cases, you might want to smooth the hard edges of a selection you plan to modify. You can make the transition between the pixels in the selection and the surrounding pixels more gradual by feathering or anti-aliasing.

### Feathering a selection

Feathering blurs the edges of the selection by building a transition boundary between the selection and the surrounding pixels. The transition gradually blends the edges of the selection. This smoothing can cause some loss of detail at the edge of the selection. You can define a feathered edge for selections you make with the lasso tool, polygon lasso tool, or marquee tool, or you can add feathering to the edges of an existing selection. Be sure to feather a selection before you apply any editing changes.



### To define a feathered edge for the marquee tool or the lasso tool:

Enter a Feather value in the Marquee Options palette, the Lasso Options palette, or the Polygon Lasso 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:** When you make a small selection with a large feather radius, it's possible to create such a faint selection that the selection edges are invisible. If a message appears stating "No pixels are more than 50% selected," decrease the feather radius for the active selection tool, or increase the size of the selection.*

**Using the Anti-aliased option**

Anti-aliasing produces a smooth-edged selection by partially filling edge pixels so that they are semi-transparent. Because anti-aliasing removes jagged edges, it is especially useful when you're creating composite images by cutting and pasting. No detail is lost, since only the edge pixels change. You can specify anti-aliasing for the lasso tool, polygon lasso tool, elliptical marquee tool, and magic wand tool. You must specify this option before using the selection tool; once the selection is made, you cannot add anti-aliasing to it.

**To use anti-aliasing:**

Make sure that Anti-aliased is selected in the Lasso Options palette, the Polygon Lasso Options palette, the Marquee Options palette, or the Magic Wand Options palette before using the tool.

The following illustration shows a selection pasted into another image with and without anti-aliasing.



Anti-aliased option on



Anti-aliased option off

**Hiding a selection border**

When you want to view a selection without the border—for example, to preview a moved selection—you can temporarily hide the selection border. Any changes you specify, such as fills or color adjustments, are still applied to the current selection, but the border remains hidden.

The Hide Edges command affects the current selection only. The selection border reappears when you make another selection.

**To hide or show a selection border:**

Choose View > Hide Edges or Show Edges.

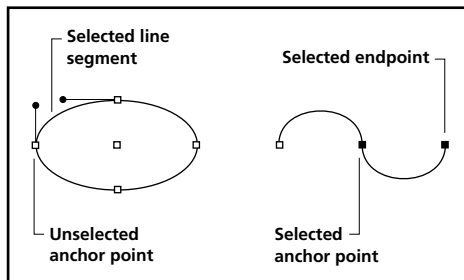
**About paths**

A *path* is any line or curve you draw using the pen tool, located in the toolbox. Although paths appear in your image on-screen, they do not contain any pixels or print with the image. Drawing a path in Photoshop is like placing a piece of tracing



paper over an image and drawing lines and curves. When you save a path in the Paths palette, you save the piece of tracing paper with all of its contents.

A path consists of one or more segments. *Anchor points* define where the path segments begin and end. A curved path is defined also by *direction lines*, which determine the shape and direction of each curved segment. A *closed path* has no beginning or end; for example, a circle is a closed path. An *open path* has distinct endpoints; a wavy curve is an example of an open path.

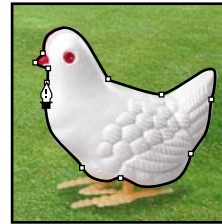


*Closed and open paths*

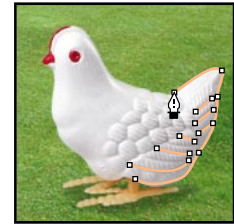
A path in the Paths palette can consist of one or more subpaths. A *subpath* consists of a series of connected path segments; different subpaths are disconnected from each other. For example, you can first draw a line, then draw a curve that is disconnected from the line, and save both subpaths as a single path in the Paths palette.

You can use paths to define shapes and areas for painting, and to define smoothly shaped selections. Because paths always consist of smooth, anti-aliased outlines, they provide an excellent alternative to using the lasso tool, which tends to produce irregularly shaped selections. Paths are useful for long-term storage of simple masks,

because paths are small, compact, and take up much less disk space than do pixel selections. You can also use paths to clip sections of your image for export to an illustration or page-layout application (see “Using clipping paths” on page 322).



*Pen tool used to create an accurate selection*



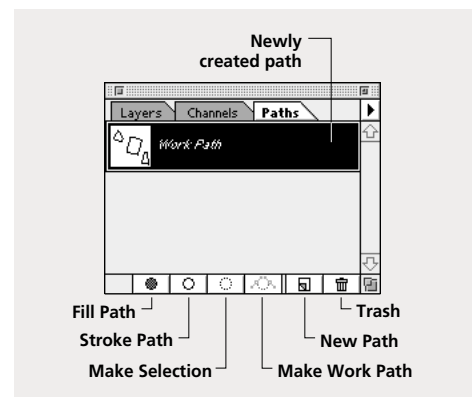
*Pen tool used as drawing tool*

## Using the Paths palette

The Paths palette lists the paths you have created. A thumbnail of the path contents appears to the left of the path name. Use the scroll bars or resize the palette to see additional paths.

### To display the Paths palette:

Choose Windows > Show Paths.



## Selecting and displaying paths

The Paths palette lets you select, deselect, show, or hide entire paths in your image.

### To select a path:

Click the path in the Paths palette. The name of the path is highlighted in the palette, and the selected path appears in the image. You can select only one path at a time.

### To deselect a path:

Click outside the path in the Paths palette.

### To hide a path:

Do one of the following:

- In the Paths palette, select the path and choose Turn Off Path from the palette menu.
- Choose View > Hide Path.

### To show a path:

Do one of the following:

- In the Paths palette, select the path.
- Choose View > Show Path.



---

To toggle between hiding and showing a path, Shift-click the path in the Paths palette.

---

## Hiding and resizing path thumbnails

You can change the size of or turn off the thumbnail for each path. Increasing the thumbnail size provides more detail for each path shape. Decreasing the size or turning off the thumbnail lets you view more paths in the Paths palette at one time and can improve Adobe Photoshop's performance.

### 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.

## Creating paths

You create a path using one of two methods: you can create a new path in the Paths palette and then begin to draw with the pen tool, or you can draw with the pen tool first and then save the path in the Paths palette. If you create a path in the Paths palette first, the path you draw is saved automatically. If you begin drawing first, the path you draw appears in the Paths palette as a temporary *work path*. You must save a work path to preserve its contents during a work session.

## Creating new paths

When you create a new path, it appears at the bottom of the paths list in the Paths palette. The lines and curves you draw with the pen tool are added to the contents of this new path.

### To create a new path without naming it:

Click the New Path button at the bottom of the Paths palette.

### To create a new path:

- 1 Do one of the following:
  - Make sure no work path is selected, and choose New Path from the Paths palette menu.
  - Option-click (Macintosh) or Alt-click (Windows) the New Path button (□) at the bottom of the Paths palette.
- 2 Enter a name for the path in the New Path dialog box, and click OK.

## Previewing path segments

The Rubber Band option lets you preview path segments before you draw them. As you move the pointer in the image, Photoshop interactively displays the segment that will be created. The path segment does not become permanent until you press the mouse button.

### To preview path segments as you draw:

- 1 Double-click the pen tool to display its Options palette.
- 2 Select Rubber Band.

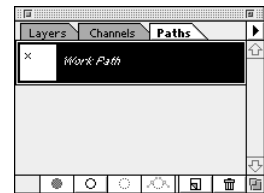
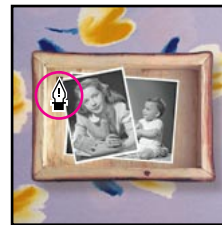
## Drawing straight line paths

You draw a straight line path by clicking to define the endpoints, or anchor points, of the path segments.

### To draw straight line paths:

- 1 Select the pen tool.
- 2 Position the 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.

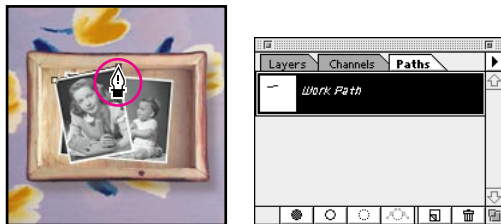
As you begin drawing with the pen tool, *Work Path* appears at the bottom of the paths list if you have not already created a new path.



- 3 Click 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°.

The second anchor point is now selected, and the first anchor point changes to a hollow square, indicating that it is no longer selected.

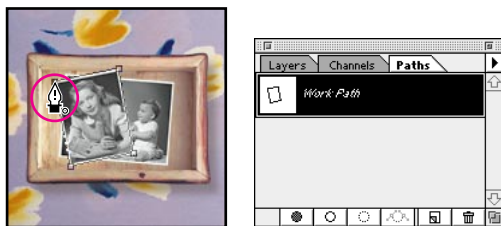
Every segment you draw becomes part of the work path. If you have a work path already on the palette and it is deselected, the path you're drawing replaces the contents of the work path.



4 Continue clicking to set anchor points for additional straight segments.

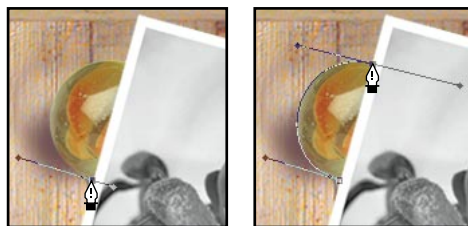
5 To complete the path, do one of the following:

- To end an open path, click the pen tool in the toolbox.
- To create a closed path, position the pointer over the first anchor point you created. A small loop appears next to the pointer when it is precisely aligned with the anchor point. Click to close the path.



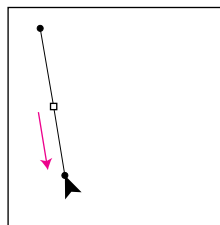
## Drawing curved paths

You draw curved paths by dragging to set anchor points and direction lines, which define the direction and shape of each segment.



### To draw a curved path:

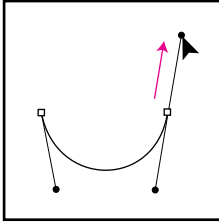
- 1 Select the pen tool.
- 2 Position the pointer where you want the curve to begin. Hold down the mouse button. The first anchor point appears.
- 3 Drag away from the anchor point. As you drag, a direction line appears. Hold down Shift as you drag to constrain the angle of the direction line to a multiple of 45°. Release the mouse button when the curve segment looks the way you want.



*Drag in direction of curve to set first anchor point*

The length and slope of the direction line determine the shape and direction of the curve segment.

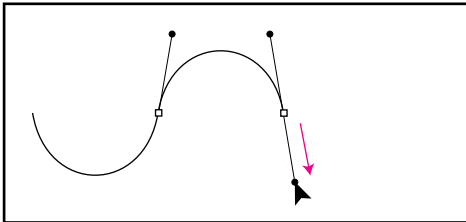
4 Position the pointer where you want the segment to end, press the mouse button, and drag in the opposite direction to complete the segment.



*Drag in opposite direction to complete curve*

5 Do one of the following:

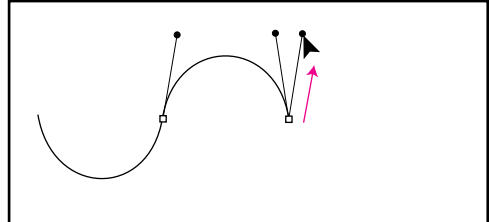
- To create the next segment of a smooth curve, position the pointer where you want the next segment to end, and drag away from the bump of the curve.



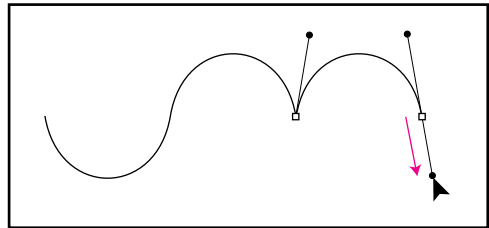
*Drag away from bump to create next segment*

- To create a sharp curve, position the pointer over the last anchor point, press Option (Macintosh) or Alt (Windows), and hold down the mouse button to set a *corner point*; then drag in the direction of the bump of the curve. Release Option/Alt and the

mouse button, reposition the pointer where you want the segment to end, and drag in the opposite direction.



*Press Option/Alt and drag in direction of curve...*



*then release Option/Alt and drag in opposite direction.*

6 Continue to create additional curved segments by setting anchor points and dragging direction lines as described in the previous steps.

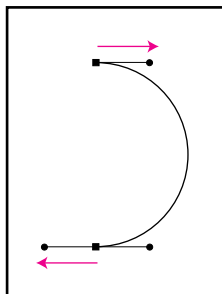
7 To complete the path, do one of the following:

- To end an open path, click the pen tool in the toolbox.
- To create a closed path, position the pointer over the first anchor point you created. A small loop appears next to the pointer when it is precisely aligned with the anchor point. Click or drag to close the path.

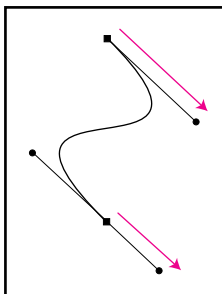
## Tips for drawing curves

Keep the following guidelines in mind to help you draw curves quickly and easily:

- To create a simple curve, always drag in the direction of the bump of the curve first, and then drag in the opposite direction. Dragging in the same direction creates an “S” curve.

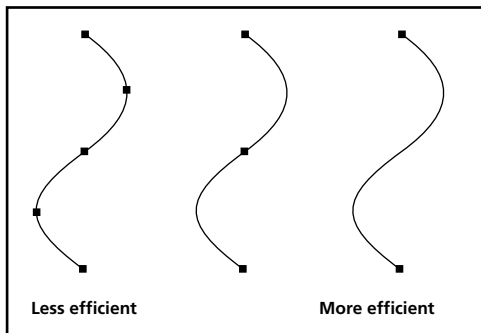


*Drag in opposite direction to create smooth curve.*



*Drag in same direction to create “S” curve.*

- When drawing a series of smooth curves, draw one segment at a time, placing anchor points at the beginning and end of each segment, not at the tip of the segment’s bump. Use as few anchor points as possible, and place them as far apart as possible.



## 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, you must complete the subpath before you begin drawing again with the pen tool. Closing or ending a subpath ensures that the next segment you draw is disconnected from that subpath.



*Original path*



*Subpath added*

## Saving and renaming paths

You must save a work path to keep its contents. Once you have saved a path, any changes you make to the path are saved automatically.

The path is saved with the image, in the same file format as the image. On the Macintosh, all available formats in Photoshop support paths. In Windows, the Photoshop, JPEG, EPS, PDF, and TIFF formats support paths. For information on using clipping paths saved in the EPS format, see “Using

clipping paths” on page 322. Any paths saved with an image appear in the Paths palette when you open the image.

**To save a work path without naming it:**

Drag the *Work Path* name to the New Path button (📄) at the bottom of the Paths palette.

**To save a work path:**

- 1 Draw the work path.
- 2 Choose Save Path from the Paths palette menu.
- 3 Enter a name for the path in the Save 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.

## Editing paths

The path tools in the toolbox let you easily edit and adjust the shape of a path. You can move anchor points and direction lines, add and delete anchor points on a path, and change the behavior of direction lines around an anchor point.

## Adjusting paths

You adjust a path by dragging its segments, anchor points, or direction lines. You must select a path first to display its anchor points and direction lines. To adjust only part of a path, first select that part. The selected parts of a path are indicated by solid anchor points and solid direction points (the endpoints of direction lines).

**To select a segment, anchor point, subpath, or path:**

- 1 Drag to select the direct-selection tool (⌘) in the toolbox.
- 2 Do one of the following:
  - To select an anchor point, click the anchor point in the image.



- To select a path segment, click the segment.
- To select multiple path segments, drag a marquee around the segments of the path you want.
- To select the entire path, hold down Option (Macintosh) or Alt (Windows), and click the path in the image. If the path consists of several subpaths, only the subpath directly under the pointer is selected.

### To add to a selection:

Hold down Shift while selecting additional anchor points, segments, or subpaths.



*Single segment selected*




*Entire subpath selected  
by holding down Option/  
Alt*



*Second subpath added to  
selection by holding down  
Shift and Option /Alt*

### To adjust a path:

- 1 Select the direct-selection tool () in the toolbox.
- 2 Click the path in the image to display its anchor points and direction lines.
- 3 Do one of the following:
  - To adjust the shape of the path, drag an anchor point, direction line, or segment of the path.

- To adjust a specific part of the path, select that part. Then drag the selected part to adjust it.




To activate the direct-selection tool when any other tool is selected, position the pointer over an anchor point and press Command (Macintosh) or Ctrl (Windows).

## Adding and deleting anchor points

You use the add-anchor-point tool and the delete-anchor-point tool in the toolbox to add and delete anchor points from a path.

### To add an anchor point:

- 1 Drag to select the add-anchor-point tool () in the toolbox, and position the pointer on the path where you want to add an anchor point (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.

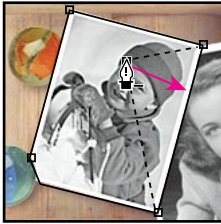


To activate the add-anchor-point tool when the direct-selection tool is selected, position the pointer over the path border where there is no anchor point and press Command+Option (Macintosh) or Ctrl+Alt (Windows).



### To delete an anchor point:

- 1 Drag to select the delete-anchor-point tool (⌘-) in the toolbox, and position the pointer on the anchor point you want to delete (a minus sign appears next to the pointer).
- 2 Do one of the following:
  - Click the anchor point to delete it and reshape the path to fit the remaining anchor points.



- Drag to delete the anchor point and change the shape of the edited segment.



To activate the delete-anchor-point tool when the direct-selection tool is selected, position the pointer over an anchor point and press Command+Option (Macintosh) or Ctrl+Alt (Windows).

### Converting between smooth points and corner points

When you draw a smooth curve, two direction lines emanate from each anchor point. The first direction line completes the definition of the segment ending at the anchor point, while the second direction line establishes the shape and direction of the next segment of the path. Smooth curves use

anchor points that are called *smooth points*. That is, both direction lines lie along the same angle and move together when you drag either one of them.

Converting a smooth point to a *corner point* lets you convert a smooth curve to a sharp curve or to a straight segment. A corner point for a sharp curve has two direction lines that can be modified independently, while a corner point for a straight segment has no direction lines at all.

### To convert between a smooth point and a corner point:

- 1 Use the direct-selection tool (⌘) to select the path in the image and display its anchor points and direction lines.
- 2 Drag to select the convert-anchor-point tool (⌘) in the toolbox, and position the pointer over the anchor point you want to change.

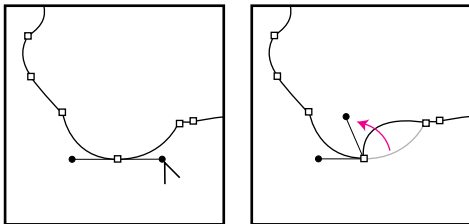


On the Macintosh, to activate the convert-anchor-point tool while the pen tool is selected, position the pointer over an anchor point and press Control+Command.

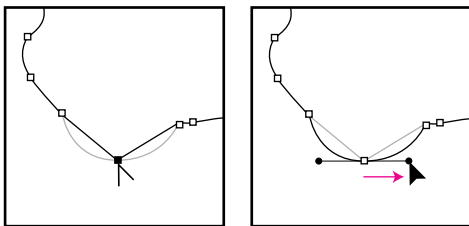
- 3 Do one of the following:

- 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 that the direction lines are visible; then drag a direction point (the point at the end of a direction line) to break the pair of direction lines.



- To convert a corner point to a smooth point, drag away from the corner point to make direction lines appear.



- To convert a corner point to a smooth point, click a direction point to align the direction lines along the same angle.

## Copying and moving paths

You can copy paths and move them within an image and between images in various ways. You can also change the layering order of paths in the Paths palette as you edit them.

### 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 and, when the solid line appears in the desired location, release the mouse button.

## Moving paths

You can move a path anywhere in an image.

### To move a path:

- 1 Select the path in the Paths palette.
- 2 Select the direct-selection tool in the toolbox.
- 3 Option-click (Macintosh) or Alt-click (Windows) the path in the image to select it.
- 4 Drag the path in the image to its new location.

If you move any part of a path beyond the canvas boundaries, it 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 the new image.

### To copy a path as you move it:

- 1 Select the path in the Paths palette.
- 2 Select the path using the direct-selection tool.
- 3 Hold down Option (Macintosh) or Alt (Windows) as you drag the path.

## Copying paths

You can copy paths within an image or between two Photoshop images. You can also use the Edit > Copy and Edit > 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 copy a path in an image without naming the path:**

Drag the path in the Paths palette to the New Path button at the bottom of the palette.

**To copy a path in an image and name the copy:**

- 1 Do one of the following:
  - Option-drag (Macintosh) or Alt-drag (Windows) the path in the Paths palette to the New Path button (📄) at the bottom of the palette.
  - Select the path you that want to copy and choose Duplicate Path from the Paths palette menu.
- 2 Enter a new name for the path and click OK.

**To copy paths between two Adobe Photoshop files:**

- 1 Open both images.
- 2 In the source image, use the direct-selection tool to select the path that you want to copy.
- 3 Do one of the following:
  - Drag the path from the source image to the destination image. The path is centered in the new window and, if an active path exists, is added to the path.
  - Drag the path from the source image's Paths palette into the destination image. The path is copied where you release the mouse button and, if an active path exists, is added to the path.

## Filling and stroking paths

When you fill or stroke a path, you add pixels to your image. The Fill Path command lets you fill a path with a specified color, a saved section of a file, or a pattern. The Stroke Path command lets you paint a path border. If a subpath is selected, the Fill Path and Stroke Path commands become the Fill Subpath and Stroke Subpath commands, and Photoshop fills or strokes only the selected subpath.

**Important:** When you fill or stroke a path, the added pixels appear on the active layer. Make sure that the desired layer is active before filling or stroking a path.

**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 Do one of the following:
  - Option-click (Macintosh) or Alt-click (Windows) 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 a selection or layer” on page 215).
- 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 208.

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. For more information on this option, see “Preserving a layer’s transparency” on page 255.

**7** Select one of the following Rendering options:

- 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 153 for more information on these options.

**8** Click OK to fill the path.



*Path created*



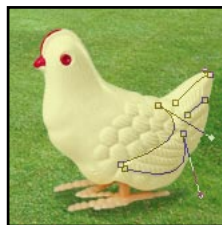
*Filled area*

#### 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.
- 3** Do one of the following:
  - Option-click (Macintosh) or Alt-click (Windows) 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.



*Selected paths*



*Stroked paths*

## Erasing and deleting paths

You can erase or delete part or all of a path. You may want to delete paths when you have finished using them (for example, when they have been filled or stroked), or you may want to keep the Paths palette to a manageable size and avoid confusion with too many paths.

If a work path is unselected in the Paths palette when you start drawing, the work path contents are deleted and replaced.

**To erase a path segment:**

- 1 Select the path segment you want to erase.
- 2 Press Delete (Macintosh) or Backspace (Windows) to erase the selected segment. Pressing Delete/Backspace again erases the rest of the subpath.

**To delete a path:**

- 1 Select the path in the Paths palette.
- 2 Do one of the following:
  - 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, Option-click (Macintosh) or Alt-click (Windows) the Trash button at the bottom of the Paths palette.


## Converting between paths and selection borders

The Make Selection command lets you convert closed paths into selection borders; the Make Work Path command lets you convert selection borders into paths.


## 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 you want to define as a selection.
- 3 Do one of the following:
  - Option-click (Macintosh) or Alt-click (Windows) the Make Selection button () at the bottom of the Paths palette.
  - Choose Make Selection from the Paths palette menu.
- 4 Do one of the following:
  - For Feather Radius, enter a value in pixels to define how far inside and outside the selection border the feather edge extends. See “Feathering a selection” on page 153 for more information.
  - Select Anti-aliased to create a finer transition between the pixels in the selection and the surrounding pixels. Make sure that the Feather Radius is set to 0. See “Using the Anti-aliased option” on page 154 for more information.

5 Select one of the following selection options:

- 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.



Use the following shortcuts to convert paths to selections:

- To define a path as a selection using the current settings in the Make Selection dialog box, Command-click (Macintosh) or Ctrl-click (Windows) the path thumbnail in the Paths palette.
- To add the path to the current selection, press Command+Shift/Ctrl+Shift and click the path thumbnail.
- To subtract the path from the current selection, press Command+Option/Ctrl+Alt and click the path thumbnail.
- To select the intersection of the path and the current selection, press Command+Shift+Option/Ctrl+Shift+Alt and click the path thumbnail.

## Converting selection borders into paths

Any selection made with an Adobe Photoshop selection tool can be defined as a path. This is useful, for example, when you want to use the direct-

selection tool to fine-tune the path segments. You can then redefine the path as a selection border or save the path with the file for later use. 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. In addition, the Make Work Path command may 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 using the current Make Work Path tolerance setting:

Click the Make Work Path button ( ) at the bottom of the Paths palette.

### To convert a selection to a path:

1 Make the selection.



*Selection*

2 Do one of the following:

- Option-click (Macintosh) or Alt-click (Windows) 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 number of anchor points used to draw the path and the smoother the path. See “Printing clipping paths” on page 324 for information on how the number of anchor points affects printing.



*Path tolerance: 2 pixels*



*Path tolerance: 10 pixels*

**4** Click OK. The converted selection appears as a work path at the bottom of the Paths palette.





# Chapter 8: Editing

**A**dobe Photoshop lets you edit and modify selections and layers of images in many ways. (For information on how to make selections, see Chapter 7, “Selecting.”) This chapter describes the editing tools and techniques, including how to move, copy, and paste selections, how to use the eraser tool, the smudge tool, the blur/sharpen tool, the dodge/burn/sponge tool, and the type tool, and how to apply special effects to a selected area.

Keep in mind that pixels can exist beyond the visible canvas when you drag or paste a selection onto a layer, apply a transformation, or create artwork or type. You can move the pixels back onto the visible canvas using the move tool or selection arrow, modify or reposition the pixels using the Free Transform or any of the Transform commands, or increase the canvas size to incorporate the pixels without discarding them. But as long as the pixels are beyond the visible canvas, you cannot paint or modify them (for example, using filters or the Levels command).

## Indicating when tasks finish

The Beep When Done preference setting causes Adobe Photoshop to sound a beep whenever the program finishes performing a task requiring a progress bar. After the beep, you can continue working with the program.

### To set the beep:

- 1 Choose File > Preferences > General.
- 2 Select Beep When Done, and click OK.

## Interrupting operations

When trying to cancel an operation in progress (when Adobe Photoshop displays a progress bar), press Command+[.] (Macintosh) or hold down Esc until the operation in progress has stopped (Windows).

## Correcting a mistake

You don't need to be overly concerned about making mistakes while using the Adobe Photoshop program. Most operations can be undone using the Undo command.

In some cases, the information held in memory by the Undo command, Clipboard, Pattern buffer, or Snapshot buffer can be so large that it prevents Photoshop from performing the next operation. The Purge command clears the operation stored by the Undo command, the Clipboard, or the Pattern or Snapshot buffer to free up memory, preventing you from undoing an operation or reapplying the information held on the Clipboard or in the buffers.

**To undo the last performed operation only:**

Choose Edit > Undo.

If an operation can't be undone, the Undo choice is dimmed and reads "Can't Undo."

**To free memory used by the Undo command, by the Clipboard, or by the Pattern or Snapshot buffer:**

Choose Edit > Purge, and choose the command or buffer you want to clear. If the command or buffer is empty, the command appears dimmed.

You cannot undo the Purge command.

## Restoring an image

You can undo a series of operations that you have performed by restoring all or part of an image to its last saved version.

**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 rubber stamp tool with the From Saved option selected in its Options palette. For more information, see "Using the rubber stamp tool" on page 188.
- If you took a snapshot of the image using the Edit > Take Snapshot command, use the rubber stamp tool with the From Snapshot option

selected in its Options palette. For more information, see "Using the rubber stamp tool" on page 188.

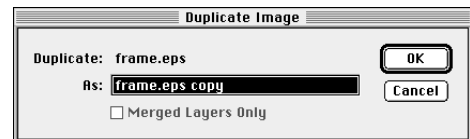
- Use the eraser tool with the Erase to Saved option selected in its Options palette. For more information, see "Using the eraser tool" on page 202.
- Select the area you want to restore and choose Edit > Fill. For Use, choose Saved, and click OK. For more information, see "Filling a selection or layer" on page 215.

## Duplicating images

You can copy an entire image (including all layers, layer masks, and channels) into the available memory on your system without saving the image to disk by using the Duplicate command or by dragging and dropping. Duplicating is useful when you want to experiment with different effects on an image without permanently changing it. For example, you can duplicate an image, modify it, and then compare the results to the original.


**To duplicate an image using the Duplicate command:**

- 1 Open the image you want to duplicate.
- 2 Choose Image > Duplicate.
- 3 Enter a name for the duplicate image.



4 To duplicate the image without layers, select Merged Layers Only.

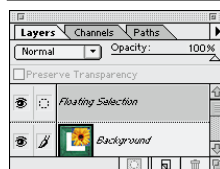
5 Click OK.

 To duplicate an image without naming it, hold down Option (Macintosh) or Alt (Windows) as you choose Image > Duplicate.

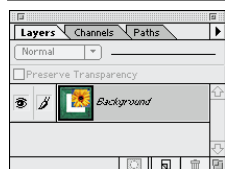
## Moving selections

You move a selection by dragging it to a new location using the move tool. When the Info palette is open, you can track the exact distance you are moving a selection.

When you move a selection, Photoshop creates a temporary layer called a *floating selection*, which appears in the Layers palette. When you deselect the selection, its contents become part of the underlying layer.




Selection moved; floating selection in Layers palette




Selection deselected; contents merged with background



To convert a floating selection to a layer, drag the floating selection in the Layers palette to the New Layer button () at the bottom of the palette.

### To move a selection:

1 Select the move tool () in the toolbox.

To activate the move tool when any other tool is selected (except the pen, direct-selection, add-anchor-point, delete-anchor-point, and convert-anchor-point tools), hold down Command (Macintosh) or Ctrl (Windows).

2 Move the pointer inside the selection border, and drag the selection to the position you want. If you have selected multiple areas, all move as you drag.



Original selection



Moving selection with move tool

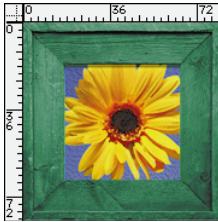
## Using rulers, guides, and grids

Photoshop includes rulers, guides, and grids to help you align artwork. Guides and grids help you align elements precisely across the width or length of a Photoshop image. The grid is useful for laying out images or elements symmetrically.

Changing the ruler origins (the 0, 0 mark on the top and left ruler) lets you measure from a specific point on the image. The ruler origin also affects the grid by determining its point of origin.

## 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.



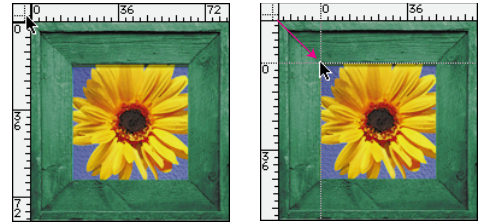
### To display or hide rulers:

Choose View > Show Rulers or Hide Rulers.

### To change the rulers' zero origin:

- 1 To have the ruler origin snap to guidelines or gridlines, choose View > Snap to Guides or View > Snap to Grid, respectively.
- 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 crosshairs appears, 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.

### 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 also updates the rulers.

- 3 For Width and Gutter, enter values for the column size. If desired, you can change the units for these options.

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 the column width setting; for more information, see “Changing the print dimensions and resolution of an image” on page 46 and “Increasing the size of the work canvas” on page 61.

- 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 72.27 printer's points per inch.

5 Click OK.

## Using guides and the grid

Guides appear as lines; they float over the entire image and do not print. Once you place a guide, you can move, remove, or lock it into place to avoid accidentally moving it. The grid appears as lines by default, but can be set to display as points.

Guides and grids behave in similar ways:

- Selections, selection borders, and tools snap to a guide or the grid when they are dragged within 8 screen (not image) pixels of a guide. 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, are specific to an image.
- Grid spacing, along with guide and grid color and style, are the same for all images. See “Setting guide and grid preferences” on page 178.

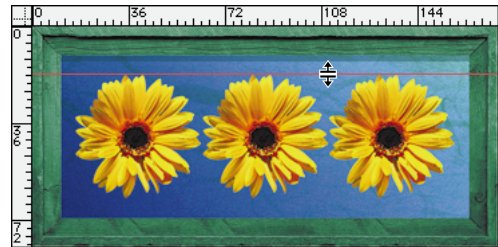
### To show or hide guides or the grid:

Choose View > Show/Hide Guides, or choose View > Show/Hide Grid, respectively.

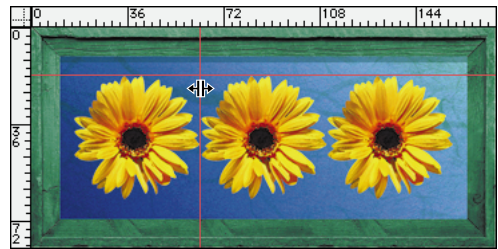
### To place a guide:

- 1 If the rulers are not visible, choose View > Show Rulers.
- 2 With any tool selected, use one of the following methods to drag a guide from the ruler onto the image:

- Drag from the horizontal ruler to create a horizontal guide.



- Drag from the vertical 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 Do one of the following:
  - Drag the guide to move it.
  - Change the guide from horizontal to vertical, or vice versa, by holding down Option (Macintosh) or Alt (Windows) 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 remove a guide from the image:

Drag the guide outside the image window.

#### To remove all guides:

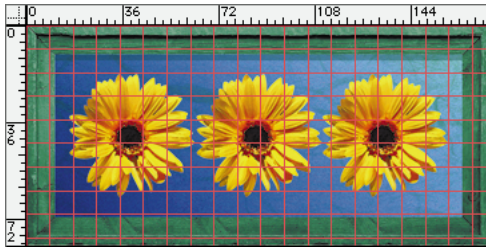
Choose View > Clear Guides.

#### To turn snapping to guides or the grid on or off:

Choose View > Snap to Guides or Snap to Grid, respectively.

### Setting guide and grid preferences

Use the Guides and Grid preferences to set the color and style of guides and the grid, as well as grid spacing.



*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 on page 225, 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, you can change the units for this option.

- 5 Click OK.

## Copying a selection

You can copy a selection by choosing Edit > Copy. You can also copy a selection as you move it within an image, or as you drag it from one image to another. A valid drag-and-drop destination appears outlined in boldface when you drag over it.

### Copying a selection as you move it

You can copy a selection as you use the move tool to drag it, or you can use the arrow keys to create multiple duplicates of the selection.

#### To copy a selection while dragging:

- 1 Select the move tool or hold down Command (Macintosh) or Ctrl (Windows) to activate the move tool.

- 2 Hold down Option (Macintosh) or Alt (Windows), and drag the selection you want to copy and move.



Original selection

Duplicate selection

### To create multiple copies of a selection:

- 1 Select the move tool or hold down Command (Macintosh) or Ctrl (Windows) to activate the move tool.
- 2 Do one of the following:
  - To copy the selection and offset the duplicate by 1 pixel, hold down Option (Macintosh) or Alt (Windows), and press an arrow key.
  - To copy the selection and offset the duplicate by 10 pixels, press Option+Shift/Alt+Shift, and press an arrow key.

As long as you hold down Option/Alt, each press of an arrow key creates a copy of the selection and offsets it by the specified distance from the last duplicate.

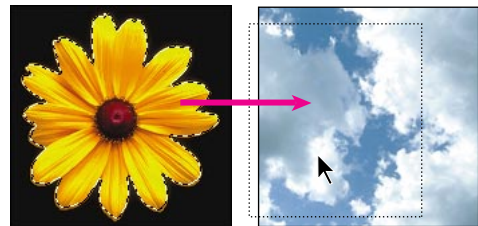
### Copying a selection from one Photoshop image to another

You can use the Edit > Copy and Paste commands to copy selections between Photoshop images. However, it is often faster and easier to drag a selection from one Photoshop image and drop it

into another; it also saves memory by not using the Clipboard. The drag-and-drop method requires that both images be open, and creates a new layer when the selection is dropped.

### To copy a selection from one open Adobe Photoshop image to another:

Select the move tool, and drag the selection from the active image window into the destination image window. If nothing is selected, the entire active layer is copied. A valid drag-and-drop destination appears outlined in boldface when you drag over it.



Selection dragged to new image



Result

**Note:** If you copy a selection to an image type that does not support layers (such as an indexed-color image), the selection is pasted as a floating selection.

## Copying between applications

In some cases, you can copy selections between a Photoshop image and another application by dragging and dropping. You can also use the Clipboard to copy a selection in Adobe Photoshop and paste it in another application, or vice versa.

### Dragging selections between applications

On the Macintosh, you can drag and drop images between Adobe Photoshop and other applications that support Macintosh Drag Manager, provided that your system is running System 7.0. or 7.1 or higher with the Drag Manager Extension or System 7.5 or higher. Dragging vector artwork from Adobe Illustrator or from other applications that use the Illustrator Clipboard rasterizes the artwork. To copy the artwork as a path in Adobe Photoshop, hold down Command as you drag.

In Windows, you can drag and drop images from Adobe Photoshop to other OLE-compliant applications. 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; for more information, see your Windows documentation.

### Copying selections between Adobe Photoshop and another application

A selection cut or copied using the Edit > Cut or Edit > Copy command remains on the Clipboard until you copy or cut another selection. By default, when you quit Adobe Photoshop, or switch to another application, the contents of the Clipboard

are converted to bitmap format (that is, rasterized). This conversion lets you paste the Clipboard's contents into a file created in another application.

To save time, you can disable this automatic conversion if you don't plan to paste the Clipboard contents into other applications. The automatic conversion does not affect the pasting of selections between Photoshop images.

#### To change the Export Clipboard preference:

- 1 Choose File > Preferences > General.
- 2 Do one of the following:
  - Select Export Clipboard to save the contents of the Clipboard upon quitting Photoshop (Macintosh) or to display a prompt upon quitting Photoshop asking you whether to make the contents of the Clipboard available to other applications (Windows).
  - Deselect Export Clipboard to delete the Clipboard contents upon quitting the program. In Windows, the Clipboard contents are also deleted when you switch applications.
- 3 Click OK.

### Pasting from another application (Macintosh)

On the Macintosh, Adobe Photoshop lets you paste PostScript artwork copied to the Clipboard from applications such as Adobe Illustrator (version 5.0 and later), Adobe Dimensions, and Adobe Streamline.



**To paste a selection from another application to Adobe Photoshop via the Clipboard:**

- 1 In the supporting application, select your artwork, and choose Edit > Copy.
- 2 In Adobe Photoshop, make the image active 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 “Using the Anti-Aliased option” on page 154 for more information.
  - Deselect Anti-aliasing if you want the selection to have a crisp edge.

**Note:** *If anti-aliasing causes ghosting, you can remove unwanted edge pixels using the Matting commands. For more information, see “Matting a moved or pasted selection” on page 183.*

- 6 Click OK.

## Pasting a selection

Adobe Photoshop offers a range of pasting options that control how the pasted selection appears in the image. The Paste command pastes a cut or copied selection into another part of the image or into another image as a new layer. You can then control the opacity and blending mode of the pasted pixels using the Layers palette. The Paste Into command lets you paste a selection inside another selection border, which acts as a mask for the pasted selection.

### Pasting using different resolutions

When you're pasting between images that have different resolutions, the pasted data retains its current pixel dimensions when pasted. This can make the pasted contents appear out of proportion to the new image. To match the images, use the Image Size command to make the source and destination images the same resolution before copying and pasting (see page 46).

### Pasting into another selection

You can paste a cut or copied selection (the *source selection*) inside another selection in the image (the *destination selection*). The Paste Into command pastes the source selection onto a new layer, and converts the destination selection border into a layer mask. You can paint on the mask to reveal more or less of the source selection's contents or move the contents within the mask to reveal a different part. For more information, see “Using layer masks” on page 262.

**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.

*Source selection**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*

- 4 Select the move tool, or hold down the Command (Macintosh) or Ctrl (Windows) 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 source contents, click the layer mask thumbnail in the Layers palette, select a painting tool, and do one of the following:

- To hide more of the source contents, paint the mask with black.
- To reveal more of the source contents, paint the mask with white.
- To reveal the source contents partially, paint the mask with grey.

For more information, see “Adding a layer mask” on page 263.

- 6 If you are satisfied with your results, choose Layer > Merge Down to merge the new layer and layer mask with the underlying layer and make the changes permanent.

## Deleting a selection

To delete a selection, choose Edit > Clear or press Delete (Macintosh) or Backspace (Windows). 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.

## Matting a moved or pasted 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 contents. You use the Matting command to edit these unwanted edge pixels.

### Defringing a selection

The Defringe command replaces the color of any “fringe” pixels with the colors of nearby pixels that contain pure colors (pure-color pixels don’t contain any of the background color). For example, if you select a white object on a blue background and move the selection, some of the blue background is moved with the object. The Defringe command removes the blue pixels.

#### To decrease a fringe on a selection:

- 1 Do one of the following:
  - To defringe a moved selection, select the floating selection in the Layers palette (see page 175).
  - To defringe a pasted selection, select the layer containing the pasted contents in the Layers palette.
- 2 Choose Layer > Matting > Defringe.
- 3 Enter a value in the Width text box for the distance to be used to find replacement pixels; then click OK.

In most cases, a distance of 1 or 2 pixels is enough to locate pixels that remove a fringe.



*Floating selection*



*Defringe value: 2 pixels*

### Removing matte from a selection

The Remove Black Matte and Remove White Matte commands are useful when a selection has been anti-aliased against a white or black background, and you want to paste the selection in front of a different background. For example, creating white text with anti-aliasing on a black background produces gray pixels at the edges, which are visible against a colored background.

The Remove Black Matte mode removes the remnants (ghosting) of black around the edges of images created on black backgrounds. The Remove White Matte mode eliminates the ghosting of white around the edges of images created on white backgrounds.

#### To remove a matte from a selection:

- 1 Do one of the following:
  - To remove matte from a moved selection, select the floating selection in the Layers palette (see page 175).
  - To remove matte from a pasted selection, select the layer containing the pasted contents in the Layers palette.

2 Choose Layer > Matting > Remove Black Matte or Remove White Matte.

## Rotating and flipping an image

The Image > Rotate Canvas commands let you rotate or flip the entire contents of an image.

### To rotate or flip an image:

Choose Image > Rotate Canvas and, from the submenu, choose one of the following commands:

- 180° to rotate by a half-turn.
- 90° CW to rotate clockwise by a quarter-turn.
- 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



Canvas rotated

## Applying transformations

Using the Layer > Transform and Layer > Free Transform commands, you can transform a selection or layer by rotating, scaling, flipping, skewing, or distorting it. When you transform a linked layer, the transformation affects all the layers in the linking group. The Free Transform command lets you apply any combination of these transformations in one operation. The Transform > Numeric command lets you apply a combination of transformations to a selection or layer by specifying numeric values.

**Note:** You cannot apply transformations to the background as a layer. You can, however, transform selections on the background.

You can also apply transformations to an alpha channel by first selecting it in the Channels palette, and you can transform a layer mask by selecting its thumbnail in the Layers palette.

## Using interpolation

To calculate the color values of pixels that are added or deleted during transformation, Adobe Photoshop uses the interpolation method selected in the General Preferences dialog box.

This option directly affects the speed and quality of the transformation. The default Bicubic interpolation is the slowest method, but yields the best results. For more information on different interpolation options, see “Choosing an interpolation method” on page 48.

## Applying a specific transformation

The commands under the Transform submenu let you apply specific transformations to a selection or layer. When you use the Scale, Rotate, Skew, Distort, or Perspective command, Photoshop previews the effect and surrounds the selected area with a bounding border. You drag the handles at the corners and sides of the bounding border to manipulate the selection or layer according to the specified transformation.

You can manipulate a selection or layer using several transformation commands in succession before applying the cumulative transformation. For example, you can choose Layer > Transform > Scale, drag a handle to scale, and then choose Layer > Transform > Distort, drag a handle to distort, and press Return (Macintosh) or Enter (Windows) to apply both transformations.

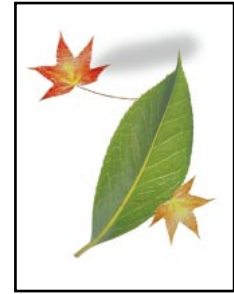
### To scale, rotate, skew, distort, or apply perspective:

- 1 Do one of the following:
  - To transform part of a layer, select that area of the layer.
  - To transform an entire layer, make the layer active and make sure that nothing is selected.
- 2 Choose Layer > Transform > Scale, Rotate, Skew, Distort, or Perspective.
- 3 Drag the handles to achieve the desired effect.
- 4 To apply additional transformations, repeat steps 2 and 3.

- 5 Press Return (Macintosh) or Enter (Windows) to apply the cumulative transformation. Press Esc to cancel the transformation.



*Original*

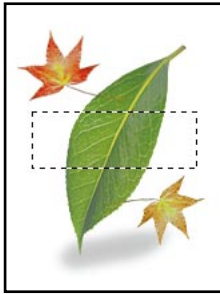


*Green leaf layer rotated*

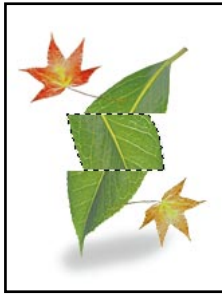
### To flip or rotate a selection or layer:

- 1 Do one of the following:
  - To transform part of a layer, select that area of the layer.
  - To transform an entire layer, make the layer active (see “Using the Layers palette” on page 246), and make sure that nothing is selected.
- 2 Choose Layer > Transform 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*



*Selection on green leaf layer flipped*

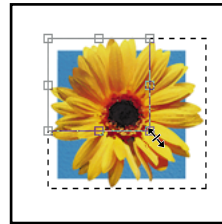
## Freely transforming and previewing effects

When you use the Free Transform command to scale, rotate, or skew a selection, Photoshop previews the effect and surrounds the selected area with a bounding border. You use the handles at the corners and sides of the bounding border to manipulate the selection.

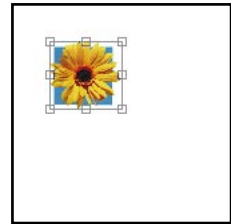
### To freely transform a selection or layer:

- 1 Do one of the following:
  - To transform part of a layer, select that area of the layer.
  - To transform an entire layer, make the layer active and make sure that nothing is selected.
- 2 Choose Layer > Free Transform.
- 3 To transform the selection or layer, do one or more of the following:

- To move the selection or layer, position the pointer inside the bounding border (the pointer turns into a black arrowhead) and drag.
- To scale, drag a handle. Press Shift as you drag a corner handle to scale proportionately. The pointer turns into a double arrow when you position it over a handle.

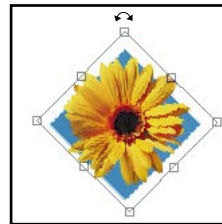


*Drag handle to scale*



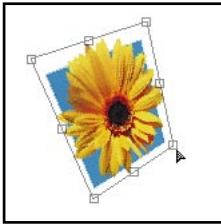
*Scaled image*

- To rotate, move the pointer outside of the bounding border (the pointer turns into a curved, two-sided arrow), and then drag. Press Shift to constrain the rotation to 15° increments.



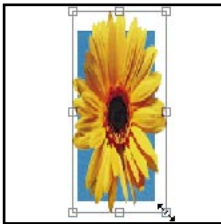
*Rotate*

- To distort freely, press Command (Macintosh) or Control (Windows) and drag a handle.



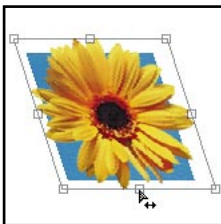
*Distort freely*

- To distort symmetrically about the center of the selection or layer, press Option (Macintosh) or Alt (Windows) and drag a handle.



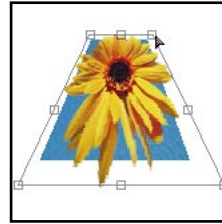
*Distort symmetrically*

- To skew, press Command+Shift (Macintosh) or Control+Shift (Windows) and drag a side handle. The pointer turns into a white arrowhead with a small double arrow when you position it over a side handle.



*Skew*

- To apply perspective, press Command+Option+Shift (Macintosh) or Control+Alt+Shift (Windows) and drag a corner handle. The pointer turns into a gray arrowhead when you position it over a corner handle.



*Perspective applied*

To undo the last handle adjustment, choose Edit > Undo.

**4** Press Return (Macintosh) or Enter (Windows) to apply the transformation. To cancel the transformation, press Esc.

## Transforming a selection or layer numerically

To scale, rotate, skew, or move a selection or layer precisely, you use the Transform > Numeric command. This command lets you enter specific numeric values for the transformation.

### To transform a selection or layer numerically:

**1** Do one of the following:

- To transform part of a layer, select that area of the layer.
- To transform an entire layer, make the layer active (see “Using the Layers palette” on page 246), and make sure that nothing is selected.

2 Choose Layer > Transform > Numeric to open the Numeric Transform dialog box.


3 Deselect any transformation to turn it off.

4 Do one or more of the following:

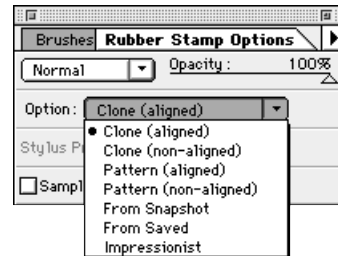
- To move the selection or layer, enter values for X and Y. Adobe Photoshop moves the selection or layer by the distance specified in these text boxes.
- To scale, enter percentage values for Width and Height. Select Constrain Proportions to scale proportionally.
- To skew, enter values for the Horizontal and Vertical angles of slant.
- To rotate, enter a value for Angle or drag the radius inside the circle to the desired angle of rotation.

5 Click OK.


## Using the rubber stamp tool

The rubber stamp tool () lets you paint a copy, or a modified copy, of an image or color into the same image or into another image. The Clone options of the rubber stamp tool make a copy of, or *sample*, an image and paint an exact duplicate of that image. Other rubber stamp options let you paint

with a pattern or with an “impressionistic” copy of the image. You can also restore painted areas to their last-saved states.



### To use the rubber stamp tool:

1 Double-click the rubber stamp tool () to display its Options palette.

2 Choose a mode, as explained in “Selecting a blending mode” on page 208.

3 Drag the slider to set the opacity, as explained in “Specifying the opacity, pressure, or exposure” on page 206.

4 For Option, choose a rubber stamp option. See the following sections for a discussion of each of these options.

5 If you are using one of the Clone options and want to sample using data from all visible layers, select Sample Merged. If you leave this option deselected, the rubber stamp tool samples only from the data on the active layer.

6 If you are using one of the Clone options, position the pointer on the part of the image you want to sample, and Option-click (Macintosh) or Alt-click (Windows). This sample point is the location from which the image will begin to be duplicated as you paint.





Option-click (Macintosh) or Alt-click (Windows) with the rubber stamp tool to sample from any open Adobe Photoshop window without changing the active window.

7 Drag to paint with the rubber stamp tool.

## Clone options

The Clone options take a sample of the image, which you can then apply, or paint, over another image or over another part of the same image. Each stroke of the tool paints on more of the sampled image.

- The Clone (aligned) option applies 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 Clone (aligned) option for duplicating two halves of a single image and placing them at different locations.

In the following illustration, the image is sampled using the petal in the upper left as the sampling point; the petal in the lower right is then painted in. Crosshairs mark the part of the original sampled image that is currently being applied.

- The Clone (nonaligned) option applies 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 part of an image to different locations.



*Sampling point*





*Crosshairs mark the part of the original being applied.*

## Pattern options

The Pattern options let you select a pattern and then use the rubber stamp tool to paint with that pattern. The Pattern (aligned) option repeats the pattern as contiguous, uniform tiles, even when you stop and resume painting several times. The Pattern (nonaligned) option centers the pattern on the rubber stamp pointer each time you stop and resume painting.

### To use the Pattern options with the rubber stamp tool:

- 1 Use the rectangle marquee tool () to select an area to use as a pattern. You can select a pattern from any open image.
- 2 Choose Edit > Define Pattern.
- 3 Double-click the rubber stamp tool () to display its Options palette.
- 4 Select a Pattern option.
- 5 Drag to paint with the pattern.

### From Snapshot option

The From Snapshot option paints the contents of the snapshot buffer onto the image. By default, each image has an empty buffer associated with it. You can store the current selection in the buffer at any time by choosing Edit > Take Snapshot or Edit > Take Merged Snapshot.

For example, you can use a painting tool or a filter to alter all or part of an image and then take a snapshot to save the change. You can then undo the change to the image, and choose the rubber stamp tool's From Snapshot option to apply the change selectively to areas of the image. The Take Snapshot command stores data from the active layer only; the Take Merged Snapshot command captures merged data from all the visible layers.

### From Saved option

The From Saved option for the rubber stamp tool lets you restore an area of an image to its previously saved state, and is the same as using the eraser tool with the Erase to Saved option selected.

When you use the From Saved option, Adobe Photoshop reads in the last-saved version of the image from the disk and restores the portions of the image as you drag the rubber stamp tool. When you begin using this option, it may take a few moments for the tool to start working while Photoshop reads the image from the disk.

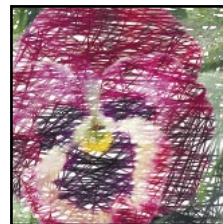
### Impressionist option

When you use the Impressionist option, the program reads the pixels from the last-saved version of the area you drag over and “smears” the pixels

together to create an impressionistic effect. As with the From Saved option, this rubber stamp tool option may take a few moments to start working while Photoshop reads the image from the disk.




Original image




Impressionist option

## Using the smudge tool

The smudge tool () simulates the actions of dragging a finger through wet paint. The tool picks up color from where the stroke begins and pushes it in the direction in which you drag.

**Note:** The smudge tool cannot be used with *Bitmap* or *Indexed-colored mode* images.

### To use the smudge tool:

- 1 Double-click the smudge tool () to display its Options palette.
- 2 Choose a mode, as explained in “Selecting a blending mode” on page 208.
- 3 Drag the slider to set the pressure, as explained in “Specifying the opacity, pressure, or exposure” on page 206.
- 4 To smudge using the foreground color at the beginning of each stroke, select *Finger Painting*. If you leave this option deselected, the smudge tool uses the color under the pointer at the beginning of each stroke.

5 If you left Finger Painting deselected and want to smudge using color data from all visible layers, select Sample Merged. If you leave this option deselected, the smudge tool uses colors only from the active layer.

6 Drag in the image to smudge color in the direction of the drag.



*Smudging an image*



Press Option (Macintosh) or Alt (Windows) as you drag with the smudge tool to use the Finger Painting option.

## Using the focus tools

The focus tools include the blur tool (⬠), which lets you blur hard edges or areas in an image to reduce detail, and the sharpen tool (⬡), which lets you sharpen soft edges to increase clarity or focus.

**Note:** *The blur and sharpen tools cannot be used with bitmap or index-color mode images.*

For other ways to adjust image sharpness, see “Step 6: Sharpen the image” on page 134, “Choosing a filter effect” on page 285, or the gallery that starts on page 297.

### To use the blur or sharpen tool:

- 1 Double-click the blur or sharpen tool (⬠/⬡) in the toolbox to display the Focus Tools Options palette.
- 2 For Tool, choose Blur or Sharpen.
- 3 Choose a mode, as explained in “Selecting a blending mode” on page 208.
- 4 Drag the slider to set the pressure, as explained in “Specifying the opacity, pressure, or exposure” on page 206.
- 5 Drag over the part of the image you want to blur or sharpen.



*Blurring an image*



*Sharpening an image*

## Using the toning tools

The toning tools include the dodge and burn tools (⬤/☉), which let you lighten or darken, respectively, specific areas of an image, and the sponge tool (⦿), which lets you change the color saturation of an area.

The dodge and burn tools are based on the traditional photographer’s technique of increasing the amount of exposure given to a specific area on a print. Photographers hold back light during an exposure to lighten an area on the print (dodging) or increase the exposure to darken areas on a print

(burning-in). The sponge tool is useful for subtly increasing or reducing the saturation in an area. In Grayscale mode, the sponge tool increases or decreases contrast by moving gray levels away from or toward the middle gray.

**Note:** *The dodge, burn, and sponge tools cannot be used with bitmap or index-color mode images.*

#### To use the dodge or burn tool:

1 Double-click the dodge, burn, or sponge tool in the toolbox to display the Toning Tools Options palette.

2 For Tool, choose Dodge or Burn.

3 Choose one of the following modes to limit the changes to specific parts of the image:

- Midtones to change only the middle range of grays in the image.
- Shadows to alter the dark portions of the image.
- Highlights to modify only the light pixels.



Original image



Dodging an image

4 Drag the slider to set the exposure, as explained in “Specifying the opacity, pressure, or exposure” on page 206.

5 Drag over the part of the image you want to lighten or darken.

#### To use the sponge tool:

1 Double-click the dodge, burn, or sponge tool in the toolbox to display the Toning Tools Options palette.

2 For Tool, choose Sponge.

3 Choose one of the following modes to define the action of the sponge:

- Saturate to intensify the color’s saturation.
- Desaturate to dilute the color’s saturation.

4 Drag the slider to set the pressure, as explained in “Specifying the opacity, pressure, or exposure” on page 206.

5 Drag over a portion of the image to change its saturation.



Original image



Saturation increased

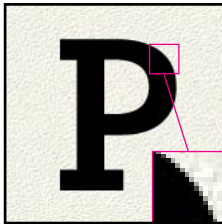
## Using the type and type mask tools

Adobe Photoshop lets you add bitmap type to an image using the type tool (T). You can specify the leading, spacing, type styles, and alignment of the type. Normally, large bitmap characters appear jagged on the screen. However, if you use the Adobe Type Manager (ATM) program installed with Adobe Photoshop, or if you use TrueType™

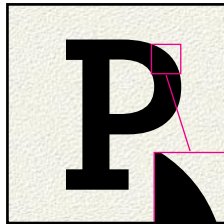
fonts, characters appear almost as smooth and as well-defined as outline type. See the *Getting Started* guide for information on using ATM.

Bitmap type differs from the outline type generated in object-oriented applications such as Adobe Illustrator. In bitmap applications such as Adobe Photoshop, type is rendered at the resolution of the image. For example, if the resolution of the image is 100 ppi, the resolution of the type will also be 100 ppi. You can't edit the text contents of the bitmap type after you have placed it into the image.

For best results, import your Adobe Photoshop image into a page-layout program that supports PostScript language type, and create the type using that program.



*Bitmap type; inset  
zoom 350%*

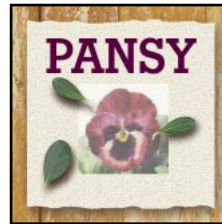


*Outline type; inset  
zoom 350%*

## Adding type to an image

You use the type tool to create bitmap type, which is added to the image as a new layer using the foreground color. You can also use the type mask tool

to create a selection border in the shape of the type. This type selection can be moved, edited, filled, or stroked just like any other selection.

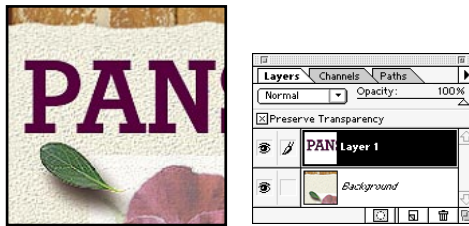


### To add type filled with the foreground color:

- 1 Select the type tool (T).
- 2 Click where you want the type to appear.
- 3 Choose a font, and specify a size for the type.
- 4 Enter values for the leading and spacing. See “Setting the leading” on page 194 and “Setting the letterspacing” on page 194 for information on these options.
- 5 Select a style and alignment for the type. See “Selecting style options for type” on page 195 and “Aligning type” on page 195 for information on these options.
- 6 Type the text in the text box. Press Return (Macintosh) or Enter (Windows) to create a line break.

The type automatically wraps in the dialog box, but it appears as a single line in the image unless you press Return/Enter. You can enter up to 32,000 characters (or as much as the Windows text box holds, whichever is smaller).

- 7 To display the text in the text box as it will appear in the image, select Font and Size for Show. (When working with very large type sizes, deselect Size to prevent the pointer or type disappearing from the text box.)
- 8 Click OK. Type appears in the foreground color on a new layer.



Type with foreground color      New layer

**Note:** In Windows, incompatibilities with some video drivers may cause TrueType fonts to rasterize incorrectly or not at all. (Type 1 fonts rasterized with ATM are not affected.) To work around the problem, create type at a large point size and then scale it down as desired using the Scale command. Contact your video driver manufacturer for an updated driver that addresses this problem.

#### To create a type selection border:

- 1 Select the type mask tool ( ).
- 2 Click where you want the type selection border to appear.
- 3 Specify type options and enter the text as described in steps 3 through 6 in the previous procedure.
- 4 Click OK. The type selection border appears in the image on the active layer.

## Changing type opacity and mode

Type created using the type tool appears as a new layer in the Layers palette. To change the type's opacity or mode, choose a different opacity or mode from the Layers palette.



Change type opacity...



using the Layers palette.

## Setting the leading

You control the spacing between lines of text, called *leading*, using the Leading option in the Type Tool dialog box. Leading is measured from baseline to baseline. The leading setting uses the same unit of measurement you specify for the font size (either points or pixels); by default, the leading built into the font is used. Values can range from 1 to 1000.

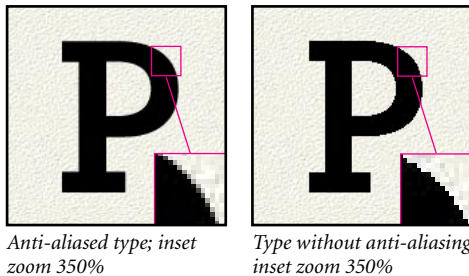
## Setting the letterspacing

You can control the spacing between letters using the Spacing option in the Type Tool dialog box. The Spacing setting uses the same unit of measurement that is specified for the font size (either points or pixels). Positive values increase the spacing; negative values reduce the spacing. Spacing increments can be as small as tenths of a point or pixel (from -99.9 to 999.9).

## Selecting style options for type

You can apply six Style options for type—bold, italic, underline, outline, strikethrough, and anti-aliased—individually or in combination.

Type, like all images in Adobe Photoshop, is composed of pixels. The Anti-aliased option in the Type Tool dialog box lets you minimize the pixel contrast at the edges of the text. When you select this option, the edges of the text appear smooth and blend into the background. You'll probably want to use anti-aliased type in your images, unless you are working with type in small point sizes.



## Aligning type

Adobe Photoshop aligns type in reference to the last point you clicked with the type tool. For example, to center type on the image, select the type tool, click the center of the image, and then click the Center Alignment option in the Type Tool dialog box.

The Type Tool dialog box includes the following Alignment options:

- The left column of Alignment options aligns text horizontally.
- The right column aligns text vertically.
- The top alignment options begin the text at the insertion point that you click in the image.
- The center alignment options center the text around the insertion point.
- The bottom alignment options end the text at the insertion point.

## Adjusting individual characters

When a text block is on its own layer, you can select individual characters and words in the text block. You then can move these characters to another position on the image and adjust letter-spacing. You use a similar technique for deselecting characters in a type mask.

### To select type characters or to deselect characters in a type mask:

Do one of the following:

- To select type characters, select the lasso tool, and drag around the character or characters you want selected. To add additional characters to the selection, hold down Shift and drag the lasso around the additional characters.

- To deselect characters in a type mask, select the lasso tool, hold down Option (Macintosh) or Alt (Windows), and drag around the character or characters you want to deselect.

**Note:** *Be sure to encircle the entire character you want to select or deselect; any part of a character outside the lasso is not changed.*



To move characters in a type mask, switch to Quick Mask mode (see page 236). Then select the characters you want to move, press Command+Option (Macintosh) or Ctrl+Alt (Windows) and press an arrow key. Deselect the characters and exit Quick Mask mode.

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#### **To adjust letterspacing manually:**

Do one of the following:

- Hold down Command (Macintosh) or Ctrl (Windows) to activate the move tool, position the pointer inside one of the selected characters, and drag the characters to their new positions. To constrain the direction of movement to a multiple of 45°, hold down Shift as you drag.
- Hold down Command (Macintosh) or Ctrl (Windows) to activate the move tool, and press the arrow keys to move the selected characters in 1-pixel increments (or hold down Shift and press an arrow key to move the type in 10-pixel increments).

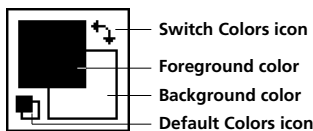


# Chapter 9: Painting

**T**he painting tools and fill commands let you change the color of pixels to modify and create areas in your image. This chapter describes how to paint an image using the painting tools, how to fill and stroke selections, and how to choose and edit colors for painting and filling.

## Choosing the foreground and background colors

Adobe Photoshop uses the foreground color, which appears in the top color selection box in the toolbox, to paint, fill, and stroke (paint the border of) selections. The background color, shown in the lower color selection box, is used for making gradient fills and for filling in the erased areas of an image. The default foreground color is black, and the default background color is white. (If you are viewing an alpha channel, the default foreground and background colors are white and black, respectively.)



### 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 222, and click OK.




To switch between the foreground and background colors, press X on the keyboard.

## Using the painting tools

The painting tools include the paintbrush tool, the airbrush tool, and the pencil tool. Each painting tool paints with the specified brush and tool pointer. For more information, see “Using the Brushes palette” on page 203 and “Using the tool pointers” on page 21.

To save time when working with painting tools, make sure that the Brushes/Options palette group and the Color/Swatches palette group are open on your desktop.

## Using the paintbrush tool

The paintbrush tool () lets you create soft strokes of color.


### To use the paintbrush tool:

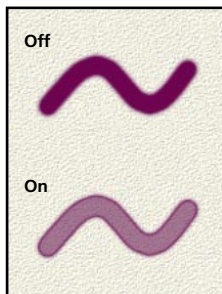
Select the paintbrush tool and drag in the image.




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 choose options for the paintbrush tool:

- 1 Double-click the paintbrush tool () in the toolbox to display its Options palette.
- 2 Choose a mode, as explained in “Selecting a blending mode” on page 208.
- 3 Drag the slider to set the opacity, as explained in “Specifying the opacity, pressure, or exposure” on page 206.
- 4 Select Fade to set a fade-out rate, as explained in “Specifying the paint fade-out rate” on page 207.
- 5 Select Wet Edges to paint with a watercolor effect. With this option selected, the paint builds up along the edges of the brush stroke.



## Using the airbrush tool

The airbrush tool () lets you apply gradual tones (including sprays of color) to an image. It simulates the effect produced by 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 determines how quickly the spray of paint is applied.


### To use the airbrush tool:

Select the airbrush tool and drag in the image. To build up color, hold down the mouse button without dragging.

### To choose options for the airbrush tool:

- 1 Double-click the airbrush tool in the toolbox to display its Options palette.
- 2 Choose a mode, as explained in “Selecting a blending mode” on page 208.
- 3 Drag the slider to set the pressure, as explained in “Specifying the opacity, pressure, or exposure” on page 206.
- 4 Select Fade to set a fade-out rate, as explained in “Specifying the paint fade-out rate” on page 207.

## Using the pencil tool

The pencil tool () creates hard-edged freehand lines and is most useful for bitmapped images. See page 202 for information on using the Auto Erase option with the pencil tool.

### To draw a freehand line:

Select the pencil tool and drag in the image.

### To choose options for the pencil tool:

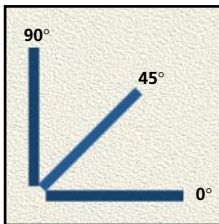
- 1 Double-click the pencil tool ( $\theta$ ) to display its Options palette.
- 2 Choose a mode, as explained in “Selecting a blending mode” on page 208.
- 3 Drag the slider to set the opacity, as explained in “Specifying the opacity, pressure, or exposure” on page 206.
- 4 Select Fade to set a fade-out rate, as explained in “Specifying the paint fade-out rate” on page 207.

## Using the line tool

The line tool ( $\backslash$ ) draws straight lines on an image. Line tool options let you specify the width of lines, set anti-aliasing, and create lines with arrowheads.

### To draw a line:

Select the line tool and drag in the image. To constrain the line angle to a multiple of 45°, hold down Shift as you drag.

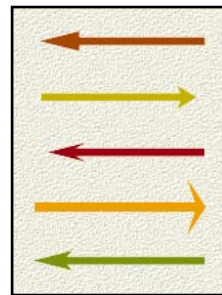


*Constraining angles when using the line tool*

### To choose options for the line tool:

- 1 Double-click the line tool in the toolbox to display its Options palette.

- 2 Choose a mode, as explained in “Selecting a blending mode” on page 208.
- 3 Drag the slider to set the opacity, as explained in “Specifying the opacity, pressure, or exposure” on page 206.
- 4 Enter the line width in pixels.
- 5 To draw anti-aliased lines, make sure that Anti-aliased is selected.
- 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:
  - Enter a value from 10 to 1000% of the line width for the width of the arrowhead.
  - Enter a value from 10 to 5000% of the line width for the length of the arrowhead.
  - Enter a value from -50 to +50% for the concavity of the arrowhead. 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*


## 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.

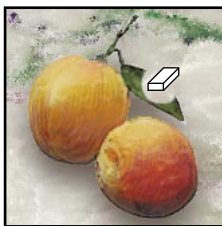
### Using the eraser tool

The eraser tool changes pixels in the image as you drag through them. You can choose to change the color and transparency of the affected pixels, or to revert the affected area to its previously saved version.

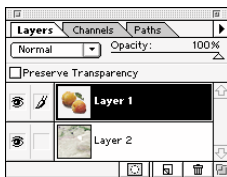
#### To use the eraser tool:

Select the eraser tool () and drag through the area you want to erase.

If you're working in the background, the pixels are changed to the background color. If you're working in a layer, the color is replaced by transparency.



*Erasing pixels from a layer exposes background*



#### To choose options for 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, Option-click (Macintosh) or Alt-click (Windows) the eraser tool, or press **E** on the keyboard.

3 Drag the slider to set the opacity or pressure, as explained in “Specifying the opacity, pressure, or exposure” on page 206.

4 Select Fade to set a fade-out rate, as explained in “Specifying the paint fade-out rate” on page 207.

**Note:** If you're using the paintbrush option, you can select *Wet Edges* to erase with a watercolor effect. With this option selected, the erased effect builds up along the edges of the brush stroke.


5 To erase to a saved version of the image, select Erase to Saved.



To use the eraser tool in Erase to Saved mode, hold down Option (Macintosh) or Alt (Windows) as you drag in the image.

6 To erase an entire layer to transparency or to erase a background to the background color, click Erase Layer. (If the image has no layers, this button becomes Erase Image.)

### 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:

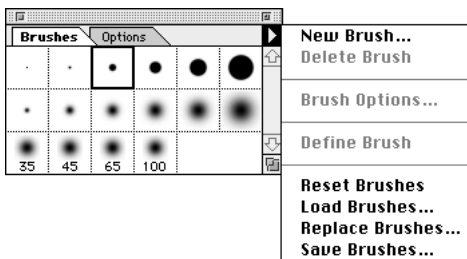
- 1 Double-click the pencil tool to display its Options palette.

- 2 Select Auto Erase.
- 3 Drag over the image.

If you drag 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 brushes you use for the painting and editing tools appear in the Brushes palette. Round brush shapes for the painting and editing tools are available in several sizes. Adobe Photoshop retains the brush settings for each painting and editing tool, so you can select a different default brush for each tool. The Brushes palette also contains commands for creating and deleting brushes, defining brush options, and saving and loading sets of brushes.



### Choosing a brush

You use the Brushes palette to choose a brush shape for any painting tool. When a brush is too large to fit in a square on the palette, it appears in a reduced size with a number that indicates the brush diameter in pixels.

#### To choose a brush:

- 1 Select the tool you want to use.
- 2 Choose Window > Show Brushes.
- 3 Click the brush you want to use.

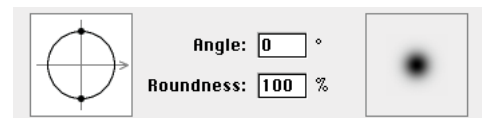
## Creating and deleting brushes

If the Brushes palette does not contain the brushes you need, you can create new brushes. New brushes are added at the bottom of the palette. If you find that you no longer use a brush, you can delete it from the Brushes palette.

#### 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. These boxes change to reflect the new brush as you enter brush options.



*Brush angle and roundness*

- 2 Set the brush options. (See “Setting brush options” on page 204 for a description of these options.)
- 3 Click OK.

### To delete a brush:

Do one of the following:

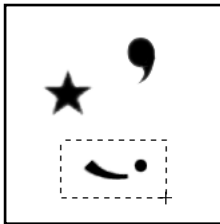
- Press Command (Macintosh) or Ctrl (Windows) (the pointer turns into scissors) and click the brush you want to delete.
- Click the brush in the Brushes palette and choose Delete Brush from the palette menu.

## Creating custom brushes

You can use part of an image to create a custom brush shape. If you want to define brushes with soft edges, select brush shapes composed of pixels with gray values.

### To create a custom brush shape:

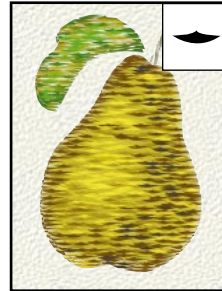
- 1 Select the part of the image you want to use as a custom brush. The brush shape can be up to 1000 pixels by 1000 pixels in size. To be most effective, the shape should appear on a solid white background.



- 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.

The Anti-aliased option is not available for large brushes.



*Pear painted with custom brush shown in inset*

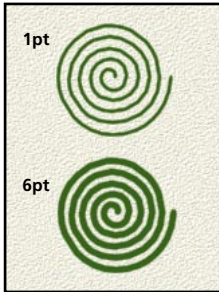
## Setting brush options

You can define a number of options for the default brushes and any brushes you create. Only the spacing option can be changed for custom brushes.

### To set brush options:

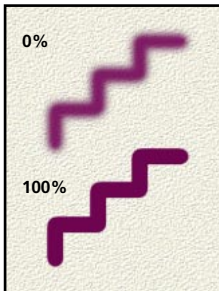
- 1 Do one of the following:
  - Double-click the brush you want to edit.
  - Select the brush in the Brushes palette you want to edit, and choose Brush Options from the palette menu.
- 2 Set the options as described in the following sections. Then click OK.

**Diameter** Controls the size of the brush. Enter a value in pixels or drag the slider.



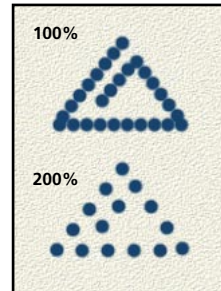
*Brush strokes with different diameter values*

**Hardness** Controls the size of the hard center of the brush. Type a number or use the slider to enter a value that is a percentage of the brush diameter.



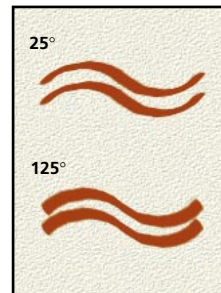
*Brush strokes with different hardness values*

**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.*

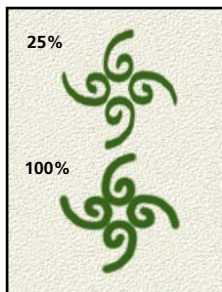
**Angle** Specifies the angle by which an elliptical brush's long axis is offset from horizontal. Type a value in degrees, or drag the horizontal axis in the left preview box to set a new angle.



*Angled brushes create a chiseled stroke.*

**Roundness** Specifies the ratio between the brush's short and long axes to determine its shape. 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. However, to make the palette more manageable and to group related or special brushes, you might want to create your own sets of brushes. A number of files containing different brush sets are included in the Adobe Photoshop program folder.

#### **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 the 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.

When you exit Adobe Photoshop, the current Brushes palette is saved in the Preferences file.

## **Specifying painting and editing options**

You specify options for a painting or editing tool by using the Options palette for that tool. See page 24 for more information on using the Options palette.

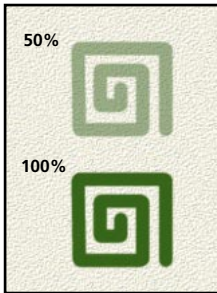
### **Specifying the opacity, pressure, or exposure**

The slider in the Options palette lets you specify the opacity, pressure, or exposure for various painting and editing tools. You can determine the opacity used by the gradient fill, pencil, paintbrush, and rubber stamp tools. You can adjust the pressure of action applied by the airbrush, smudge, blur, sharpen, and sponge tools. You can also adjust the amount of exposure used by the dodge and burn tools.

Opacity can range from 1 to 100%. To use transparent paint, specify a low percentage value. To use more opaque paint, specify a high value.

Pressure and exposure can range from 1 to 100%. To create a strong effect, specify a high percentage value. To create a weaker effect, specify a low value.





*Painting with various opacity settings*



To set the opacity, pressure, or exposure for any selected painting or editing tool in multiples of 10%, press a number from 0 through 9. For example, press 5 to choose 50%. Press 0 to choose 100%. To set an exact opacity or pressure, quickly type the desired value on the keyboard.

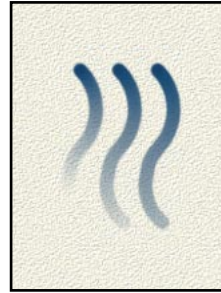
### Specifying the paint fade-out rate

You can specify the rate at which the pencil, paint brush, airbrush, and eraser strokes fade out to simulate actual brush strokes.

#### To set a fade-out rate:

- 1 Select Fade in the tool's Options palette.
- 2 Enter a value for the number of steps of the fade.  
The steps determine the rate of the fade from the beginning to the end of the stroke. 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.
- 3 Choose one of the following options:

- 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 supports pressure-sensitive digitizing tablets such as the Wacom® and Calcomp tablets. If the Control Panel software for your tablet is installed, you can specify the type of effect that results from varying the stylus pressure. These stylus pressure options affect the pencil, paintbrush, airbrush, eraser, rubber stamp, smudge, blur, sharpen, dodge, burn, and sponge tools.

#### To set the effect of different stylus pressures:

Display the tool's Options palette, and select one of the following options:

- Size if you want increasing pressure to result in a bigger brush stroke.

- Opacity/Pressure/Exposure if you want increasing pressure to result in more opaque paint or a more intense effect.

**Note:** The highest pressure of your stylus may not reach 100%. This problem is due to the driver software and is not caused by the Adobe Photoshop program. If you experience this problem, contact your tablet vendor for more information.

## Selecting a blending mode

You can control which pixels are affected by a painting or editing tool by choosing a blending mode in the tool's Options palette. When using blending modes, it's helpful to think of the effects in terms of the following three colors:

- 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. See the illustrations at the end of the section for examples of each mode.

**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 that contain transparency. When you apply paint, it appears that you're painting on the back of the 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 paintbucket tool (🪣), the Fill command, and the Stroke command. You must be in a layer 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 painting over an area with bleach.

**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.

**Exclusion** Creates an effect similar to but softer than the Difference mode. Blending with white inverts the base color values. Blending with black produces no change.

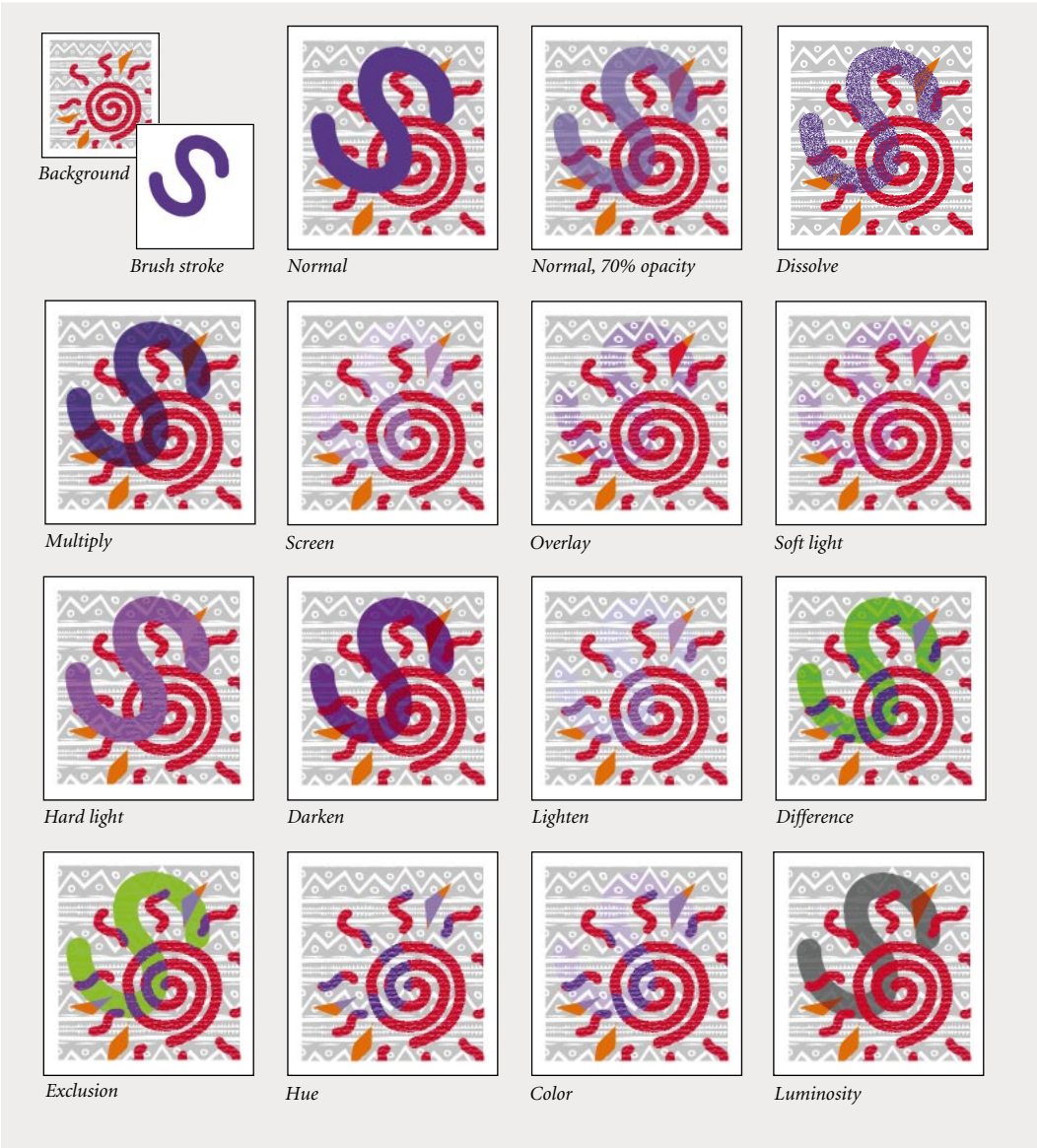
**Hue** Creates a result color with the luminance and saturation of the base color and the hue of the blend color.

**Saturation** Creates a result color with the luminance and hue of the base color and the saturation of the blend color. If you paint with this mode in an area with a saturation of zero (gray), there is 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.

**BLENDING MODES AND OPACITY** The blending modes let you control how pixels in an image are affected by 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 208.



## Using the paint bucket tool

The paint bucket tool () fills adjacent pixels that are similar in color value to the pixels you click. The paint bucket options let you specify a mode and opacity, indicate the color range, or *tolerance*, of pixels to be filled, and choose whether to fill with the foreground color or a pattern. You can also choose to create smooth edges for the filled selection.

**Note:** *The paint bucket tool cannot be used with images in Bitmap or index color mode.*

If you're working on a layer and do not want to fill transparent areas, make sure that Preserve Transparency is selected in the Layers palette. See "Preserving a layer's transparency" on page 255.

### To use the paintbucket tool:

Select the paint bucket tool and then 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.

### To choose options for the paint bucket tool:


- 1 Double-click the paint bucket tool to display its Options palette.
- 2 Choose a mode, as explained in "Selecting a blending mode" on page 208.
- 3 Drag the slider to set the opacity, as explained in "Specifying the opacity, pressure, or exposure" on page 206.
- 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 that have

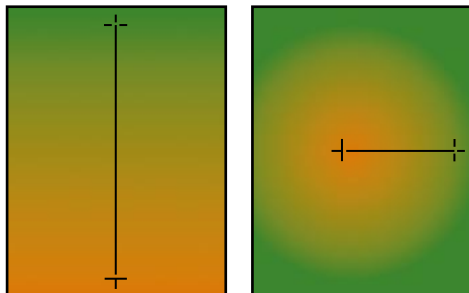
color values very similar to the pixel you click. A high tolerance fills pixels within a broader range of colors.

- 5 To smooth the edges of the filled selection, select Anti-aliased. See "Using the Anti-aliased option" on page 154 for more information on anti-aliasing.
- 6 To fill the selection with the foreground color or with a pattern, choose an option for Contents. See "Filling a selection with a pattern" on page 216 for information on defining and using patterns.
- 7 To fill pixels using merged data from all visible layers, select Sample Merged. This option lets you fill pixels from any visible layer, as long as the pixels fall within the specified tolerance. Deselecting Sample Merged fills only the pixels on the active layer.

## Using the gradient tool

The gradient tool () lets you create a gradual transition between two or more colors. You can choose from the existing gradient fills in the Gradient Tool Options palette, or you can create and edit your own gradient fills. If you don't select a specific part of the image to fill, the gradient tool applies the fill to the entire active layer.

A gradient fill can be applied as either a radial or a linear fill. A linear gradient fill creates a gradient from one point to another in a straight line. A radial fill creates a gradient fill from a center point outward in all directions.



Linear fill

Radial fill

**Note:** The gradient tool cannot be used with bitmap or indexed-color images.

#### To apply a gradient fill:

- 1 Select the part of the image you want to fill. If you do not make a selection, the gradient fill is applied to the entire active layer.
- 2 Double-click the gradient tool (▀) in the toolbox to display its Options palette.
- 3 Choose a mode, as explained in “Selecting a blending mode” on page 208.
- 4 Drag the slider to set the opacity, as explained in “Specifying the opacity, pressure, or exposure” on page 206.
- 5 If you want to turn off the transparency mask for the gradient fill, deselect Mask. For more information, see “Editing the gradient transparency mask” on page 214.

6 If you want to create a smoother blend with less banding, select Dither.

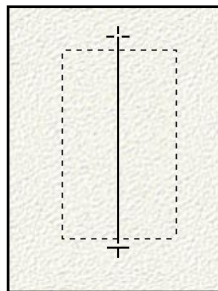
7 For Type, choose one of the following options:

- Linear to create a linear fill.
- Radial to create a radial fill.

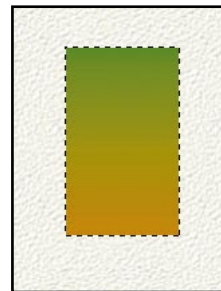
8 Select a gradient fill from the list.

9 Position the pointer in the image where you want to set the starting point of the gradient, and drag to define the length and direction of a linear fill or to define the radius of a radial fill. To constrain the line angle to a multiple of 45°, hold down Shift as you drag.

10 Release the mouse button where you want to set the ending point of the gradient.



Drag to create linear gradient

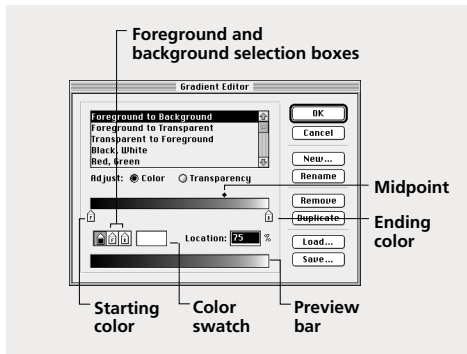


Result

If you're creating a linear fill, the portion of the layer or selection before the starting point is filled with the starting color; the portion after the ending point is filled with the ending color. If you're creating a radial fill, the ending color fills the portion after the ending point.

## Creating and editing gradient fills

The Gradient Editor dialog box lets you define the starting and ending points of a new gradient or modify an existing gradient. You can also add intermediate colors to a gradient to create a blend between more than two colors.



### To create or edit a gradient:

- 1 Double-click the 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 gradient, select the existing gradient in the list and click Duplicate. If you want to name the copied gradient, hold down Option (Macintosh) or Alt (Windows) 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 square under the gradient bar. The triangle above the square turns black, indicating that the starting color is being edited.

5 To choose a color, do one of the following:

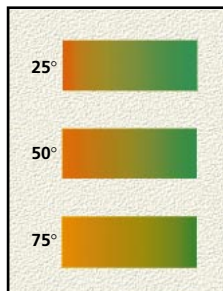
- Click the color swatch below the gradient bar. Choose a color as described in “Using the Adobe Photoshop Color Picker” on page 222, and click OK.
- Click the foreground selection box to use the current foreground color.
- Click the background selection box to use the current background color.
- Position 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 square 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 square left or right to the location you want.
- Click the corresponding square, 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% places the point at the far right end of the gradient bar.

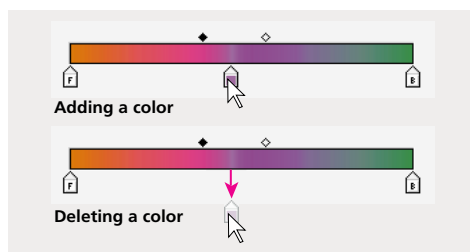
8 To adjust the location of the midpoint (where the gradient displays an even mix of the starting and ending colors), drag the diamond above the gradient bar to the left or right, or click the diamond and enter a value for Location.



9 Click OK to add the new gradient fill to the list or update the edited gradient fill.

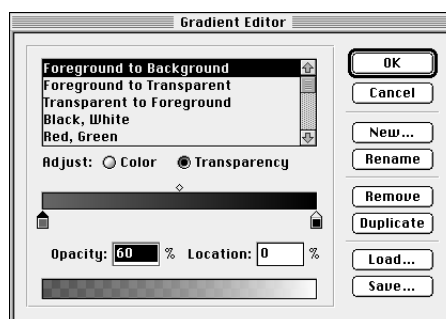
#### To add intermediate colors to a gradient:

In the Gradient Editor dialog box, click below the gradient bar to define another square. You can 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 square down and off the gradient bar.



## Editing the gradient transparency mask

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%. You can turn off the mask by deselecting Mask in the Gradient Options palette.



#### To edit the gradient transparency mask:

- 1 Double-click the gradient tool (■) to display its Options palette and click Edit.
- 2 For Adjust, select Transparency.
- 3 To adjust the starting opacity, click the left square under the transparency gradient bar.
- 4 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.



**5** To adjust the opacity of the endpoint, click the right square under the transparency gradient bar. Then set the opacity as explained in the previous step.

**6** To adjust the location of the starting or ending opacity, do one of the following:

- Drag the corresponding square to the left or right.
- Select the corresponding square and enter a value for Location.

**7** 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.

**8** To add an intermediate opacity to the mask, click under the transparency gradient bar to define a new square. You can then adjust and move this opacity as you would for a starting or ending opacity. To remove an intermediate opacity, drag its square down and off the gradient bar.

**9** 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 the current list of gradients in a separate file for later use, click Save in the Gradient Editor dialog box.
- To return to the default gradient list, choose Reset Tool from the Gradient Tool Options palette menu. You can either replace the current list or append the default gradients to the current list.

## Filling a selection or layer

The Fill command lets you fill a selection or a layer with a color, a saved portion of an image, or a pattern. You can also use keyboard shortcuts to fill a selection quickly.

### To fill a selection or layer using shortcuts:

**1** Select the area or layer you want to fill.

**2** Do one of the following:

- To fill with the foreground color, press Option+Delete (Macintosh) or Alt+Backspace (Windows).
- To apply a foreground color fill only to the areas that contain pixels, press Option+Shift+Delete (Macintosh) or Alt+Shift+Backspace (Windows). This operation preserves the transparency of the layer.
- To fill with the background color, press Command+Delete (Macintosh) or Ctrl+Backspace (Windows).

- To apply a background color fill only to the areas that contain pixels, press Command+Shift+Delete (Macintosh) or Ctrl+Shift+Backspace (Windows).

**To fill a selection or a layer:**

- 1 Select the area you want to fill. To fill an entire layer, select the layer in the Layers palette.
- 2 Choose Edit > Fill to fill the selection or layer.



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To display the Fill dialog box, press Shift+Delete (Macintosh) or Shift+Backspace (Windows).

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- 3 For Use, choose one of the following options:

- 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 section.
- Saved to fill the selection with a saved version of the image. The Saved option restores the selected area of the image to its previously saved state.
- Snapshot to fill the selection with the contents of the snapshot buffer. See “From Snapshot Option” on page 190 for more information about taking and using snapshots.

- 4 Choose a mode, as explained in “Selecting a blending mode” on page 208.

- 5 Set the opacity, as explained in “Specifying the opacity, pressure, or exposure” on page 206.

- 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 255 for more information.

- 7 Click OK to fill the selection.

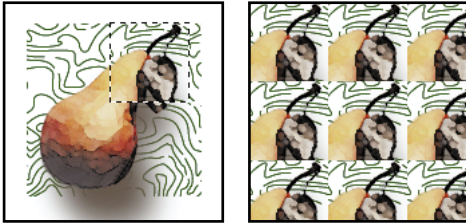
**Filling a selection with a pattern**

You can also use the Fill command to fill selected areas of an image with a pattern. Before you fill a selection with a pattern, you must define the pattern using the Edit > Define Pattern command. Each new pattern you define replaces the current pattern. If you want to reuse the patterns you create, save a file of pattern swatches; you can then use these swatches to define patterns easily.

**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.



## Using PostScript patterns to fill a selection

The Adobe Photoshop software contains a folder of PostScript patterns that you can use to fill selections. Each file in this folder contains a single pattern in the Adobe Illustrator format; you can scale and render these patterns at any resolution.

### To use a pattern from the PostScript patterns folder:

- 1 Choose File > Open.
- 2 Select the pattern file you want to use, and click Open.
- 3 Select the rasterizing options you want to use. See “Importing Adobe Illustrator files” on page 54 for information on 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.

## Stroking a selection

The Stroke command uses the foreground color to paint a border around a selection or around the edge of a layer. As with the Fill command, you can specify the opacity and blending mode of the fill.

### To stroke a selection or layer:

- 1 Select the area or layer you want to stroke.
- 2 Choose Edit > Stroke.
- 3 Specify the width and location of the border. Values for the width can range from 1 to 16 pixels.
- 4 Set the opacity, as explained in “Specifying the opacity, pressure, or exposure” on page 206.
- 5 Choose a mode, as explained in “Selecting a blending mode” on page 208.
- 6 If you’re working in a layer and want to stroke only areas containing pixel values, select the Preserve Transparency option. See “Preserving a layer’s transparency” on page 255 for more information.
- 7 Click OK to stroke the selection or layer.



*Selected area*



*Selection stroked: 10 pixels*

## Using the eyedropper tool

The eyedropper tool (👉) lets you sample color from an area of 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.)

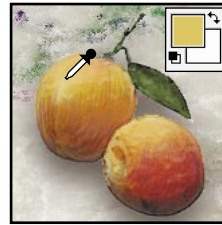
You can also specify the sample area that the eyedropper tool reads. For example, you can set the eyedropper to sample the color values of a 3-by-3-screen-pixel area under the pointer. Modifying the sample size of the eyedropper affects the color readouts displayed in the Info Palette.

### To select the foreground or background color using the eyedropper:


- 1 Click the eyedropper tool (👉).
- 2 Do one of the following:
  - To select a new foreground color from an image, click the color you want.
  - To select a new background color from an image, Option-click (Macintosh) or Alt-click (Windows) the color you want.

If you drag the eyedropper tool, the foreground color selection box changes dynamically as you drag. Option-drag (Macintosh) or Alt-drag (Win-

dows) to activate the background color selection box. Release the mouse button to pick the new color.




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 To use the eyedropper tool temporarily while using any painting tool, hold down Option (Macintosh) or Alt (Windows).

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### To change the sample size of the eyedropper:

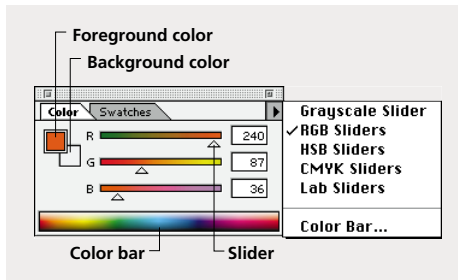
- 1 Double-click the eyedropper tool to display the Eyedropper Options palette.
- 2 Choose one of the following options from the Sample Size menu:
  - Point Sample to read the precise value of the pixel you click.
  - 3 by 3 Average or 5 by 5 Average to read the average value of the specified number of screen 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.

### To edit the foreground or background color using the Color palette:

- 1 Choose Window > Show Color.



- 2 From the Color palette menu, choose the color model you want to use for color readout values. See “Setting color readout values” on page 220 for a discussion of these models.

- 3 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.

- 4 To specify a new color, do one of the following:

- 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 222, and click OK.

**Note:** An exclamation point inside a triangle in the Colors palette indicates that you have chosen 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 CMYK equivalent to substitute it for the out-of-gamut color. See “Identifying out-of-gamut colors” on page 111 for more information.

### Choosing a color from the color bar

The color bar along the bottom of the Color palette lets you quickly choose a background or foreground color from a specified spectrum of colors.

#### 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 option 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.

### Setting color readout values

The Info palette, the Color palette, and the Adobe Photoshop Color Picker let you display color values using a number of different color models. See “Color modes and models” on page 65 for more information on these color models.

- **Grayscale:** Lets you choose a color with a gray value from 0% to 100%.
- **RGB:** Lets you choose a color with red, green, and blue values ranging from 0 to 255.
- **HSB:** Lets you choose a color with a hue from 0° to 360° and with saturation and brightness values from 0 to 100%. The angle for hue is defined as an angle relative to pure red on the color wheel. See “HSB Model” on page 65.
- **CMYK:** Lets you choose a color with cyan, magenta, yellow, and black values ranging from 0% to 100%.
- **Lab:** Lets you choose a color with a lightness value (*L*) from 0 to 100, and values along the *a* axis (green to magenta) and *b* axis (blue to yellow).

## Using the Swatches palette

The Swatches palette contains the current color palette. You can choose a foreground or background color from the swatches, or you can add or delete colors to create a custom palette. You can also save a set of swatches and reload them for use in another image.

### 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, Option-click (Macintosh) or Alt-click (Windows) a color in the Swatches palette.

### Adding or deleting a color

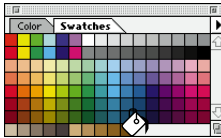
You can add, delete, and insert colors in the Swatches palette to create a customized palette. Swatches can be added to the blank areas in the palette.

### 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.

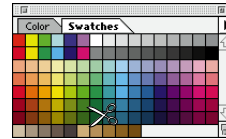


### To replace or insert a color in the Swatches palette:

- 1 Use the eyedropper tool (👉), the Color palette, or the Color Picker to select the color you want to add.
- 2 Do one of the following:
  - 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+Option (Macintosh) or Shift+Alt (Windows) and click a swatch.

### To delete a color from the Swatches palette:

Hold down Command (Macintosh) or Ctrl (Windows), 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 Do one of the following:
  - 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.

## Saving, loading, and replacing swatches

The Swatches palette can hold as many colors as you want. However, to make the palette more manageable and to group related or special colors, you might want to create your own Swatches palettes. A number of files containing different swatch sets are included in the Adobe Photoshop program folder.

### To save and use custom swatch sets:

Choose one of the following commands 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.
- 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.

When you exit the program, the current Swatches palette is saved in the Adobe Photoshop preferences file.

## Using the Adobe Photoshop Color Picker

The Adobe Photoshop Color Picker lets you select the foreground or background color from a color spectrum or to define color components for a color numerically. In addition, you can select colors based on the HSB, RGB, Lab, and CMYK color models and choose from several custom color systems. By default, the program uses the Adobe Photoshop Color Picker.

### To display the Adobe Photoshop Color Picker:

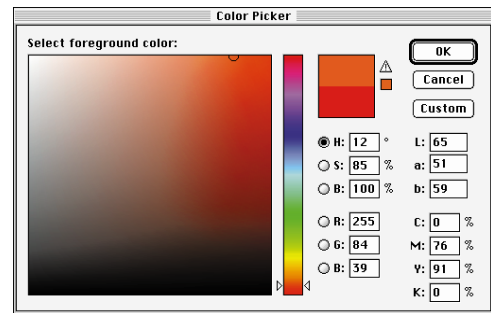
Do one of the following:

- Click the foreground or background color selection box in the toolbox.
- Click the active color selection box in the Color palette.

### To return to the Adobe Photoshop Color Picker after using another color picker:

- 1 Choose File > Preferences > General.

- 2 For Color Picker, choose Photoshop.



## Specifying a color using the color field and color slider

With the HSB and RGB color models, 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 and one on the vertical axis.

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 and the values for green along its vertical axis.

### To choose a color:

Do one of the following:

- 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 in 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.

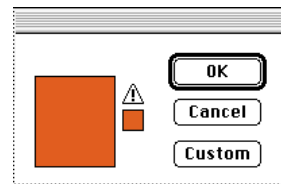
### To specify colors using numeric values:

Do one of the following:

- In the CMYK color model, specify each component value as a percentage of cyan, magenta, yellow, and black.
- In the RGB color model (this is the model your monitor uses), specify component values from 0 to 255 (0 is black, and 255 is the pure color).
- In the HSB color model, specify saturation and brightness as percentages; and 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 65 for information on the color wheel.)
- In the Lab model, 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 and HSB 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.



*Color Picker out-of-gamut display*

Printable colors are determined by the printing values you enter for the selected ink set in the Printing Inks Setup and Separations Setup dialog boxes.

### 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.

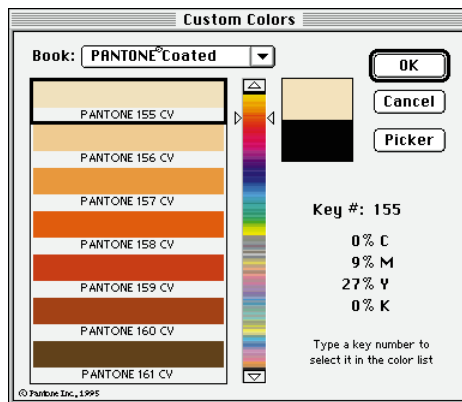
It's important to understand that although you can choose custom colors in Photoshop, custom colors are printed to their equivalent CMYK plates in every mode except Duotone. See "Printing and previewing spot colors" on page 343 for information on how to print true spot color plates in Photoshop.

To ensure that the final printed output is the color you want, choose your custom color based on a printed swatch for the color. Manufacturers recommend that you get a new swatch book each year to compensate for fading inks and other damage. For information on color systems and how to obtain color swatch books, see "Choosing a color system" on this page.

#### To specify the CMYK equivalents of 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 the color system you want to use.

- 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 Picker to return to the Color Picker. The Adobe Photoshop Color Picker appears with the current color equivalent selected.

**Note:** In Adobe Photoshop, custom colors are printed to their equivalent CMYK plates in every mode except Duotone.

## Choosing a color system

The following is a description of each color system supported by the Adobe Photoshop Color Picker.

**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.

When you're using PANTONE colors in images that you plan to export to other applications, such as Adobe Illustrator, Adobe PageMaker®, or QuarkXPress, choose File > Preferences > General and make sure that Short PANTONE Names is selected. This ensures that the PANTONE color names will match the naming conventions used in the other applications.

You can select from PANTONE Coated, PANTONE Uncoated, PANTONE Process, and PANTONE ProSim custom colors. For more information, contact PANTONE, Inc. in Carlstadt, New Jersey, U.S.A.

**TRUMATCH** Provides predictable CMYK color matching with over 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 image-setters. In addition, four-color grays using different hues are included. For more information on the TRUMATCH system, 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 is available from FOCOLTONE. For more information, contact FOCOLTONE INTERNATIONAL, Ltd. in Stafford, United Kingdom.

**TOYO Color Finder 1050** Consists of over 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. For more information, 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. For more information, contact the Newspaper Association of America in Reston, Virginia, U.S.A.

**DIC Color Guide** Commonly used for printing projects in Japan. For more information, contact Dainippon Ink and Chemicals, Inc. in Tokyo, Japan.

## Using the Apple Color Picker

On the Macintosh, you can use the Apple Color Picker (also known as the color wheel) to change the foreground or background color. The Apple Color Picker lets you select colors based on the HSB or the RGB color model, but it does not alert you to nonprintable colors.

This section briefly describes how to use the Apple Color Picker. For more information, see your Macintosh 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 Enter values for Hue, Saturation, and Lightness, or click the color you want in the color wheel.

To select colors based on the RGB model, click Apple RGB at the left of the dialog box and enter values for Red, Blue, and Green.

## Using the Windows Color Picker

In Windows, you can use the Windows Color Picker to change the foreground or background color. 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.

This section briefly describes how to use the Windows Color Picker. For more information, see your Windows documentation.

### 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.
- 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 bring up 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.

## Using plug-in color pickers

In addition to the default Adobe Photoshop Color Picker and the Apple or Windows Color Picker, you can install and use plug-in color pickers. Any plug-in color pickers you install appear under Color Picker when you choose File > Preferences > General. For information on installing and using a plug-in color picker, see the documentation that came with the plug-in.

# Chapter 10: Using Channels and Masks

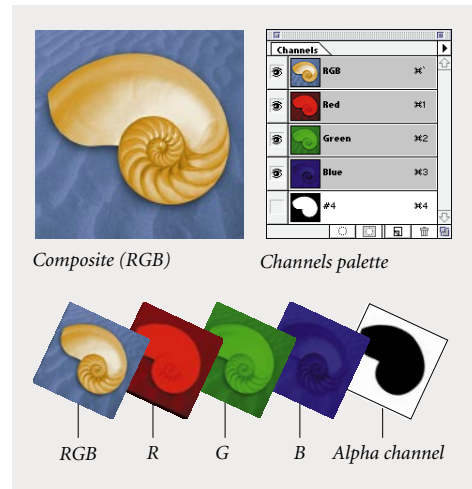
**A**dobe Photoshop uses channels in two ways: to store color information about an image and to store selections. Color information channels are automatically created when you open a new image. The number of color information channels depends on the color mode of the image. See “About color channels” on page 71 for more information about the color channels created by Adobe Photoshop.

You can also create additional channels (sometimes called *alpha channels*) in an Adobe Photoshop image. You use alpha channels to create and store masks, which let you isolate and protect parts of an image. Other types of masks in Adobe Photoshop include quick masks and layer masks.

## About channels

Every Adobe Photoshop image contains a number of color information channels based on the color mode. For example, an RGB image has four default channels: a red channel to store red information, a green channel to store green information, a blue channel to store blue information, and

a composite channel to display all the color information. If an image has multiple layers, each layer has its own set of color channels.



The file size required for a channel depends on the pixel information in the channel. For example, if your image has no alpha channels, adding a duplicate of a color channel to an RGB image increases the file size by about one-third; adding a duplicate of a color channel to a CMYK image increases the file size by about one-fourth. Each alpha channel also adds to the file size; however, if you save a file in the TIFF format using the compressed option or in the Photoshop format, alpha channels used as masks may require far less storage space because Adobe Photoshop compresses the alpha channel

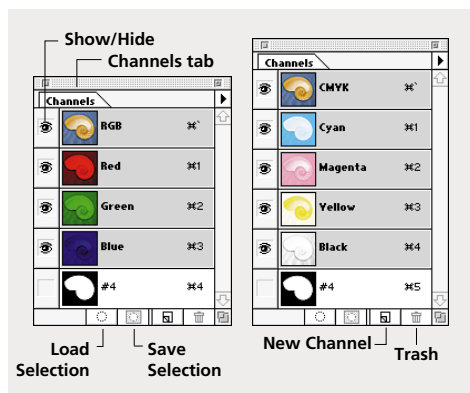
information when the file is saved (see “Saving and managing channels” on page 232). To determine the size of a file with its alpha channels, save the file and look at the file size on the disk.

## Using the Channels palette

When working with channels, you use the Channels palette to create new channels; duplicate, delete, hide, and show individual channels; select channels and rearrange their order; and monitor the effects of editing on alpha channels.

### To display the Channels palette:

Choose Windows > Show Channels.



The Channels palette lists all channels in the image. RGB, CMYK, and Lab images each also include a composite channel, which is listed first. The individual color channels appear below the composite channel. Alpha channels appear at the bottom of the list. A thumbnail of the channel contents appears to the left of the channel name. This

thumbnail is automatically updated as you edit the channel. Use the scroll bars or resize the palette to see additional channels.

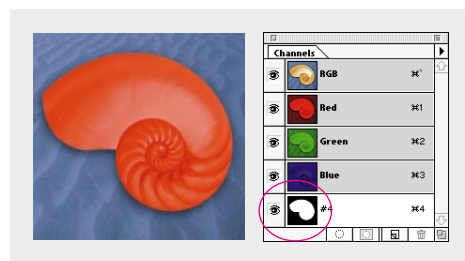
### To select a channel:

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 channel or channels.

**Note:** You cannot edit the transparent areas of an individual color information channel in a single layer. For more information on working with layers, see Chapter 11, “Using Layers.”

## Showing and hiding channels

When a channel is visible, an eye icon appears to the left of the channel in the Channels palette. You can view any combination of individual color channels in the image. You may also find it useful to view an alpha channel and the composite channel together, in order to see how changes made in the alpha channel relate to the entire image.



Alpha channel visible in image and Channels palette

### To show or hide a channel:

In the Channels palette, click in the eye column next to the channel to show or hide that channel. (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.

By default, individual channels are displayed in grayscale. 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.

If you display an alpha channel at the same time as color channels, the alpha channel appears as a color overlay. To change the color of this overlay or set other alpha channel options, see “Changing alpha channel options” on page 240.

### To see the individual channels in color:

- 1 Choose File > Preferences > Display & Cursors.
- 2 Select Color Channels in Color and click OK.

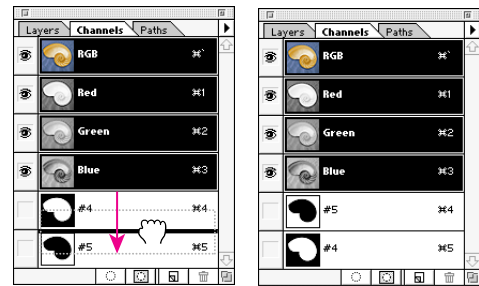
## Changing the order of alpha channels

When you have selections stored in several alpha channels in an image, you might want to change the order of the channels to view the channels more easily. You can change the order of any alpha channels you add to an image; however, the color information channels created by Adobe Photo-

shop always appear at the top of the Channels palette. For more information, see “Using alpha channels” on page 237.

### To change the order of alpha channels:

In the Channels palette, drag the channel up or down. When the heavy black line appears in the position you want, release the mouse button.



Drag channel in palette...

...and release to set new position.

## Hiding and resizing channel thumbnails

You can change the size of or turn off the thumbnails displayed in the Channels palette. Using thumbnails is the most convenient way of tracking channel contents; however, turning off the display of thumbnails can improve performance. Using a smaller thumbnail size reduces the space required by the Channels palette and can be helpful when you're working on smaller monitors.

### To hide or change the size of channel thumbnails:

- 1 Choose Palette Options from the Channels palette menu.
- 2 Click a thumbnail size, or click None to turn off the display of thumbnails.
- 3 Click OK.

## Duplicating channels

You can duplicate any channel in the same image, to a new image, or to any other open image. (You cannot, however, duplicate a channel to a Bitmap-mode image.) You may want to duplicate a channel in the same image to keep a backup if you're going to perform manipulations on a channel. You may want to duplicate alpha channels to a new image to keep a library of selections that you can load into the current image one at a time. This helps you keep the size of the file smaller to improve performance.

### To duplicate a channel using the Duplicate command:

- 1 In the Channels palette, select the channel you want to duplicate.
- 2 Choose Duplicate Channel from the Channels palette menu.
- 3 Type a name for the duplicate channel.
- 4 For Document, choose a destination. Only images with the same pixel dimensions as the current image are available. You can also choose New to copy the channel to a new image. If you choose New, type a name for the new image. The New option creates a single-channel grayscale 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 Do one of the following:
  - To duplicate a channel into its original image, drag the channel in the Channels palette 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 from the Channels palette into the destination image window.

## Saving and managing channels

As long as you save a file in a format that supports the image's color mode, the color channels will be preserved. Alpha channels, on the other hand, are automatically preserved only when you save a file in the Adobe Photoshop, Adobe Photoshop 2.0 (Macintosh only), TIFF, or Raw formats. Saving in other formats may cause channel information to be discarded. See "About file formats" on page 318 for more information.

In addition, you can create a separate new image for each channel of an original image, and you can merge channels from separate images into a single image.



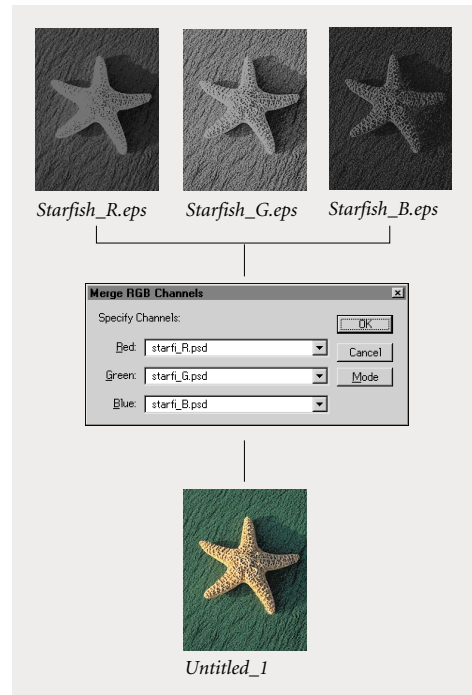
## Splitting channels into separate images

You can split the various channels that make up an image into separate images by using the Split Channels command in the Channels palette menu. When you choose Split Channels, Adobe Photoshop closes the original file and places each channel into a separate grayscale image window. The title bar of each window reflects the original image name along with the channel name (Macintosh) or abbreviation (Windows). Any changes you've made since you last saved are reflected in the new images but are lost in the original image.

**Note:** You can split only flattened images. See “Flattening all layers” on page 271 for more information.

## Merging channels

You can combine channels to form a single image. For example, 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 channels of a color image that was scanned in this way and save the image as a single, color image.



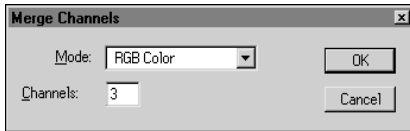
The images you want to merge must be in Grayscale mode, must have the same dimensions (in pixels), and must be open. In addition, the number of grayscale images you have open determines the available color modes into which you can merge channels. For example, you can't merge the split channels from an RGB image into a CMYK

image, because a CMYK image requires four channels and an RGB image contains only three channels.

**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 that contain the channels you want to merge.
- 2 Make one of the images active.
- 3 Choose Merge Channels from the Channels palette menu.

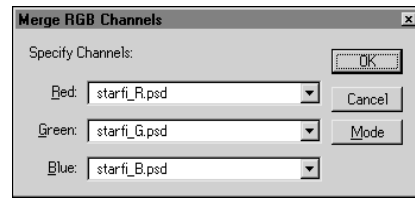


4 For Mode, choose the color mode you want to create. Image types that aren't available are dimmed. The number of channels appropriate for the selected image type appears in the Channels text box.

5 If necessary, enter a number in the Channels text box.

If you enter a number that is incompatible with the selected image type, the Multichannel image type is automatically selected. This creates a grayscale image, and all color information is lost.

6 Click OK.



7 For each channel, make sure the image you want is selected. If you change your mind and want to select a different image type, click Mode to return to the Merge Channels dialog box.

8 When you have finished selecting the channels, click OK. If you are merging into a multichannel image, click Next, and repeat the selection process for each channel in the image.

Adobe Photoshop merges the selected channels into a new image of the specified type and closes the images containing the channels that were merged without saving them. The new image appears in an untitled window.

## Using masks

You use a mask to isolate an area that you want to protect from change while you apply color changes, filters, or other effects to the rest of the image. Masks are closely related to selection areas. When you select part of an image, the area that is not selected is “masked” or protected from editing. You can also create a semitransparent mask that enables you to partially affect an area of an image.

In our first example, we used a mask to protect the background as we changed the color of the starfish. In the second example, we used a mask to

protect the starfish as we changed the background color. In the third example, we created a semi-transparent mask on the starfish; then we changed the color of the background and part of the starfish.



Adobe Photoshop provides three ways to create masks:

- Quick Mask mode lets you create and view a temporary mask for an image. Temporary masks are useful when you don't want to save the mask for later use. See “Using Quick Mask mode” on page 236 for more information.
- Alpha channels let you save and load selections to be used as masks. Alpha channels appear in the Channels palette. See “Using alpha channels” on page 237 for more information.
- Layer masks let you control how different areas of a layer are covered or revealed. By using layer masks in conjunction with layers, you can create a variety of visual effects. See “Using layer masks” on page 262 for more information.

## Editing masks

Quick masks in Quick Mask mode and alpha channel masks appear as 8-bit grayscale channels in the Channels palette. As a result, foreground and background colors default to grayscale values when the mask is selected in the Channels palette.



*Alpha channel in image*



*Alpha channel in palette*

If the Masked Areas option (the default) is selected in the Quick Mask Options or Channel Options dialog box, unselected areas in an alpha channel are black (opaque), and selected areas are white (transparent). Gray areas represent any areas within a feather radius or within an anti-aliased range; these areas are only partially affected by modifications to the image. Painting with black decreases the selected area so that more area is protected by the mask. Painting with white adds to the selected area so less area is protected by the mask. Painting with gray creates a semitransparent mask.

If the Selected Areas option is selected in the Quick Mask Options or Channel Options dialog box, unselected areas in the channel are white (transparent) and selected areas are black (opaque). Editing with the paint tools is reversed; that is, painting with black adds to the selected area so

more area is unprotected, and painting with white subtracts from the selected area so more area is protected.

For information on these options, see “Changing alpha channel options” on page 240.

## Using Quick Mask mode

Quick Mask mode lets you view a mask and the image simultaneously. Color differentiates the protected and unprotected areas. Quick Mask mode is useful for creating and editing temporary masks. You can start with a selected area and then use Quick Mask mode to add to or subtract from it to make the mask. Or you can create the mask entirely in Quick Mask mode. Once you leave Quick Mask mode, the unprotected areas become a selection.

### 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.



*Selected area*



*Quick Mask mode applied*

A color overlay (similar to a piece of rubylith) covers the protected area, which consists of the area outside the selection (the unprotected area). By default, Quick Mask mode colors the protected area using a red, 50% opaque overlay.

When you create a quick mask, Adobe Photoshop adds a temporary Quick Mask channel to the Channels palette to indicate that you are working in Quick Mask mode; however, you do all mask editing in the image window.

- 3 To edit the mask, select a painting tool from the toolbox, and paint in the image window.

By default, painting with black increases the masked area and subtracts from the selection so that more of the image is protected. Painting with white eliminates masked areas and adds to the selection so that more of the image can be edited. Painting with gray or another color creates a semi-transparent mask.



*Quick Mask*



*Editing with paintbrush tool*

- 4 Click the Standard mode button (◼) in the toolbox to turn off the quick mask and return to your original image. The unprotected area of the quick mask is now surrounded by a selection border.

- 5 Apply the desired changes to the image. Changes affect only the selected area.



*Edited mask*



*Color changes applied*

- 6 Choose **Select > None** to deselect the selection or save the selection as explained on page 239.

#### To change the Quick Mask options:

- 1 Double-click the Quick Mask mode button (◼) in the toolbox.
- 2 Choose one of the following display options:
  - **Masked Areas** to color only the protected areas. This default option colors the areas outside the selection.
  - **Selected Areas** to color only the selected, or unprotected, areas. When this option is selected, all colored areas can be edited.



To toggle between the Masked Areas and Selected Areas options for quick masks, Option-click (Macintosh) or Alt-click (Windows) the Quick Mask mode button.

- 3 To choose a different color for the mask, click the color swatch and choose a new color, as explained in “Using the Adobe Photoshop Color Picker” on page 222. Then click OK.

- 4 Enter an Opacity value for the mask color. Use this setting to change the transparency of the mask color. This setting controls only the mask’s appearance and has no effect on how much of the underlying area is actually protected.



*Quick Mask opacity: 50%*



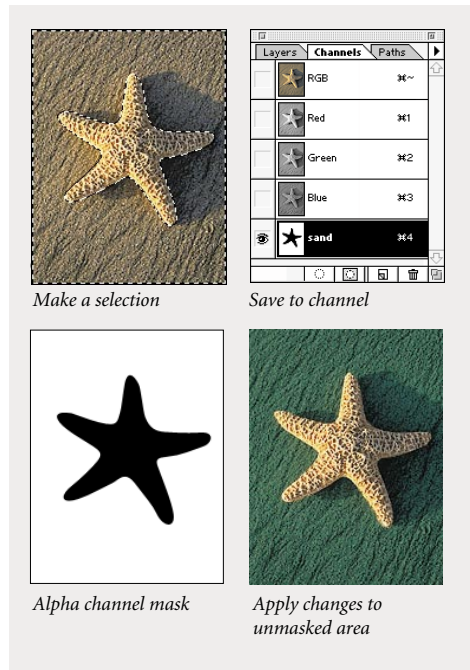
*Quick Mask opacity: 90%*

When the Masked Areas option is selected in the Quick Mask Options dialog box, the Quick Mask button in the toolbox appears as a white circle on a gray background (◼). When the Selected Areas option is selected, the icon appears as a gray circle on a white background (◼).

## Using alpha channels

In addition to working with the temporary masks of Quick Mask mode, you can create new channels, called *alpha channels*, to store and edit selections, which can be used as masks for your image (see “Using masks” on page 234). Each image can contain up to 24 channels, including all color and alpha channels. You can add and delete alpha

channels, and you can specify a name, color, mask protection option, and opacity for each channel. 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 them permanent, so that they can be used again in the same image or in a different image. You can also use the Calculations command to perform operations on two or more channels. For more information on the Calculations command, see “Using channel calculations” on page 272. For more

examples of how you can use channels with your artwork, see the Adobe Photoshop CD-ROM tutorials.

**Note:** To keep track of the active channel or channels, it's a good idea to keep your Channels palette open as you create and edit channels. You should also keep your Layers palette open to track your active layer.

## Creating a new alpha channel

You create a new alpha channel when you want to save a selection or create a new mask. For example, you can create a gradient fill in a blank channel and then use the gradient fill as a mask.

### 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 order in which it was created.

### To create a new alpha channel and specify options:

1 Do one of the following:

- Option-click (Macintosh) or Alt-click (Windows) 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. By default, alpha channels are assigned numbers according to the order in which they are created.

3 Select display options for the channel, as described in steps 2 through 4 starting on page 240. Alpha channel options are identical to Quick Mask options.


#### 4 Click OK.

A new 8-bit grayscale channel appears at the bottom of the Channels palette and is the only channel visible in the image window.

### Saving a selection in an alpha channel

You can save a selection to either a new or existing alpha channel. You can then store the selection permanently and use it as a mask for your image.

#### To save a selection to a new channel with default options:

Click the Save Selection button () at the bottom of the Channels palette. A new channel appears in the Channels palette, named according to the order 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.



*Selected area*

2 Choose Select > Save Selection.

3 For Document, choose a destination image for the selection.

By default, the selection is placed into a channel in your active image. You can choose to save the selection to a channel in any other open image having 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.

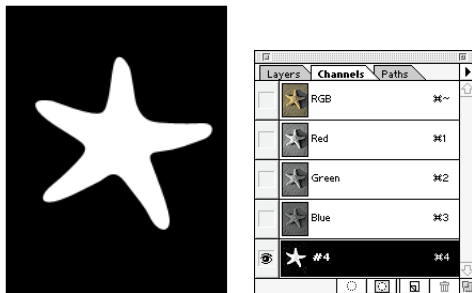
5 If you're saving the selection to an existing channel, select one of the following options to indicate how the selections should be combined:

- Replace Channel to replace the current selection in the channel.
- Add to Channel to add the selection in the image 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.



To see the saved selection, select the channel in the Channels palette. The channel displays the saved selection in grayscale.



## Changing alpha channel options

You can rename an alpha channel and change its display options, which are identical to the display options for quick masks. However, you cannot modify the characteristics of the default color channels.

### To set 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 on page 237.

## 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.
- In the Channels palette, Command-click (Macintosh) or Ctrl-click (Windows) the channel containing the selection you want to load.
- To add the selection to an existing selection, press Command+Shift/Ctrl+Shift and click the channel in the Channels palette.
- To subtract the selection from an existing selection, press Command+Option/Ctrl+Alt and click the channel in the Channels palette.
- To load the intersection of the saved selection and an existing selection, press Command+Option+Shift/Ctrl+Alt+Shift and click the channel in the Channels palette.

### 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 there is already a selection in the image, select one of the following:
  - New Channel to replace the current selection with that of the selected channel.
  - Add to Channel to add the selected channel to the current selection.



- Subtract from Channel to delete the selected channel from the current selection.
  - Intersect with Channel to keep the areas of the selected channel that intersect with the current selection.
- 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 exactly the same pixel dimensions.

- 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 there is already a selection in the destination image, indicate how the selections should be combined. See step 4 of the previous procedure for information on these options.
- 7 Click OK to load the selection.

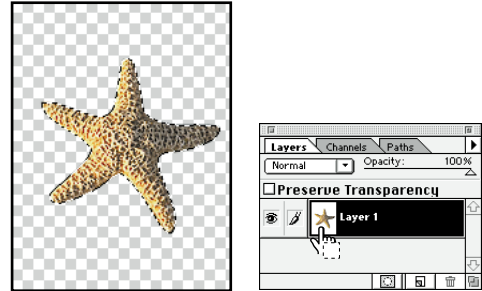
## Selecting all non-transparent areas

You can quickly load a selection (called a *transparency mask*) of all non-transparent areas on a layer, that is, all areas that have color values. This is useful for making selections on a layer that contains both transparent and non-transparent areas.

#### To load all non-transparent areas on a layer:

Do one of the following:

- In the Layers palette, Command-click (Macintosh) or Ctrl-click (Windows) the layer containing the pixels you want to load as a selection.



- To add the pixels to an existing selection, press Command+Shift/Ctrl+Shift and click the layer in the Layers palette.
- To subtract the pixels from an existing selection, press Command+Option/Ctrl+Alt and click the layer in the Layers palette.
- To load the intersection of the pixels and an existing selection, press Command+Option+Shift/Ctrl+Alt+Shift and click the layer in the Layers palette.



To move all non-transparent areas on a layer, you can use the move tool without selecting any pixels first.

## Deleting channels

Depending on the complexity of the information they contain, alpha channels can substantially increase the disk space required for an image. If you have a shortage of disk space, you may want to delete any channels you no longer need before saving the image.

### To delete a channel with no confirmation:

- 1 Select the channel in the Channels palette.
- 2 Do one of the following:
  - Option-click (Macintosh) or Alt-click (Windows) 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.

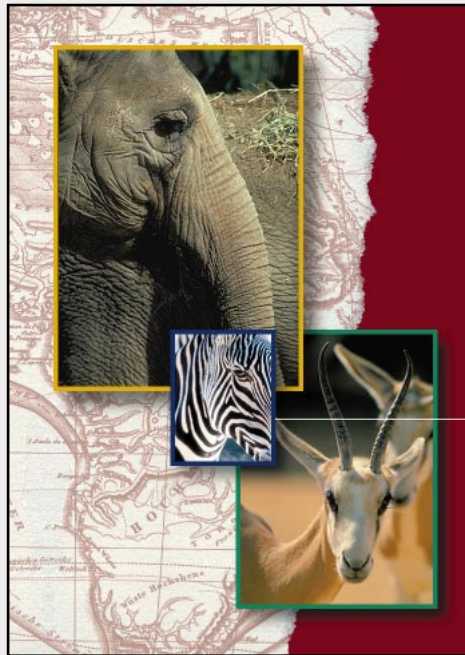
No matter what method you use, if you're deleting a color channel and the file has layers, you will be prompted to let Photoshop flatten the visible layers and discard hidden layers (if any) before deleting the channel. This is necessary since removing a color channel results in a multichannel image, a color mode that does not support layers.

# Chapter 11: Using Layers

**W**hen you create a new Adobe Photoshop document, the image consists of a background, which is analogous to the canvas under a painting. You can add one or more *layers* to the document. Layers let you edit specific

areas of your image without affecting any other data. You can draw, edit, paste, use masks, and reposition elements on a layer without disturbing any other layers in the image.

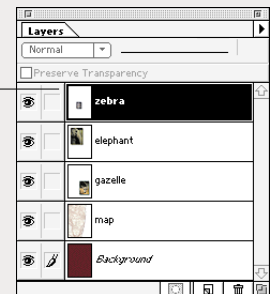
**UNDERSTANDING LAYERS** Think of layers as sheets of acetate stacked one on top of the other. Where there is no image on a layer, you can see through to the layers below. Behind all the layers is the background. In the illustration below, each animal and the map are on separate layers. The red texture is the background. All layers in a file share the same number of pixels, the same number of channels, and the same image mode (RGB, CMYK, or Grayscale).



Transparent areas on a layer (represented here in blue) allow you to see through to the layers below



Zebra is on topmost layer



In addition, a special kind of layer, called an *adjustment layer*, lets you apply tonal and color correction effects to all the layers underneath. Thus, you can experiment freely with different combinations of graphics, type, special effects, opacities, and blending modes. Until you *merge* (that is, combine) the layers, each one remains independent of the other layers in the image.

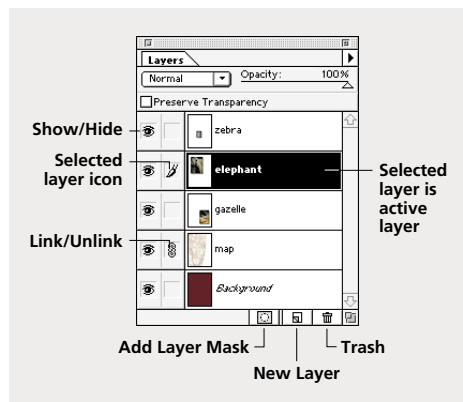
**Note:** Images created using the *Transparent* option in the *New* dialog box are created without a background. Images with no background, as well as images with layers, can be saved only in the *Photoshop* format.

Images created in versions of Adobe Photoshop earlier than 3.0 consist only of a single background layer. If you add layers to these images using Adobe Photoshop 4.0, you can only save them in the *Photoshop* format.

## Using the Layers palette

The Layers palette lists all the layers in the image, starting with the topmost layer. A thumbnail of the layer contents appears to the left of the layer name. This thumbnail is updated as you edit the layer. Use the scroll bars or resize the palette to see additional layers.

You use the Layers palette to create, hide, display, copy, merge, and delete layers. (Additional commands appear in the menu.) When you modify an image, the changes affect only the *active* layer, that is, the highlighted layer in the Layers palette. You select a layer to make it active, and only one layer can be active at a time. The name of the active layer also appears in the image window's title bar.



### To select a layer:

Do one of the following:

- In the Layers palette, click a layer to make it active.
- Select the move tool and Control-click (Macintosh) or right-click (Windows) in the image and choose the layer you want from the context menu.

## 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 you can have in a single image.

You can create new layers by using the *New Layer* button or command, by dragging or pasting selections into your image, or by converting selections into layers. You can also copy layers between two open Adobe Photoshop images (see “Duplicating layers in a single image” on page 251).

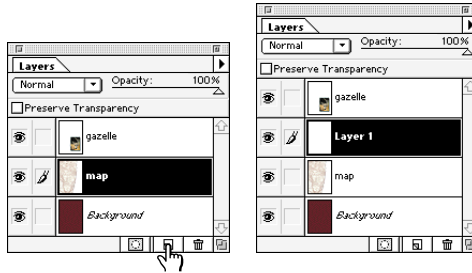
## Adding new layers

You add layers to an image using the New Layer button at the bottom of the Layers palette or the New Layer command, which appears in the Layer > New menu or in the Layers palette menu. New layers appear above the active layer in the Layers palette.

**Note:** Creating a new layer adds any floating selections in the image to that layer. For information on floating selections, see “Moving selections” on page 175

### 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 the order in which it was created.



Click New layer button. . . to create a layer.

### 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.

- Option-click (Macintosh) or Alt-click (Windows) the New Layer button at the bottom of the Layers palette.

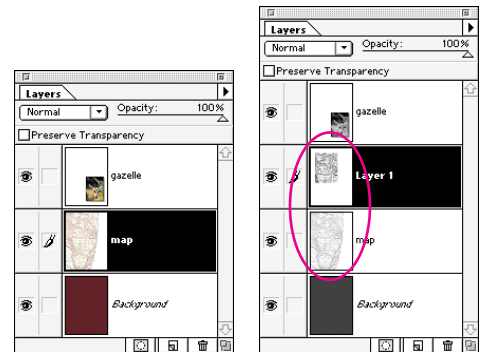
2 Name the layer, and select mode, opacity, and fill options as described in “Specifying layer options” on page 257. Then click OK.

## Adding selections as layers

When you drag or paste a selection into a document, the selection is automatically pasted into a new layer. The new layer is created using the default options of Normal mode and 100% opacity and appears above the active layer in the Layers palette. You can also convert a selection to a layer.

### To turn a selection into a new layer:

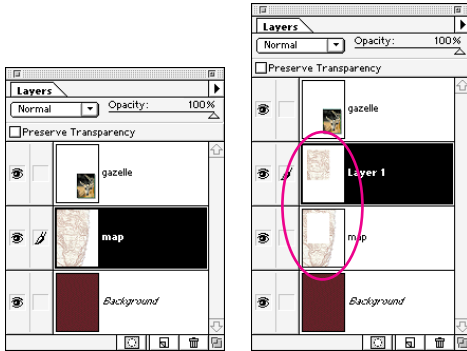
- 1 Make a selection.
- 2 Choose Layer > New and choose one of the following commands from the submenu:
  - To copy the selection into a new layer, choose Layer Via Copy.



Original

Selection copied to new layer

- To cut the selection and paste it into a new layer, choose Layer > New > Layer Via Cut.

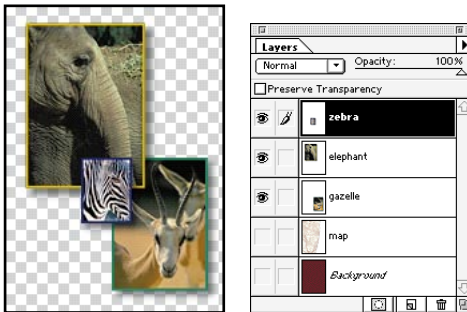


Original

Selection cut to new layer

## Viewing layers

You use the Layers palette to show, hide, and pre-view layers. You can also control how transparent areas in a layer appear in your image.



Map layer and background hidden

## Showing and hiding layers

You can make layers temporarily invisible to speed performance as you edit or print other parts of the image. Only visible layers are printed. When a layer is visible, an eye icon appears in the leftmost column of the Layers palette for that layer.

### To show or hide a layer:

Do one of the following:

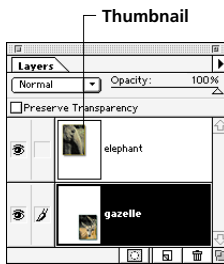
- In the Layers palette, click the eye icon next to a layer to hide that layer. Click in the column again to redisplay the layer.
- Drag through the eye column to show or hide multiple layers.
- Option-click (Macintosh) or Alt-click (Windows) the eye icon for a layer to display just that layer. Option/Alt-click in the eye column again to redisplay all the layers.

**Note:** You can have an active layer that is not visible; in most cases, however, you will want the active layer to be visible.

## Hiding and resizing layer thumbnails

You can change the size or turn off the display of thumbnails in the Layers palette. Thumbnails are the most convenient way of monitoring layer contents, but turning off thumbnails can improve performance and save disk space. Using smaller

thumbnails reduces the space required by the Layers palette and can be helpful when you're working on a smaller monitor.



#### 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.

### Setting transparency preferences

A layer is transparent until you add pixels to it. By default, the transparent areas of a document appear as a checkerboard pattern. You can change the appearance of this pattern.

#### To change the transparency settings:

- 1 Choose File > Preferences > Transparency & Gamut.
- 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 one of the following options:
  - 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.
- 4 If you chose Custom, click either of the color selection boxes (with the current pattern colors) to choose a custom color from the Color Picker.
  - 5 Click OK.

## Moving and copying layers

You can move, copy, and change the stacking order of layers.

### Changing the order of layers

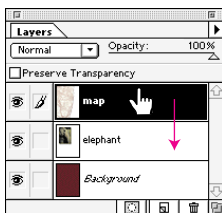
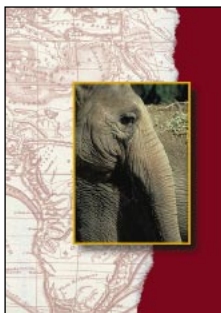
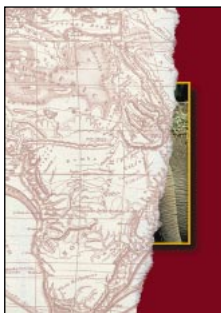
You can use the Layer menu or the Layers palette to change the stacking order of layers in an image.

#### To change the order of a single layer:

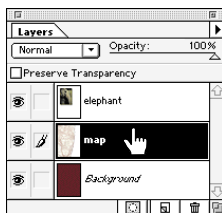
- 1 In the Layers palette, select the layer that you want to move.
- 2 Choose Layer > Arrange, and choose one of the following options from the submenu:
  - Bring to Front to make the layer the topmost layer.
  - Bring Forward to move the layer one level up in the stacking order.
  - Send Backward to 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 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 position where you want to position the layer, release the mouse button.



Original image



Map layer dragged below elephant layer

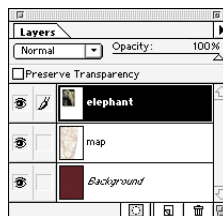
**Note:** By default, the background cannot be moved and is always at the bottom of the layer list. To move the background to a different location, first convert the background into a layer by double-clicking the background name, typing a new name, and clicking OK.

**Moving layers**

You can move the contents of a layer within its image window. You can also link multiple layers and move their contents together.

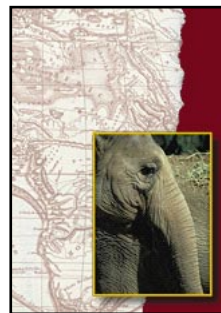
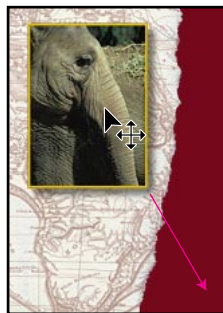
**To move a layer in an image:**

- 1 In the Layers palette, select the layer that you want to move to make it the active layer.



- 2 Select the move tool. To activate the move tool when any other tool is selected, hold down Command (Macintosh) or Ctrl (Windows).

- 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.



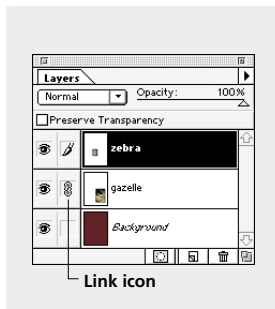




To move the layer contents in 1-pixel increments when the move tool is selected, press the arrow keys on the keyboard. To move the layer in 10-pixel increments (or to move one frame if you're editing an Adobe Photoshop filmstrip file), press Shift and an arrow key.

#### To move multiple layers:

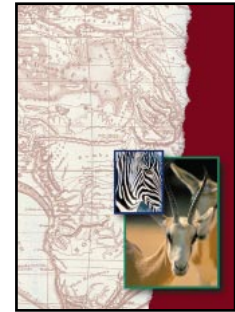
- 1 In the Layers palette, select one of the layers you want to move.
- 2 Click in the column immediately to the left of any additional layers you want to move. The link icon appears in the column.



- 3 Use the move tool to move the linked layers in the image window.



Original image



Gazelle and zebra layers linked and moved

- 4 To unlink a layer, click the link icon next to the layer's name.

### Duplicating layers in a single image

You can duplicate any layer (including the background) in the same image using the Duplicate Layer command (which prompts you for the new layer name) or by dragging and dropping (without any prompt).

#### To duplicate a layer in an image:

- 1 Select the layer in the Layers palette.
- 2 Do one of the following:
  - Choose Layer > Duplicate Layer.
  - Choose Duplicate Layer from the Layers palette menu.
- 3 Name the duplicate layer and click OK.

#### To duplicate a layer in an image without naming it:

- 1 Do one of the following:

- Drag the layer name from the Layers palette to the image window.
- 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 the order in which it was created.

### Copying layers between images

You can copy any layer or the background from one Adobe Photoshop image to another using copy and paste, drag and drop, or the Duplicate Layer command. The Duplicate Layer command also lets you create a new image with the copied layer.

#### 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 Choose **Select > All** to select all of the pixels on the layer that fall inside the canvas boundaries. Pixels beyond the visible canvas are not included in the selection.
- 4 Choose **Edit > Copy**.
- 5 Make active the image window into which you want to paste the layer.
- 6 Choose **Edit > Paste** to paste the layer as a new layer in the destination image.

#### To copy a layer between images by dragging:

- 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 Do one of the following:
  - Drag the layer's name from the Layers palette into the destination image.

- Select the move tool and drag the layer from the source image to the destination image.



A new layer appears in the Layers palette of the image into which you copied the layer.

The layer appears in the image in the same position it occupied in the original image and appears above the active layer in the Layers palette. If the layer you're dragging is larger than the image into

which you're copying, only part of the layer is visible, although all the layer contents are still available. To see other sections of the layer, use the move tool to drag the layer into position.



To copy a layer into the center of a destination image whose dimensions differ from the source image, start dragging the layer, hold down Shift, and continue to drag to the destination image.

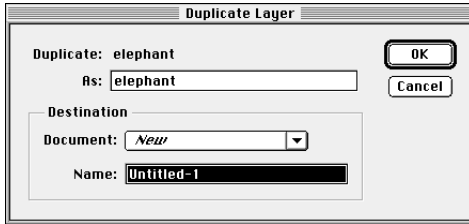
### To copy multiple layers into another image:

- 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 copy a layer into another image or a new image:

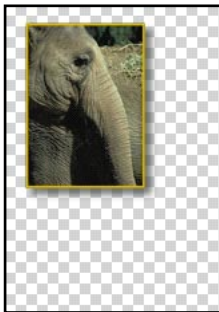
- 1 If you plan to copy a layer to an existing image, open both the source and destination images.
- 2 In the source document's Layers palette, select the name of the layer you want to duplicate.
- 3 Do one of the following:
  - Choose Layer > Duplicate Layer.
  - Choose Duplicate Layer from the Layers 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.

A new image created with a duplicate layer doesn't have a background.



## Converting and adding backgrounds

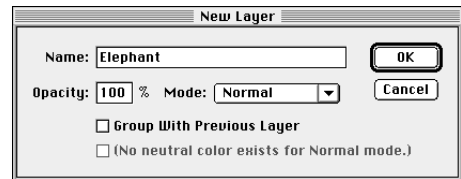
At times you may want to convert a background to a layer—for example, to change its position in the Layers palette or to apply a mode or opacity to it. You can also add a background to an image without a background. An image can contain only one background.

### 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 257 for information on layer options.
- 3 Click OK.

### To add a background to an image:

- 1 Do one of the following:
  - Option-click (Macintosh) or Alt-click (Windows) the New Layer button (📄) at the bottom of the Layers palette.
  - Choose New Layer from the Layers palette menu.
  - Choose Layer > New > New Layer.
- 2 For Mode, choose Background. (This option is available only when you're working in a document that has no background.)



3 Click OK.

## Editing layers

You can use the painting and editing tools to draw on a layer, and you can copy and paste selections to a layer.

All editing occurs on the active layer (and in the active channel). To keep track of your editing, you should keep the Layers and Channels palettes open and refer to them as you edit.

## Adding pixels to a layer

When you add a layer to an image, the new layer has no pixels. Pasting, painting, and editing in a layer fills the selected areas with pixels. Once an area on a layer contains pixels, you can paint or edit the pixels, apply filters, or use special effects to modify the layer.

## Using blending modes and opacity on a layer

When you use the painting and editing tools to draw on a layer, keep in mind that the opacity and mode settings for these tools interact with the opacity and mode settings for the active layer, and that the actions affect the active channel.

For example, suppose you have a layer that uses the Dissolve mode and an opacity of 50%. You paint on this layer using the paintbrush with a Normal mode and an opacity of 100%. As it is displayed on the layer, the paint appears in Dissolve mode with a 50% opacity because this is the maximum the layer can display.

On the other hand, if you were working on a layer created using Normal mode and 100% opacity, but were using the eraser tool with the paintbrush option set to 50% opacity, only 50% of the paint would disappear as you painted. For more information, see “Selecting a blending mode” on page 208 and the examples in “Layer blending modes” on page 265.

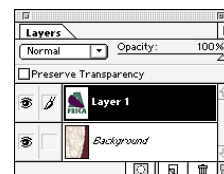
## Preserving a layer's transparency

You can confine editing only to areas of a layer that already contain pixels. For example, if you have added type to a transparent layer, you may want to edit the type (e.g., by adding special effects or changing its color) without adding pixels to the transparent areas of the layer.

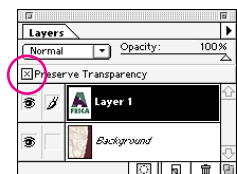
### To confine editing to the opaque portions of a layer:

- 1 Select the layer in the Layers palette.
- 2 Select Preserve Transparency in the Layers palette.

The pencil, paintbrush, airbrush, rubber stamp, paint bucket, and gradient tools affect only the opaque areas of a layer that contain pixels.



*Painting on a layer with Preserve Transparency off*



*Painting on a layer with Preserve Transparency on*

## Sampling merged data

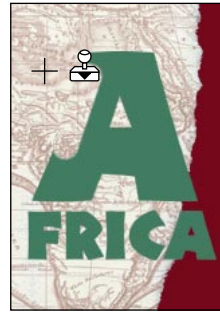
By default, when you're working with the magic wand tool, the smudge tool, the blur/sharpen tool, or the aligned and nonaligned Clone options for the rubber stamp tool, you are painting with (or sampling from) only the pixels on the active layer. For example, you can smudge or sample in a single layer even when other layers are visible, and you can sample from and paint in different layers.

You can also choose to paint using sampled data from all the visible layers. For example, you can use the rubber stamp tool to clone an image that contains pixels from all the visible layers.

### To sample from all visible layers:

- 1 Double-click the magic wand tool, the smudge tool, the blur/sharpen tool, or the rubber stamp tool in the toolbox to display its Options palette.
- 2 If you selected the rubber stamp tool, select Clone (aligned) or Clone (nonaligned) for Option.

- 3 Select Sample Merged in the tool's Options palette.



*Painting with merged data*



**Note:** Unless you are using the Clone options for the rubber stamp tool, painting or editing in a new layer produces the best results when Sample Merged is selected.

## Deleting layers

Because layers increase a file's size, it's important to delete layers that you no longer need. You can also delete floating selections.

### To delete a layer or floating selection:

- 1 Select the layer or floating selection in the Layers palette.
- 2 Do one of the following:
  - 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. If a floating selection is selected, the command appears as Delete Selection.



To delete a selected layer or floating selection automatically, Option-click (Macintosh) or Alt-click (Windows) the Trash button at the bottom of the Layers palette. You can also drag the layer or floating selection name in the Layers palette to the Trash button.

## Specifying layer options

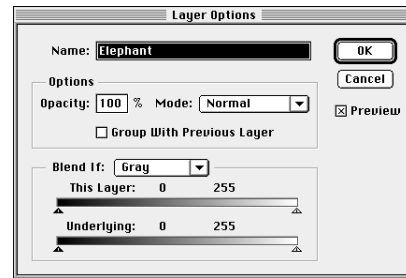
The layer options let you change a layer's name and opacity and control how the pixels in the layer interact with the layers underneath. You can also choose to make a layer part of a clipping group or fill a new layer with neutral pixel values so that you can apply more Photoshop effects to it.

You can choose layer options each time you create a new layer using the New Layer dialog box, or at any time by opening the Layer Options dialog box. You can also change a layer's opacity or blending mode using the controls in the Layers palette.

### 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.

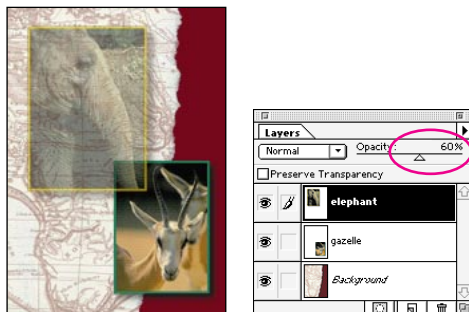


- 2 If desired, type a new name for the layer.
- 3 Choose layer options as described in the following sections. For a discussion of the Group with Previous Layer option, see “Creating clipping groups” on page 261.
- 4 To turn off previewing as you choose layer options, deselect Preview.
- 5 Click OK.

## Specifying opacity

You can use the Opacity option in the Layer Options dialog box or the Opacity slider in the Layers palette to change the opacity of a layer at any time. A layer with 0% opacity is completely transparent, while a layer with 100% opacity is completely opaque. Each layer can be created with its own opacity.

If an image has only one layer with no background, or has only one layer visible, the Opacity slider is dimmed and unavailable until you add or display a second layer or background.



Elephant layer with 60% opacity



If you have selected a tool that does not have a slider option in its Option palette, you can change the opacity of the active layer in multiples of 10% by pressing a number key from 0 to 9 (for example, pressing 1 sets the opacity to 10%). Pressing 0 sets the opacity to 100%. To specify an exact opacity, enter the desired value using the keyboard.

The Layers palette modes include the modes that appear in the Options palette when you paint or edit an image. For a description of these modes, see “Selecting a blending mode” on page 208.

**Note:** Unlike the options for the line tool and paint bucket tool, you cannot select a Clear mode for layers. In addition, the Exclusion, Color Dodge, Color Burn, Lighten, Darken, and Difference modes cannot be used in Lab images.



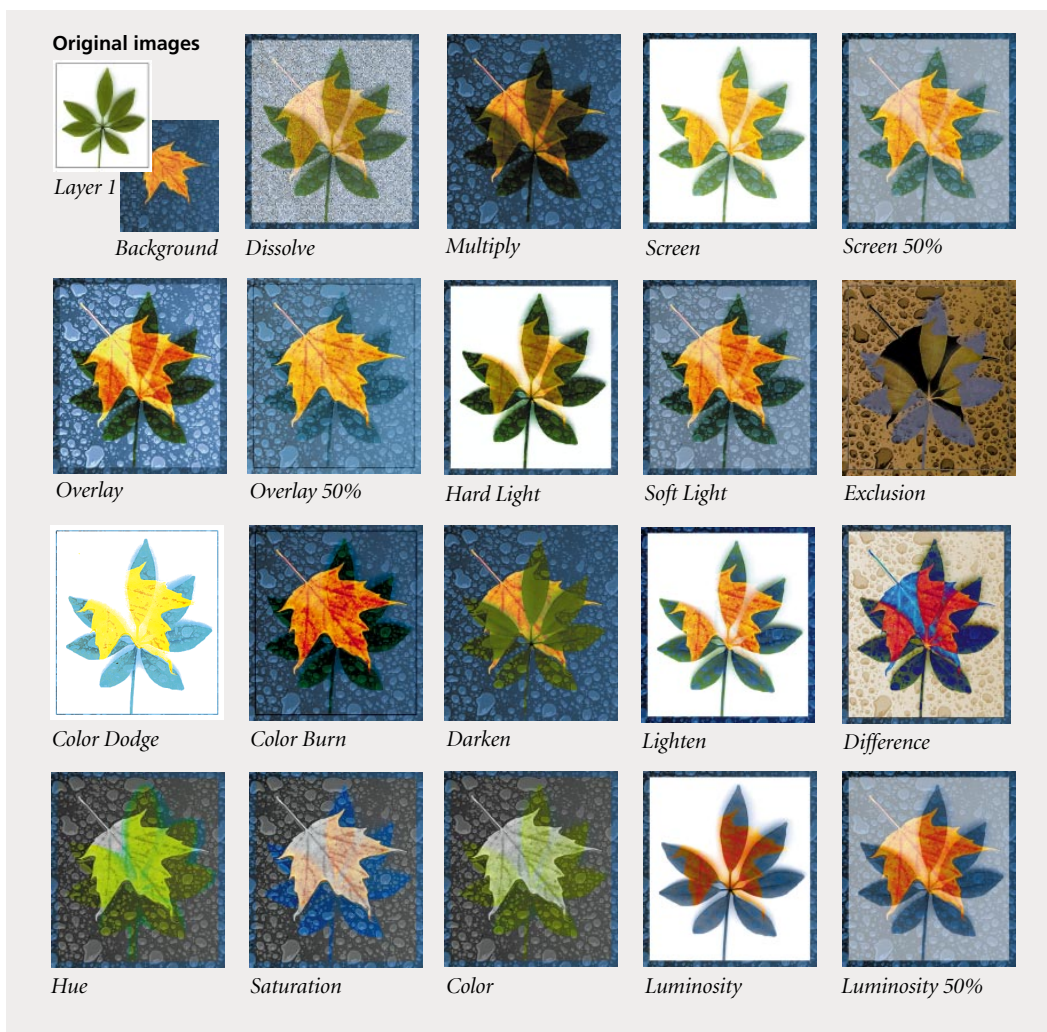
Elephant layer in Hard Light mode

## Specifying blending modes

You use 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. For example, if you create a layer using Darken mode, the pixels in the layer that are darker than the underlying pixels are blended into the image. The table “Layer blending modes” on page 265 shows examples of the different layer modes.

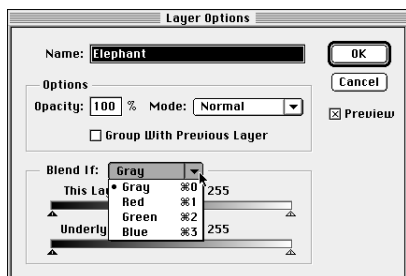


**LAYER BLENDING MODES** The layer blending modes let you control how the pixels in the layer are blended with the pixels in underlying layers. For a description of each mode, see page “Selecting a blending mode” on page 212.



## Specifying a range for blending layers

The sliders in the Layer Options dialog box define which pixels are blended by indicating a range of brightness values for the replacement pixels. These values determine which pixels in the combined image come from the active layer and which come from the underlying visible layers. Color values are measured on a scale from 0 (black) to 255 (white). To create a smooth transition between blended and nonblended areas, you can also define a range of pixels that are only partially blended.



Only the pixels in the current layer whose color values fall inside the range specified on the This Layer slider are blended into the final image. For example, if you set the This Layer slider to 0 and 235, the pixels in the active layer with values between 235 and 255 remain unblended and do not appear in the final image. If the pixels in the underlying visible layer fall outside the color range specified by the Underlying slider, they are retained in the final image. For example, if you set Underlying to 19 and 255, pixels in the underlying layers with values between 0 and 19 appear in the final image. The pixels in the active layer that overlay pixels in the underlying layer with values of 0 to 19 remain unblended and do not appear.

### To define a range for the blending operation:

- 1 In the Layer Options dialog box, for Blend If, select one of the following options:
  - Gray to set the range of values for all pixels in the image.
  - Any other color to set the range for that color channel (for example, red, green, or blue values for RGB images).
- 2 Use the This Layer and Underlying sliders to set the color range. 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 Option (Macintosh) or Alt (Windows) and drag one half of a slider triangle. The range of partially blended pixels is indicated by the two values that appear above the divided slider.

## Filling a new layer with a neutral color

Some Adobe Photoshop effects (such as the Lighting Effects filter) cannot be applied to layers that do not contain pixels. Selecting Fill with Neutral Color in the New Layer dialog box lets you apply these effects to empty layers 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 unavailable when you create a layer using the Normal, Dissolve, Hue, Saturation, Color, or Luminosity modes.

You fill a layer with a neutral color when you create a new layer. For more information, see “Adding new layers” on page 247

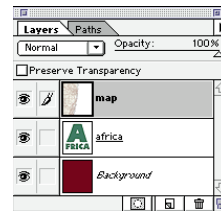
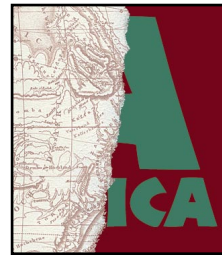
**Note:** *Not all filters produce a visible effect when applied to a layer filled with a neutral color.*

## Creating clipping groups

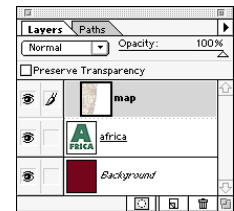
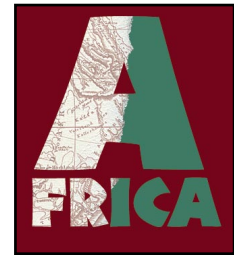
Clipping groups let you define a layer as a mask for one or more layers above that layer. For example, if you have a shape on one layer, a texture on the overlying layer, and some text on the topmost layer, you can define all three layers as a clipping group so that the texture and the text appear only through the shape. In a layer group, the bottom layer in the group (called the *base layer*) affects the mode and opacity of all other layers in the group; this blending applies only to the layers within the group. Note that only successive layers can be included in a clipping group.

In the Layers palette, dotted lines separate the layers in a clipping group. The base layer in a clipping group is indicated by its underlined name, and the thumbnails for the overlying layers are indented.

For more information on working with clipping groups, see the tutorials on the Adobe Photoshop Tutorial CD-ROM.



Original

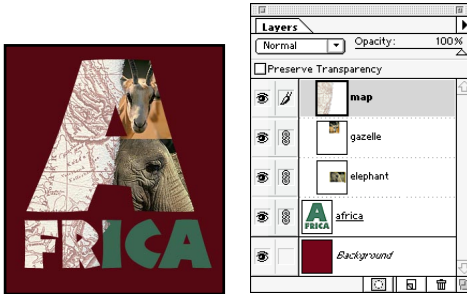


Clipping group with map and Africa layers

### To create a clipping group:

- 1 In the Layers palette, select one of the layers that you want.
- 2 Click in the column immediately to the left of the layers you want to add to the clipping group. Link icons appear in the column.

3 Choose Layer > Group Linked to create a clipping group from the linked layers.



*Layers linked and made into clipping group*

#### To add a layer to a clipping group:

1 Do one of the following:

- Hold down Option (Macintosh) or Alt (Windows), 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.

- In the Layers palette, double-click the name of the layer you want to add to a group. In the Layers Options dialog box, select Group with Previous Layer, and then click OK.

The layer is grouped with the layer below it and is assigned the opacity and mode attributes of the bottommost layer in the group.

2 Repeat step 1 for each layer that you want to add to the clipping group.

#### To remove a layer from a clipping group:

Do one of the following:

- Hold down Option (Macintosh) or Alt (Windows), 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 the topmost layer in the clipping group and choose Layer > Ungroup.
- In the Layers palette, double-click the name of the layer that you want to remove from a group. In the Layers Options dialog box, deselect Group with Previous Layer, and then click OK.

#### To ungroup all layers in a clipping group:

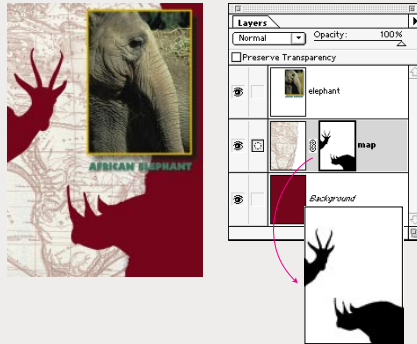
- 1 In the Layers palette, select any layer in the clipping group except the topmost layer.
- 2 Choose Layer > Ungroup.

## Using layer masks

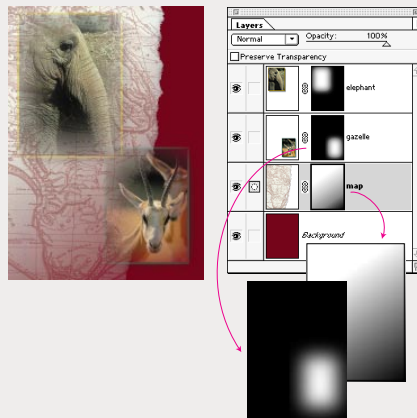
A *layer mask* lets you control how different areas of a layer are hidden and revealed. By making changes to the layer mask, you can apply a variety of special effects to the layer without actually affecting the pixels on that layer. You can then apply the mask and make the changes permanent, or remove 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. Black indicates the portions of the

layer that are hidden and white indicates the portions of the layer that are revealed. Gray indicates portions of the layer that are partially visible.



*Animal shapes mask areas of the map layer*




*Map, gazelle and elephant layers with masks blended from black to white*

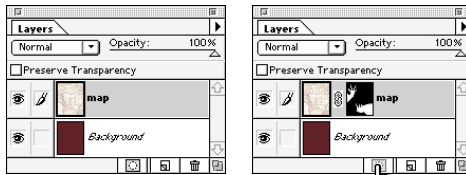
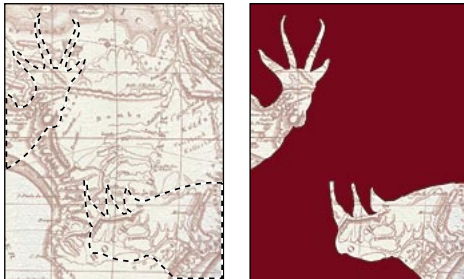
## Adding a layer mask

You can add one layer mask per layer. By painting the mask, you can control which areas of the layer are hidden or revealed.

### To add a mask to a layer:

- 1 In the Layers palette, select the layer to which you want to add a mask.
- 2 If you want to base the boundaries of the mask on a selection, select the desired area in the image.
- 3 Do one of the following:
  - To create a mask that reveals the entire layer, choose Layer > Add Layer Mask > Reveal All.
  - To create a mask that hides the entire layer, choose Layer > Add Layer Mask > Hide All.
  - To create a mask that reveals the selected area and hides the remaining portion of the layer, choose Layer > Add Layer Mask > Reveal Selection.
  - To create a mask that hides the selected area and reveals the remaining portion of the layer, choose Layer > Add Layer Mask > Hide Selection.

- To create a layer mask that reveals the entire selection or layer, click the New Layer Mask () button at the bottom of the Layers palette.



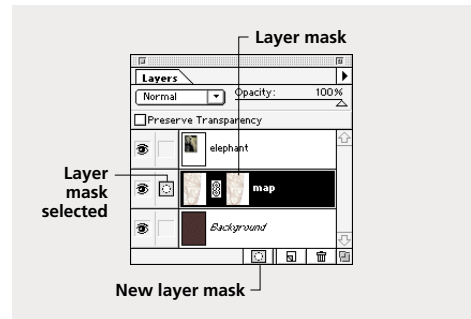
*Selection*

*Layer mask revealing selection*

- To create a mask that hides the entire selection or layer, Option-click (Macintosh) or Alt-click (Windows) the New Layer Mask button.

A layer mask thumbnail appears to the right of the layer thumbnail in the Layers palette. The layer mask is selected, as indicated by the mask icon that appears to the left of the layer thumbnail. The layer mask thumbnail represents the temporary 8-bit grayscale (alpha) channel that Adobe Photoshop creates when you add a mask to a layer. To view the

layer mask channel, select it in the Channels palette. See Chapter 10, “Using Channels and Masks,” for information on alpha channels.



### 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.

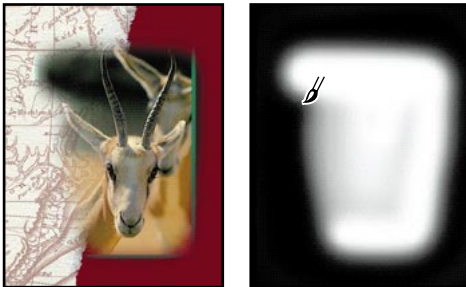
Because the layer mask is an 8-bit grayscale channel, the foreground and background colors default to grayscale values when the mask is active. As you edit, the mask thumbnail displays the changes.

3 Do one of the following:

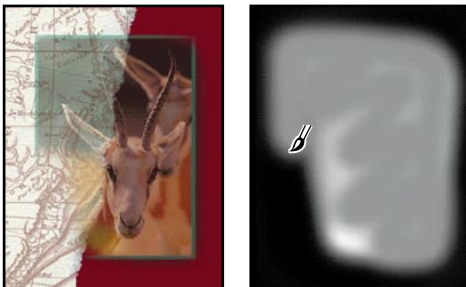
- To hide the layer and add to the mask, paint the mask with black.



- To reveal the layer and subtract from the mask, paint the mask with white.



- To make the layer partially visible, paint the mask with gray.

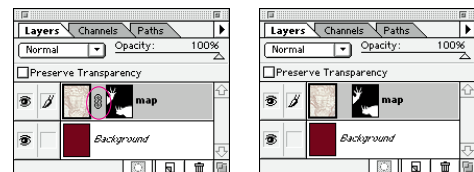


To edit the layer instead of the layer mask, make the layer active by clicking its thumbnail in the Layers palette. The paintbrush icon appears to the left of the thumbnail to indicate that you are editing the layer. Inverting the contents of the layer mask reverses the masking effect.

## Unlinking layers and layer masks

By default, a layer is linked to its layer mask—that is, both the layer and layer mask move together in the image when you move either one with the move tool. In the Layers palette, a link icon appears between the layer and layer mask thumbnails to indicate this linking behavior.

You can unlink the layer from its layer mask by clicking the link icon. Unlinking a layer from its layer mask lets you move the layer and the layer mask independently. You can click between the layer and layer mask thumbnails to redisplay the link icon and return to the linking behavior.



*Linked*

*Unlinked*

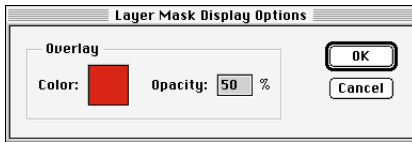
## Changing layer mask options

When you view the layer mask channel by clicking its eye icon in the Channels palette, the mask appears by default as 50% red (to represent ruby-lith). You can change the color and opacity of the mask display.



### To change the display options for a layer mask:

- 1 Do one of the following:
  - Double-click the layer mask thumbnail in the Layers palette.
  - Double-click the layer mask channel in the Channels palette.



- 2 To choose a new mask color, click the color swatch, and choose a color as described on page 222. The color of the mask affects only the display of the mask and does not affect what is edited.
- 3 For Opacity, enter a value between 0 and 100%. This setting changes the opacity of the mask channel display only; it does not affect how much of the underlying layer is actually hidden or revealed.
- 4 Click OK.

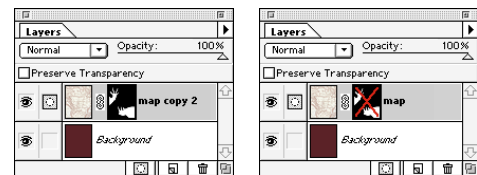
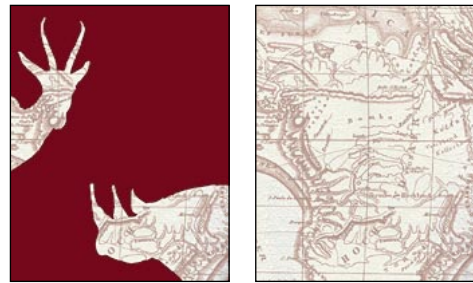
### Turning off the layer mask

As you edit a layer mask, all editing changes appear on the layer. If you want to view the layer without the mask, you can temporarily turn off the mask in the document window.

### 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 is visible.



*Layer mask on...*

*and 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.



## Viewing the layer mask channel

By default, the layer mask channel is not visible as you edit the layer mask. However, you can view and edit the mask channel without viewing the layer contents.

### To view the layer mask channel:

Do one of the following:

- Option-click (Macintosh) or Alt-click (Windows) the layer mask thumbnail to view only the mask. The eye icons in the Layers palette are dimmed because you are not seeing any of the layers. Click an eye icon to redisplay the layers.
- Hold down Option+Shift (Macintosh) or Alt+Shift (Windows) and click the layer mask thumbnail to view the mask on top of the layer in the masking color set in the Layer Mask Options dialog box. Hold down Option+Shift/Alt+Shift and click the layer mask thumbnail again to turn off the color display.

## Applying and removing a layer mask

When you have finished creating a layer mask, you can either apply the mask and make the changes permanent or remove the mask without applying changes. Because layer masks are essentially alpha channels, which require varying quantities of storage space, applying and removing layer masks may help reduce file size. For more information, see “About channels” on page 229.

### To remove 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.

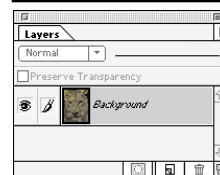
- Choose Layer > Remove Layer Mask.

- 3 Do one of the following:

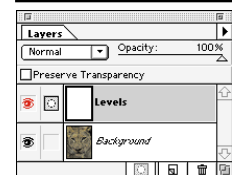
- To remove the layer mask and make the changes permanent, click Apply.
- To remove the layer mask without applying the changes, click Discard.

## 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.

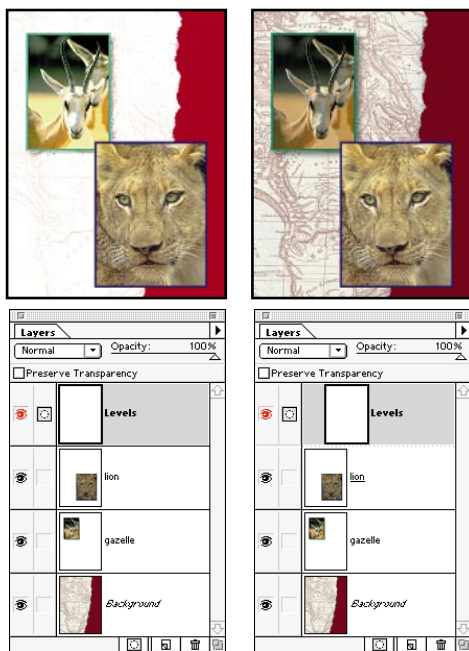


Original image



Adjustment layer added

When you create an adjustment layer, its adjustments affect 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 layer just below it, you can create a clipping group consisting of these two layers. See “Creating clipping groups” on page 261 for more information.



*Adjustment layer applied to all layers beneath*

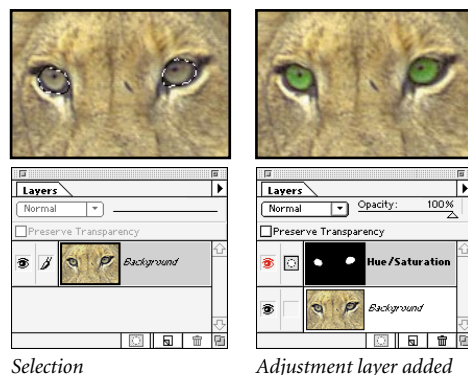
*Adjustment layer clipped to lion layer*

## Creating an adjustment layer

When you create a new adjustment layer, it appears above the last active layer in the Layers palette. The adjustment layer is selected and is indicated by a partially filled circle to the right of the

layer name. You can edit the color and tonal adjustments you make at any time. 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.

Adjustment layers always have layer masks, as indicated by the mask icon to the left of the adjustment layer thumbnail. When an adjustment layer is active, the foreground and background colors default to grayscale values. By painting the adjustment layer, you can control how the layers underneath are masked by the adjustment effects. If you make a selection before creating the adjustment layer, the adjustment is confined to the selected area.



*Selection*

*Adjustment layer added*

### To add 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:
  - Command-click (Macintosh) or Ctrl-click (Windows) 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 257.)
  - 6 Make the desired adjustments and click OK. See Chapter 6 for more information on the different tonal and color correction techniques.

#### 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 no adjustment options are available (for example, if you are using the Invert type), double-clicking the layer’s name opens the Layer Options dialog box.



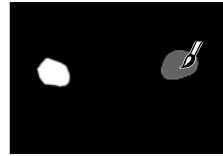
Before adjustment

After adjustment

#### To edit an adjustment layer mask:

- 1 Select the adjustment layer in the Layers palette.
- 2 Select any of the painting or editing tools.
- 3 Do one of the following:

- 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 remove the adjustment effect partially, paint the adjustment layer with gray.



Painting with grey...



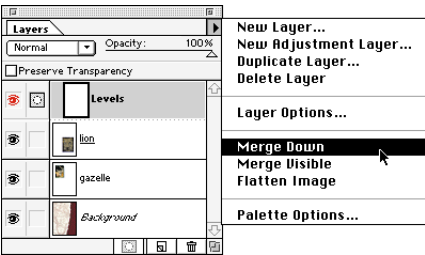
partially removes the adjustment.

**Note:** If you paint the adjustment layer mask with black or grey, you can modify the boundaries and effects of the mask (by applying a filter, for example). These changes only affect adjustment layer masks that contain black or grey values.

## 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 image layer below it, the adjustments become permanent and

apply only within the merged layer. For information on merging layers, see “Merging layers” on page 270.



Merging adjustment layer



Result

## Managing layered documents

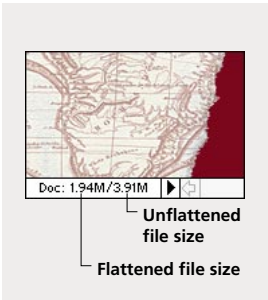
Adding layers to an image increases the file size. (Transparent areas in a layer, however, do not add to the file size.) To conserve disk space, you can merge two or more layers together, or flatten all the layers in an image into one layer.

### Keeping track of file sizes

Adobe Photoshop lets you monitor file size as you add, delete, and edit layers.


### To track file size:

Check the values in the Document Sizes box at the lower left corner of the image window (Macintosh) or the screen (Windows).



The first (left) value indicates the size the file will have when it is flattened. The second (right) value shows the estimated file size of the unflattened file, including any layers and channels.

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 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” on page 363 for more information.

---

### Merging layers

Merging layers combines several layers into one and keeps the file size manageable, especially when you’re working in large files. When you’ve finalized the characteristics and positioning of the layer contents, you can merge a layer with one or more

other layers to create partial versions of your composite image. You can also merge linked layers into one layer and layers in a clipping group into one layer.

If you merge layers into an image with a transparent background, the intersection of all transparent areas remains transparent. For information on merging adjustment layers, see page 269.

#### **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 in the Layers palette.
- 2 Do one of the following:
  - Choose Layer > Merge Down.
  - Choose Merge Down from the Layers palette menu.

#### **To merge all visible linked layers:**

- 1 Make visible all the linked layers you want to merge.
- 2 Select one of the visible linked layers.
- 3 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.

- 2 Do one of the following:

- Choose Layer > Merge Visible.
- Choose Merge Visible from the Layers palette menu.

### **Flattening all layers**

A flattened image contains only a background with no layers, and thus has a greatly reduced file size. You can save a flattened version of the file when you have finished creating the composite image. In most cases, you won't want to flatten a file until you are absolutely sure that you no longer want to change individual layers.

***Note:** Converting an image between some modes flattens the file. Be sure to save a copy of your file that includes all layers if you want to edit the image after the conversion.*

#### **To flatten an image:**

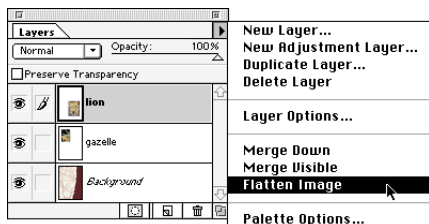
- 1 Make sure that all the layers you want to keep are visible.

In a flattened image, all the visible layers are merged into the background. Hidden layers are discarded, and the final image contains only a background. If the background is transparent, the transparent areas are filled with white.

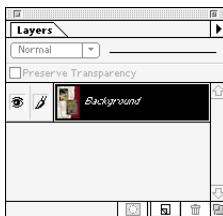
- 2 Do one of the following:

- Choose Flatten Image from the Layers palette menu.

- Choose Layer > Flatten Image.



*Flattening an image*



*Result*

## Saving layered documents

If you plan to send files out for proofs, you may want to save two versions of the file—one version with all the layers and layer masks intact so that you can easily incorporate editing changes, and another version with flattened layers to send to the printer.

The Save a Copy command in the File menu lets you save a flattened version of your file while keeping the original source file intact. The Save a Copy command saves in any of the file formats supported by Adobe Photoshop. Unlike Save As, the Save a Copy command allows you to keep working in the original file. The copy is saved to your disk but does not replace the active window. For more

information on saving documents and for a complete description of the file formats, see “Saving files” on page 305.

## Using channel calculations

The Calculations and Apply Image commands let you combine channels using the Layers palette blending modes, plus the Add and Subtract modes. Although you can also perform these operations (except Add and Subtract) by copying channels into layers in the Layers palette, it's often quicker and easier to use the calculations commands to combine channel information.

The calculation commands perform mathematical operations on the corresponding pixels of two channels (the pixels with identical locations on the image). When working with composite images, Adobe Photoshop calculates the pixel values in each set of color channels, and then combines them in a single channel. The Calculations command works on single channels only; the Apply Image command works on single and composite channels.

Two concepts are fundamental to understanding how the calculation commands work:

- Each pixel in a channel has a value from 0 (off or black) to 255 (on or white). The Calculations and Apply Image commands manipulate these values to produce the result color.
- These commands overlay the pixels in two or more channels. Thus, the documents used for calculations *must have the same pixel dimensions*.

## Applying channel calculations to composite image channels

The Apply Image command lets you combine composite images. You can place the results in a new image or in the selected image channel and layer (the *target*) of any open image.

### To use the Apply Image command:

1 Open the image or images that you want to blend.

2 If you want to blend into a channel of an existing image, make sure that the destination (*target*) image, channel, and layer are selected.

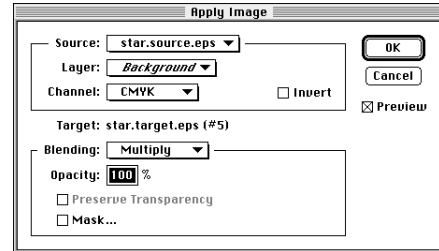
The images must match in pixel dimensions for the image names to appear in the Source menus in the Apply Image dialog box.

**Note:** *If the image modes of two images differ, you can copy a single channel to another channel, but you cannot copy a composite channel to another composite channel in another image.*

3 Do one of the following:

- To place the results in the selected image, choose Image > Apply Image.
- To place the results in a new image, channel, or layer, press Option (Macintosh) or Alt (Windows) as you choose Image > Apply Image; then select the destination for Result.

4 Choose the source image, layer, and channel you want to combine with the target. To use all the layers in the source document, select Merged for Layer.



5 Select Preview to preview the results in the document window.

6 Select Invert to use the reverse of the channel contents in the calculation.

7 For Blending, choose the calculation you want to perform.

These options perform the same operations as the modes in the Options palette and the modes in the Layers palette. A brief description of these options appears at the end of this chapter.

8 Enter an opacity to indicate the strength of the effect.

9 Select Preserve Transparency to apply the results only to opaque areas in the result layer.

10 Select Mask to indicate a channel to use as a grayscale mask. The Mask option has the same effect between the channels being combined as a layer mask has between two adjacent channels. See “Using layer masks” on page 262 for more information.

11 Click OK to perform the calculation.

## Calculating using multiple source documents

The Calculations command lets you perform channel calculations using two source documents and then apply the results to a new channel in either document or create a new result document.

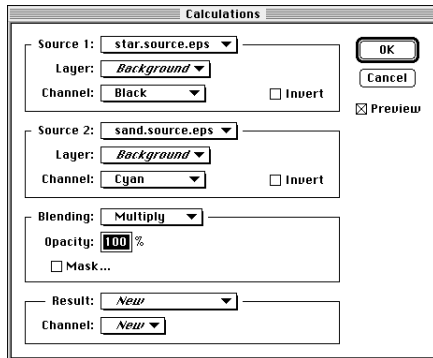
### To perform the channel calculations:

1 Open the source documents that will be used in the channel calculations.

The images must have the same pixel dimensions for their names to appear in the Source or Result menus in the Calculations dialog box.

2 Choose Image > Calculations.

3 To preview the calculation results in the document window, select Preview.



4 Choose the first source image, layer, and channel.

To use all the layers in the source document, choose the Merged option for Layer.

5 Select Invert to use the reverse of the channel contents in the calculation. Choose Luminosity to get the same effect as converting the document to a grayscale image.

6 Choose the second source image, layer, and channel.

7 For Blending, choose the calculation you want to perform. These options perform the same operations as the modes in the Options palette and Layers palette. See the next section for a brief description of the calculations options follow these steps.

8 Enter an opacity for the effect's strength.

9 Select Mask to use a channel as a grayscale mask. The Mask option has the same effect between the channels being combined as a layer mask has between two adjacent channels. See "Using layer masks" on page 262 for more information.

10 For Result, choose a result image. You can choose either an open image or a new image.

11 Choose a channel for the results of the calculations. You can place the results in a specific channel or in a selection.

**Important:** If you assign the results of a channel calculation to an existing channel, the channel calculation results will overwrite the pixels in the existing channel.

12 Click OK to perform the calculation.



## Calculations blending options

The following is a brief description of some Calculations blending options. For a description of the remaining blending options, see “Selecting a blending mode” on page 208.

**Lighter** Compares the brightness values of the corresponding pixels in two channels and displays the lighter of the two. With two single-channel files, such as grayscale files, using Lighter simply retains the lighter values from both files. In composite color images, Lighter compares the brightness value in each set of color channels and then combines the lighter values into one channel. In this case, the colors in the resulting image may be very different from the colors in either source channel.

**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 ( $255 + \text{any value} = 255$  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. Entering a negative Offset value darkens the image even more. Entering a positive Offset value lightens 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.



# Chapter 12: Using Filters

**T**he filters that are built into Adobe Photoshop let you apply special effects to your images. For example, you can apply an impressionistic or mosaic effect, add or reduce noise (pixels with randomly distributed color values), apply lighting effects, distort images, and produce many other interesting visual effects. You can also create your own effects using the Custom filter or the Filter Factory (included on the Adobe Photoshop CD-ROM), and then save and reuse these unique filters for other images. For more information about the Custom filter, see “Using the Custom filter” on page 287. For more detailed information on individual filters, see online help.

## About plug-in filters

Adobe Photoshop also supports plug-in filters developed by non-Adobe software developers. For information on installing these plug-in modules, see “Using plug-in modules” on page 31. Once installed, plug-in filters appear in the Filter menu and work the same as built-in filters. If you are interested in creating Adobe Photoshop-compatible plug-in modules, please contact Adobe Systems Developer Support.

## Previewing and applying filters

To use a filter, choose the appropriate submenu command from the Filter menu. The last filter chosen appears at the top of the menu.

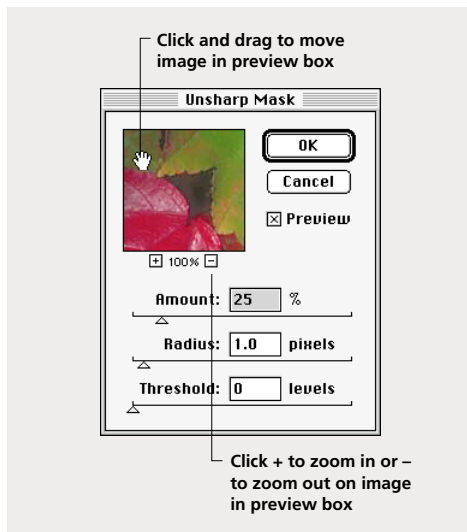
**Note:** *Filters cannot be applied to Bitmap-mode, indexed-color, 48-bit RGB, or 16-bit grayscale images.*

Some Photoshop filters let you preview a filter effect on the active layer before applying the filter. Because applying a filter—especially to large images—can be time-consuming, use the Preview option to save time and prevent unintended results. Several filter dialog boxes also have a built-in preview box that shows the filter’s effect on the active layer.

### 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 has ellipses, a dialog box appears.

- 3 If a dialog box appears, enter values or select options.
- 4 To preview the effect using the filter's preview box, use the following navigation methods:
  - Drag in the image window to center a specific area of the image in the preview box.
  - To see part of the layer that is not visible, move the cursor inside the preview box to activate the hand tool. Drag to move the layer preview.
  - Use the + or – button under the preview box to zoom in or zoom out on the preview.



A flashing line beneath the preview size indicates that Adobe Photoshop is still rendering the preview.

- 5 If the Preview option is available, select the option to preview the filter effect on the image.
- 6 Click OK to apply the filter.

When a filter takes a while to be applied, Adobe Photoshop displays a progress bar (Macintosh) or progress indicator in the status bar (Windows) so that you can gauge the time remaining until the filter is applied.

See the various examples of filter effects in this chapter.

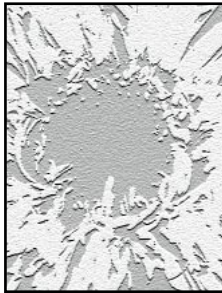
## Blending filter effects

The Filter > Fade command fades the effect of a filter or of a color adjustment (the Image > Adjust commands). You choose a blending opacity and a mode, which determines how the modified pixels in the selection appear in relation to the original pixels. The blending modes in the Fade dialog box are a subset of those available in the painting and editing tools Options palette (the Behind and Clear blending modes are not available in the Fade dialog box). For more information about color adjustment commands, see Chapter 6, “Making Color and Tonal Adjustments.”

Applying the Filter > Fade command is similar to applying the filter effect on a separate layer and then using the layer opacity and blending mode controls. (For more information, see “Using adjustment layers” on page 267).



Original



Note paper filter applied



Screen mode applied  
using Fade command

#### To fade a filter effect 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%. For more information, see “Specifying the opacity, pressure, or exposure” on page 206.

5 For Mode, choose a blending mode. For more information on opacity and blending modes, see “Selecting a blending mode” on page 208.

**Note:** The Color Dodge, Color Burn, Lighten, Darken, Difference, and Exclusion modes do not work on Lab images.

6 Click OK. Then deselect the selection to merge its pixels with the image.

Undoing the Fade command also cancels the filter effect or color adjustment, even if you have applied the Fade command several times in succession.

### Using filter shortcuts

These techniques can help save time when working with filters:

- To cancel a filter as it is being applied, press Command-period (Macintosh) or Esc (Windows).
- To undo a filter, press Command+Z (Macintosh) or Ctrl+Z (Windows). The Undo command also undoes an application of the Fade command; for more information, see “Blending filter effects” on page 280.
- To reapply the most recently used filter with its last values, press Command+F (Macintosh) or Ctrl+F (Windows).
- To display the dialog box for the last filter you applied, press Command+Option+F (Macintosh) or Ctrl+Alt+F (Windows).

## Loading images and textures

Some filters let you load other images, such as textures and displacement maps, to use with a filter. These filters include the Conté Crayon, Displace, Glass, Lighting Effects, Rough Pastels, Texture Fill, Texturizer, Underpainting, and Custom filter dialog boxes. Not all these filters load images or textures in the same way; for information on the Displace filter, see page 289; for information on Lighting Effects, see page 291.

### To load images and textures:

- 1 Choose the filter you want from the appropriate filter submenu.
- 2 For Texture, choose Load Texture, and locate and open a texture image. The texture must be in the Photoshop format. If you choose a color file, most filters will use only its grayscale information.
- 3 Click OK in the filter dialog box to apply the settings.

## Defining undistorted areas

The Displace, Shear, and Wave filters in the Distort submenu, and the Offset filter in the Other submenu let you choose the following ways to treat areas undefined by the filter:

- Wrap Around copies the image to fill the undefined space so that the area is filled with content from the opposite side of the image.
- Repeat Edge Pixels extends the colors of the pixels along the edge of the image in the direction specified. Banding may result if the edge pixels are different colors.

- Set to Background fills the selected area with the current background color (available for the Offset filter only).

## Using texture and glass surface controls

Five filters included in Adobe Photoshop have texturizing options—the Conté Crayon, Glass, Rough Pastels, Texturizer, and Underpainting filters. The texturizing options can make an image appear as though painted onto various 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, Artistic > 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*



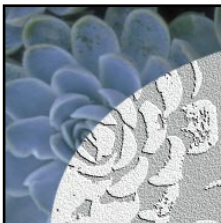
*Underpainting filter;  
Canvas texture*

## Tips for creating special effects

Try the following techniques to create special effects with filters.

**Create edge effects** When you apply an effect to only a selected part of an image, you can use various techniques to blend the effect into the original image.

For a distinct edge, apply the filter effect as is, to contrast it with the rest of the image. For a soft edge, feather the edge and then apply a filter. For a transparent effect, apply the filter, then use the Fade command to adjust the selection's blending mode and opacity. (See “Blending filter effects” on page 280 for more information.)



*Distinct edge*



*Feathered edge*

**Apply filters to layers** Another way to vary filter effects is by applying them 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 it must contain pixels (for example, it could contain a neutral fill color). For more information about this option, see “Filling a new layer with a neutral color” on page 260.

**Apply filters to individual channels** For a special effect, apply a filter to an individual channel of an image, apply a different effect to each color channel, or apply the same filter but with different settings.



*Grayscale image converted to RGB*

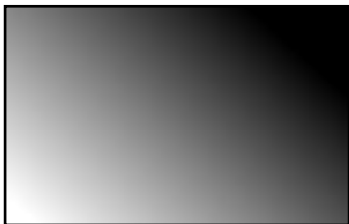


*Graphic Pen filter applied to green and blue channels*

**Create backgrounds** By applying effects to solid-color or grayscale shapes, you can generate a variety of backgrounds and textures. You can also apply a texture, and then blur it. Try these filters to create background texture: Add Noise, Chalk & Charcoal, Clouds, Conté Crayon, Craquelure, Dif-

ference Clouds, Glass, Grain, Graphic Pen, Half-tone Pattern, Mezzotint, Mosaic Tiles, Note Paper, Patchwork, Pointillize, Reticulation, Rough Pastels, Sponge, Stained Glass, Texture Fill, Texturizer, and Underpainting. Note that some filters, such as Glass, have little or no visible effect when applied to a solid color.

**Combine multiple effects with masks or with duplicate images** Use masks to combine multiple effects. By using masks to create the selection areas, you have more control over the transition from one effect to another. For example, use a mask to create a selection, and then filter the selection. Or create a smoother transition by creating a mask of the entire image, and then filling it with a black-to-white gradient fill. Paste it into the first copy of the original.



*Mask with gradient fill*



*Water Paper and Rough Pastels applied through mask*

Use two duplicate images to apply various effects to selected areas in each image, and then recombine the two images. For example, apply a different effect to each of two copies of an image, and then use the Clone option of the rubber stamp tool to paint one copy onto the other copy.

**Improve image consistency** If you're working with a series of photos of varying or poor quality, you can achieve a unified look in the final piece by applying the same effect to each image to disguise the faults of the original or to alter or enhance the mode of the image. Use the Actions palette to record and preserve the process you use to modify one image, then play back the action to other images. For more information, see Chapter 15, "Automating Tasks."



*Original too dark*



*Chalk and Charcoal filter applied*



## Improving performance with filters

Some filter effects can be memory intensive, especially when applied to a high-resolution image. You use these techniques to improve performance when applying filters:

- Try out a filter on a small portion of an image.
- Apply the effect to individual channels. If you have difficulty applying an effect to a large image, try applying the effect to each RGB channel individually. (For some filters—particularly those that modify the pixels randomly, this approach will create a different effect than applying the filter to the composite channel.)
- Change the settings. Some filters are extremely memory intensive, such as the Lighting Effects, Cutout, Stained Glass, Chrome, Ripple, Spatter, Sprayed Strokes, and Glass filters. Try different settings to increase the speed of the filter. (For example, with the Stained Glass filter, increase the cell size; with the Cutout filter, increase the Edge Simplicity or decrease the Edge Fidelity, or both.)
- If you plan to print to a grayscale printer, convert a copy of the image to grayscale before applying filters. Note, however, that in some cases applying a filter to a color image and then converting it to grayscale may not have the same effect as applying the same 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 additional information, see online help.

**Artistic filters** Give an image the appearance of different media for a more organic (and less computer-generated) look. For specific information on the Rough Pastels and Underpainting filters, see “Using texture and glass surface controls” on page 282.

**Blur filters** Soften a selection or an image and are useful for retouching images. Blur filters smooth transitions by averaging the pixels next to the hard edges of defined lines and shaded areas where significant color transitions occur in an image.

**Brush Strokes filters** Give an image 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 and can be used to create 3-D or other plastic effects. For specific information on the Glass filter, see “Using texture and glass surface controls” on page 282.

For more information about the Displace filter, see “Using the Displace filter” on page 289. For specific information on individual filters, see “Using texture and glass surface controls” on page 282 and “Defining undistorted areas” on page 282.

**Noise filters** Add or remove noise from an image and help make a selection blend into the surrounding pixels. *Noise* in an image is pixels with

randomly distributed color levels. You can use the Noise filters to remove problem areas from an image, such as dust and scratches, and to create unusual textures, such as those used as backgrounds behind title text. The Add Noise filter can also be useful in reducing banding in feathered selections and graduated fills and in giving a more realistic look to heavily retouched areas. For specific information on the Dust & Scratches filter, see page 288.

**Pixelate filters** Sharply define a selection by clumping pixels of similar color values in cells. For specific information on the Color Halftone filter, see page 287.

**Render filters** Create blending cloud patterns by varying the foreground and background color (the Clouds and Difference Clouds filters), create refraction patterns simulating light reflections in the image (the Lens Flare filter), create 3-D-like effects for lighting (the Lighting Effects filter), and create fills from a grayscale file or part of a file (the Texture Fill filter). For more information about the Lighting Effects filter, see page 291.

**Note:** *The Difference Clouds filter does not work with Lab mode images.*



When using the Clouds filter, generate a more stark cloud pattern by holding down Option (Macintosh) or Alt (Windows) as you choose Filter > Render > Clouds.

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**Sharpen filters** Focus blurry images by increasing the contrast of adjacent pixels. These include the Sharpen and Sharpen More filters, and the Sharpen Edges and Unsharp Mask filters—both of

which find the areas in the image where significant color changes occur (such as at the edges) and sharpen them. The Unsharp Mask filter is commonly used for high-end color correction; for more information, see “Step 6: Sharpen the image” on page 134.

**Sketch filters** Add fine-arts and hand-drawn effects to an image. For specific information on the Conté Crayon filter, see “Using texture and glass surface controls” on page 282.



When using the Conté Crayon filter, for a truer effect, change the foreground color to one of the common Conté Crayon colors (black, sepia, sanguine) before applying the filter.

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**Stylize filters** Produce bold, exaggerated effects by displacing pixels and by finding and heightening contrast in an image.

**Texture filters** Add texture to an image. For specific information about the Texturizer filter controls, see “Using texture and glass surface controls” on page 282.

**Video filters** Include the National Television Standards Committee Colors and De-Interlace filters. The NTSC Colors filter restricts the gamut of colors to those acceptable for television reproduction, to prevent oversaturated colors from bleeding across television scan lines. The De-Interlace filter smooths moving images captured on video by removing either the odd or even interlaced lines in a video image; the filter gives you the option of replacing the discarded lines by duplication or interpolation.

**Other filters** Let you create your own filters using the Custom filter, use filters to modify masks (the Minimum and Maximum filters), offset a selection within an image (Offset filter), and make quick color adjustments (the High Pass filter, which emphasizes very bright areas and highlights and removes shading in a selection).

For more information about defining empty areas left by the Offset filter, see “Defining undistorted areas” on page 282. For more information about the Custom filter, see “Using the Custom filter” later on this page.

**Digimarc filters** Embed a digital, invisible watermark into an image to store copyright information. For more information, see *Adobe Photoshop Getting Started*.

## Using the Color Halftone filter

The Pixelate > Color Halftone filter simulates the effect of using an enlarged halftone screen on each channel of the image. For each channel, the filter divides the image into rectangles and replaces each rectangle with a circle. The circle size is proportional to the brightness of the rectangle. To use the Color Halftone filter, you specify a screen-angle value for each channel of the image.

### To use the Color Halftone filter:

- 1 Choose Filter > Pixelate > Color Halftone.
- 2 Enter a value in pixels for the maximum radius of a halftone dot, from 4 to 127.
- 3 Enter a screen-angle value (the angle of the dot from the true horizontal) for each channel, as follows:

- Grayscale images use only channel 1.
  - In RGB images, channels 1, 2, and 3 correspond to the red, green, and blue channels.
  - In CMYK images, the four channels correspond to the cyan, magenta, yellow, and black channels, respectively.
  - Click Defaults to return all the screen angles to their default values.
- 4 Click OK.

## Using the Custom filter

The Other > Custom filter lets you change the brightness values of each pixel in the image according to a predefined mathematical operation known as *convolution*. Each pixel is reassigned a value based on the values of surrounding pixels. This operation is similar to the Add and Subtract calculations for channels. (For more information about the Add and Subtract commands, see “Calculations Blending options” on page 275.)

You can save the custom filters you create and use them with other Adobe Photoshop images.

### To create a Custom filter:

- 1 Choose Filter > Other > Custom.
- 2 Select the center text box, which represents the pixel being evaluated. Enter the value by which you want to multiply that pixel’s brightness value, from -999 to +999.
- 3 Select a text box representing an adjacent pixel to which to assign a weighted value. Enter the value by which you want the pixel in that position multiplied.

For example, to multiply the brightness value of the pixel to the immediate right of the current pixel by 2, enter 2 in the text box to the immediate right of the center text box.

4 Repeat steps 2 and 3 for all pixels to include in the operation. You don't have to enter values in all the text boxes.

5 For scale, enter the value by which to divide the sum of the brightness values of the pixels included in the calculation.

6 For Offset, enter the value to be added to the result of the scale calculation.

7 Click OK. The custom filter is applied to each pixel in the image, one at a time.

Use the Save and Load buttons to save and reuse custom filters.

## Using the Dust & Scratches filter

The Noise > Dust & Scratches filter reduces noise by changing dissimilar pixels. You specify how different pixel values should be before they are eliminated, and a radius for how far the filter should search for them. Finding the desired trade-off between sharpness and hiding defects may require trying different combinations of radius and threshold settings. If you can't make the image sharp enough, try selecting specific areas on which to use the filter.

### To use the Dust & Scratches filter:

- 1 Choose Filter > Noise > Dust & Scratches.
- 2 If necessary, adjust the preview zoom ratio until the area containing the noise is visible.

3 Drag the Threshold slider to the left to 0 levels to turn off the value so that you can examine all pixels in the selection or the image.

The Threshold option determines the degree of difference among pixels that will be affected by the filter.

***Note:** The Threshold slider gives greater control for values between 0 and 128—the most common range for images—than for values between 128 and 255.*

4 Drag the Radius slider left or right, or enter a value in the text box from 1 to 16 pixels to set how far to search for differences among pixels, until the defects disappear from the image.

Adjusting the radius makes the image blurry; stop when the value is the smallest that eliminates the defects.

5 Increase the threshold gradually by entering an exact number or by dragging the Threshold slider until it is as high as possible without displaying the defects.

6 Click OK.

## Using the Extrude filter

The Stylize > Extrude filter gives a three-dimensional texture to a selection or layer. You choose a type of three-dimensional object on which the filter is based.

### To use the Extrude filter:

- 1 Choose Filter > Stylize > Extrude.
- 2 Choose from the following types of three-dimensional objects:

- **Blocks** creates objects with a square front face and four side faces. To fill the front face of each block with the average color of the block, select the **Solid Front Faces** option. To fill the front face with the image, keep the **Solid Front Faces** option deselected.

- **Pyramids** creates objects with four triangular sides that meet at a point.

**3** Enter a value in the **Size** box to determine the length of any side of the object's base, from 2 to 255.

**4** Enter a value in the **Depth** box to indicate how far the tallest object appears to protrude from the screen, from 0 to 255.

**5** Choose a depth option: **Random** to give each block or pyramid an arbitrary depth, or **Level-based** to make each object's depth correspond to the overall brightness of the object; brighter objects appear to protrude more than dark objects.

**6** Select **Mask Incomplete Blocks** to hide any object that extends beyond the selection.

**7** Click **OK**.

## Using the Displace filter

The **Distort > Displace** filter uses a second image (called a *displacement map*) to determine how to distort the selection. For example, using a parabola-shaped displacement map, you can create an image that appears as though it were printed on a cloth held at its corners. You can use any file in the Adobe Photoshop format, except one in **Bitmap** mode, for a displacement map. The Adobe Photoshop software also includes several maps useful for

experimenting (search for the **Displacement Maps** folder on the Macintosh or the **Dispmaps** folder in Windows).

The **Displace** filter shifts a selection using a color value from the displacement map: 0 is the maximum negative shift, 255 is the maximum positive shift, and a gray value of 128 produces no displacement. (You can use the **Curves** dialog box to modify a gradient to get a particular effect.) If a map has one channel, the image shifts along a diagonal defined by the horizontal and vertical scale ratios. If the map has more than one channel, the first channel controls the horizontal displacement, and the second channel controls the vertical displacement.

### To use the Displace filter:

**1** Choose **Filter > Distort > Displace**.

**2** Enter the scale for the magnitude of the displacement.

When the horizontal and vertical scale are set to 100%, the greatest displacement is 128 pixels (because middle gray produces no displacement).

**3** If the displacement map is not the same size as the selection, choose how the map will fit the image: **Stretch to Fit** to resize the map, or **Tile** to fill the selection by repeating the map in a pattern.

**4** Choose from the following options to determine how to treat areas of the image undefined by the distortion:

- **Wrap Around** copies the image to fill the undefined space so that the area is filled with content from the opposite side of the image.

- Repeat Edge Pixels extends the colors of the pixels along the edge of the image in the direction specified. Banding can result if the edge pixels are different colors.

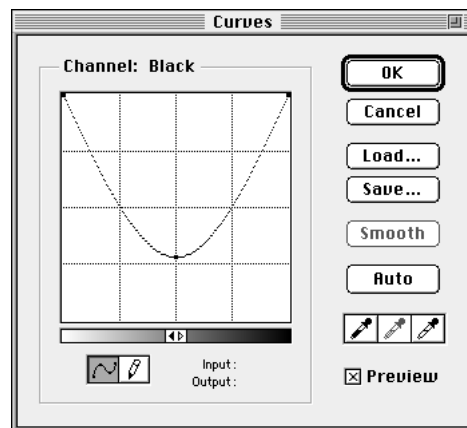
5 Click OK.

6 Select and open the displacement map. The distortion is applied to the image.

**To make a parabola-shaped displacement map and create a sagging image effect:**

- 1 Start with a new grayscale image. (For best performance, use small images.)
- 2 Set the foreground color to black and the background color to white.
- 3 Double-click the gradient tool and choose Foreground to Background for Gradient in the Gradient Tool Options palette. Then drag the gradient tool from left to right in the image window to make a linear gradient fill.

4 Using the Curves dialog box, draw a parabola that dips down from the upper left corner of the dialog box and back to the upper right corner. Then click OK.



5 Save the image to disk in the Photoshop format; this is the shape of the displacement map.

6 To apply the displacement map, open the image you want to displace, and choose Filter > Distort > Displace.

7 Set the horizontal scale to 0% and the vertical scale to 50%. Select the Stretch to Fit option.

8 Select the displacement map that you saved in step 4.

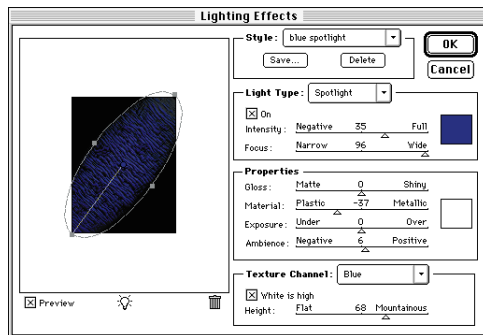
9 Click Open.

## Using the Lighting Effects filter

The Render > Lighting Effects filter lets you apply up to 17 different light styles to an RGB image. You can choose from three different types of lights and from four sets of properties for each image. You can also save your own styles for use in other images.

By varying the number of lights, the light types, and the light properties, you can produce myriad lighting effects. You can also use textures from grayscale files (called *bump maps*) to produce 3-D-like lighting effects.

**Note:** The Lighting Effects filter works only on RGB images.

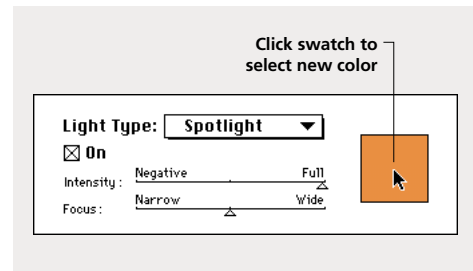


### To use the Lighting Effects filter:

- 1 Choose Filter > Render > Lighting Effects.
- 2 For Style, choose a style. Press Tab to cycle through the lights in a style. For more information, see “Choosing a Lighting Effects style” on page 294.

3 For Light Type, choose a type. For more information, see “Choosing a Lighting Effects type” on page 292. If you’re using multiple lights, select and deselect On to turn individual lights on and off.

4 To change the color of the light, click the color swatch in the Light Type section of the dialog box.



The color picker chosen in the General Preferences dialog box opens. For more information, see “Using the Adobe Photoshop Color Picker” on page 222, “Using the Apple Color Picker” on page 225, or “Using the Windows Color Picker” on page 226.

5 To set light properties, drag the corresponding slider for the following options:

- Gloss determines how much the surface reflects light (as on the surface of a piece of photographic paper) from Matte (little reflectance) to Glossy (high reflectance).
- Material determines whether the light or the object on which the light is cast reflects more light: choose Plastic to reflect the light’s color or choose Metallic to reflect the object’s color.

- Exposure increases the light (positive values) or darkens the light (negative values). A value of 0 has no effect.
- Ambience diffuses the light as if it were combined with other light in a room, such as sunlight or fluorescent light. Choose a value of 100 to use only the light source; a value of -100 removes the light source. To change the color of the ambient light, click the color swatch and use the Color Picker that appears.



To duplicate a light, Option-drag (Macintosh) or Alt-drag (Windows) the light within the preview box.

**6** To use a texture fill, choose a channel for Texture Channel. See “Using a Lighting Effects texture” on page 295.

**7** Click OK to apply the filter.

#### To delete a light:

In the Lighting Effects dialog box, drag the light by its center circle to the Trash icon at the bottom right of the preview box.

### Choosing a Lighting Effects type

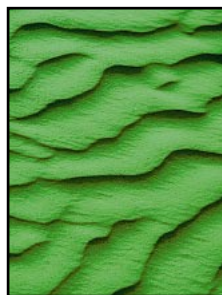
You can choose from three light types.

- Omni shines in all directions from directly above the image, as if a light bulb were over a piece of paper.



*Omni light*

- Directional shines light from far away, like the sun, so that the light angle does not change.



*Directional light*

- Spotlight casts an elliptical beam of light. The line in the preview box defines the light direction and angle, and four boxes define the edges of the ellipse.

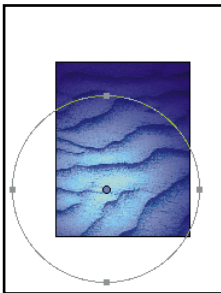




*Spotlight*

**To adjust an Omni light:**

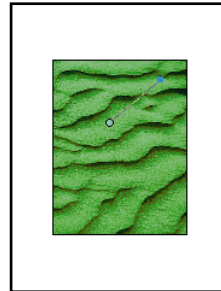
- 1 Choose Filter > Render > Lighting Effects.
- 2 For Light Type, choose Omni.
- 3 Choose from the following:
  - To move the light, drag the center circle.
  - To increase or decrease the size of the light (as if the light were moving closer to or farther away from the paper), drag one of the four boxes, which define the edges of the effect.



- 4 Click OK to apply the filter.

**To adjust the angle and height of the directional light using the preview box:**

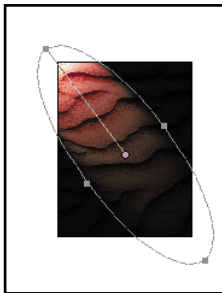
- 1 Choose Filter > Render > Lighting Effects.
- 2 For Light Type, choose Directional.
- 3 Choose from the following:
  - To move the light, drag the center circle.
  - To change the direction of the light, drag the black square at the end of the line to rotate the light's angle. Command-drag (Macintosh) or Ctrl-drag (Windows) to keep the light's height (line length) constant.
  - To change the light's height, drag the square at the end of the line that represents the height of the light: Shorten the line to create a very bright light; if the line gets too short, it produces pure white light. Lengthen the line for a less intense light; a very long line produces no light. Shift-drag to keep the angle constant and change the light's height (line length).



- 4 Click OK to apply the filter.

**To adjust the angle and height of the spotlight using the preview box:**

- 1 Choose Filter > Render > Lighting Effects.
- 2 For Light Type, choose Spotlight.
- 3 Choose from the following:
  - To move the light, drag the center circle.
  - To increase or decrease the light angle, drag the black square at the end of the line to shorten or lengthen the line, respectively
  - To stretch the ellipse or rotate the light, drag one of the four boxes. Shift-drag to keep the angle constant and change only the size of the ellipse. Command-drag (Macintosh) or Ctrl-drag (Windows) to keep the size constant and change the angle or direction of the spotlight.



- To set the light focus (or spotlight intensity), and control how much of an ellipse is filled with light, drag the Intensity slider: Full intensity (a value of 100) is brightest; Normal intensity is about 50; a negative intensity takes away light; -100 intensity produces no light. Use the Focus slider to control how much of the ellipse is filled with light.
- 4 Click OK to apply the filter.

## Choosing a Lighting Effects style

Use the Style menu in the Lighting Effects dialog box to choose from 17 light styles. You can also create your own lighting style by adding lights to the Default setting. The Lighting Effects filter requires at least one light source. Only one light can be active for editing at a time, but all of the lights will be used to create the effect.

**Note:** The names of these styles are abbreviated in Windows.

**Default** One yellow spotlight with a medium intensity and a wide focus.

**2 o'clock Spotlight** One yellow spotlight with medium (17) intensity and wide (91) focus.

**Blue Omni** One blue overhead omni light with full (85) intensity and no focus.

**Circle of Light** A spotlight made up of red, blue, yellow, and white lights with full (100) intensity and a concentrated (8) focus.

**Crossing** A white spotlight with medium (35) intensity and a concentrated (8) focus.

**Crossing Down** Two white spotlights with medium (35) intensity and wide (100) focus.

**5 Lights Down/5 Lights Up** Five white spotlights down or up, respectively, with full (100) intensity and wide (60) focus.

**Flashlight** An omni yellow light with medium (46) intensity.

**Flood Light** A white spotlight with medium (35) intensity and wide (69) focus.

**Parallel Directional** A directional blue light with full (98) intensity and no focus.

**RGB Lights** A red, blue, and green light that produces a white spotlight of medium (60) intensity and wide (96) focus.

**Soft Direct Lights** Two unfocused whitish and blue directional lights of soft (20) intensity.

**Soft Omni** A soft omni light of medium (50) intensity.

**Soft Spotlight** A white spotlight with full (98) intensity and white (100) focus.

**Three Down** Three white spotlights with soft (35) intensity and wide (96) focus.

**Triple Spotlight** Three spotlights with slight (35) intensity and wide (100) focus.

#### **To add a light:**

In the Lighting Effects dialog box, drag the light icon at the bottom of the dialog box into the preview area. Repeat as desired for a maximum of 16 lights.

#### **To create a new style:**

- 1 In the Lighting Effects dialog box, choose Default for Style.
- 2 Drag the light icon at the bottom of the dialog box into the preview area. Repeat as desired for a maximum of 16 lights.

#### **To save a style:**

- 1 In the Lighting Effects dialog box, click Save.
  - 2 Name the style, and click OK.
- Saved styles include all the settings for each light and appear in the Style menu whenever you open the image.

#### **To delete a style:**

- 1 In the Lighting Effects dialog box, choose a style for Style.
- 2 Click Delete.

### **Using a Lighting Effects texture**

The Texture Channel in the Lighting Effects dialog box lets you use a grayscale texture such as paper or water to control how light reflects off an image. You can use a channel from any image as a texture, or create your own texture, such as 3-D bumps that bounce light from their surface; the texture channel sets the height of the bumps. For an embossed text effect, use a channel with white text on a black background, or vice versa.

#### **To use the Texture Channel in the Lighting Effects dialog box:**

- 1 If necessary, create an alpha channel in your image and add texture to it. To use a texture from another image, copy and paste the image into a new channel. For more information, see “Creating a new alpha channel” on page 238.
- 2 In the Lighting Effects dialog box, choose a channel from the Texture Channel menu: the image’s Red, Green, or Blue channel, or any channel added to the image.
- 3 Select White is High to raise the white parts of the channel from the surface. Turn off this option to raise the dark parts of the channel from the surface.
- 4 Drag the Height slider to vary the texture from Flat (0) to Mountainous (100).
- 5 Click OK.

## Using the Trace Contour Filter

The Stylize > Trace Contour filter finds the transitions of major brightness areas and thinly outlines them for each color channel, similar to the Find Edges filter.

### To use the Trace Contour filter:

- 1 Choose Filter > Stylize > Trace Contour.
- 2 Choose an Edge option to outline areas in the selection: Lower outlines where the color values of pixels fall below the specified level; Upper outlines where the color values of pixels are above the specified level.
- 3 Enter a threshold (Level) for evaluating color values (its tonal level), from 0 to 255. You can experiment to see what values bring out the best detail in the image.

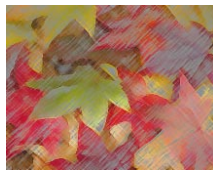
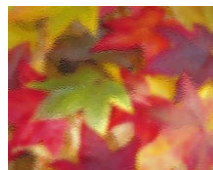
4 Use the Info palette in Grayscale mode to identify a color value that you want traced; then enter the value in the Level text box. For more information, see “Customizing the Info palette” on page 26.

5 Click OK.

## Photoshop Filter Sample Gallery

The following pages show examples of effects using filters included in Adobe Photoshop. For additional information on filters, see online help.

## ARTISTIC

*Original**Colored Pencil**Cutout**Dry Brush**Film Grain**Fresco**Neon Glow**Paint Daubs**Palette Knife**Plastic Wrap**Poster Edges**Rough Pastels**Smudge Stick**Sponge**Underpainting**Watercolor*

## BLUR

*Original**Blur More**Gaussian Blur, radius 4**Gaussian Blur, radius 8**Motion Blur**Radial Blur, spin**Radial Blur, zoom**Smart Blur*

**BRUSH  
STROKES**



*Original*



*Accented Edges*



*Accented Edges, brighter*



*Angled Strokes*



*Crosshatch*



*Dark Strokes*



*Ink Outlines*



*Spatter*



*Sprayed Strokes, diagonal*



*Sprayed Strokes, vertical*



*Sumi-e, high contrast*



*Sumi-e, smooth*

**DISTORT**



*Original*



*Diffuse Glow*



*Displace*



*Glass, tiny lens texture*



*Glass, blocks texture*



*Ocean Ripple*



*Pinch*



*Polar Coordinates*



*Ripple*



*Shear*

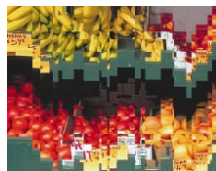
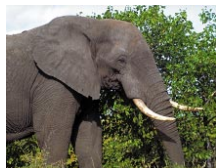
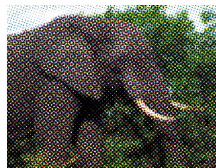


*Spherize*



*Twirl*



**DISTORT***Wave, sine type**Wave, square type**ZigZag, out from center**ZigZag, pond ripples***NOISE***Original**Add Noise, 25**Add Noise, 55**Median***PIXELATE***Original**Color Halftone**Crystallize**Facet**Fragment**Mezzotint**Mosaic**Pointillize***RENDER***Original**Clouds**Difference Clouds**Lens Flare***SHARPEN***Original**Sharpen Edges**Sharpen More**Unsharp Mask*

SKETCH



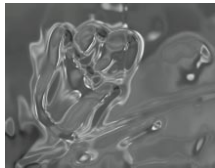
Original



Bas Relief



Chalk & Charcoal



Chrome



Conté Crayon



Graphic Pen



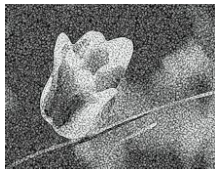
Note Paper



Photocopy



Plaster



Reticulation



Stamp



Water Paper

STYLIZE



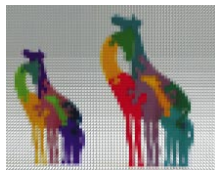
Original



Diffuse



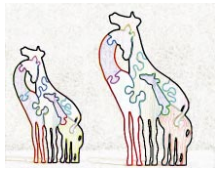
Emboss



Extrude, pyramids



Extrude, blocks



Find Edges



Glowing Edges



Solarize

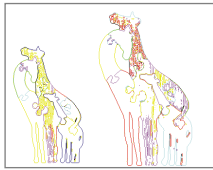
STYLIZE



Tiles, inverse image



Tiles, background color



Trace Contour



Wind



## TEXTURE

*Original**Craquelure**Grain**Mosaic Tiles**Patchwork**Stained Glass**Texturizer, burlap texture**Texturizer, custom texture*



# Chapter 13: Saving and Exporting Images

**A**dobe 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 Photoshop features such as clipping paths when placing images in other applications.

File format and export choices appear either in the Save As or Save a Copy dialog box or in the Export menu. If a file format does not appear, install the format's plug-in module following the instructions in "Using plug-in modules" on page 31. For information on a specific format, see "About file formats" on page 318.

## Saving files

Adobe Photoshop provides several ways for you 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 an identical or flattened copy of the file. This command leaves the original file intact.

**Note:** Some formats are available only for certain color modes. For example, PixelPaint™ (Macintosh) is available for indexed-color and grayscale images. In addition, many formats are available only if an image has no additional layers 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 Format (Macintosh) or Save As (Windows), choose a format. Unavailable formats are dimmed (Macintosh) or not visible (Windows).
- 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 318.

### To save a duplicate of a file:

- 1 Choose File > Save a Copy.

2 For Format (Macintosh) or Save As (Windows), choose a format.

3 To flatten all visible layers, select Flatten Image. See “Flattening all layers” on page 271 for information on flattened images.

4 To remove alpha channels from the image, select Don’t Include Alpha Channels.

5 Click Save.

**Note:** To copy an image without saving it to your hard disk, use the Duplicate command. See “Duplicating images” on page 174 for more information.

## Using image previews on the Macintosh

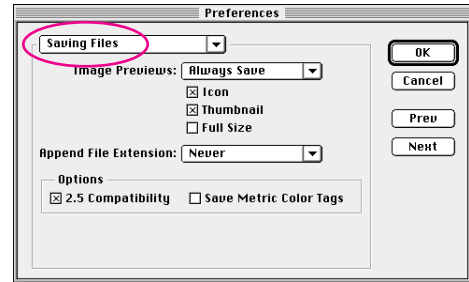
On the Macintosh, you can choose to save your files with the following types of image previews:

- File icons are the preview icons you see on the desktop.
- Thumbnails are the image previews that appear in the Open dialog box.
- Full size previews are images intended for use in applications that open Adobe Photoshop images but require 72 ppi images. For non-EPS files, this is a PICT preview.

The Full Size preview option is off by default. Turning off the other preview options can make saving faster and requires less file storage space on your disk.

### To set options for image previews:

1 Choose File > Preferences > Saving Files.



2 For Image Previews, choose one of the following options:

- Never Save to save files without previews.
- Always Save to save files with the specified preview or previews.
- Ask When Saving to assign previews on a file-by-file basis when you save.

3 If you chose Always Save, select the preview or previews you want to use.

4 Click OK.

## Using image previews in Windows

In Windows, you can choose to save images with a thumbnail preview that appears in the Open dialog box. In Windows NT 4.0 and Windows 95, you can also generate preview icons for files that have been saved.

### To set options for thumbnail previews:

1 Choose File > Preferences > Saving Files.

2 For Image Previews, choose one of the following options:

- Never Save to save files without previews.
- Always Save to save files with the specified preview or previews.
- Ask When Saving to assign previews on a file-by-file basis when you save.

3 Click OK.

**To generate a preview icon for a file (Windows NT 4.0 and Windows 95 only):**

- 1 Save the file.
- 2 Choose File > Save As.
- 3 Position the pointer on the filename in the file list, click the right mouse button, and choose Properties from the context menu that appears.
- 4 Click the Photoshop Image tab.
- 5 For Icon Thumbnails, select the desired preview icon. To have the file appear without a preview icon, select Don't Generate.
- 6 Click OK.

### Using file extensions (Macintosh only)

On the Macintosh, you can have Adobe Photoshop append the file extension to the name of a file when you save it. This three-character file extension refers to the file's format (for example, the extension for a JPEG file is .jpg). Saving files with extensions is useful when you want to use the files on a system running Windows.

**To append file extensions to filenames:**

- 1 Choose File > Preferences > Saving Files.

2 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 when you save.

3 Click OK.

### Saving files without extra alpha channels

When saving, Adobe Photoshop always preserves the alpha channels in your image if the file format supports it. If your target application requires that these alpha channels be removed to properly read the file, choose File > Save a Copy to create a new file, select Don't Include Alpha Channels, and save the file.

### 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 original. The captions and keyword entries can also be searched by some third-party image browsers.

On the Macintosh, you can add file information to files saved in any format. In Windows, you can add file information to files saved in the Photoshop, TIFF, and JPEG formats.

**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 308.
- 3 Choose additional sections if desired, and fill in the file information. To move in forward sequence through the sections, click Next; to move in backward sequence, click Previous.
- 4 When you've finished adding information, 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** Can contain up to 2000 characters. Up to 32 characters can be entered for Caption Writer. Both the headline text and the special instructions can contain up to 255 characters.

**Note:** *To print the caption under an Adobe Photoshop image, choose File > Page Setup and select Caption. Then print as usual. For more information on printing, see Chapter 14, "Printing."*

**Keywords** Provides a way for some image browsers to categorize and search for an image. Type up to 31 characters 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 the replacement in the text box, and click Replace. To delete a keyword, select the word in the list, 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 Supplemental Categories, and click Add. To replace a category, select the code in the list, type the replacement, and then click Replace. To delete a category, select the code in the list, 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 in the Credits section text boxes. All entries are limited to 32 characters.

**Origin** Provides critical information on the history of the image. The Object Name field contains a short identification for the object, such as *Montgomery Street*. You can enter up to 64 characters for the name. The date entry can be in any format. To enter the current date in a short text format (for example, Oct. 25, 1996), click Today.

The City, Province-State, and Original Transmission Reference fields can contain up to 32 characters. The Country field can contain up to 64 characters.

**Copyright & URL** Provides copyright information that is not included as part of the IPTC specification. Click Mark as Copyrighted if you want to indicate that the image is copyrighted, and type a copyright notice. If you have a Web site with information pertaining to the image, you can specify the URL for that Web site.

## **Saving Adobe Photoshop files**

Adobe Photoshop is the default file format for newly created images. This encoded format is the only format that supports all available Adobe Photoshop image modes (Bitmap, Grayscale, Duotone, Indexed Color, RGB, CMYK, Lab, and Multichannel), guides, grids, alpha channels, and layers (including adjustment layers).

If you're exporting Photoshop files to a page-layout program that doesn't support the Adobe Photoshop format, use the Save a Copy command to save a duplicate file in a format supported by the page-layout program.

***Note:** Only files that were created in Adobe Photoshop 4.0 support adjustment layers, guides, and grids. If you edit or save a file using an earlier version of Photoshop, these features are discarded from the file.*

## **Saving Adobe Photoshop 2.0 files (Macintosh only)**

Choose the Photoshop 2.0 format when you need to open a Photoshop file in version 2.0 of Adobe Photoshop, or when you are exporting to an application that supports only Photoshop 2.0 files. Saving in Photoshop 2.0 format flattens your file and discards layer information.

## **Saving Adobe Photoshop files as Adobe Photoshop 2.5 files**

If you're planning to use a file created in Adobe Photoshop 4.0 in an application that supports only Photoshop 2.5 files, you can still save the file in Photoshop format. By default, the Photoshop format saves a copy of the flattened data that can be used by programs that read Photoshop 2.5 files.

***Important:** Adobe Photoshop 2.5 and Adobe Photoshop 2.5.1 can open only files that contain no more than 16 channels. Files with more channels will not open.*

Saving a Photoshop file with Photoshop 2.5 compatibility turned on does increase the file size. If you plan to work only in Adobe Photoshop 4.0, you can turn off Photoshop 2.5 compatibility to minimize the file size of saved files.

### **To turn off Photoshop 2.5 compatibility:**

- 1 Choose File > Preferences > Saving Files.
- 2 Deselect 2.5 Format Compatibility, and click OK.

## **Saving files in Photoshop EPS format**

When you save a file in Encapsulated PostScript (EPS) format, you can choose from a variety of options, as described in the following sections.

***Note:** When exporting Adobe Photoshop images intended for four-color process printing from Adobe Illustrator, make sure that the image is in CMYK mode before saving it in Photoshop EPS format.*

**Preview** You can save a TIFF preview of an Photoshop EPS file. On the Macintosh, you can also save a PICT preview. These preview images give you an idea of how the image will look when it is printed and help you accurately place the image on the page. On the Macintosh, choose a TIFF option to save a preview for use with an IBM® PC-compatible application.

**Note:** *To use the 24-bit JPEG preview option on the Macintosh, you must have QuickTime installed.*

**Encoding** When saving images in Photoshop EPS format and when printing to PostScript output devices, you can choose from three types of encoding options: ASCII encoding is the most generic, but creates the largest output files. If you're working in Windows, use ASCII encoding. Binary encoding makes a smaller output file (speeding the transfer of the file to your output device) without modifying the original data. JPEG encoding makes even smaller output files, but the technique used to compress JPEG files may reduce the quality of your printed output. Files with JPEG encoding can only be printed on Level 2 PostScript printers and may not separate into individual plates. It's best to choose JPEG's maximum quality if you plan to print the files.

Some page layout applications may not support binary Photoshop EPS files. For these applications, you should select the ASCII encoding option. Some commercial print spooling and network printing software does not support binary encoding. If you experience printing errors, it may be that your print spooler requires ASCII encoding.

**Clipping Paths** If you plan to use a path from the file as a clipping path, select the path, and set a flatness value if needed. See "Using clipping paths" on page 322 for more information about clipping paths and flatness values.

**Halftone Screen and Transfer functions** You can choose to include the EPS file halftone screen information (including the frequencies and angles of the screens) and transfer function information when you save the file. If you include the halftone screen information and place the file into another application, such as Adobe Separator™, the PostScript language interpreter uses these screen settings when the color separations are generated. The transfer information overrides the printer's default functions if you have checked the Override Printer's Default Functions option in the Transfer Functions dialog box. For more information on the transfer function, see "Compensating for dot gain using transfer functions" on page 92.

**DCS** When you save a CMYK image in Photoshop EPS format, you have the option of saving the image in an extension of the standard EPS format, developed by Quark, called Desktop Color Separations (DCS). The DCS format enables certain applications, such as QuarkXPress, to read imported Photoshop files and print color separations. Saving in DCS format creates five files: one file for each of the color channels in the CMYK image and a fifth master file corresponding to the composite color channel. To save the file in standard EPS format without the DCS option, choose Off.

When you turn on the DCS option, you can choose to include a 72-ppi grayscale or color version of the image in the master file. You can then



proof the image by printing this low-resolution file from the destination application. If you want to proof the color accurately, choose On (72 pixels/inch color); keep in mind, however, that this option may substantially increase the file size. If you're certain that you will print directly to film, choose On (no composite PostScript).

**Transparent Whites** Select Transparent Whites to make the white areas in an image appear transparent. This option is available only when saving a Bitmap-mode image in Photoshop EPS format.

### **Saving files in JPEG format**

When saving in JPEG format, you can specify an image quality and compression level for the file. To specify image quality, enter a value between 0 and 10 or choose an option for Quality; to specify the amount of compression, drag the slider. A trade-off exists between the image quality and the amount of compression; an image compressed using Maximum quality is less compressed (and thus takes up more disk space) than an image compressed using the Low quality option.

In addition, you can select a format option for the JPEG file. To optimize the color quality of the image, select Baseline Optimized. To save the file as a progressive JPEG, select Progressive. This option displays the image gradually as it is downloaded from a Web browser, using a series of scans to show increasingly detailed versions of the entire image until all of the data has finished downloading. However, progressive JPEG images require more RAM for viewing and are not supported by

all Web browsers. When you select Progressive, you can also specify the number of progressive scans.

## **Exporting images**

Adobe Photoshop includes plug-in modules for creating GIF files for online display, exporting paths to Adobe Illustrator, and saving Quick Edit files (see “Opening QuickEdit files” on page 57 and “Exporting paths to Adobe Illustrator” on page 324).

The GIF89a Export module lets you convert RGB images to indexed-color GIF files and specify the number of colors you want the file to have. In addition, the command lets you designate transparent areas in your GIF images for use in hypertext markup language (HTML) documents used on the World Wide Web. Adobe Photoshop 4.0 can open and save CompuServe® GIF files that are either 8-bit indexed color or grayscale.

### **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, you can use layers in Adobe Photoshop to define what parts of the image you want to appear transparent. The GIF89a export feature then lets you convert

the image to indexed color, choose a transparency color for the Web browser, and save the image as a GIF file.

**To export an RGB image to GIF:**

1 If you want to include only part of the RGB image in your HTML document, select that part of the image and feather it if desired. Copy the selection onto a new, transparent layer. Be sure to hide any layers that you do not want to include in the GIF file. For more information, see Chapter 11, “Using Layers.”



*Original*



*Selection copied to transparent layer*

2 Choose File > Export > GIF89a Export.

3 To display transparent areas of the image as a solid color, do one of the following:

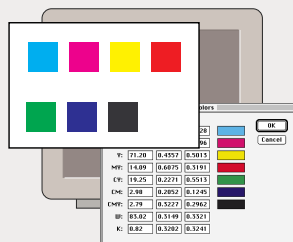
- To make transparent areas the same color as the Web browser window background, leave the Transparency Index Color box at the default color. The default color is Netscape gray, which is 192 R, 192 G, and 192 B.

- To change the color used for displaying transparent areas, click the Transparency Index Color box, and choose a new color, as described on page 225. Click OK.

4 For Palette, choose one of the following options:

- Exact to create a palette using the colors in the image. This option is not dimmed (Macintosh) or visible (Windows) only if the image contains 256 or fewer colors.
  - Adaptive to create a palette using a representative sample of colors in the image. Use this option for the best results if the Exact option is unavailable. When multiple images are displayed simultaneously, the Netscape 1.1 (or higher) browser dynamically creates a color table using the adaptive palettes.
  - System to create a color table using the computer's built-in color palette. Note that the System option may produce unexpected results when the image is displayed on an 8-bit monitor using a different built-in palette.
- 5 To select a custom palette that you have created in Adobe Photoshop, click Load, and locate and select a custom palette. Then click OK.

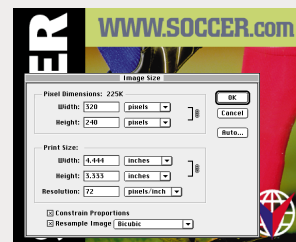
**PREPARING IMAGES FOR ONLINE DISTRIBUTION** When you distribute an image online, such as through electronic mail or on a Web page, several factors affect the quality and speed of output, including your color calibration settings, the file size and resolution, and the file format you use for the final images.



1. Adjust the Printing Inks Setup settings to ensure color consistency between applications. (Chapter 5, page 103).



2. Create and composite the image in Adobe Photoshop, and apply color correction to the image. (Chapters 6–12).



3. Determine the display dimensions for the on-screen image, based on the monitor resolution and file size needed for the image (Chapter 3, page 42).



4. Save the file in JPEG format or export the file in GIF89a format, depending on your display requirements (page 327).



5. For the GIF89a Export module, choose the number of colors and the transparency color (pages 321 and 324).



6. Link the file to the HTML document or convert the file to PDF format (page 329).

**6** If you have loaded a custom palette or chosen the System palette option, select Use Best Match to use the colors from the palette that best represent the image.



**7** If you have chosen the Adaptive palette option, select or type in the smallest number of colors that retains the necessary detail in your image.

Note that the effect of reducing the number of colors on the file size will vary significantly with images of different dimensions and color content. In small-sized images, the effect on file size is insignificant.

**Note:** *You can reduce the number of colors in an image only when exporting an RGB image to GIF. To reduce the number of colors in an indexed-color image, convert the image to RGB mode, and then export the image using the GIF module.*

**8** To see how the image will appear in the Web browser, click Preview.

**9** To navigate the preview, use the following methods:

- To move the image within the preview window, select the hand tool and drag over the image. To fit all of the image in the window, double-click the hand tool (.
- To increase the magnification, select the zoom-in tool and click the part of the preview that you want to magnify. For a 100% preview, double-click the zoom-in tool (.
- To reduce the magnification, hold down Option (Macintosh) or Alt (Windows) and click the part of the preview you want to reduce.



To use the viewing tools quickly when working in the GIF89a Export Preview, use the following shortcuts:

- To activate the zoom-in tool, press Command (Macintosh) or Ctrl (Windows).
- To activate the zoom-out tool, press Option (Macintosh) or Alt (Windows).
- To activate the hand tool, press the spacebar.

**10** Click OK to close the preview window.

**11** If dissatisfied with the results, hold down Option (Macintosh) or Alt (Windows) and click Reset to restore the colors in the image. Repeat steps 3 through 8 as needed.

**12** To determine how the image displays as it is downloaded in the Web browser, do one of the following:

- Select Interlaced to display the image gradually in increasing detail as it is downloaded.
- Deselect Interlaced to use your image as a background or texture.

**13** If the file contains a caption that you want to include as a comment in the GIF header, select the Export Caption option. For more information, see “Adding file information” on page 307.

**14** Click OK to export the file. 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 use the GIF89a Export dialog box to choose transparency options for the GIF image. You can select more than one color to be transparent. For

information on indexed-color images, see “Indexed color mode” on page 69 and “Converting to indexed color” on page 76.

For the most control, however, you may want to convert your image to RGB, create transparency in Photoshop using layers, and then convert the RGB image to GIF. Creating transparency in RGB mode lets you feather transparent areas. Converting to GIF from RGB also lets you reduce the number of colors in an indexed-color image. See the previous section, “Exporting RGB images to GIF,” for more information.

#### **To export an indexed-color image to GIF:**

**1** Choose File > Export > GIF89a Export.

**2** To define specifically colored areas of the image as transparent, click the eyedropper-plus tool and click the desired areas in the preview or the desired colors from the swatches. Then do one of the following:

- To make transparent areas the same color as the browser window background, leave the Transparency Preview Color box at its default. (The default is Netscape gray—192 R, 192 G, and 192 B.)
- To change the color used for displaying transparent areas, click the Transparency Preview Color box. Choose a new color, as described on page 225. Click OK.

**Note:** *If your background color is the same color as another element in the image and you want only the background to be transparent, you must create an alpha channel to mask the background. See the next section for instructions.*

**3** To designate additional colors in the image as transparent areas, click the eyedropper-plus (👉) tool and click the colors in the preview or in the set of swatches. The selected colors appear highlighted in the swatches.

**4** To preview the image, follow the navigation guidelines described in step 8 of the previous procedure.

**5** If dissatisfied with the results, do one of the following:

- To restore a single color in the image, hold down Option (Macintosh) or Alt (Windows) and click the eyedropper-plus tool to switch to the eyedropper-minus tool. Click a swatch to restore the color.



To activate the eyedropper-minus tool while the eyedropper-plus tool is selected in the GIF89a Export Preview, press Command (Macintosh) or Ctrl (Windows); to activate the eyedropper-plus tool while the eyedropper-minus tool is selected, press Shift.

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- To restore all colors in the image, hold down Option (Macintosh) or Alt (Windows) and click Reset. Repeat steps 2 and 3 as needed.
- 6** Select or deselect the Interlaced and Export Caption options, as described in steps 11 and 12 of the previous procedure.
- 7** Click OK to export the file. Choose a location for the exported file, and click Save.

### Exporting an indexed-color image to GIF with a transparent background

If you are exporting an indexed-color image to GIF and want only the background to appear transparent, you may want to use an alpha channel to mask the background first. For example, certain elements in your image might have the same color as the background; if you define the background color as transparent, these elements will also appear transparent. By using a mask, you can apply transparency to just the background without affecting the elements that you want to remain visible. See Chapter 10, “Using Channels and Masks,” for complete information on alpha channels.

Alternatively, you can convert the image to RGB mode, place the foreground selection on a new transparent layer, and hide the background before exporting the image to GIF. Converting the image to RGB lets you feather your selection and reduce the number of colors in an adaptive palette image when you convert the image to GIF (see “Exporting RGB images to GIF” on page 311). See Chapter 11, “Using Layers” for more information on working with layers.

### To export an indexed-color image to GIF with a transparent background:

- 1 In the image, select the area that you want to remain visible.
- 2 Click the Save Selection button at the bottom of the Channels palette to create an alpha channel based on your selection. Note the name of the channel in the palette.
- 3 Choose File > Export > GIF89a Export.
- 4 For Transparency From, choose the alpha channel that you just created.

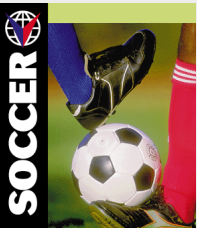


To invert what will be transparent in the image, hold down Option (Macintosh) or Alt (Windows) as you choose a channel for Transparency From in the GIF89a Export Options dialog box.

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- 5 Choose additional export options as described in the previous procedure, “To export an indexed-color image to GIF.”
- 6 Click OK to export the file. Choose a location for the exported file, and click Save. The extension .gif is added automatically to the filename.

**JPEG OR GIF?** For online display, such as on the World Wide Web, JPEG images give you the best color and the smallest file size. If your image contains line art or needs to have transparent areas, use the GIF89a Export command. To keep file size to a minimum, choose Image > Mode > Indexed Color, and use the fewest number of colors that still give good results (compare the examples below). For continuous-tone images, the Adaptive palette gives the best results.

ORIGINAL	INDEX COLOR ADAPTIVE: Dither Diffusion	INDEX COLOR SYSTEM: Use Best Match	INDEX COLOR ADAPTIVE: Dither None	
 <p>4" x 4.5", 223K</p>	 <p>62K</p>	 <p>42K</p>	 <p>47K</p>	256 colors
 <p>JPEG high: 39K</p>	 <p>47K</p>	 <p>35K</p>	 <p>34K</p>	128 colors
 <p>JPEG low: 22K</p>	 <p>31K</p>	 <p>22K</p>	 <p>14K</p>	16 colors

## About file formats

The following sections discuss the various file formats you can use to get images into and out of Adobe Photoshop. See Chapter 3, “Getting images into Photoshop,” for information on opening files; see the beginning of this chapter for information on saving files.

### BMP

BMP is the standard Windows bitmap image format on DOS and Windows-compatible computers. When saving an image in this format, you can specify either Microsoft Windows or OS/2® format and a 1-bit to 24-bit depth for the image. For 4-bit and 8-bit images, you can also choose to use Run-Length-Encoding (RLE) compression; this compression scheme is lossless, that is, it does not discard detail from the image.

### Photoshop EPS

The Encapsulated PostScript (EPS) language file format is supported by most illustration and page-layout programs, and in most cases is the preferred format for these applications. Note that Photoshop EPS also supports transparent whites in Bitmap mode. For more information on EPS options, see “Saving files in Photoshop EPS format” on page 309.

### EPS TIFF or EPS PICT Preview

You can use these formats to open files saved in applications 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.

### Filmstrip

The Filmstrip format is used for animation or movie files created by Adobe Premiere. Only images that were exported from Adobe Premiere in the Filmstrip file format can be saved in the Filmstrip file format in Adobe Photoshop. When editing a Filmstrip file in Adobe Photoshop, you must not resize or crop if you plan to export the image back into Adobe Premiere. For further guidelines, see the *Adobe Premiere User Guide*.

### CompuServe GIF

The CompuServe 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 compressed format that is designed to minimize file transfer time over phone lines.

Adobe Photoshop 4.0 can save Bitmap mode, grayscale, or indexed-color images in the CompuServe GIF format. When saving an image as GIF, you can specify how the image appears as it is downloaded. Select Interlaced to display the image gradually in increasing detail as it is downloaded.



The GIF89a Export command lets you specify the appearance of transparent areas in the image and save an RGB image in the GIF format. For more information, see “Exporting images” on page 311.

## 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, including DeluxePaint from Electronic Arts; IFF is the best export format to use with that program.

## 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. Unlike the GIF format, JPEG retains all the color information in an RGB image. JPEG also uses a compression scheme that effectively reduces file size by identifying and discarding extra data not essential to the display of the image. Opening a JPEG image automatically decompresses it.

Because it discards data, the JPEG compression scheme is referred to as *lossy*. This means that once an image has been compressed and then decompressed, it will not be identical to the original image. A higher level of compression results in lower image quality, while a lower level of compression results in better image quality. In most cases, compressing an image using the Maximum quality option produces a result that is indistin-

guishable from the original. For information on choosing JPEG options, see “Saving files in JPEG format” on page 311.

## MacPaint

The MacPaint format is commonly used to transfer Bitmap-mode images to Macintosh applications. To save a Bitmap mode image in this format, the image must be no larger than 576 by 720 pixels. You can choose to center the image on the page or to place it into the upper left corner of the page when it is opened.

## PCX

PCX format, established by Z-Soft® for its PC Paintbrush® software, is commonly used by IBM PC-compatible computers. Most PC software supports version 5 of the PCX format. Version 3 files do not support a custom color palette. For this reason, when you open a version 3 PCX file, the palette is ignored, and a standard VGA color palette is used instead.

## PDF

The PDF format is used by Adobe Acrobat®, Adobe’s electronic publishing software for Macintosh, Windows, UNIX®, and DOS. You can view PDF files using the Acrobat Reader® software included on your Adobe Photoshop CD-ROM.

Based on the PostScript Level 2 language, PDF can represent both vector and bitmap graphics. For the purposes of representing pages, PDF pages are identical to PostScript pages, but PDF files can also

contain electronic document search and navigation features. PDF files, for example, can contain hypertext links and an electronic table of contents

For more information on PDF and Adobe Acrobat see the Electronic Publishing Guide included on the Adobe Photoshop Tutorial CD-ROM.

### **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 is especially effective at compressing images that contain large areas of solid color. This compression can be dramatic for alpha channels, which often consist of 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. If you're using a Macintosh with QuickTime installed, you can also choose from four JPEG compression options for the file.

### **PICT Resource (Macintosh only)**

A PICT resource is a PICT file contained in a Macintosh application's resource fork; examples of PICT resources include the Adobe Photoshop splash screen and the contents of the Scrapbook. You can open a PICT resource by choosing File > Import > PICT Resource (see page 57). When saving a file as a PICT resource, you can specify the resource ID and resource name. You can also specify bit depth and compression options as you would for the PICT format.

### **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.

### **PixelPaint**

The PixelPaint file format lets you open files in the PixelPaint graphics application on the Macintosh. You should use this information for saving files for PixelPaint 1.0 and 2.0. The PixelPaint options let you specify the image size (canvas) you want to use and whether you want the image to appear in the center or in the upper left corner of the canvas when you open the file. PixelPaint format is available only for indexed color and grayscale files.

### **PNG**

The PNG format was developed as an alternative to the GIF format and, like GIF, is used for displaying images on the World Wide Web and other online services. PNG preserves all color information and alpha channels in an image and uses a lossless compression scheme to reduce file size.

When saving an image in PNG format, you can choose to display the image in gradually increasing detail as it is downloaded. To do this, select Adam7 for Interlace. You can also select a filtering algorithm, which is used to prepare the image data for compression.

## Raw

The Raw format is a flexible file format for transferring files between applications and computer platforms. Raw format consists of a stream of bytes describing the color information in the file. Each pixel is described in binary format, in which 0 equals black and 255 equals white. Adobe Photoshop designates the number of channels needed to describe the image, plus any additional channels in the file. You can specify the file extension (Windows), file type (Macintosh), file creator (Macintosh), and header information.

On the Macintosh, the file type is generally a four-character ID that identifies the file; for example, TEXT identifies the file as an ASCII text file. The file creator is also generally a four-character ID. Most Macintosh applications have a unique file creator ID that is registered with the Apple Computer Developer Services group.

The header parameter is the number of bytes of information that will appear at the beginning of the file, before the actual image information. This value defines the number of zeros that will be placed at the beginning of the file as placeholders. By default, there is no header (header size = 0). You can enter a header when you open the file in the Raw format (see “Opening Raw files” on page 56). You can also save the file without a header and then use a file-editing program, such as Norton Utilities® (Macintosh) or HEdit (Windows), to replace the zeros with header information.

You can choose to save the image in an interleaved or noninterleaved format. If you choose the interleaved format, the color values (red, green, and

blue, for example) are stored sequentially. The choice you make depends on the requirements of the application you plan to use to open the file.

## Scitex CT

The Scitex Continuous Tone (CT) format is available for RGB and CMYK images and grayscale images. Scitex computers are used for high-end image processing. Contact Scitex to obtain utilities that will let you transfer files saved in the Scitex CT format to a Scitex system. When you select the Scitex CT option, the active Adobe Photoshop file is converted directly to the Scitex format; you do not select options for the conversion.

Images in Scitex CT format are CMYK files that are often extremely large in size. For input, these files are generated using a Scitex scanner. When Adobe Photoshop outputs in Scitex CT format, the files are printed to film by using the Scitex rasterizing unit, which produces separations with a patented Scitex halftoning system. This system produces very few moiré patterns and is often demanded in professional color work, such as ads that run in national magazines.

## Targa

The TGA (Targa) format is designed for use on systems that use the Truevision® video board and is commonly supported by MS-DOS color applications. If you are saving an RGB image in this format, you can choose the color depth you want.

## TIFF

The Tagged-Image File Format (TIFF) is used to exchange files between applications and computer platforms. The TIFF format supports LZW compression, a lossless compression method that does not discard detail from the image.

When you save an Adobe Photoshop image in TIFF format, you can choose to save in a format that can be read either by Macintosh or by IBM PC-compatible computers. You can also choose to compress the file to a smaller size automatically by clicking the LZW Compression check box.

Adobe Photoshop reads and saves captions in TIFF files. This feature is of particular use with the Associated Press Picture Desk system, which uses the same TIFF caption fields. For information on using captions, see “Adding file information” on page 307.

## 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 create transparent areas in images that you place in page-layout applications. In addition, Macintosh users can use Photoshop’s publish and subscribe features to ensure automatic updates of images used in other programs.

### Using clipping paths

*Clipping paths* let you export part of a Photoshop image to an illustration or page-layout program. A clipping path isolates part of a Photoshop image

and makes everything outside the isolated area transparent when the image is printed or placed in another application. This lets you place an image into another file without obscuring the other file’s background.

These examples show the effects of using a clipping path. In the example below, the background behind the ball was selected and changed to white. When the ball was placed into the Adobe Illustrator file, the white background blocked out the underlying area.



*Background selected*



*Background changed to white*



*Image imported into Adobe Illustrator*

In the following example, the ball was selected and converted into a path. The path was then saved as a clipping path. When the Adobe Photoshop file

was placed into the Adobe Illustrator file, the ball appeared without blocking the surrounding portions of the Illustrator image.



*Ball selected*



*Selection defined as a clipping path*



*Clipping path imported into Adobe Illustrator*

## Creating a clipping path

You specify a saved path as a clipping path.

### To save a path as a clipping path:

- 1 Create and save a path or convert an existing selection into a path. For more information, see “Creating paths” on page 156 and “Converting selection borders into paths” on page 168.
- 2 Choose Clipping Path from the Paths palette menu.
- 3 For Path, choose the path you want to save.
- 4 If necessary, enter a flatness value.

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*



*Flatness: 30*

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 is recommended for low-resolution printing (300 dpi to 600 dpi). When the flatness value is blank, the image is printed using the printer’s default setting.

### 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 99 for a discussion of this mode.

### 6 Save the file in Photoshop EPS format.

To achieve the best display quality when you export the image, use an 8-bit preview option. If you’re using a Macintosh and want to share the image with a Windows user, use a TIFF preview option. For more information, see “Saving files in Photoshop EPS format” on page 309.

## Printing clipping paths

You may encounter unexpected results when printing an image containing clipping paths if the imagesetter has difficulty interpreting the clipping paths or if the paths are too complex to print.

If your printer generates a Limitcheck error or a general PostScript error, the clipping path may be too complex to print. You may be able to print a complex path on a low-resolution printer without difficulty, but you may run into problems when printing the same path on a high-resolution printer. That is because a low-resolution printer uses fewer line segments to describe curves than does a high-resolution printer, thus automatically simplifying the path. You can simplify clipping paths by reducing the number of anchor points on the path.

### To simplify a clipping path:

- 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 Save and name the work path.

## Exporting paths to Adobe Illustrator

The Paths to Illustrator module lets you export pen tool 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 might want to export a pen tool path and stroke it to use as a trap with a Photoshop clipping path that 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, create a path or convert an existing selection into a path; then save the path. See “Creating paths” on page 156 and “Converting selection borders into paths” on page 168 for more information.
- 2 Choose File > Export > Paths to Illustrator.
- 3 Choose a location for the exported path. On the Macintosh, for Write, choose the path you want to export.
- 4 Click Save. This saves the path in a file you can use in Adobe Illustrator.
- 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 that you don't change the crop marks or move the path.

## Embedding Photoshop images in word-processor applications (Macintosh 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 simpler alternative to the

Publish and Subscribe features when a word-processor file has many small images that need to be updated.

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.

**Publishing and subscribing (Macintosh only)**

You can use the Publish and Subscribe feature to share Photoshop data dynamically with other Macintosh applications. For example, you can publish a Photoshop image placed in a page layout file and then subscribe to the Photoshop image from the page layout file: any modifications that you make to the Photoshop image are then automatically updated in the page layout file when you save the image. You can also choose to manually update the published images.

**Note:** Adobe Photoshop publishes in PICT, Photoshop EPS, and TIFF formats. Files published as Photoshop EPS files are saved in binary format.

**To publish a Photoshop image:**

- 1 Open the image that you want to publish, and choose Edit > Create Publisher.
- 2 Type a name for the published image (called an *edition*), specify its location, and choose PICT, Photoshop EPS, or TIFF, depending on the format required by the subscribing application.
- 3 Click Publish.
- 4 Open the file into which you want to place the Photoshop image, click to set an insertion point, and choose Edit > Subscribe To to subscribe to the published image. See your subscribing application's documentation for more information on using the Subscribe feature.

Each time you save the published Photoshop image, the image is automatically updated in any applications that subscribe to that image. If you don't want your published image to be updated automatically, you can change to manual updating.

**To specify manual updating of published images:**

- 1 In Adobe Photoshop, choose Edit > Publisher Options.
- 2 Click Manually; then click OK. The image is now updated only when you click Send Publisher Now in the Publisher Options dialog box.

## Object linking and embedding (OLE) (Windows 95 and Windows NT 4.0 only)

Object linking and embedding are two ways to import an Adobe Photoshop image into another application and update that image when it is modified. 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 6.0® and Microsoft Word® 7.0 using copy and paste, drag and drop, or other methods.

Once an image is in the container application, you can double-click it to open and edit it in Photoshop. When you close the file 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:

- Make a selection, select the move tool, and use the right-mouse button to drag the selection to the OLE container application (if it supports this feature) or to the desktop. When you release the mouse button, choose Create Scrap Here. If you dropped the object on the desktop, you can then drag that scrap object into an OLE container application.

**Note:** You cannot drag scraps into a Photoshop image because Photoshop is an OLE server only, not a container.

- Copy a selection in Photoshop and insert it in your OLE container application using its 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 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 or any selection 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.



# Chapter 14: Printing

In most instances, the default print settings in Adobe Photoshop produce excellent results.

However, 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."

This chapter provides an overview of the basic concepts of printing and describes how to print using the Adobe Photoshop program, including how to select screen attributes for halftones and color separations. It also explains how to create duotones and print spot colors in Photoshop.

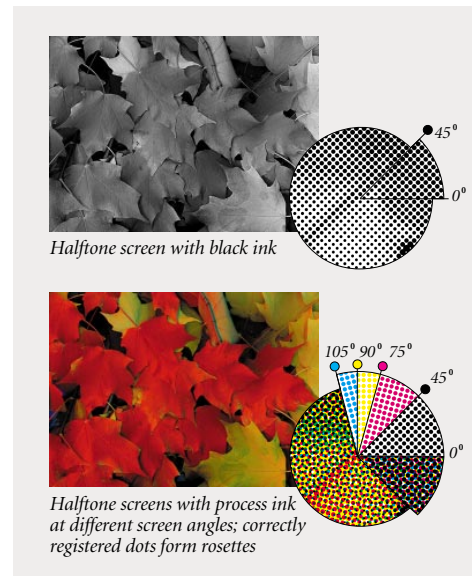
## Printing: an overview

The most common way to output 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.

### About halftones

To produce the appearance of continuous tone in an image, the image must be broken down into a series of dots. These dots are created during the printing process when a *halftone screen* is applied to the image. The dots in a halftone screen control how much ink is deposited at a specific location. Varying the size and density of the dots creates the optical illusion of variations of gray or continuous

color in the image. For a process color image, four halftone screens are used: cyan, magenta, yellow, and black—one for each ink used in the printing process.



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 Adobe Photoshop, you specify the attributes for the halftone screen immediately prior to producing the film or paper output. To achieve the best results, the output device you use, such as a PostScript imagesetter, should be set to the correct

density limit, and the processor should be properly calibrated. If these factors are inconsistent, the results can be unpredictable.

## Setting up to print

To print any type of image in Adobe Photoshop, you first select the printing options you want and then specify settings for the particular image type. For color separations, you may also want to adjust how the various plates are generated and to create traps. Finally, you print the image as one or several plates.

**Important:** *Photoshop always prints images at the center of the page—you cannot change the position of the artwork to print it at a different location on the page. If you want to print an image at a precise location on a page, you must export it to a page-layout program and reposition it there.*

By default, Adobe Photoshop prints 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.

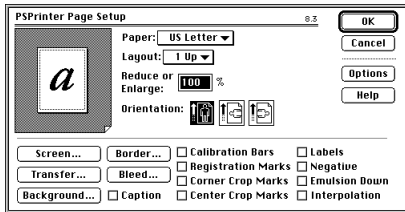
## General printing options

For any type of image you print, you can choose to print the filename, along with crop marks, registration marks, and a caption. You can print a negative of the image, specify an emulsion side for your film processor, and select a background color for the image.



These printing options appear in the Page Setup dialog box, which appears when you choose File > Page Setup. The exact appearance of this dialog box varies with different printers. The top half of the Page Setup 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.



Not all options are available for all printers. For example, if you are printing to a non-PostScript printer, the Calibration Bars option is not available, and only some registration mark options may be available.

## Previewing the page layout

To preview the results of your printing options, click the page preview box at the lower left of the window. The box with the *x* in it represents the image. Note that Photoshop always prints images from the center of the page (you can't adjust the image to print on another part of the page). See "Previewing the page layout and print size" on page 43 for more information on the page preview feature.

## Speeding up landscape printing

Adobe Systems recommends that, rather than using Landscape orientation, you rotate the image 90 degrees by choosing Image > Rotate Canvas, choose an option from the submenu, and then

print using Portrait orientation. Printing a page with the Portrait setting is much faster than printing with the Landscape setting.

## Setting additional page setup options

In the Page Setup dialog box, click the Options button or the Properties button (the button name varies with different operating systems) to set specific options for the printer you have selected. For more information on using the printing options, see your printer documentation.

## Printing labels

The Labels option in the Page Setup dialog box prints the filename and channel name on the image.

## Printing crop marks

The Crop Marks option in the Page Setup dialog box prints crop marks that indicate where the page is to be trimmed. You can choose to print crop marks at the corners of the page, at the center of each edge of the page, or both.

## Printing calibration bars

The Calibration Bars option in the Page Setup dialog box prints an 11-step grayscale. The steps represent a transition in density from 0 to 100% in 10% increments.

In addition, when you print a CMYK color separation, a gradient tint bar is printed on the left of each CMY plate; a progressive color bar is printed on the right.

## Printing registration marks

The Registration Marks option in the Page Setup dialog box prints registration marks on the image, including bull's-eyes and star targets. These marks are used primarily for aligning color separations and duotones.

## Printing a negative

The Negative option in the Page Setup dialog box prints an inverted version of the image. Unlike the Invert command in the Image menu, the Negative option converts only the output to a negative (not the on-screen image). If you are printing separations directly to film, you will probably want a negative, although in many countries, it is common to print film positives. Check with your print shop to determine if it requires a film positive or negative. If you are printing to paper, print a positive.

## Specifying an emulsion side

Emulsion refers to the photosensitive layer on a piece of film or photographic paper. By default, the emulsion is up (right reading); type in the image is readable when the photosensitive layer is facing you. When you select the Emulsion Down option (also right reading), type is readable when the photosensitive layer is facing away from you. Normally, images printed on paper should be printed emulsion up.

To determine the emulsion side of a piece of film, 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 with your print shop

to see whether it requires film with positive emulsion up, negative emulsion up, positive emulsion down, or negative emulsion down.

## Using interpolation

Some PostScript Level 2 printers can reduce the jagged appearance of a low-resolution image by automatically resampling up an image while it is printing. If your printer does not have this capability, this option has no effect.

## Printing a border

You can specify the width of a border you want to have appear around an image by using the Border button. The border is printed in black.

### To specify the width of a border:

- 1 Click Border in the Page Setup dialog box.
- 2 For Width, enter a value for the width of the border; then choose a unit of measurement and click OK. You can specify decimal values for the width.

## Printing a caption

Select the Caption option in the Page Setup dialog box when you want to print the text you entered for the caption in the File Info dialog box. See “Adding file information” on page 307. Caption text is printed as 9-point Helvetica plain. This font cannot be changed.

## Selecting a background color

The Background button in the Page Setup dialog box lets you select a background color to be printed on the page outside the image area. This option is especially useful if you are printing slides to a film recorder, because a black or colored background is often desirable for slides. To use this option, click Background; then select a color from the Color Picker dialog box. The Background option is a printing option only and does not affect the image area itself.

## Creating bleed

The Bleed button lets you print crop marks inside the image instead of outside the image. Use this when you want to trim the image within the graphic. You can specify the width of the bleed.

## Displaying the transfer functions

The Transfer button in the Page Setup dialog box lets you adjust the transfer functions that Adobe Photoshop uses to print the image. Transfer functions are traditionally used to compensate for dot gain or dot loss that may occur when an image is transferred to film. For information on setting the transfer functions, see “Compensating for dot gain using transfer functions” on page 92.

## 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.

Check with your print shop for the preferred frequency, angle, and dot settings before creating your halftone screens. (In general, the default angle settings should be used unless your printer specifies that they be changed.)

### To define the screen attributes:

- 1 Click Screen in the Page Setup dialog box. The following illustration shows the Halftone Screens dialog box as it appears for a CMYK image.
- 2 Deselect Use Printer’s Default Screens, and set the screen frequency and angle for each screen. The screen frequencies and angles for grayscale and color halftones are discussed in the sections following this procedure.

**Note:** To use the default halftone screen built into the printer, select Use Printer’s Default Screens. The specifications from the Halftone Screens dialog box are then ignored when the halftone screens are generated.

- 3 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, which lets you define your own dot shapes by entering PostScript commands. The Custom Spot Function is 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 printing, the image resolution should be twice the halftone screen frequency. If the resolution is more than 2.5 times the screen frequency, Adobe Photoshop displays an alert message. See "Image resolution and screen frequency" on page 40 for more information.

### Selecting screen attributes for a grayscale halftone

For a grayscale image, enter a screen frequency from 1 to 999.999 for Frequency; then choose the unit of measurement you want.

For Angle, enter a screen angle from -180 to +180 degrees.

### Selecting screen attributes for a color separation

To print halftones for a color separation, choose the color of the screen for Ink, and manually enter the frequency and angle for each of the four screens; or you can choose to have Adobe Photoshop enter the frequency and angles for each screen. To do this, click the Auto button, and in the Auto Screens dialog box, enter the resolution of the output device and the screen frequency you intend to use. When you click OK in the Auto Screens dialog box, Adobe Photoshop determines the best frequencies and angles for the four halftone screens and enters these 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 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 an Emerald controller, this option has no effect.

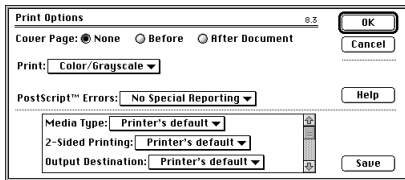
### Saving and loading halftone screen settings

You can save your halftone screen settings for use with other Adobe Photoshop files by clicking the Save and Load buttons in the Halftone Screens dialog box. To save the new settings as the default, hold down Option (Macintosh) or Alt (Windows), and click the —> Default button. To return to the original default settings, hold down Option/Alt and click <—Default.

## Additional printing options

You can also set printing options by using the Print dialog box, which appears when you choose File > Print. These options let you print only a selected area of an image, transfer image data to the output device in ASCII format, and print a color-cor-

rected composite image on a color printer. The appearance of this dialog box varies with different printers.



## Printing a selected area

You can print a rectangular selection of an image.

### To print a selected part of an image:

- 1 Use the rectangular marquee tool to select the part of an image you want to print.
- 2 Choose File > Print.
- 3 In the Print Range options, click Selection; then click OK.

## Printing a color-corrected image

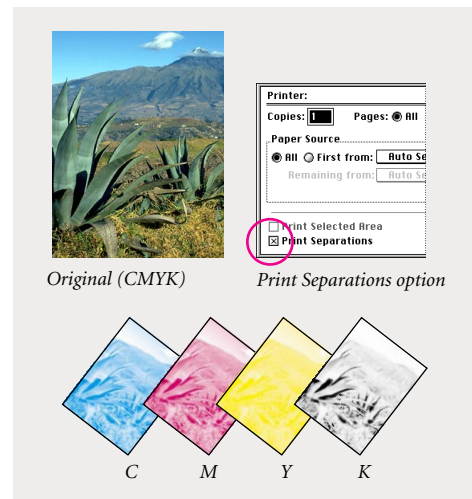
To print a CMYK version of an RGB, Lab, or indexed-color image, select CMYK for Print as in the Print dialog box. Before using this option, make sure that you have entered the correct settings in the Printing Inks Setup dialog box. See “Step 4: Enter the Printing Inks Setup information” on page 89 for more information on these settings.

The CMYK option causes Adobe Photoshop, instead of your printer's built-in color tables, to make the conversion to CMYK colors. This

method usually produces better results. The option works with color PostScript printers, but is not recommended for PostScript Level 2 printers.

## Printing separations

By default, a single file is printed for CMYK images. If you want to print four separate files (one for each color), select Print Separations.



## Printing with print spoolers and across networks

By default, Adobe Photoshop 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, and not their parallel or serial ports. In addition, only PostScript Level 2 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 choose to transfer the file in ASCII format. Files that are encoded in ASCII format require about twice as much time to transfer as binary files, because they contain about twice as many characters. To select the ASCII encoding option, select ASCII in the Print dialog box.

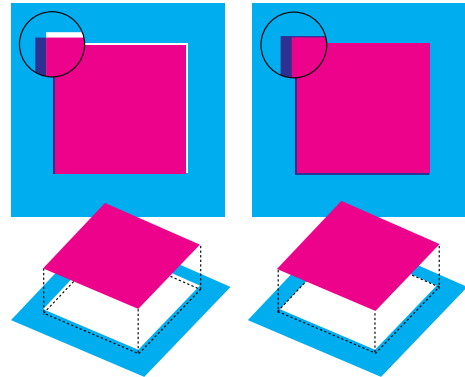
### Printing an ImageWriter® color file (Macintosh only)

ImageWriter Color is a plug-in module that lets you print color Adobe Photoshop images on the ImageWriter II with a color ribbon. When you choose this export module, the Page Setup dialog box appears.

## 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 any trapping is needed and will tell you the values you need to enter in the Trap dialog box.



Misregistration with no trap    Misregistration with trap

Adobe Photoshop uses the value in the Trap dialog box to determine how far overlapping colors should be spread outward to compensate for misregistration on the press. Adobe Photoshop traps only by spreading; it does not choke colors. In general, Adobe Photoshop uses the 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.

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 crosshair 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.

**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 the amount of misregistration you can expect.

## Using monotones, duotones, tritones, and quadtones

Adobe 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, respectively. In these types of images, colored inks are used to reproduce tinted grays rather than to reproduce 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. As a result, a grayscale image printed with only black ink can look significantly coarser than the same image printed with two, three, or four inks, because each individual ink can reproduce up to 50 levels of gray.

Sometimes duotones are printed using a black ink and a gray ink. The black ink captures shadow detail, and the gray ink is used in the midtone and highlight areas. More frequently, duotones are printed using a colored ink for the highlight color. This technique produces an image that has a slight tint to it and gives the image a significant increase in dynamic range. Duotones are ideal for two-color print jobs in which a spot color (such as a PANTONE ink) is used for accent.

Because duotones use different color inks to reproduce different gray levels, Adobe Photoshop treats duotones, tritones, quadtones, and monotones as single-channel, 8-bit, grayscale images. In Duotone mode, you do not have direct access to the individual image channels, as you do in RGB, CMYK, and Lab modes; instead, the channels are manipulated through the curves in the Duotone Options dialog box.

To convert an image to a duotone, the image must be converted to grayscale first. Only grayscale images can be converted to duotone images.

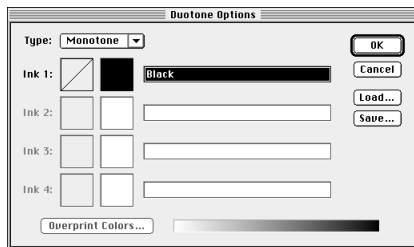
**To convert an image to duotone:**

- 1 Convert the image to a grayscale image by choosing Image > Mode > Grayscale.
- 2 Choose Image > Mode > Duotone.

- 3 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.
- 4 When you have finished choosing options, click OK.

### Choosing the duotone image type

For Type, specify whether you are working with a monotone, duotone, tritone, or quadtone. This option determines how many ink controls are active.



### Specifying the ink colors

To produce fully saturated colors, darker inks should be printed before lighter inks. When entering colors in the duotone dialog boxes, make sure that the inks are specified in descending order; that is, the darkest ink appears at the top, and the lightest ink appears at the bottom. The order of inks affects how Adobe Photoshop applies screens.

#### To specify an ink color:

- 1 Click the color swatch (the solid square) for that ink.

- 2 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 swatch, and the color name appears in the text box. For information on using the Color Picker, see “Using the Adobe Photoshop Color Picker” on page 222.

**Important:** The PANTONE colors in the Adobe Photoshop Custom Colors dialog box represent the most recent specifications from Pantone, Inc.; therefore some ink names may be slightly different from those in older programs. When you use PANTONE colors in images that you plan to export to other applications, such as Adobe Illustrator, PageMaker®, or QuarkXPress, make sure that the Short PANTONE Names option is selected in the General Preferences dialog box. This selection ensures that the PANTONE color names will match the naming conventions used in the other applications.

- 3 If the ink is to be separated on a process color plate, name it cyan, magenta, yellow, or black.

### Modifying the duotone curve

The 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. You specify a duotone curve for each ink used to print a duotone, tritone, or quadtone image.

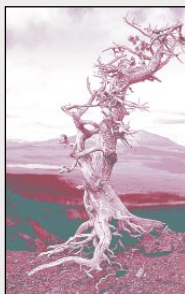
**DUOTONES, TRITONES, AND QUADTONES** These examples show sets of process color curves applied to the same gray-scale image. A set of Duotone curves is supplied on the Adobe Photoshop CD-ROM.



*Original*



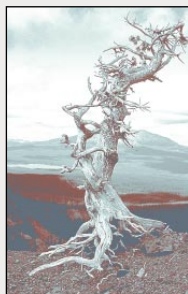
*Quadtone, CMYK cool*



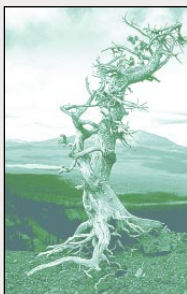
*Quadtone, CMYK ext wm*



*Quadtone, CMYK very wm*



*Tritone, bmy sepia 1*



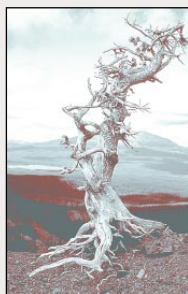
*Tritone, bcy green 2*



*Tritone, bmc blue 1*



*Tritone, bmy red 1*



*Tritone, bmy brown 1*



*Duotone, cyan bl 2*



*Duotone, magenta bl 2*



*Duotone, yellow bl 3*

**To modify the duotone curve for a given ink:**

- 1 Click the curve box next to the ink swatch.

The default duotone curve is a straight diagonal line across the grid, which 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 will be printed with a 50% dot of the ink, a 100% shadow with a 100% dot of the ink, and so on.

- 2 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 along the vertical axis. You can specify up to 13 points on the curve. When you specify two values along the curve, Adobe Photoshop calculates the intermediate values. As you adjust the curve, the 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.

- 3 Use the Save button in the Duotone Curve dialog box to save curves created with this dialog box.

- 4 Use the Load button to load these curves or curves created in the Curves dialog box (including curves created using the Arbitrary Map option). See “Using Curves” on page 124 for additional information on adjusting curves, and “Saving and loading duotone settings” on page 341.

You can use the Info palette to display the 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. For more information, see “Customizing the Info palette” on page 26.

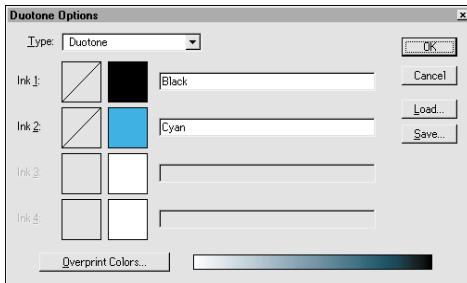
The following examples show a duotone image with the default curves and the same image after the curves have been adjusted to reduce the ink in the highlights and midtone areas in the black plate and to reduce the ink in the shadow and midtone areas in the cyan plate.



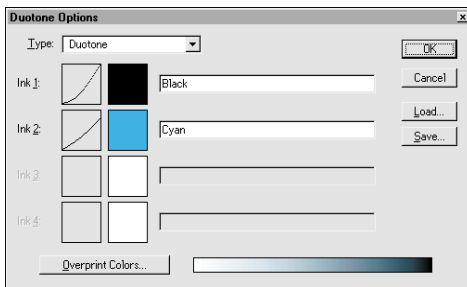
*Original image*



*Adjusted image*



*Default duotone curves*



*Adjusted duotone curves*

## 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.

You can indicate how you want the overprint colors to be displayed on-screen so you can see how they will look when printed. If possible, run a test using a printed sample of the overprinted inks to adjust your screen display. Note that this adjustment affects only how the overprint colors appear on the screen; it does not affect how the final image is printed.

Before adjusting these colors, make sure that you have calibrated your system following the instructions in Chapter 5, “Reproducing Color.” Make sure that Use Dot Gain for Grayscale Images is selected in the Printing Inks Setup dialog box so you can use the Levels or Curves command to compensate for dot gain. For more information, see “Compensating for dot gain in grayscale and duotone images” on page 92.

### 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 in the Overprint Colors dialog box.

## Saving and loading duotone settings

Use the Save and Load buttons in the Duotone Options dialog box to save the 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 provide some of the more commonly used curves and colors and can be used 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 might 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 representing a printing ink. Channel 1 represents the first ink specified in the Duotone Options dialog box, channel 2 represents the second ink color, and so on.

Do not save the image; you’ll need to undo the mode change (return to Duotone mode) before printing or exporting the image.

- 2 Select the channel you want to examine in the Channels palette.

- 3 Choose Edit > Undo Mode Change to revert to Duotone mode.

**Note:** Using the Curves command in Multichannel mode to create duotone curves does not produce the desired results. If you want 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.

## 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. For more information, see “Specifying the ink colors” on page 338.

Use the Auto button in the Halftone Screens dialog box to set the optimal screen angles and frequencies. Make sure you select Use Accurate Screens in the Auto Screens dialog box if you’re printing to an imagesetter equipped with PostScript Level 2 or an Emerald controller. See “Selecting screen attributes for a color separation” on page 334 for complete information about the Accurate Screens option.

**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 need 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

When working with duotones that you’re going to export to other applications, it is important to name custom colors exactly as they are recognized by the other application. If the name is different, the image will not print correctly or might not print at all.

This section tells you how to export duotone images to Scitex CT format and how to print duotones from QuarkXPress.

**To save a duotone image in Scitex CT format:**

- 1 Convert the image to Multichannel mode by choosing Image > Mode > Multichannel.
- 2 Choose New Channel from the Channels palette menu to add new channels until there are four channels in the image. (If the image is a quadtone, you do not need to add channels.)
- 3 Convert the image to CMYK mode by choosing Image > Mode > CMYK.

Although the converted image will not display correctly as a duotone image, it will be printed correctly in the Scitex CT format. Converting to CMYK preserves the contents of the four separated custom color plates and lets you save the image in Scitex CT format. The conversion generates blank plates if the image is a monotone, duotone, or tritone. These blank plates are necessary because the Scitex CT format requires four channels.

## Printing and previewing spot colors

*Spot colors*, also called *custom colors*, are special premixed inks that are used instead of, or in addition to, the process color (CMYK) inks, and require their own separations and their own plates on press. Spot colors may or may not fall within the CMYK gamut; for example, a spot color may be a neon or metallic ink that is not within the CMYK gamut, or it may be a shade of green that

falls within the gamut. In addition to colored inks, varnishes are considered spot colors because they also require a separate plate on press.

You cannot directly assign spot colors in Adobe Photoshop; however, you can use one of two techniques to prepare a Photoshop image for spot color printing:

- If a spot color is to be distributed throughout the image, convert the image to Duotone mode and apply the spot color to one of the duotone plates. (You use Duotone mode to create monotones, duotones, tritones, and quadtones, enabling you to use up to four spot colors, one per plate.) For instructions on creating duotones, see “Using monotones, duotones, tritones, and quadtones,” on page 337.
- If a spot color is to be printed on specific areas of an image, convert the image to CMYK and use the C, M, and Y channels as substitute spot color plates. You can then preview the spot colors on-screen by changing the default color values in the C, M, and Y channels (cyan, magenta, and yellow) to the values of the spot color you will give to your printer. The following technique shows you how to apply spot colors to an image using CMYK Color mode.

### Adding spot colors to an image

Working in CMYK mode, you can apply up to three spot colors to an image. By converting an image to CMYK, you can add a single spot color to each of the C, M, and Y channels.

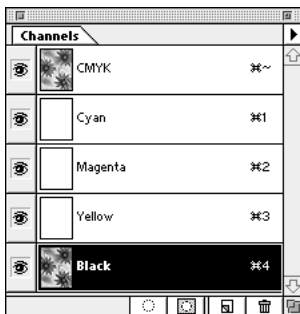
To prepare an image for use with spot colors, you begin by converting the image to Grayscale mode and then convert it to CMYK Color mode.

**To add spot colors to an image:**

- 1 Choose Image > Mode > Grayscale. When prompted, click OK to discard the color information.
- 2 Choose File > Color Settings > Separation Setup. In the Separation Setup dialog box, select Maximum from the Black Generation menu and then click OK.

The Maximum option indicates that all the grayscale values in the image are created using black instead of any mix of cyan, magenta, yellow, and black. Selecting the Maximum option in the Black Generation menu before converting to CMYK Color mode causes the entire image to be placed into the Black channel when you convert the image to CMYK Color.

- 3 Choose Image > Mode > CMYK Color. The image is converted to CMYK mode and all grayscale pixel values are now in the Black channel.



- 4 Choose File > Color Settings > Separation Setup. In the Separation Setup dialog box, return the Black Generation value to whatever setting was selected before you changed it to Maximum. Click OK.

- 5 Choose File > Preferences > Display and Cursors, and make sure the Show Channels in Color option is selected. Then click OK.

- 6 Open the Channels palette and select the Black channel in the palette.

- 7 Use a selection tool to select the part of the image to which you want to apply a spot color. (In this example, we used the magic wand tool to select the type and the border in the image.)



- 8 With the selection still active, click one of the blank channels (cyan, magenta, or yellow), but it's a good idea to select the channel whose color is closest to the spot color you'll use (e.g., the cyan channel to represent a bluish spot color).

- 9 Fill the selection with 100% black. If you want a tint of the spot color, fill the selection with a percentage of black.



In a Photoshop color channel, 100% black represents 100% of the channel color. See Chapter 4, “Choosing a Color Display Mode,” for information on color channels.

**10** With the selection still active, select the Black channel in the Channels palette, and then fill the selection with 100% white. Filling with 100% white in effect erases the grayscale values in the Black channel, leaving just the cyan, magenta, or yellow values (depending on the channel you selected) in the selection.

**11** Repeat steps 6 through 10 for each area in the image you want to apply a spot color to. For each spot color, select a different channel.

## Adjusting overlapping spot colors

If there are places in an image where spot colors overlap, you'll need to remove one of the overlapping spot colors from the area so that the colors don't overprint.

### To remove an overlapping spot color:

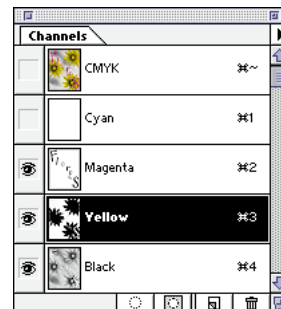
**1** In the Channels palette, select the channel whose color you want to print, and then use a selection tool to select the image in that channel.

For example, in this artwork, we wanted to print only the spot color in the letters, so we selected the magenta channel and selected the letters.

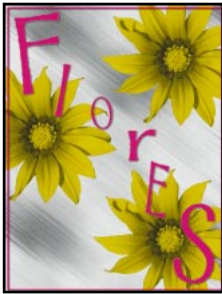


To quickly select an image in a channel, hold down Command (Macintosh) or Ctrl (Windows) and click the channel in the Channels palette; then choose **Select > Inverse** to invert the selection.

**2** Select the channel containing the color you want to remove, and then fill it with 100% white. The overlapping color is removed from the selected area.



3 If a spot color in one channel overlaps more than one other spot color, repeat steps 1 and 2 for each channel whose color you want to remove.



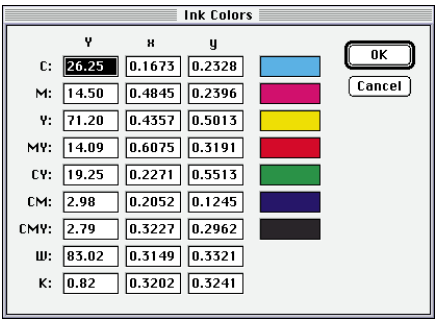
Previewing spot colors

In a CMYK image, the part of an image in the C, M, or Y channels is displayed in the default color of cyan, magenta, or yellow, respectively. You can change the color value of the C, M, or Y channels to match the spot color you'll use, enabling you to display an accurate preview on-screen. To change the color values for the cyan, magenta, and yellow channels, you use the Printing Inks Setup dialog box.

To preview spot color values in the C, M, or Y channels:

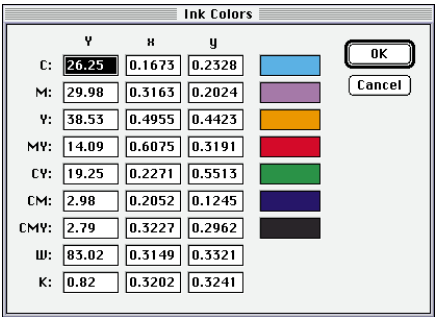
1 Choose File > Color Settings > Printing Inks Setups.

2 Choose Custom from the Ink Colors menu in the Printing Inks dialog box.



3 Click the swatch next to the channel you used for your spot color selection. For example, if you placed the selection in the yellow channel, click the yellow swatch in the Inks Color dialog box. The Color Picker appears.

4 To choose the desired spot color, either enter the values in the Color Picker or select the color from the color swatch in the Color Picker. Click OK to exit the Color Picker, then click OK twice to exit the Printing Inks Setup dialog box.



The channel color changes from its default to the spot color.



### 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. Because separations don't print the name of the spot color, be sure to indicate to your printer which spot color you want for each plate.

#### To print separations from Photoshop:

- 1 Choose File > Print.
- 2 Select the Print Separations option at the bottom of the Print dialog box.
- 3 Click OK. Separations are printed for each of the colors in the image.

#### To prepare a spot color image for printing from another application:

- 1 In the General Preferences dialog box, select Short Pantone Names.
- 2 Save the image as TIFF or EPS. If you are saving in EPS, be sure to deselect the Include Halftone Screen and the Include Transfer Function options in the EPS Format dialog box.
- 3 Open or import the image in the application you will be printing from and set your screen angles. Make sure that the cyan, magenta, and yellow plates correspond to the appropriate spot color in the Photoshop image, and that you've communicated to the printer the spot color you want for each of the color plates.



# Chapter 15: Automating Tasks

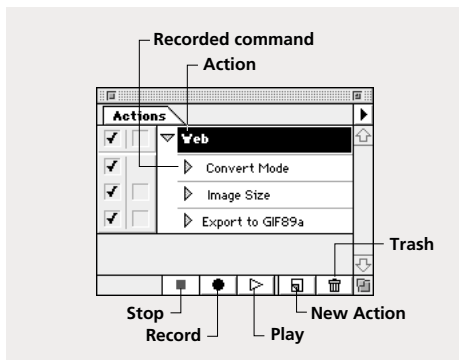
**A**dobe Photoshop 4.0 lets you automate tasks by grouping a series of Photoshop commands into a single command, or *action*. For example, you can create an action that combines a series of filters together to reproduce a favorite effect, or you can combine commands you use when preparing images for online publishing. You can use an action on a single file or on multiple files in the same folder, called a *batch*. Using actions lets you easily reproduce frequently used techniques.

## Using the Actions palette

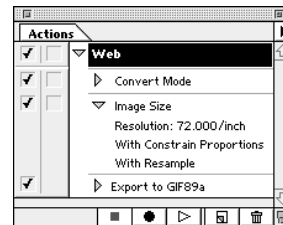
You use the Actions palette to record, play, edit, and delete actions. It also lets you save, load, and replace action sets.

### To display the Actions palette:

Choose Window > Show Actions.

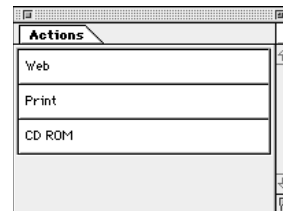


You can display actions in the Actions palette in either list view or button view. In the list view, actions can be expanded to display each command in the action, and the commands can be expanded to display their recorded values.



### 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 lists and commands:

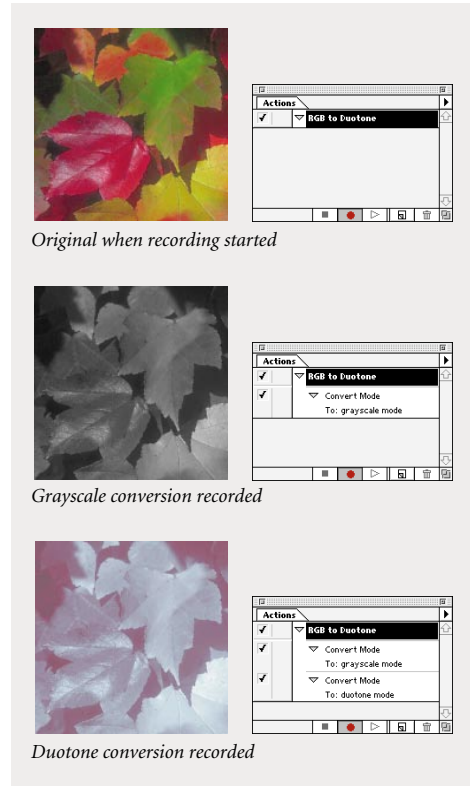
Click the triangle to the left of the list or command in the Actions palette.


## Creating and recording actions

When you create an action, Photoshop records the commands you use, in the order you use them, including any values you specify. Not all commands and functions can be recorded. For example, you cannot record commands from the Paths palette menu. To include a command that cannot be recorded, you can use the Insert Menu Item command. See the following section, “Inserting non-recordable commands” for more information. Note that you can also record the Play Action and Batch commands on the Actions palette menu.

When recording an action, keep in mind that playback results depend on file and program settings, such as the image color mode, resolution, and active layer, as well as the current background and foreground colors. For example, a 3-pixel Gaussian blur will not create the same effect on a 72-ppi file as it will on a 144-ppi file. Likewise, Color Balance will not work on a grayscale file. To avoid this problem, change the file’s settings as appropriate to the action before you play the action. If you are concerned about making radical changes to a file, record the Save a Copy command at the beginning of the action to maintain a copy of the original.

**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 will use that filename each time you run the action. You can specify a different location, however, without having to specify a filename.



 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 playing the action on the original.

### To create and record an action:

- 1 Open a file.
- 2 In the Actions palette, click the New Action button.

3 Name the action, assign it to a Function key or Shift-Function key combination, and choose a color for its display in the Actions palette.

4 Click Record. The Record button in the Actions palette turns red.

5 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 next section, “Inserting non-recordable commands.”

6 Stop recording by clicking the Stop button.

7 If you want to keep the action for use in future work sessions, save the action (see page 358).

### Inserting non-recordable commands

Many commands that cannot be recorded when executed can be inserted into an action using the Insert Menu Item command. Because an inserted command isn’t executed when added to an action, no values for that command are recorded in the action, nor does the file change when the command is inserted. Only when the action is played, is the command executed. 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 Function key or Shift-Function key combination to an action, you can use the insert feature to recreate the functionality of the former Commands palette.

#### To insert a menu item in an action:

1 Do one of the following:

- Select an action’s name to insert the menu item at the end of the action.
- Select a command to insert the menu item after the command.

2 Choose Insert Menu Item from the Actions palette menu.

3 Do one of the following:

- Choose a command from its menu.
- Type a partial command name and click Find.

4 Click OK.

### Inserting stops

When playing actions, you may want to temporarily stop the action so that you can perform a task that cannot be recorded, such as using a selection tool. Once you’ve made the selection, you can then continue playing the action with the next command after the inserted stop by clicking the Play button in the Actions palette.

You can also display a short message when the action reaches the stop. This can be useful for reminding yourself of what task you need to complete next before continuing with the action. You can include a Continue button in the message box. In this way, you can check for a certain condition in the file, and if the condition is not met (for example, you do not need to make a selection), you can click Continue and the action proceeds with the next command. You can insert a stop when recording an action or after it has been recorded.

### To insert a stop:

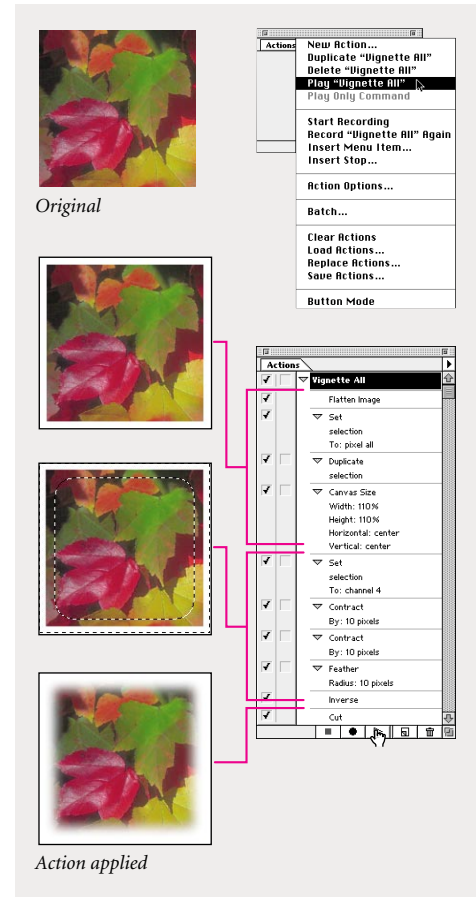
- 1 Do one of the following:
  - Select an action's name to insert the stop at the end of the action.
  - Select a command to insert the stop after the command.
- 2 Choose Insert Stop from the Actions palette menu.
- 3 Type the message you want to appear.
- 4 If you want the option to continue the action without stopping, select Allow Continue.
- 5 Click OK.

## Playing actions

When you play an action, Photoshop executes the series of commands as you recorded them. You can start from any command, not just the first command in the action. You can exclude commands you don't want executed before playing an action and you can play a single command in an action. If an action includes a command with a dialog box, you can pause the action when it reaches that command during playback, so that you can specify values. This is called a *break point*. If you do not use a break point, Photoshop executes the command using the original values that you specified when you first recorded the action (and the dialog box does not appear).

To execute part of an action, exclude commands, and set break points, the Actions palette must be in list view. When it is in button view, clicking a button executes the entire action. Commands that

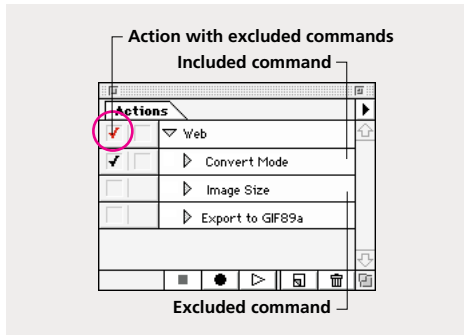
were previously excluded are not executed. Note that you can also set break points and exclude commands when recording an action.





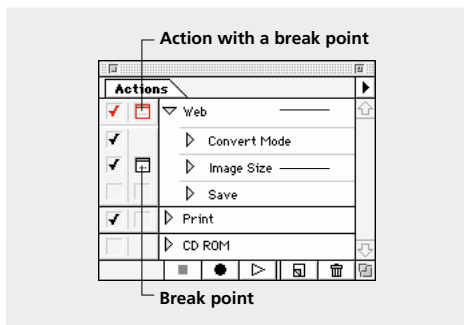
### To exclude a command:

Click to clear the check mark to the left of the command name. Click again to include the command.



### To set a break point:

Click the column to the left of the command name to display the dialog box icon. Click again to remove the break point.



### To play an action on a single file:

- 1 Open the file.
- 2 Do one of the following:
  - 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 Click the Play button in the Actions palette.



To play an entire action, hold down Command (Macintosh) or Ctrl (Windows) as you double-click the action name.

**Important:** Because an action is a series of commands, you cannot undo an entire action. Only the last command in an action can be undone.

### To play a single command in an action:

- 1 Select the command you want to play.
- 2 Do one of the following:
  - Command-click (Macintosh) or Ctrl-click (Windows) the Play button in the Actions palette.
  - Hold down Command/Ctrl and double-click the command.
  - Choose Play *command name* from the Actions palette menu.

## Batch processing

By using the batch feature, you can play an action on a folder of files, or import images that are then processed with the action. For example, if you have a scanner with a document feeder or a digital camera, you can import and process multiple images with a single action. Your scanner or digital camera may need an acquire plug-in module that supports actions.

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.

**To batch process files:**

- 1 Make sure the Actions palette is in list view, and choose Batch from the palette menu.
- 2 For Source, choose one of the following options:
  - Folder to play an action on files already stored on your computer. Click Choose to locate and select the folder.
  - Import to import files in a batch. For From, choose an Import command. For more information on the Import commands, see Chapter 3, “Getting Images into Photoshop.”
- 3 For Action, choose the desired action.
- 4 For Destination, choose one of the following options:

- None to leave the files open without saving changes.
- 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.

5 If you chose Folder, select Override 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.



To batch process using multiple actions, create a new action and record the Batch command for each action you want to use. This also enables you to process multiple folders in a single batch.

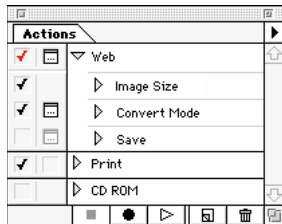
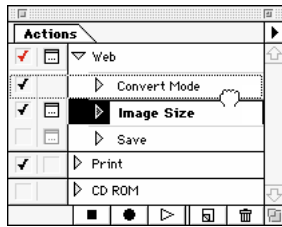
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## Changing the order of commands in an action

By rearranging commands in the Actions palette, you can change the order in which commands are executed when you play an action. You can also move a command to a different action.

### To change the order of commands:

In the Actions palette, drag the command you want to move to its new location. When the highlighted line appears in the desired position, release the mouse button.



*Dragging Image Size command into new position*

## Adding commands to an action

You can add commands to an action by recording them, inserting them (see “Inserting non-recordable commands” on page 353), or by dragging commands from other actions (see “Duplicating actions and commands” on page 358).

### To record additional commands:

- 1 Do one of the following:
  - Select the action name to insert the 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.

## Recording actions and commands again

The Record Again command lets you record new values for commands with dialog boxes in an action. When you use the Record Again command, Photoshop executes the action, pausing when a command has a dialog box so you can enter the new values.

### To record an action again:

- 1 Select an action and choose **Record *action name* Again** from the Actions palette menu.
- 2 When a dialog box appears, do one of the following:
  - Change the values and click OK to record them.
  - Click Cancel to keep the values the same.

### To record a single command again:

- 1 In the Actions palette, double-click the command.
- 2 Enter the new values and click OK.

## Changing action options

Action options let you name an action, choose a color for its button when the Actions palette is in button view, and assign a Function key or Shift-Function key shortcut to the action.

**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 keyboard shortcut to the action.
- 3 Click OK.

## Duplicating actions and commands

Duplicating an action can help when you want to experiment with changing an action, but you don't want to lose the original version. It's also a useful method for creating an action based on an existing one. Duplicating commands can be a simple way to add commands to other actions.

**To duplicate an action or command:**

Do one of the following:

- Option-drag (Macintosh) or Alt-drag (Windows) 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 an action or command and choose Duplicate *action name* or Duplicate *command name* from the Actions palette menu. The copied action appears at the bottom of the Actions palette. The copied command appears after the original command.

- Drag an action or command to the New Action 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.

## Deleting actions and commands

You can remove an entire action or remove a command from an action.

**To delete an action or command:**

- 1 In the Actions palette, select the action or command you want to delete.
- 2 Click the Trash button on the Actions palette. Click OK to delete the action or command.

**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, Option-click (Macintosh) or Alt-click (Windows) the Trash button.

---

## Saving, loading, and replacing sets of actions

You can save actions to disk, enabling you to organize actions for different types of work, as well as transfer sets of action to other computers. For example, you may want a set of actions for print publishing, another for online publishing, and so

on. When saving actions, you can only save the entire contents of the Actions palette; you cannot save individual actions.

Replacing a saved set of actions replaces all the existing actions. Loading a saved set adds the saved actions, maintaining the existing set. The new actions appear at the bottom of the Actions palette.

**Note:** *The actions you create are stored in the Adobe Photoshop preferences file. As a result, deleting the preferences file also deletes the actions when you next start Photoshop. If you want to ensure that your actions remain available for future work sessions, save the actions.*

**To save a set of actions:**

- 1 Choose Save Actions from the Actions palette menu.
- 2 Type a name for the set, choose a location, and click Save.

**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.

## External automation

Photoshop supports some external automation using AppleScript™ on the Macintosh, or an OLE Automation controller, such as Microsoft Visual Basic® or Borland Delphi, in Windows. Using either of these methods lets you start Adobe Photoshop and execute actions externally.

**Note:** *OLE automation support is not available in Windows 3.1.*

Using external automation lets you perform tasks such as the following:

- Have another scriptable application generate a series of files and have Photoshop batch process them.
- Have Photoshop batch process files and save them to your Web site.
- Write a script that runs an action and then shuts down your computer late at night after you've gone home.

Photoshop includes four automation objects (Application, Document, Actions Collection, and Action) that are available to an OLE Automation controller. For a description of these objects, see the online help.

For information on using OLE and Applescript, see your Windows and Macintosh documentation.



# Appendix A: Improving Performance

**A** program's "performance" is the amount of time that it takes the program to complete certain operations, such as opening a file, sending a file to a printer, or redrawing the screen after you edit an image.

To a great extent, your computer processor speed and the amount of RAM you have affect the performance of Adobe Photoshop. Other factors that can dramatically affect the application's performance are how you set up your software, how you use virtual memory, and the size and complexity of your files.

This appendix explains how best to configure your system for optimal performance, and how Adobe Photoshop uses memory. The appendix also explains how to improve performance by minimizing the size of your files and making efficient use of Photoshop's features.

## Using RAM, scratch disks, and system virtual memory

The best way to improve performance when using Adobe Photoshop is to increase the amount of random access memory (RAM) installed on your system. Testing at Adobe Systems has shown that increasing the amount of installed RAM tremendously improves the overall performance of Adobe Photoshop.

### Determining the amount of RAM required

The amount of RAM that Photoshop requires depends on numerous factors, including the pixel dimensions of your image (see Chapter 2), its color display mode (see page 70), the number of layers in the file, (see Chapter 11) as well as on the operations you're performing. Copying part of an image, taking a snapshot, or performing other operations in Photoshop may require 2 to 3 times the image size in RAM.

In most cases, it's a good idea to give Photoshop at least 3 to 5 times your file size in RAM, plus about 5 to 10 MB. If you're using many layers and channels, Photoshop will need even more RAM.

The RAM available to Photoshop is determined in the following ways:

- On the Macintosh, Photoshop is set to a default application size determined by the type of Macintosh you have. If you have more RAM available, you can increase the amount of RAM allocated to Photoshop in the Finder. See "Increase the application memory size" on page 366 for instructions.
- In Windows, Photoshop's default setting allocates 75% of available RAM (i.e., RAM not being used by the operating system or by disk-caching software) for its own use. You can increase this amount in the Memory & Image Cache Preferences dialog box (choose File > Preferences > Memory & Image Cache).

## Determining the amount of scratch disk space required

When your system does not have enough RAM to perform an operation, Adobe Photoshop uses *virtual memory*, also called the *scratch disk*. Virtual memory is disk space used for storing data during a work session when the amount of RAM is insufficient. Photoshop's virtual memory scheme lets you open and manipulate large images by swapping image data to a hard drive if there is not enough RAM to contain the data. Keep in mind, however, that copying data to and from the scratch disk requires significantly more time than processing files in RAM. Allocating enough RAM to Photoshop to avoid using the scratch disk will keep Photoshop operating at peak performance.

Whether or not Photoshop is using the scratch disk, the amount of free space on the scratch disk must be greater than or equal to the amount of RAM you have allocated to Photoshop. To ensure good performance, Photoshop writes the entire RAM contents to the scratch disk during idle times. If the scratch disk runs out of free space, Photoshop quits taking additional RAM—regardless of what you have allocated to the program. This means that if you've allocated 60 MB to Photoshop but you have only 10 MB of free space on your scratch disk, Photoshop will use only 10 MB of RAM.

## Assigning scratch disks

By default, Photoshop uses the hard drive that the operating system is installed on as its primary scratch disk. You can change the primary scratch disk or designate a secondary scratch disk, to be

used when the primary disk is full. Your primary scratch disk should be your fastest hard disk, and should have plenty of defragmented space available. For the best performance with large files, Adobe recommends that you dedicate an entire hard disk to Photoshop's scratch disk.

### To change the scratch disk assignment:

- 1 Choose File > Preferences > Plug-ins & Scratch Disk.
- 2 Select the desired disk from the menu. Then restart Adobe Photoshop for the change to take effect.

**Important:** Adobe recommends that you use a disk tool utility, such as Norton Utilities or Defrag, to optimize and defragment your hard drive on a regular basis. See your Macintosh or Windows documentation for information.

## Using the operating system's virtual memory

In addition to Photoshop's virtual memory, both Apple System software 7.0 and later and Windows use their own virtual memory schemes. These virtual memory schemes swap active application programs to a hard disk when there is not enough RAM to hold them all simultaneously. Increasing the system virtual memory will not speed up operations within Photoshop; it may, in fact, take needed scratch disk space from Photoshop and so seriously degrade performance. Use the following guidelines for setting up system virtual memory:

- On the Macintosh, turn off System 7 virtual memory. See page 367 for instructions.



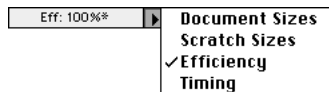
- On Windows, if you have plenty of RAM for Photoshop (see “Determining the amount of RAM required” on page 363) you might want to increase the amount of virtual memory to speed up Windows operations, including printing. See page 368 for more information.

## Displaying file size and memory status

The display in the lower left of the window lets you view different information related to disk space and memory. It’s important to note that the amount of data in an image and the amount of RAM the image is using may be very different values.

### To display file size and memory status:

- 1 Move the pointer to the [icon] in the lower left of the window, and hold down the mouse button.



- 2 Choose from the following options:

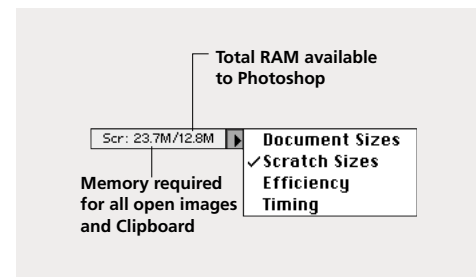
- Document Sizes to display information on the amount of data in the image. (See the following section for more information.)
- Scratch Sizes to display information on the amount of RAM used to process the image. See “Scratch sizes” on page 366 for more information.
- Efficiency to display the percentage of Photoshop operations being performed using RAM (as compared to using scratch disk space). An Effi-

ciency display below 100% indicates that Photoshop is using the scratch disk and so is operating more slowly than if only RAM were being used. See “Determining the amount of scratch disk space required” on page 364 for information on the scratch disk.

- Timing to display the amount of time it took to complete the last operation.

## Document sizes

When you display Document Sizes, the number on the left represents the printing size of the image—that is, the amount of data that will be sent to a printer if you print the file. The printing size is approximately the size of the saved, flattened file in Adobe Photoshop format; however, it is usually somewhat smaller than the uncompressed file size on disk. This discrepancy is caused by other factors—such as your preview options, paths, File Info, and the type of disk you have—which can add to the size of the file on disk. On the other hand, if you save in a compressed format, such as JPEG, the printing size displayed here may be significantly larger than the file size on disk.

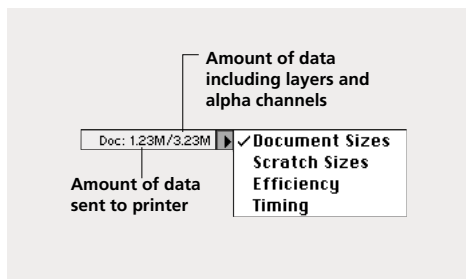


The number on the right indicates the file's approximate size in its layered format including alpha channels. This number is usually greater than the file size on disk because Photoshop is able to compress certain data, such as alpha channels, when it saves the file to disk. The larger the image, the greater the difference between this number and the saved file size. For more information on how layers affect file size, see “Keeping track of file size” on page 270.

**Important:** *If the 2.5 Format Compatibility option is turned off in the Saving Files Preferences dialog box (it's on by default), the saved file size will be significantly smaller with layered files because the 2.5 compatibility option saves a flattened version of the file with the layered file.*

## Scratch sizes

When you display scratch sizes, the number on the left represents the amount of memory that is currently being used by the program to display all open images, including channels, layers, and any information on the Clipboard.



The number on the right represents the total amount of RAM available for processing images. This number is equal to the amount of memory

available to Photoshop minus the amount that Photoshop needs to run. See “Determining the amount of RAM required” on page 363 for more information.

With Scratch Sizes, when the number on the left is greater than the number on the right, Photoshop is using the scratch disk in addition to RAM. At this point, you'll probably notice a dramatic decline in Photoshop's performance because Photoshop must read and write files to the scratch disk. See “Determining the amount of scratch disk space required” on page 364 for more information.

## Additional tips for improving performance on the Macintosh

You can optimize Adobe Photoshop's performance on the Macintosh by changing a variety of system settings.

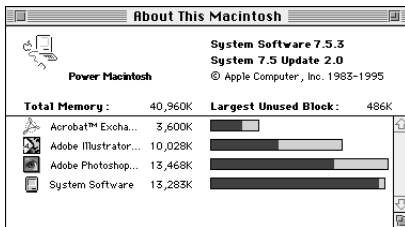
### Increase the application memory size

If your computer has more RAM than Photoshop's default RAM allocation, you can significantly improve Photoshop's performance by increasing the application memory size. See “Determining the amount of RAM required” on page 363 for more information.

#### To change the application memory size:

- 1 Start all applications—except Adobe Photoshop—that you must use at the same time as Adobe Photoshop. Keep in mind, however, that running other applications with Photoshop uses RAM that could be allocated to Photoshop.

2 Return to the Finder. Choose About This Macintosh from the Apple menu.



3 Note the Largest Unused Block value. (You will use this result in step 5.) This value shows the amount of memory currently available.

4 In the Finder, select the Adobe Photoshop program icon (not the folder or the alias icon), and choose File > Get Info.

You cannot increase the application memory size while Photoshop is running.

5 In the Adobe Photoshop Info window, set the Preferred Size option (or the Current Size option in System software versions earlier than 7.0) to no more than 90% of the Largest Unused Block value you noted in step 3.

**Important:** *Using RAM Doubler™ will improve performance when running Photoshop with other applications. However, Photoshop's memory allocation must be based only on installed RAM.*

6 Close the Adobe Photoshop Info window.

## Turn on 32-bit addressing and turn off Virtual Memory in the Memory control panel

Adobe Photoshop is designed to use the 32-bit addressing capability (called the Modern Memory Manager in System 7.5.1 and later) of System 7.0 and later. This capability enables applications to use more than 8 MB of RAM, thus allowing a larger portion of a file to be stored in RAM instead of on a comparatively slower hard disk.

In addition, Adobe recommends that you turn off System 7 Virtual Memory (see “Using the operating system's virtual memory” on page 364). For instructions on using the Memory control panel, see your Macintosh documentation.

**Note:** *Macintosh computers prior to the IIfx and IIfx models do not supply built-in 32-bit addressing.*

## Decrease the disk cache setting

The disk cache setting in the Memory control panel sets aside memory for common operating system tasks. Adobe Systems recommends that you set the disk cache to a maximum of 128K. If you have limited RAM allocated to Photoshop, setting the disk cache higher may significantly degrade Photoshop's performance.

### To set the disk cache size:

- 1 Choose Control Panels > Memory from the Apple menu.
- 2 If necessary, click the arrow keys to change the disk cache size to no higher than 128K.
- 3 Close the Memory control panel.

## Turn off system extensions and control panels

Like any application running at the same time as Photoshop, system extensions and control panels use RAM that could be allocated to Photoshop. If you are running Photoshop with limited RAM, use Extensions Manager to turn off as many extensions and control panels as possible. See your Macintosh documentation for instructions.

## Additional tips for improving performance with Windows

The first time you launch Adobe Photoshop, the program automatically checks the amount of RAM and warns you if you need to change the virtual memory allocation. By default, Adobe Photoshop allocates 75% of all available RAM (that is, RAM not being used by the operating system or by disk-caching software) for its own use.

### Use Enhanced 386 mode

If you are using Windows 3.1 or earlier, you must run the Adobe Photoshop program in Windows Enhanced 386 mode; the program does not run in Windows Standard mode. See your Windows documentation for more information.

### Increase the virtual memory allocation

Although you can't improve the performance of Photoshop operations by increasing the Windows virtual memory allocation, adequate virtual memory lets Windows swap Photoshop out of RAM when launching other applications, performing other Windows operations, or printing.

With Windows 3.1, the amount of memory you assign to the Windows virtual memory disk, called the permanent *swap file*, should be either as large as the amount of RAM installed on your system or 10 MB, whichever is greater. For instructions on increasing the virtual memory setting in Windows, see your Windows documentation.

If more memory is needed to run other applications at the same time as Photoshop, you can lower the percentage of RAM allocated to Adobe Photoshop in the Memory & Image Cache Preferences dialog box. Adjusting the RAM percentage will probably degrade the program's performance, but it may make it easier to run other applications with Adobe Photoshop.

## Tips for working efficiently

In addition to the amount of RAM and your system configuration, the single most important factor affecting performance is the size of your files. File size is determined chiefly by the pixel dimensions of an image and its color mode (see "Determining image size and resolution" on page 37 and "Color modes and models" on page 65). In addition, the number of layers and channels in an image can significantly increase file size.

### Minimize file size

The most important factor in determining file size is the pixel dimensions of the image. If you are preparing your image for printed output, make sure that the print resolution and dimensions are the size you need for your final file. In general, the recommended image resolution is 1.5 to 2 times the

screen frequency you will use to print the image. See [screen frequency sidebar in chapter 3] for more information.

If you are preparing images for color separation, it's also a good idea to work in RGB mode until you are ready to print RGB images. RGB images are approximately 75% the size of CMYK images.

Also, merge layers and delete channels as you no longer need them. Layers and channels may add significantly to the size of the file.

### Clear data from RAM

The images and selections you cut or copy to the Clipboard or that you define as patterns or snapshots are stored in RAM. Keeping large amounts of data in RAM can significantly degrade Adobe Photoshop's performance.

#### To clear cut and copied data from RAM:

Choose Edit Purge and then choose an option from the submenu:

- Undo to remove from RAM a copy of the image before the last-performed operation.
- Clipboard to remove from RAM any data copied or cut from an image.
- Pattern or Snapshot to remove from RAM any defined patterns or snapshots.

**Note:** To avoid filling the Clipboard with data, use the program's drag-and-drop capability to drag elements (images, selections, channels, layers, and paths) from one file to another or from the Layers, Channels, or Paths palette to another file.

### Turn off palette previews

The preview thumbnails on the Layers, Channels, and Paths palettes can be turned off for a slight performance improvement. To turn off these previews, choose Palette Options from the palette menu and select None from the Thumbnail Size options.

### Use shortcuts

Learn to use the command shortcuts that appear to the right of the commands in the menus. These are especially useful for operations that you perform frequently, such as displaying a specific command's dialog box or adjusting color levels. You can also select frequently used commands or sets of commands or show and hide palettes by clicking buttons in the Actions palette. Buttons can easily be added to the button display of the Actions palette.

For complete information on shortcuts, see the Adobe Photoshop Quick Reference Card.

### Save selections in channels

Get into the habit of saving complex selections in channels until you have finished editing a file. You can then easily load the selections without reselecting. If you have many selections in a channel, copy the channel containing the selections either by dragging the channel to the New Channel button in the Channels palette or by choosing Duplicate Channel from the Channels palette menu. By loading the channels as selections from this second file, you can keep the file size manageable.

## Make complex selections in Grayscale mode

Making complex selections in Grayscale mode can save processing time, because grayscale images are about one-third the size of RGB images. Save the selection in a channel, and then copy the channel by dragging it from the Channels palette to the open color document. Note that if you increase the contrast of a grayscale image, it's easier to select shapes of different colors. When you're working with selections in Bitmap mode, it's even faster to save a complex selection as a path.

## Apply filters to individual channels

Some Photoshop filters, such as the Distort filters, work only in RAM and don't use Photoshop's scratch disk. If you're having problems applying a filter to a color image, try applying it to each color channel individually. (Use Command/Ctrl+F to reapply a filter with the same settings.) Applying a filter to a single channel requires significantly less memory. (In a flattened file, each RGB channel is equal to about one-third the entire file size; a CMYK channel is about one-fourth the size of the entire file.)

## Working in two windows

You can save time by using the View > New View command to open a second window for a document. For example, you can work on a magnified version of an image in one window while viewing the entire image in a second window, or you can use two windows to view the results of color corrections in the composite color channel and in an individual channel of an image.

## Use QuickEdit

You can significantly decrease the time it takes to open large high-resolution files, especially files larger than 4 MB, by opening and editing parts of the file using the Quick Edit feature. The feature is also useful when you don't have enough RAM to open the entire file or when you want to speed up processing while trying different painting techniques or special effects. The Quick Edit module opens Scitex CT, uncompressed TIFF files, and Photoshop 2.0 files (Macintosh only). For more information about using the Quick Edit module, see "Acquiring Quick Edit Files" on page 57.

## Work on low-resolution copies of files

Another way to save time and space is to create a low-resolution version of your file. Be sure to give this copy a unique name when you create it so that you don't overwrite your original high-resolution image.

A low-resolution image is useful for making initial editing and color corrections. If you're adjusting color, save the settings by using the Save buttons in the color-adjustment dialog boxes. Once you know which features and dialog box settings produce the results you want, open the original file and repeat the steps; then use the Load button to apply saved settings to the original file.

# Appendix B: Troubleshooting

**T**his appendix contains common solutions to problems you may encounter when using the Adobe Photoshop program. Also see the Read Me file installed with the program for last-minute information not included in this user guide.

When you register your product purchase, you receive free technical telephone support for 90 days (for new users) or 30 days (for upgrade users) from the date of your first call. When your complimentary telephone support expires, you can get direct telephone support for \$2 per minute by calling 1-900- 555-3300. (Additional support options are also available.) Outside the United States and Canada, terms may vary. Contact your local subsidiary or distributor for details.

See “Additional technical support resources” on page 372 for information on automated technical support information.

## 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** If you are experiencing installation problems, delete all of your Photoshop applications files, including the preferences file

(located in the System Folder/Preferences folder on the Macintosh and in the Photoshop/Prefs folder on Windows), and then try the following:

- If you are installing from the CD, copy the entire Disk Images folder (Macintosh) or Photoshop folder (Windows) to your hard disk and then install from the hard disk after following the instructions in the next paragraphs.
- On the Macintosh, hold down the Shift key and restart to turn off all extensions; then reinstall Adobe Photoshop.
- On Windows, remove all items from the Startup Group and remark out the load/run lines in the win.ini file. Then restart in Safemode (Windows 95), with the Microsoft VGA driver (earlier versions of Windows), or in VGA mode (Windows NT). 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 Safe-mode, VGA mode, or with the VGA driver.)

**Check for new software or setting conflicts** Very often problems with Adobe Photoshop can 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 must also re-install

Photoshop following to 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 a utility conflict** On the Macintosh, hold down the Shift key and restart the computer to restart with extensions off. In Windows, remove all items from the startup group and remark out the load/run lines in the win.ini file. (See your Macintosh or Windows 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 on the Macintosh, drag the Adobe Photoshop Prefs file (located in the Preferences folder in your System Folder) to the Trash. To deactivate the preferences file in Windows, rename the photos40.psp and the ColorSD files (located in your Photoshop\Prefs directory). If the problem disappears, delete the preferences. If the problem persists, restore the preferences file to its original location (Macintosh) or names (Windows) 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, and that device cords are not damaged. The cause of the problem could be a bad connection.

**Important:** *Be sure to turn off your computer and SCSI devices before checking cord connections. Failure to do so can damage your hardware.*

**Optimize and defragment your hard disk** Use a disk tool 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 the Norton Speed Disk or Defrag utility to optimize and defragment the hard drive. (Defragmenting cleans up any leftover file fragments and orders data contiguously so that it can be accessed quickly.) For instructions, see the utility's documentation.

## Additional technical support resources

Adobe Systems provides several forms of automated technical support free of charge:

- See the Read Me file installed with the program for last-minute information not included in this user guide.
- Use forums on CompuServe and America Online, extensive customer support information on the Adobe Home Page on the World Wide Web, or Adobe's own technical support bulletin board system. To open the Adobe Home Page, use the URL <http://www.adobe.com> once you're on the



World Wide Web. To use the Adobe bulletin board, call 1-206-623-6984. Forums and availability may vary by country.

- Call Adobe FaxYI, a free fax-on-demand system that can fax you any of over 1400 technical and customer services documents on Photoshop and other Adobe products. Call 1-206-628-5737 from a touch-tone phone and follow the recorded instructions.
- Browse through the Adobe Technical Library on the application CD-ROM for additional technical and troubleshooting information.

## Setup and performance problems

***Commands don't appear in menus; Filter (or Import or Export) menu and submenus are gray or missing.***

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. Also make sure that all the plug-ins you want to use are within a single umbrella folder. Although you can nest plug-ins in folders within folders, you can select only one umbrella plug-in folder at a time. See “Setting plug-ins preferences” on page 31 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 Appendix A.

***Scratch disk full messages appear.***

Photoshop uses temporary hard disk space, called the scratch disk, for processing images. For Photoshop to function properly, your scratch disk must have the same amount of free space as the amount of RAM you have allocated to Photoshop. For more information on the scratch disk, see “Determining the amount of scratch disk space required” on page 364.

***Space on hard disk appears lost.***

If a system error occurs when a Photoshop file is open, the system creates a temporary (.tmp) file to hold the information about the open images. Normally, the temporary file is deleted when you quit the program. However, sometimes when the system crashes the file is not deleted.

To restore the hard disk space on your Macintosh, empty the Trash to delete the temporary files. For more information, see your Macintosh documentation.

To restore the hard disk space in Windows, search all hard drives from the root directory, including subfolders, delete the .temp files, and run the Scandisk utility. (Note that you will not be able to delete the active Windows .temp file.) For more information, see your Windows documentation.

***Adobe Photoshop displays an out-of-memory message when opening an Adobe Illustrator file.***

Even small Adobe Illustrator files can have a number of complex elements, such as many blends, a large number of paths, and so on. To open an Adobe Illustrator file, Adobe Photoshop must rasterize the vector artwork into bitmap, or raster, data. (See “Vector & Bitmap,” on page 36 for more information.) Too many complex elements can cause the application to run out of memory.

To reduce the size of the Illustrator file in Photoshop, open the file in Adobe Illustrator and make the file less complex. This will also prevent printing problems that can occur with complex Adobe Illustrator files. For more information about simplifying files, see the *Adobe Illustrator User Guide*.

## 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 Display Mode,” and Chapter 5, “Reproducing Color,” for more information.

***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 Separation Setup, Monitor Setup, and Printing Inks 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 Display Mode,” and Chapter 5, “Reproducing Color,” 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 Command/Ctrl+H. If you are painting outside a selected area, choose Select > None 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 (Macintosh only).***

Try either disabling or enabling the Direct Cursors extension in the Extensions folder. To turn off the extension, first create a new folder; then drag the Direct Cursors extension out of the Extensions folder (located in the Plug-Ins folder) and into a new folder.

***Only 16 pixels are available for the brush size (Macintosh 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.

## Working with placed images

***Unable to place or open EPS files in Adobe Photoshop.***

Adobe Photoshop 4.0 lets you place Encapsulated PostScript (EPS) files saved in the Adobe Illustrator format and in other applications that support the Adobe Illustrator format, such as Adobe Dimensions. Trying to place EPS files saved in applications that do not support the Adobe Illustrator format may generate an error message or produce undesirable results.

To achieve the best results with type in Adobe Photoshop, convert type to outlines in Illustrator before opening the image in Adobe Photoshop. See page 36 for information on the difference between Illustrator (vector) artwork and Photoshop (bitmap) images.

***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 with the proper preview option. See page 322 for instructions.



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