

Introduction to RAW By Linda Gregory

What is RAW? Unlike JPEG and TIFF, RAW is not an abbreviation but literally means “raw” as in “unprocessed”. A RAW file contains the original image information as it comes off the sensor before in-camera processing so you can do that processing afterwards on your PC with special software. It is digital photography’s equivalent of a negative in film photography.

Digital camera image sensors create an image from literally millions of tiny light sensing areas on a silicon chip. Each light sensor is receptive to a broad range of colors and has a minute colored filter in front of it. There are usually three different colors (red, green and blue). The actual sensor can provide data at 12 to 14 bits per pixel. This is reduced to 8 bits per color in a JPEG file (24 bits total, 8 per color R, G and B). The complete unreduced data is stored in a raw format file.

Disadvantages:

- RAW files need to be converted before they can be printed.
- RAW formats differ between camera manufacturers, and even between cameras, so dedicated software provided by the manufacturer may have to be used. However, Elements and CS contain a built-in RAW converter that addresses this problem and that’s what I’ll demonstrate today.
- RAW files are much larger than similar JPEG files, and so fewer photos can fit within the same memory card. On my camera a 2G memory card will hold 399 JPEG files, but only 134 RAW/JPEG files. The JPEG file that goes with each RAW file gives you the thumbnail of what’s on the RAW file.
- RAW files often take longer to be written to a memory card since they are larger, therefore most digital cameras may not achieve the same frame rate as with JPEG. If I want to capture a fast-moving subject, I shoot in JPEG, not RAW.
- RAW files require a more powerful computer with more temporary memory (RAM).

Advantages:

- RAW photographs, because the files contain so much information, are actually easier (and thus more satisfying) to tweak and edit.
- Modern cameras can actually detect more than 256 levels of strength. But since the TIFF and JPEG formats don’t allow more than that number, the camera throws the extra information away. The RAW format saves these extra strength levels resulting in a better image with more contrast levels.
- Images can be “fixed” in ways which would be very difficult without the raw sensor data.
- The camera doesn’t correct for exposure or white balance before it saves in RAW format, meaning you have ultimate control in manipulating the image in a paint program – so your image looks exactly how you want it to look.
- Without sharpening or compression you have not “lost” any data. You can change your mind about some of the picture settings after you have taken it.
- You can reprocess the file repeatedly to achieve the results you want. Photoshop Elements doesn’t save your changes to the original RAW file; it saves the last settings you specified before importing the file from your camera to your computer.
- You can make larger prints because the files are larger

Working in RAW:

1. Copy your photos to a file in My Pictures just as you do with your JPEG files.
2. Go to the Editor pull-down menu in the top-right corner of your screen, and choose Full Edit.
3. When you select the file in Open, instead of bringing you straight into the editor, Elements will take you into the RAW converter. Here you can make adjustments to your image before going into the main Editor. Make all the edits you like—you can always open your RAW file again and redo it later. (Elements will always remember the last ones you did.)
4. Because you're working with a RAW file, you can get all kinds of detail out of your image that you didn't think was there. Once you like your image, click the Open Image button.
5. Now you're back in the familiar world of Elements. Elements should convert your 12- or 14-bit file into 8-bit mode. Here you can do all your cloning and other retouching. If you are not able to use the clone tool, etc. you will need to go to Image > Mode > 8 Bits/Channel to convert the file to 8 bits. You can print right from here, too, but to lock in your adjustments, you need to save the file as another type. Go to File > Save As and choose TIFF if you want to save without compressing it, or JPEG if you just want to e-mail it to a friend. Next time you want to work with that picture, open your edited version or go back to the RAW file to convert it in a whole new way.

Camera Raw Controls:

Zoom tool (magnifying glass): Sets the preview zoom to the next preset zoom value when you click within the preview image. Alt-click to zoom out. Drag the Zoom tool in the preview image in on a selected area. To return to 100%, double-click the Zoom tool.

Hand tool (hand): Moves the image in the preview window if the preview image is set at a zoom level higher than 100%. Hold down the spacebar to access the Hand tool while using another tool. Double-click the Hand tool to fit the preview image in the window.

White Balance tool (eyedropper): Sets the area you click to a neutral gray tone to remove color casts and adjusts the color of the entire image. The Temperature and Tint values change to reflect the color adjustment.

Crop tool: Removes part of an image. Drag the tool within the preview image to select the portion you want to keep, and then press Enter.

Straighten tool: You can use the Straighten tool to realign an image vertically or horizontally. This tool also resizes or crops the canvas to accommodate straightening the image.

Red Eye Removal: Removes red eye in flash photos of people and green or white eye in pets.

Open Preferences Dialog: Opens the preferences dialog.

Rotate buttons: Rotates the photo either counterclockwise or clockwise.

Using Elements to Enhance Your Raw Photos:

1. Using the Histogram and RGB Values in Camera Raw: The Camera Raw histogram shows all three channels (red, green, and blue) of the image simultaneously. The histogram changes automatically as you adjust the settings in the Camera Raw dialog box.

As you move the Zoom tool, Hand tool, or White Balance tool over the preview image, you see the RGB values in the upper-right corner of the dialog box.

2. White Balance Controls: Sets the color balance of the image to reflect the lighting conditions under which the photo was taken. In some cases, choosing a white balance from the White Balance menu provides satisfactory results. You have your choice of As Shot, Auto, Daylight, Cloudy, Shade, Tungsten, Fluorescent, Flash and Custom. If one of the presets doesn't work, you can customize the white balance using the Temperature and Tint adjustments.
 - a. Temperature: Fine-tunes the white balance to a custom color temperature. Set the color temperature using the Kelvin color temperature scale. Move the slider to the left to correct a photo taken at a lower color temperature of light: the plug-in makes the image colors cooler (bluish) to compensate for the lower color temperature (yellowish) of the ambient light. Conversely, move the slider to the right to correct a photo taken at a higher color temperature of light; the plug-in makes the image colors warmer (yellowish) to compensate for the higher color temperature (bluish) of the ambient light.
 - b. Tint: Fine-tunes the white balance to compensate for a green or magenta tint. Move the slider to the left (negative values) to add green to the photo; move it to the right (positive values) to add magenta. *To adjust the white balance quickly, select the White Balance tool, and then click an area in the preview image that should be a neutral gray or white. The Temperature and Tint sliders automatically adjust to make the selected color exactly neutral (if possible). If you're clicking whites, choose a highlight area that contains significant white detail rather than a specular highlight.*
3. Exposure: Adjusts the brightness or darkness of an image. Move the slider to the left to darken the image; move it to the right to brighten the image. The values are in increments equivalent to f-stops. An adjustment of +1.50 is similar to widening the aperture one and one-half stops. Likewise, an adjustment of -1.50 is similar to reducing the aperture one and one-half stops. *Hold down ALT while moving the Exposure slider to preview where the highlights are clipped. (Clipping is the shifting of pixel values to either the highest highlight value or the lowest shadow value. Clipped areas are either completely white or completely black and have no image detail.) Move the slider until the highlights (not the specular highlights) are completely clipped, and then reverse the adjustment slightly. Black indicates unclipped areas, and color indicates areas clipped in only one or two channels.*
4. Recovery: Attempts to recover details from highlights. Camera Raw can reconstruct some details from areas in which one or two color channels are clipped to white.

5. Fill Area: Attempts to recover details from shadows, without brightening blacks. Camera Raw can reconstruct some details from areas in which one or two color channels are clipped to black. Using Fill Light is similar to using the shadows portion of the Photoshop Shadow/Highlight filter or the After Effects Shadow/Highlight effect.
6. Blacks: Specifies which input levels are mapped to black in the final image. Increasing Blacks expands the areas that are mapped to black. This sometimes creates the appearance of increased contrast in the image. The greatest change is in the shadows, with less change in the midtones and highlights. Using the Blacks slider is similar to using the black point slider for input levels when using the Photoshop Levels command or the After Effects Levels effect.
7. Brightness: Adjusts the brightness of the image, much as the Exposure slider does. However, instead of clipping the image in the highlights (areas that are completely white, with no detail) or shadows (areas that are completely black, with no detail), Brightness compresses the highlights and expands the shadows when you move the slider to the right. In general, use the Brightness slider to adjust the overall brightness after you set the white and black clipping points with the Exposure and Shadow sliders.
8. Contrast: Adjusts the midtones in an image. Higher values increase the midtone contrast, and lower values produce an image with less contrast. Generally, use the Contrast slider to adjust the contrast of the midtones after setting the Exposure, Shadow, and Brightness values.
9. Clarity: Sharpens the clarity of edges in the image. This process helps restore detail and sharpness that tonal adjustments may reduce.
10. Vibrance: Adjusts the saturation so that clipping is minimized as colors approach full saturation, changing the saturation of all lower-saturated colors with less impact on the higher-saturated colors. Vibrance also prevents skin tones from being oversaturated.
11. Saturation: Adjusts the color saturation of the image from -100 (pure monochrome) to +100 (double the saturation). *This can be used to create black and white photographs in RAW.*
12. Sharpening: Sharpening enhances the definition of edges in an image. Additional controls are available in the Detail panel. The zoom level must be set to 100% or greater in order to view the effects of these controls.
 - a. Amount: Adjusts edge definition. Increase the Amount value to increase sharpening. A value of zero turns off sharpening. In general, set Amount to a lower value for cleaner images. The adjustment locates pixels that differ from surrounding pixels based on the threshold you specify and increases the pixels' contrast by the amount you specify.
 - b. Radius: Adjusts the size of the details that sharpening is applied to. Photos with very fine details may need a lower radius setting. Photos with larger details may be able to use a larger radius. Using two large a radius generally results in unnatural results.

- c. Detail: Adjusts how much high-frequency information is sharpened in the image and how much the sharpening process emphasizes edges. Lower settings primarily sharpen edges to remove blur. Higher values are useful for making the textures in the image more pronounced.
- d. Masking: Controls an edge mask. At a setting of zero, everything in the image receives the same amount of sharpening. At a setting of 100, sharpening is mostly restricted to areas near the strongest edges.

13. Noise Reduction: The Detail tab in Camera Raw dialog contains controls for reducing image noise—the extraneous visible artifacts that degrade image quality. Image noise includes luminance (grayscale) noise, which makes an image look grainy, and chroma (color) noise, which is usually visible as colored artifacts in the image. Photos taken at high ISO speeds or with less sophisticated digital cameras can have noticeable noise.

Moving the Luminance Smoothing slider to the right reduces grayscale noise, and moving the Color Noise Reduction slider to the right reduces the chroma noise. When making Luminance Smoothing or Color Noise Reduction adjustments, it's a good idea to preview images at 100% for a better view.

Once you've made all of your adjustments in Camera Raw, click on Open Image button. The Camera Raw dialog box closes, and the photo opens in the Editor.

When you save the work you did in Editor, you can save the photo as a JPEG (compressed) or TIFF (uncompressed).

Note: You can use the Camera Raw editor for JPEG files also. Rather than clicking on Open, you select Open As. You will see a dialog box at the bottom of the page that shows Photoshop (*.PSD,* PDD) with a down arrow to the right. Click on the arrow to open a list of file types. Choose Camera Raw. The Camera Raw editor will open and you can use it just as you would for a RAW file, except that you won't have the White Balance options.