



Basic Scanning in Adobe Photoshop

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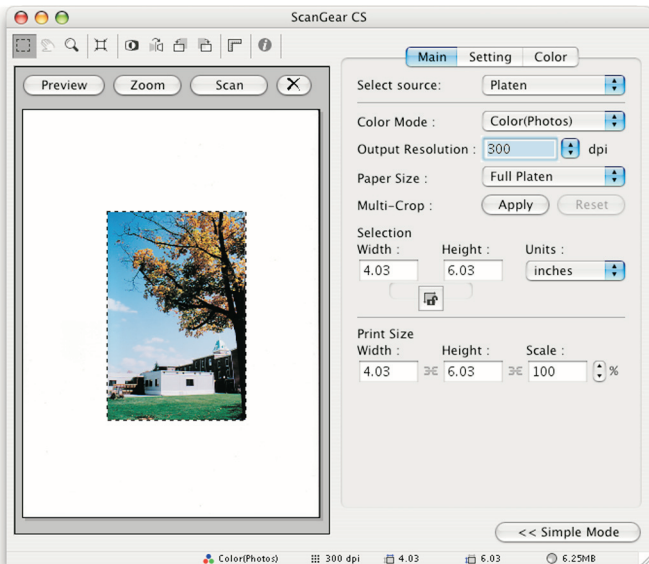
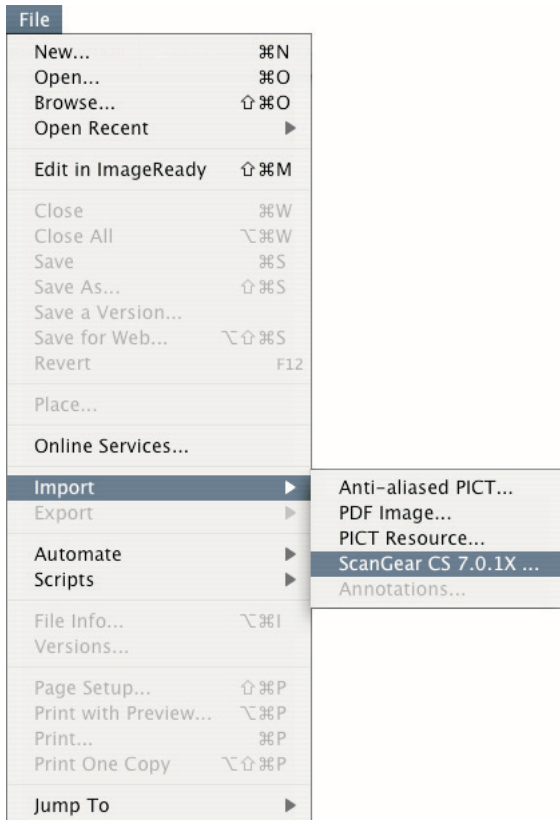
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Using the Scanner



Making a Simple Scan

After the scanner and computer have been turned on, Photoshop can be launched.

Next choose the command <Acquire:Your scanner name here...>. Although your scanner may have a slightly different controls, most attributes will be very similar.

Place your artwork facedown on the glass bed and click the <Preview> button.

Set the Scanning Mode next. For most applications you will choose “Color - Full” or “Gray - 256.” Next set the resolution. For laser quality output set the value at 115; for professional proofs choose 300 dpi

If you intend to enlarge the artwork, the resolution should be scaled accordingly. Some software includes an automatic scale. However, with many scanner if you intend to double the size of the image, you’ll have to manually double the resolution and “fix” the resolution later using Image Size.

Keep in mind that all flatbed scanners lack the quality of professional scans which use PMT (photo-multiplier tubes) instead of flatbeds poor quality CCD (charge coupled diodes). For professional quality scans, contact a service bureau and expect charges \$50 – \$150 per scan. For low-end applications consider Photo-CD which costs only a few dollars per slide.

If your scanner supports gamma correction, verify that the Gamma Correction control is set to Normal (1.8). This control adjusts the tonal range to more closely represent gray values in the midtones.

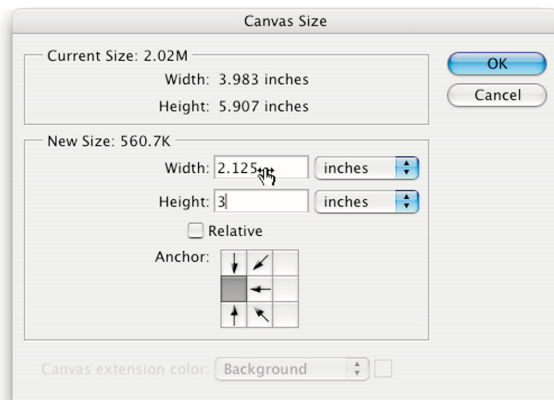
You may choose to set the contrast and tonal exposure of the image by setting the Image control to a value other than “+1.” This feature lets you make basic adjustments in the scanner to improve the data received by Photoshop.

Use the mouse to drag a box around the area you want to scan. As you change the size of the cropping area, the memory required will change. The size will determine how long it takes to scan and how difficult edits will be in Photoshop.

When satisfied with the settings, click <Acquire>.



Cropping the Scan



Cropping the Artwork

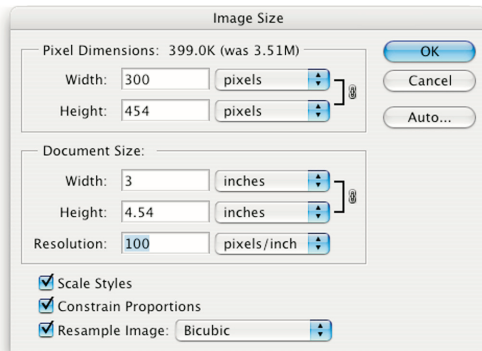
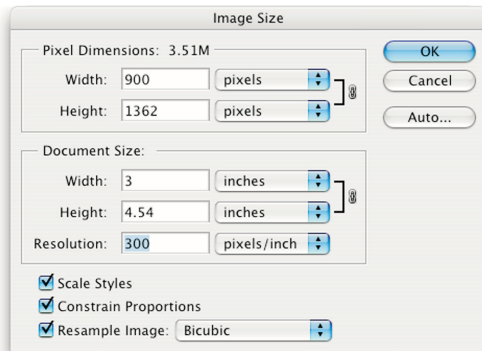
The next step is to crop the image to the proper size. The cropping tool can be used to manually crop the image. In this case, the image needs to be straightened, as well. Dragging on the corner of an existing crop shape will resize the selection. Dragging outside the handles will cause the selection to “spin.” Rotate the selection until it matches the image. That is, align the edges of the crop to the image’s orthogonal (a horizontal or vertical) axis. Once satisfied with the angle and positioning of the crop, click inside the selection (the cursor will change to the scissors). To cancel a crop, press <escape> or click the international no symbol in the info bar.

Precise Cropping

A more precise technique to crop an image uses the <Image:Canvas Size> command. The tic-tac-toe board in the Canvas Size dialog determines which portions of image will be kept and which will be discarded. The gray square represents which section of the image is sacred. If the center square is selected, the image will be cropped equally on the top and bottom, equally on the left and right. If the upper left square is selected, all cropping will occur on the right and the bottom. In our example, the center left square crops the image on the right. Should vertical cropping be needed (it is not in this example), it would occur equally at the top and bottom. After clicking <OK> the computer will verify that your action will indeed discard part of the image.



Resizing the Scan



Resizing the Image

The next step is to resize the image. In Photoshop this is a two step process. First the image is resized to the correct physical size; then it is resampled to its correct logical size (resolution). Invoke the command <Image:Image Size...> making sure that both the options for “proportions” and “file size” are checked. Now type in the physical width or height needed. As in traditional resizing of images, you must scale based on one dimension and crop based on the other. Clicking <OK> will change the physical size and inversely affect the resolution. If the physical size is reduced to 50%, the resolution (quality) will double.

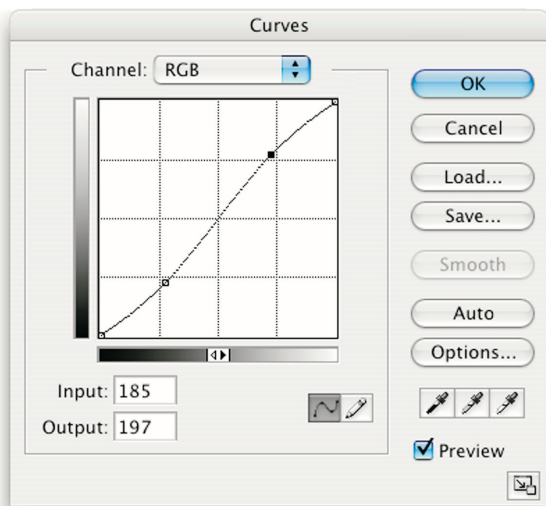
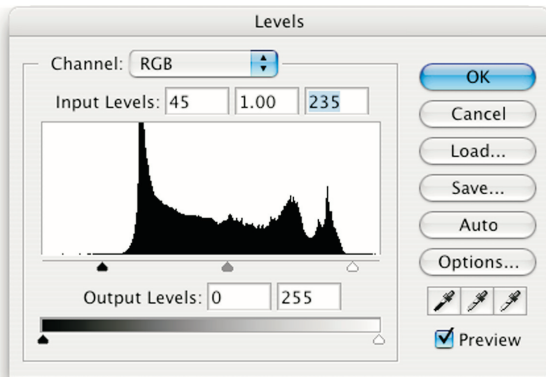
Resampling the Image

Invoking the <Image:Image Size...> command again allows us to change the resolution. Leave “proportions” checked and turn off the “file size” constraint. In this example, the 100 ppi value represents sufficient resolution for compositional output on a black and white laser printer; multimedia work requires exactly 72 ppi; and commercial quality output is processed at 300 ppi.

Most professionals will enter the value which is twice the line screen in the resolution category. For example, newspaper users would enter 170 ppi (dots per inch). This value represents twice the 85 line screen frequency common in newspaper printing.



Adjusting Scans



Adjusting Tonality with Levels

Historically, flatbed scanners tend to generate photographically flat images. Photoshop offers a variety of techniques to increase the contrast in an image. The most convenient of these is the <Image:Adjustments:Levels...> command. The levels dialog offers two sliders: the input slider (top) increases the contrast of images while the output slider (bottom) decreases the contrast in images. The slider's numeric values are in Photoshop's own 255 to 0 (white to black) scale. Slide the top black triangle right until it reaches some substantial data on the histogram. Likewise, slide the top white triangle left until it reaches some substantial data. Finally, move the gray point until the image looks correct and reasonably balanced. The resulting image should be much improved.

Fine Tuning Level with Curves

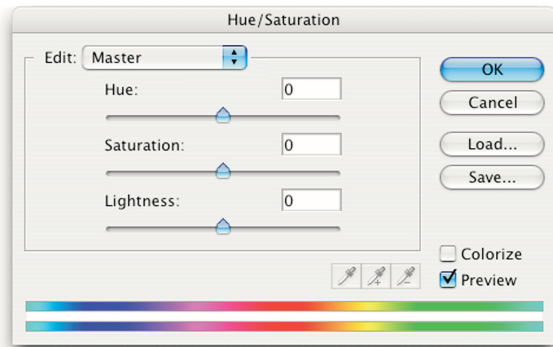
To make more subtle changes to the tonality, invoke the command <Image:Adjustments:Curves...>. Levels is used to make dramatic changes to the artwork; curves is used to fine tune the image.

Curves control the image tonality across the entire tonal range. In general, you'll want the bar under the curve grid to be white on the left and black on the right. If this is not the case, clicking the bar will flip it. Essentially each value along the bottom is converted to another value on the left. For each of the 256 values Photoshop goes up until it hits the curve. At this point, Photoshop goes left until it hits a new tonal value. All 256 values can be changed slightly or dramatically depending on the curve shape.

Click at the 50, 50 point along the very center of the chart. At this point the shadow point (lower left corner), the midtone (50,50) and the highlight point (upper right) are locked in and should not be changed. Put simply, these three values have already been set in Levels. Dragging slightly away from the highlight quarter tones (25,25) will change the light areas of the image without changing the tonal values already set in Levels. Repeat the same action around the shadow quarter tones (75,75). In most cases, some combination of values will improve the tonal range. The most common curves adjustment is to increase the contrast in the quarter tones as shown in the adjacent figure. Occasionally the opposite S-curve will improve the image. In this case the image will be softened by decreasing the contrast.

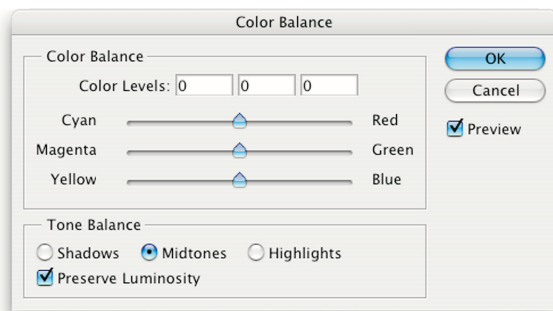


Adjusting Scans



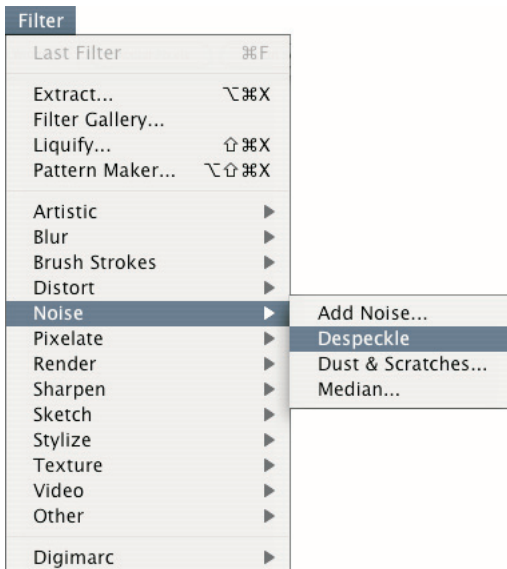
Removing Cast with Color Balance

Color balance is used to remove unwanted color shifts from scans. For instance, photography shot indoors often appears with a green tint. Likewise, amateur photographs inappropriately use flash to brighten an image. Flash can distort color balance and add multiple casts to an image. Move each of the three sliders until the image balance improves. Color specialist will monitor the densitometer readings in an image for proper cast. Since designers mostly use flatbed scans for comping and multimedia, educated guesses are probably close enough for the web and for position only (FPO) work. Next click on the <Shadow> setting and move the three balance sliders again. Finally, move the three sliders for the highlight settings. After clicking <OK> the overall effect will most likely be noticeable.



Reviving Color with Saturation

While not appropriate for all artwork, the saturation feature can add “pop” to the image. Jobs being printed professionally are generally printed in four color process. The poor quality of CMYK printing defeats the purpose of dramatic improvements to color intensity. The advent of multimedia, new proofing devices and the promise of Hexachrome printing have made RGB (red, green, blue) a more common professional format. Because RGB has a larger gamut, it benefits from more dramatic improvements in saturation. RGB is also used for most preproof technologies.



Removing part of a Halftone Dot Pattern

Scanning from preprinted artwork presents a variety of technical challenges. In most cases it also represents a violation of copyright law and the serious criminal and civil liabilities that accompany a violation. However, occasionally a client will have no original to scan. After scanning a halftoned image, using the command <Filter:Noise:Despeckle...> to reduce the intensity of the halftone pattern. In many cases despeckle can be applied iteratively to create even better results.



Adjusting Scans



Recovering Detail and Focus with Unsharp Mask

Most scans lack a certain amount of subtle detail and focus. The unsharp mask command can be used to digitally improve the overall quality of the image. Photoshop looks for areas of slight difference. These areas are then changed slightly to lighten one edge while darkening the opposite edge. This technique creates artwork that appears to offer more precise focus and increased pixel-based contrast.

To apply the filter choose the command <Filter:Sharpen:Unsharp Mask...>. The **amount** refers to the degree of change desired. The value is related to the existing quality of the image and the resolution of the image. For instance, low resolution images like multimedia may be “freeze-dried” by an amount of 50 while this setting is a rather minor change for a commercial scan. Typical values fall between 15 and 150 depending on subject and resolution.

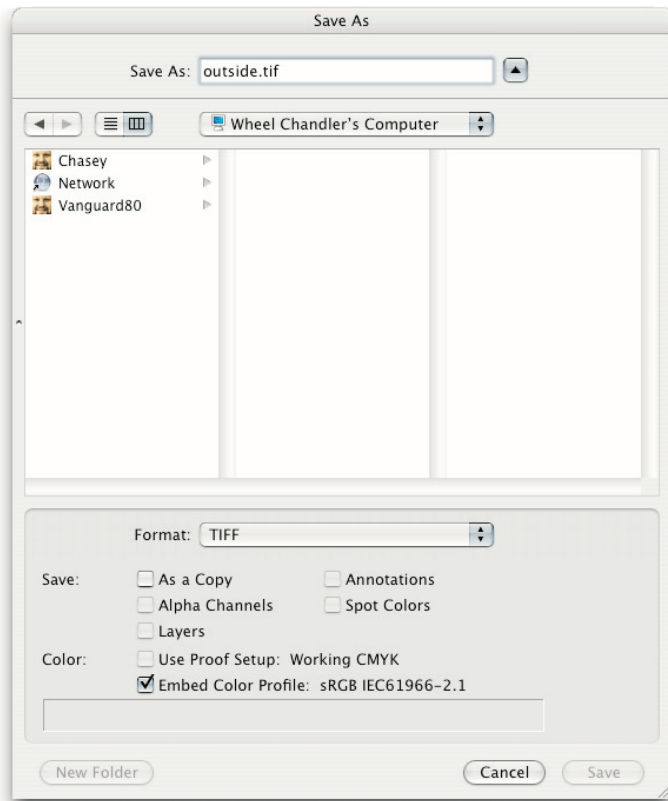
The **radius** command controls how large of a transition area should be considered. While somewhat controlled by resolution, this setting is largely regulated by the level of detail obtained by a particular scanner. Historical values were typically about 1.5 while newer equipment use values 1.0 and 1.2. Many digital camera use interpolation to create artificial resolutions; these scanners will need larger values.

The **threshold** control can be used to increase the focus of areas of “high” transition only. Even a relatively small setting will make a huge difference. This setting should be set to zero unless you are sure another value will provide superior results.

Keep in mind that images with human subjects should be sharpened less than still lifes. Individual changes performed by unsharp mask can be subtle. Look at the eyes, reflections and edges to see the most dramatic areas of change. Keep in mind that art which will be halftoned during printing will lose some of their sharpness during printing.

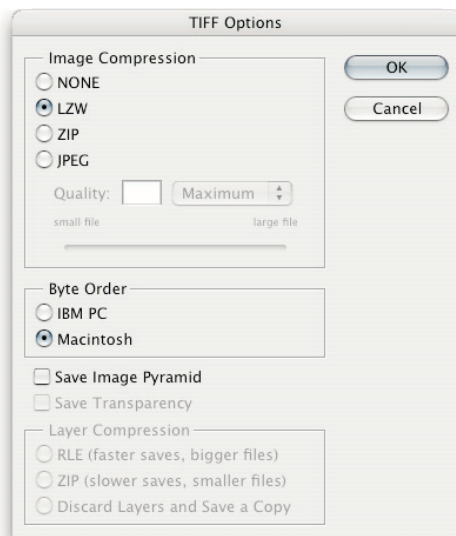


Adjusting Scans



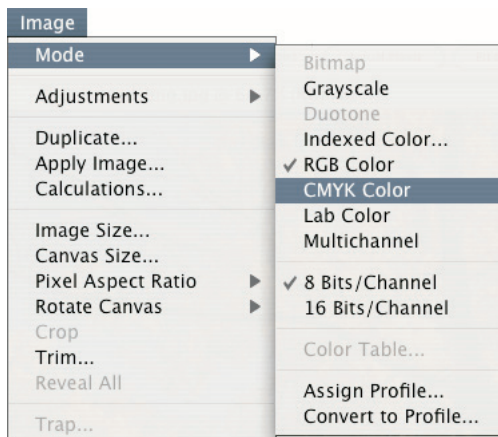
Saving the File

Finally, save the image using <File:Save As...>. After choosing a location in the standard file dialog box, you will need to name the file and choose a format. JPEG (maximum quality) is a great flattened format but can not be placed directly into all page geometry programs without conversion; also, image quality may suffer when the compression ratio is increased. Photoshop offers the most flexibility but is still not common in professional printing. TIFF with LZW compression is a good choice for almost all files and is dominant for smaller files and grayscale files. The raster EPS (encapsulated postscript) format is used for more complicated files such as those with clipping paths for transparency. Do not include halftone screens or angles in EPS files.

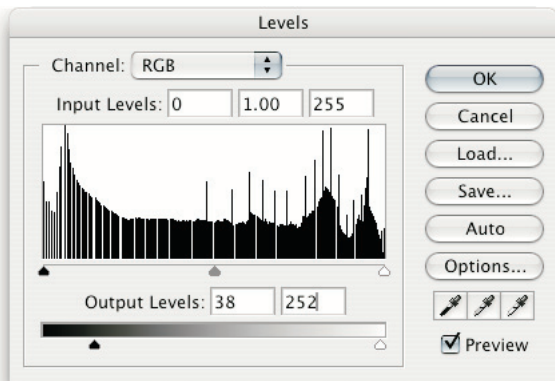




Preparing for Output



Jobs which will be imaged to orthochromatic film for printing on a press will require additional steps. As mentioned earlier, most color jobs are printed in the traditional four color process model. As such, the image should be converted to CMYK using the <Image:Mode:CMYK> command.



Printed materials are susceptible to a variety of gain issues. Halftone dots become fuzzier in camera when duplicating negatives and making plates. Even more problematic is press gain. On the press, images tend to posterize. A halftone dot of 5% may washout to white when printed, while a dot larger than 85% may become completely black. If not compensated for, gain can result in a dramatic loss of quality in both the highlight and shadow areas. Many service bureaus take responsibility for dot gain adjustments; however, designers are setting their own dot gain more and more frequently. Using the output (bottom) slider in the <Image:Adjustments:Levels...> dialog, the image can be photographically flattened to minimize the effect of dot gain. Please note, there are other methods to avoid this problem in some workflows.

Although a dot gained image will look wrong on screen and in proof, it will appear much better after being printed on a sheetfeed or web offset press.



If printing directly from Photoshop, you should specify the line screen. Use the <transfer> button in <File:Page Setup...> to invoke the line screen dialog. Set the line screen frequency, angle and dot shape. 85 lines per inch (lpi) is standard for newspapers while 133 lpi and 150 lpi are common for commercial printing. 45° is the standard angle for black ink. The round shaped dots yield best overall results. Use other options only for effect or for special applications.

To actually print the continuous tone image from Photoshop, choose <File:Print...>. The continuous tone image is transferred to the printer's RIP (raster image processor, the printer's brain) where the actual halftone is applied.

In most cases, users will place the image into a page layout program where they will be combined with other scans, vector-based artwork and text. The composited product will then be printed from the page layout program.