

Adobe Photoshop Camera Raw plug-in

Working with raw image files in Adobe Photoshop

The Adobe® Photoshop® Camera Raw plug-in lets you open a camera's raw digital photo so that you can edit it in Adobe Photoshop. As you open the raw image files, you can quickly apply adjustments such as exposure compensation or tonal adjustments without compressing the image or losing any of the original image data. The raw image file can then be brought into Photoshop and saved in a final format such as PSD, JPEG, or TIFF. To view a list of cameras supported by the Photoshop Camera Raw plug-in, see "Supported cameras" on page 7.

Raw image file formats are created by a variety of digital cameras and contain all the information the camera has about the image. The image information is directly captured from the camera's CCD or CMOS without filters and adjustments applied by the camera; a digital negative. This lets photographers interpret the image data rather than letting the camera make the adjustments and conversions.

Similar to TIFF, a raw image file does not throw away any image information to generate a file—it's *lossless*—but raw image files have the advantage of a smaller file size than uncompressed TIFFs and only raw images contain the actual data captured by the sensor without any in-camera processing.

Although each camera uses a unique format to save the raw image data, the Photoshop Camera Raw plug-in can open many raw file formats. Your workflow is improved because the raw image files are opened directly in Photoshop so you can edit them immediately. The adjustments available with the Photoshop Camera Raw Plug-in provide flexibility to produce the best image possible from a raw image file.

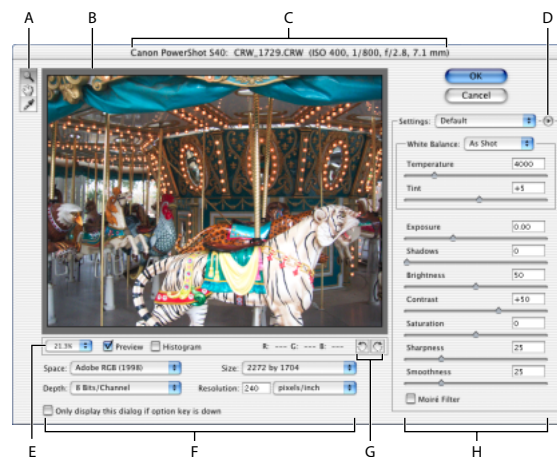
You can save the settings in the Photoshop Camera Raw plug-in dialog box for a specific camera or a specific lighting condition and reuse the settings to open another raw image file or a batch of raw image files.

Opening raw image files in Photoshop

The Photoshop Camera Raw plug-in lets you open a raw image file directly in Photoshop without using another program to convert the raw image into a readable format. As a result, all your work with raw image files can be completely done in Photoshop.


To open a raw image file for editing in Photoshop:

1 Open a raw image file by choosing File > Open or using the File Browser. The Photoshop Camera Raw plug-in dialog box automatically opens, displaying a preview of the image.



- A. Zoom, hand, and white balance tools
- B. Image preview
- C. Camera, file name, and EXIF information
- D. Photoshop Camera Raw plug-in pop-up menu
- E. Zoom level pop-up menu
- F. Image attributes
- G. Rotate Preview buttons
- H. Adjustment sliders

2 If necessary, follow the instructions below to adjust the settings such as the image attributes, the white balance, exposure and tonal settings, sharpness, smoothness, and the moiré filter.

 To restore all your adjustments to the original settings, hold down the Alt (Windows®) or Option (Mac OS) key. The Cancel button will change to a Reset button. Keep holding the key down, and click the Reset button.

3 When you've finished your adjustments, click OK. The raw image file opens in Photoshop. You can then edit the image and save it in a Photoshop supported format. The original raw image file remains unaltered.

Note: Although Photoshop can open a raw image file from a camera, it cannot save an image as a raw image file. A Raw format is available in Photoshop, but it is not the same as the raw image file from a camera. A camera's raw image file contains the unprocessed bits from the camera's CCD or CMOS. This data needs significant processing, such as the processing done by the Photoshop Camera Raw plug-in. The Photoshop Raw format (.raw) is a flexible file format for transferring images between applications and computer platforms. For more information about the Photoshop Raw format, see Photoshop Help.

Adjusting the viewing options

By default, the Photoshop Camera Raw plug-in dialog box opens with the preview image visible. This preview lets you instantly see the results when you adjust the controls in the Photoshop Camera Raw plug-in dialog box.


To rotate the preview image:


Click the Rotate Preview buttons .

Note: Rotation is only applied to the preview until the file(s) are opened in Photoshop. Photoshop automatically applies the rotation after the file(s) are opened.

To zoom in or out of the preview image:

Do one of the following:

- Choose a percentage from the zoom level pop-up menu.
- Select the zoom tool , and either drag a selection or click in the preview image. To zoom out, hold down the Alt (Windows) or Option (Mac OS) key while using the zoom tool.


If the preview image is larger than the viewing window, use the hand tool  to move the image and view different areas.

To disable the Preview option:

Deselect the Preview option to see the image unchanged, without the applied image setting adjustments.

Using the histogram and RGB levels display

Selecting the Histogram option displays the Photoshop Camera Raw histogram, which shows all three channels (Red, Green, and Blue) of the image simultaneously. Colors other than red, green, and blue, or white in the display indicate where the three charts overlap. White represents luminance. The histogram updates as you adjust the settings in the Photoshop Camera Raw plug-in dialog box. You can drag the histogram anywhere in the viewing window. For more information on using histograms, see the Photoshop Help.

 Moving the zoom, hand, or white balance tool over the preview image displays the RGB values for the area being sampled.



The Histogram option displays a histogram in the preview area; RGB values appear whenever a tool pointer hovers over an area of the preview image.

Adjusting the image attributes

The Photoshop Camera Raw plug-in dialog box lets you change the image settings for the target color space profile, bit depth, pixel size for opening the image, and resolution by using the following controls:

Space Specifies the *target* color space profile. Generally, this should be set to the same value as your Photoshop RGB working space. Keep in mind that the *source* profile for raw image files is always the camera-native color space.

Depth Specifies whether the image opens as 8 or 16 bits/channel in Photoshop.

Size Specifies the pixel size at which to open the image. The default for this setting is the pixel size you used to photograph the image. Use the pop-up menu if you want to resample the image to a larger or smaller size.

For square pixel cameras, the size pop-up menu is mostly a convenience for the user. However, choosing a smaller-than-native size is useful to speed processing when you are planning a smaller final image anyway. Picking a larger size is similar to upsampling in Photoshop, but the Photoshop Camera Raw plug-in features a new, higher-quality algorithm for improved results.

For non-square pixel cameras, the native size is the one that most closely preserves the total pixel count. This means the pixels in one dimension will be upsampled, while in the other dimension they will be downsampled. Choosing the next size larger than the native size keeps the pixel count along the high-resolution dimension constant, while upsampling the lower-resolution dimension to create square pixels. This larger size preserves maximum detail for non-square pixel cameras, since neither dimension is downsampled.

Note: You can always change the pixel size of the image after it opens in Photoshop. However, if you intend to reduce the pixel size anyway, doing so in the Photoshop Camera Raw dialog box may improve processing speed. If you intend to increase the pixel size of the image, consider doing so in the Photoshop Camera Raw dialog box to take advantage of its new, higher-quality algorithm.

Resolution Specifies the printing resolution the image will be printed at. This setting does not affect the actual pixels (pixel size of the image). For example, a 2048 x 1536 pixel image prints at approximately 28 1/2 inches x 21 1/4 inches at 72 dpi. When the resolution is changed to 300 dpi, the same image prints at approximately 6 3/4" x 5 1/8". Resolution can also be adjusted in Photoshop using the Image Size command.

Only Display This Dialog When Option/Alt Key is Down

This option is useful for tasks in Photoshop involving multiple raw image files. For example, select this option so that the dialog box doesn't open for every raw image file used in creating a Contact Sheet, Picture Package, or Web Photo Gallery.

Note to Photoshop Elements users: Although the Adobe Photoshop Camera Raw plug-in is designed for use with Adobe Photoshop 7.0, it is also compatible with Adobe Photoshop Elements 2.0. If you are using the Photoshop Camera Raw plug-in with Photoshop Elements 2.0, note that, for Depth, 16-bit is not an option. Also note that, for Space, you should choose Adobe RGB (1998) if you're using Full color management and sRGB IEC61966-1 if you're using Limited color management.

Setting the white balance

When opening a raw image, you can make adjustments to compensate for the conditions under which the photo was taken. The Photoshop Camera Raw dialog box has three controls for making adjustments to get neutral colors in your image.

White Balance Sets the color balance of the image to reflect the lighting conditions under which the photo was taken. In many cases, choosing a white balance from the White Balance pop-up menu provides satisfactory results. In some cases, you may want to customize the white balance using the Temperature and Tint adjustments.

Note: The Photoshop Camera Raw plug-in can read the white balance settings of some cameras. Leaving the White Balance pop-up menu set to As Shot uses the camera's white balance settings. For cameras whose white balance settings are not recognized by the Photoshop Camera Raw plug-in, leaving the White Balance pop-up menu set to As Shot is the same as choosing Auto: the Photoshop Camera Raw plug-in reads the image data and makes a guess as to the white balance.

Temperature Lets you fine-tune the white balance to a custom color temperature. Set the temperature using the Kelvin color temperature scale. Moving the slider to the left specifies that the photo was taken with a lower color temperature of light; so the plug-in makes the image colors bluer to compensate for the lower color temperature of the ambient light. Conversely, moving the slider to the right specifies that the photo was taken with a higher color temperature of light; the plug-in makes the image colors warmer to compensate for the higher color temperature of the ambient light.




Moving the Temperature slider to the left specifies a photo taken with a lower color temperature of light. The effect is similar to photographing with tungsten-balanced film in sunlight: The image appears cooler (bluish).



Moving the Temperature slider to the right specifies a photo taken with a higher color temperature of light. The effect is similar to photographing with daylight-balanced film under tungsten light: The image appears warmer (yellowish).

Tint Lets you fine-tune the white balance to compensate for green or magenta tint in photos. Moving the slider to the left (negative values) adds green to the photo, while moving the slider to the right (positive values) adds 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.

Making tonal adjustments

The Photoshop Camera Raw dialog box has five sliders for making tonal adjustments to your image.

Exposure Adjusts the brightness or darkness of the image. Moving the slider to the left darkens the image, while moving the slider to the right brightens the image. The values are in increments equivalent to f-stops. A +1.50 adjustment is similar to opening a camera lens up 1 1/2 stops wider. Likewise, a -1.50 adjustment is like closing down a camera lens 1 1/2 stops.

Holding down the Alt (Windows) or Option (Mac OS) key while moving the Exposure slider lets you preview where the highlights are being clipped—completely white, no detail. One way to use this feature is to adjust the slider until the highlights start to get clipped, and then back off slightly on the adjustment. Black indicates areas that are not clipped, and color indicates areas that are being clipped in only one or two channels.



Holding the Alt (Windows) or Option (Mac OS) key down while moving the Exposure slider shows the highlights being clipped.

Note: Clipping is the shifting of pixel values to either the highest highlight value (255) or the lowest shadow value (0). Areas of a photo that are clipped are either completely white or completely black and have no image detail.

Shadows Controls what input levels will be mapped to black in the final image. Moving the slider to the right increases the areas that are mapped to black. This sometimes creates the impression of increased contrast in the image. Using the Shadows slider is similar to using the black point slider for the input levels in the Photoshop Levels command. For more information on levels, see Photoshop Help.

Note: Holding down the Alt (Windows) or Option (Mac OS) key while moving the Shadow slider lets you preview the areas being clipped—black, no detail. One way to use this feature is to move the slider until the shadows begin to get clipped, and then back off slightly on the adjustment. Color indicates areas that are being clipped in one or two channels, and white indicates areas that aren't clipped.

Brightness Adjusts the brightness or darkness of the image, similar to the Exposure slider. However, instead of clipping the image in the highlights (areas that are completely white, no detail) or shadows (areas that are completely black, no detail), Brightness compresses the highlights. Generally, you use the Brightness slider to adjust the overall brightness or darkness after you set the white and black clipping points with the Exposure and Shadow sliders.

Contrast Adjusts the midtones in an image. Higher values increase the midtone contrast, while lower values produce a less contrasty image. Generally, you use the Contrast slider to adjust the contrast of the midtones after setting the Exposure, Shadow, and Brightness.

Saturation Adjusts the color saturation of the image from -100 (pure monochrome) to +100 (double the saturation).

Using the Sharpness slider to reduce blur

The Photoshop Camera Raw plug-in dialog box Sharpness slider adjusts the image sharpening to provide the edge definition you wish. The Sharpness adjustment is a variation of the Photoshop Unsharp Mask filter, which locates pixels that differ from surrounding pixels based on the threshold you specify and increases the pixels' contrast by the amount you specify.


When opening a raw image file, the Photoshop Camera Raw plug-in calculates the threshold to use based on camera model, ISO, and exposure compensation. For images with lots of noise, the Sharpness slider should be set to a higher value. For cleaner images, the Sharpness slider should be set to a lower value. A zero value turns off sharpening. If you're not planning to edit the image extensively in Photoshop, you can use the Photoshop Camera Raw plug-in's Sharpness filter.

However, if you plan to edit the image extensively in Photoshop, set the Sharpness slider to zero to turn off sharpening, and later use the sharpening filters in Photoshop as the last step after all other editing and resizing is complete.

Reducing noise and moiré patterns

The Photoshop Camera Raw plug-in dialog box has controls to reduce any noise or color moiré pattern that the camera created in the image.

Smoothness Reduces noise—extraneous visible artifacts that degrade image quality. Photographing with a higher ISO or less-sophisticated camera can result in images with objectionable noise. Image noise is made up of chroma (color) noise and luminance (grayscale) noise. The Smoothness slider affects both types of noise. Setting the slider to zero turns off the noise reduction.

 When making the Smoothness adjustment, first zoom in on the preview image for a better view.




Moving the Smoothness slider to the right reduces noise in an image.

Moiré Filter Turns on and off the Photoshop Camera Raw plug-in's color moiré pattern reduction filter. Use this option to reduce the color moiré patterns that some cameras create.

Saving the Photoshop Camera Raw dialog box settings

The Photoshop Camera Raw plug-in dialog box lets you save settings for a specific camera or a specific lighting condition and reuse them on other raw images.

To save Photoshop Camera Raw plug-in settings for reuse:

- 1 After making your adjustments in the Photoshop Camera Raw plug-in dialog box, do one of the following:
 - Choose Save Settings from the Photoshop Camera Raw plug-in pop-up menu  to save the current settings and add it to the Settings pop-up menu. The settings will then be available to apply to another image.
 - Choose Set Camera Default from the Photoshop Camera Raw plug-in pop-up menu to set a default setting for other images that come from the same camera. You can have multiple defaults for different cameras.

Make sure that you save the setting to the Camera Raw preset folder so the setting is always present in the Settings pop-up menu. Settings saved elsewhere will disappear from the Settings pop-up menu once you've chosen another setting. If this happens, you must use the Load mechanism to get the setting.

Note: Choose Reset Camera Default from the Photoshop Camera Raw plug-in pop-up menu to return the default settings to the original Photoshop Camera Raw plug-in settings.

To use a saved setting:

Do one of the following:

- Choose the setting from the Settings pop-up menu.
- Choose Previous from the Settings pop-up menu to reuse the settings from the previous image of the same camera.
- Choose Load Settings from the Photoshop Camera Raw plug-in pop-up menu.


To delete Photoshop Camera Raw plug-in settings:

- 1 Choose the settings you are going to delete from the Settings pop-up menu.
- 2 Choose Delete Current Settings from the Photoshop Camera Raw plug-in pop-up menu.

Creating an action to open raw image files

Photoshop lets you automate the opening of raw image files, editing them, and saving the files in formats like TIFF, PSD, JPEG, and PDF.

To create an action to open raw image files:

- 1 From within Photoshop, click the New Action button , or choose New Action from the Actions palette menu. Enter a name for the action.
- 2 Click Record. Then open a raw image file, and perform the operations you want to record.



If you plan to use the action with the Batch command, you may want to include a Save As operation and choose the file format to which you would like the images converted.

- 3 To stop recording, click the Stop button.

The action you've created can be used every time you want to open multiple raw image files. For more information on creating actions, see Photoshop Help.

Important: When you use an action to open a raw image file, the Photoshop Camera Raw plug-in settings are based on the settings in the dialog box, when the action was recorded. You may want to create different actions for opening raw image files with specific settings.

To open multiple raw image files using an action:

- 1 Download the raw image files from your digital camera to a folder on your computer.
- 2 From within Photoshop, choose File > Automate > Batch. The Batch dialog box opens.
- 3 For Play, choose the action you created to open your raw image files.

Note: If your action has a Save As command as one of the operations, select the Override Action "Save As" Commands option. This prevents multiple copies of the raw image files resulting from both the action and the Batch command performing Save As operations.

4 For Source, choose the folder containing the raw image files you wish to open.

5 Select the Override Action “Open” Commands option so that the Open command in the action refers to the batched files. This prevents the Photoshop Camera Raw dialog box from opening for each raw image file being processed.

6 Choose a destination for the opened files from the Destination menu. It’s best to choose either None to leave the files open or Folder to save the opened files to a specific folder.

Setting the other options in the Batch dialog box is up to your discretion.

7 Click OK after you’ve selected all your settings.

Supported cameras

The Photoshop Camera Raw plug-in supports many digital cameras that can produce raw image files.

Canon

EOS-1D
 EOS-1Ds
 EOS-D30
 EOS-D60
 PowerShot 600
 PowerShot A5
 PowerShot A50
 PowerShot G1
 PowerShot G2
 PowerShot G3
 PowerShot S30
 PowerShot S40
 PowerShot S45
 PowerShot Pro70
 PowerShot Pro90 IS

Minolta

DiIMAGE 5
 DiIMAGE 7
 DiIMAGE 7i
 DiIMAGE 7Hi

Nikon

D1
 D1H
 D1X
 D100
 Coolpix 5000
 (with firmware version 1.7)
 Coolpix 5700

Olympus

E-10
 E-20N
 C-5050 Zoom

Fujifilm

FinePix S2 Pro

Keyboard shortcuts

Result	Action
Selects zoom tool	Z
Selects hand tool	H
Selects white balance tool	I
Toggles preview	P
Toggles histogram	G
Rotates preview 90 degrees counter clockwise	L
Rotates preview 90 degrees clockwise	R
Fits image in window	Double-click hand tool, Control + 0 (Windows), Command + 0 (Mac OS)
100% magnification	Double-click zoom tool, Alt + 0 (Windows), Option + 0 (Mac OS)
Zooms in or out	Control + + or - (Windows), Command + + or - (Mac OS)
Accesses the hand tool	Spacebar
Accesses the zoom tool to zoom in	Control + Spacebar (Windows), Command + Spacebar (Mac OS)
Accesses the zoom tool to zoom out	Alt + Spacebar (Windows), Option + Spacebar (Mac OS)

Adobe Photoshop

Saving in JPEG 2000 format

JPEG 2000 is a file format that provides more options and greater flexibility than the standard JPEG (JPG) format. Using JPEG 2000 you can produce images with better compression and quality for both Web and print publishing. (Currently, a plug-in is required for viewing JPEG 2000 files on the Web.)

Unlike traditional JPEG files, which are always lossy, the JPEG 2000 format supports optional lossless compression. The JPEG 2000 format also supports 16-bit color or grayscale files, 8-bit transparency, and it can retain alpha channels and spot channels. Grayscale, RGB, and CMYK are the only modes supported by the JPEG 2000 format.

The JPEG 2000 format also supports using a Region of Interest (ROI) to minimize file size and preserve quality in critical regions of an image. By using an alpha channel, you can specify the area (ROI) where the most detail should be preserved, allowing greater compression and less detail in other regions. See Photoshop Help for more information about using alpha channels.

Photoshop saves images in extended JPEG 2000 (JPF) format, which provides an expanded set of options compared to the standard JPEG 2000 (JP2) format. However, you can make files JP2 compatible by selecting the appropriate option in the JPEG 2000 dialog box.

Note: You cannot save Indexed Color and Bitmap mode images in JPEG 2000 format. To save these files as JPEG 2000, first convert them to RGB color.

To save a file in JPEG 2000 format:

- 1 Choose File > Save As, and choose JPEG 2000 from the format list.
- 2 Specify a filename and location, select saving options, and click Save, which opens the JPEG 2000 dialog box.

Important: If you want to save a JP2-compatible file, you must select the ICC Profile option (Windows®) or the Embed Color Profile option (Mac OS) in the Save As dialog box. Otherwise, the JP2 Compatible option will be unavailable in the JPEG 2000 dialog box. The JP2-compatible option slightly increases the JPF file size by 1k. Keep in mind that JP2 viewers are not required to support ICC profiles and metadata present in JPF files, so color fidelity and other features may not work as expected.

3 (Optional) Enter a value in the File Size text box to set a target size for the saved file. The value in the Quality text box will adjust to the best quality for the file size you specified.

4 Do one of the following to specify the image quality:

- Select Lossless to compress the image without losing image quality. Selecting this option creates a larger file.
- Deselect Lossless to create a smaller file. Then drag the Quality pop-up slider or enter a value in the Quality text box to specify the image quality. A higher quality value results in better image quality and a larger file size.

If you specify an image quality that conflicts with a target file size you specified in step 3, Photoshop automatically changes the value in the File Size text box.

5 Select or deselect Include Metadata to include or exclude file information. If your image file contains paths and you wish to store the paths information in the JPEG 2000 file, the Metadata option must be selected.



Deselect the Include Metadata and Include Color Settings options to make the image file size smaller.

6 Select Include Transparency to preserve transparency that exists in the original image. The Include Transparency option is dimmed if the image does not contain transparency.

7 Select JP2 Compatible to create a file that can be displayed in viewing software that supports standard JPEG 2000 (JP2) format but does not support extended JPEG 2000 (JPF) format.

8 Click the Advanced Options button to set the following options:

Compliance This option chooses the types of devices with which the file is compliant. Currently only general devices (such as Web browsers) are supported.

Wavelet Filter This option specifies the type of numbers (coefficients) used to encode the file. Float is more accurate but cannot be used for Lossless compression. Selecting the Lossless compression option automatically sets the Wavelet Filter option to Integer.



Choose Float or Integer depending on your image and the result you want. Integer is usually the best option for an overall consistent appearance in the image. Float may sharpen the image but could cause it to lose some quality around edges.

Tile Size This option chooses the size of the tiles used in the image. When low quality values are used to optimize images smaller than 1024 x 1024 pixels, using the largest tile size will produce better results.



A tile size of 1024 is best for most images. When creating files with small dimensions (for cell phones, and so forth), a lower tile size should be used.

Metadata Format Select the metadata format(s) to include in the image file. JPEG2000 XML is JPEG 2000-specific XML data; this option is only available if the image file contains this data. XMP is Photoshop File Info data and EXIF is digital camera data.

Color Settings Format Select the Color Settings Format(s) to include in the image file. The Include ICC Profile format option includes the full ICC profile specified in the Save As dialog box. The Enumerated Profile and MAT/LUT profile format options are restricted profiles that are intended for use in portable devices such as cell phones and PDAs. Although there are (currently) no devices that support these profiles on the market, either an Enumerated or a MAT/LUT profile must be in a JP2 file.

9 Choose an Optimization Order:

Growing Thumbnail This option presents a sequence of small thumbnail images increasing in size until they reach the image's full size.

Progressive This option presents an image that displays increasingly detailed versions of the entire image as data becomes available (for example, streaming over the Web to a browser). Progressive JPEG images have a slightly larger file size, require more RAM for viewing, and are not supported by all applications and JPEG 2000 viewing software.

Color This option makes the image appear first as a grayscale image, then as a color image.

10 If your Photoshop document contains one or more alpha channels, you may choose an alpha channel to define a Region of Interest.

Once the alpha channel is loaded as a Region of Interest, choose an Enhance value to increase or decrease the quality of the Region of Interest relative to the rest of the image. Note that Enhance does not change the file size of the image, so enhancing the area inside the alpha channel will decrease the quality of the area outside the alpha channel (and vice versa).

11 To preview how the image will appear in JPEG 2000 viewing software, choose the following options then click the Preview button:

- Choose a download rate from the pop-up menu to view the estimated download time of the image.
- In the Download Image pop-up menu, choose “main” to preview the JPF file or “JP2 Compatible” to preview the JPF file with an embedded JP2-compliant image. The JP2 Compatible option is only available if you selected JP2 Compatible in step 7.

12 When you're done setting options, click OK to generate the JPEG 2000 image file.

