RAW POWER

Professional RAW Extension and App for macOS

Introduction

Thank you for purchasing RAW Power. RAW Power runs as an extension (plug-in) for Apple Photos, and also can run as a standalone editing application. It requires macOS 10.12.2 or later. Because RAW Power does not contain a database manager, it is not a replacement for applications like Photos, Lightroom, or Aperture. However, it does provide unique control over the RAW engine that Apple ships in every copy of macOS.

Despite its name, you can use RAW Power to adjust images in a wide range of formats, including JPEGs, TIFFs, and PNGs. All adjustments are non-destructive, which means your original file is never modified; the adjustments are applied in real-time using the power of your Mac's graphics card. RAW Power performs all of its adjustments in a wide gamut color space, using floating point for maximum precision.

RAW Power uses Apple's RAW engine to decode images, so any image you open in RAW Power looks the same as it would in Photos, Aperture, or iPhoto. This is one of RAW Power's key advantages. It also supports hundreds of RAW camera formats, as well as DNGs and iPhone RAW images. You can watch video tutorials of RAW Power on YouTube at:

<https://www.youtube.com/channel/UC7l78rOzFxaHG-e5AT-MGWQ>.

Image Adjustments

RAW Power's image adjustments appear on the right side of the window. Adjustments are undoable and non-destructive. RAW Power never modifies your original file. The tools form the top section on the adjustment panel:

From left to right:

Rotate Right (hold option and click to rotate left);

Flip Horizontal (hold option to flip vertically);

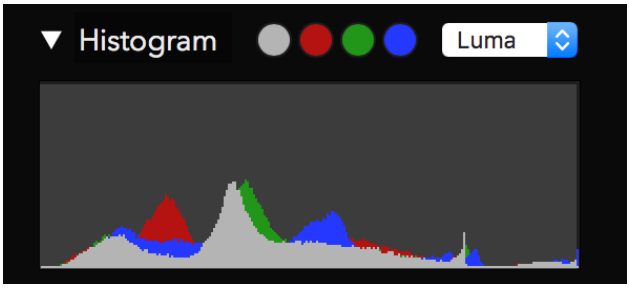
Show Original (show image without any adjustments applied);

Zoom In, Zoom Out, Zoom to Fit, Zoom to 1:1 (Actual Size), Zoom Percentage

TIP: You can quickly zoom to 1:1 by double-clicking in the image view. Double-click again to return to Zoom-to-fit.

HISTOGRAM

The histogram shows the distribution of color values in the image (with any adjustments applied). In addition to color distribution, histograms are useful for assessing image characteristics like overall contrast and the extent of clipping. The histogram can be hidden by clicking on the disclosure triangle next to the word "Histogram".



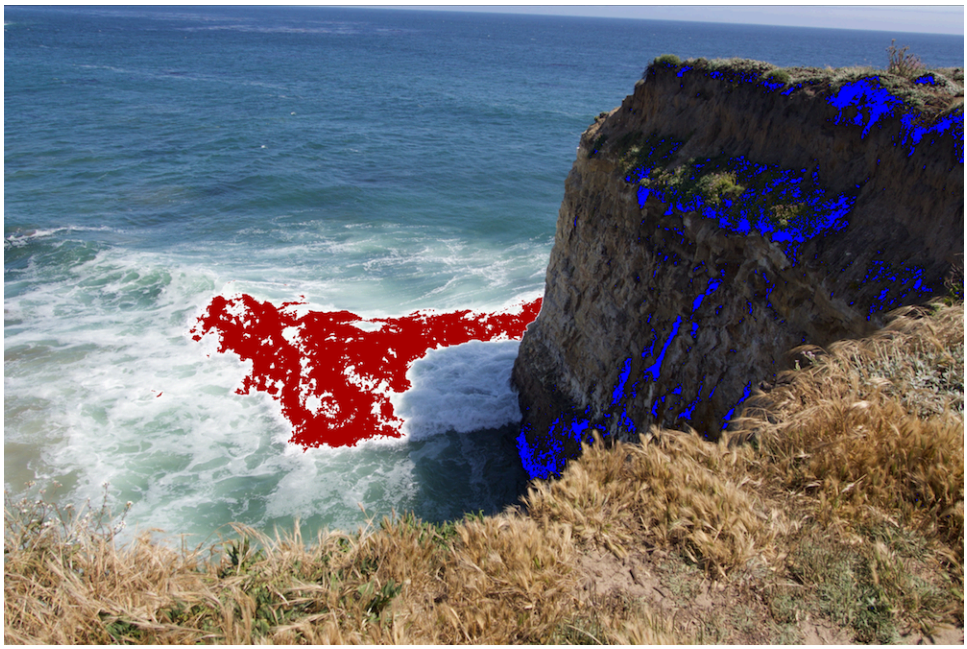
TIP: If you encounter slow performance, try hiding the histogram.

The circles next to the word "Histogram" are clipping controls. They are computed continuously and indicate whether the image has "clipped data," that is, data too bright to be displayed and that would be lost upon conversion to a JPEG. The gray circle indicates if the image has clipped luminance data. The red, green, and blue circles indicate which pixels are clipped in each of those channels, respectively. If a clipping circle is black, there are no clipped pixels in that channel.

Luminance is a weighted average red, green, and blue that corresponds the way the human eye responds to light. Because the human eye is more sensitive to green, the luminance equation gives more weight to green than it does to red or blue.

When you click on the clipping circles, you enable overlays which show you which pixels are potentially too bright or too dark. Below is an unadjusted RAW image. The waves are overexposed and lack detail. In addition, part of the cliff face is very dark and consequently lacks detail.

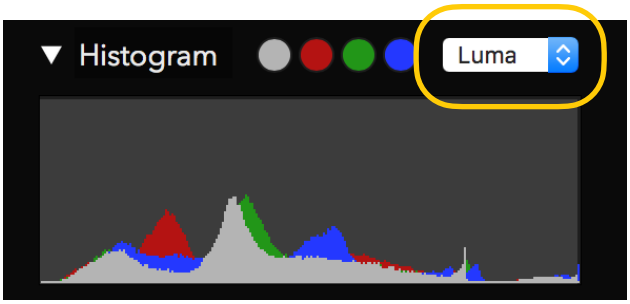
If you click the gray clipping indicator, you will see this:



The red pixels indicate over-exposed areas and the blue indicates “cold” or black pixels.

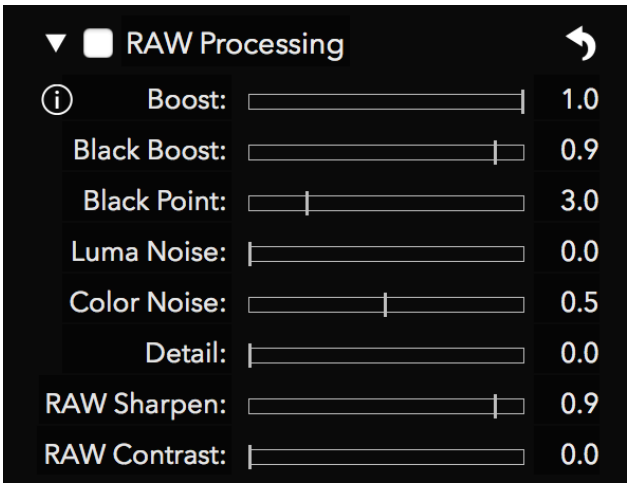
If you click on the red, green, or blue indicators, you will see just the pixels that are over-exposed in those channels. They do not show cold pixels, as that feature is unique to the gray (luminance) control.

In addition, you can change which channel is front-most in the histogram view by changing the popup next to the clipping indicators:



RAW PROCESSING

RAW Processing is the adjustment at the core of RAW Power, providing unique control over Apple's RAW Engine. All of the sliders are GPU accelerated and real-time, so adjustments appear as soon as you move a slider. There are a few older cameras that don't have access to all of the below controls, but most do. Support for new cameras comes from Apple, which periodically releases Digital RAW Camera Updates. As of this writing, the list of supported cameras (and any limitations) is at: https://support.apple.com/en-us/HT207049. As a rule of thumb, if Apple's Preview application can open an image file, then RAW Power can too.



Note: The RAW Processing adjustment only appears if you are adjusting a RAW image.

Boost: this slider controls the "look" of the RAW image. By default, RAW images can look very flat and lack contrast or "punch." Boost provides that contrast and punch. In general, this makes well-exposed images look good, but if you want the most control over your RAW images, decrease Boost to 0.5 or shut it off entirely by setting it to 0.0.

Black Boost: this slider adjusts the bottom or "black" end of the boost curve, allowing you to manipulate the darker parts of the image.

Luma Noise, Color Noise, Detail: These three sliders are part of Apple's RAW noise reduction. Luma Noise controls the black-and-white noise in the image. The Color Noise slider controls the colorful speckles that appear in noisy images. Sometimes applying strong noise reduction

can cause the image to look flat or "plasticky." If that happens, consider increasing the value of the Detail slider. It restores some "grain" to the image to make it look more natural.

RAW Sharpen and RAW Contrast: RAW Sharpen is a subtle form of capture sharpening which works at the Bayer mosaic level. RAW Contrast is a type of local contrast (which can look like sharpening). RAW Contrast generally has a lot stronger effect than RAW Sharpen. Both are image-dependent — the characteristics of the image affect how these sliders operate and affect the default values of those sliders.

Lens Correction: Apple's RAW engine can correct for distortion and shading (vignette) in cameras with fixed lenses. It does not correct images for cameras with interchangeable lenses (e.g., DSLRs). RAW Power automatically applies this correction.

TIP: Double-click any slider to reset it to its default value.

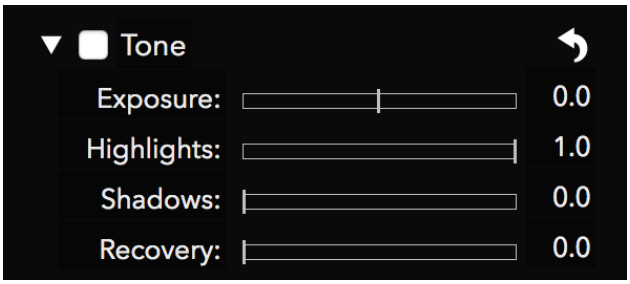
WHITE BALANCE

White Balance adjusts the image's color balance and tint. Temperature is expressed in degrees Kelvin, where lower temperatures result in a bluer image and higher temperatures in a redder image.

You can drag the sliders to set a white balance or use the sampler button. To use the sampler, click the sampler button, then click a neutral gray in your image. Do not click on a bright white area; you should select an area that is uniform in color and that you want to appear gray.

TONE

The Tone adjustment allows you to control the brightness of the image. There are four related controls in the Tone adjustment.



Exposure: this slider controls the brightness of every pixel. Setting the value to 1.0 makes every pixel twice as bright. At 2.0, every pixel is four times as bright. Moving the slider to -1.0 makes every pixel half as bright.

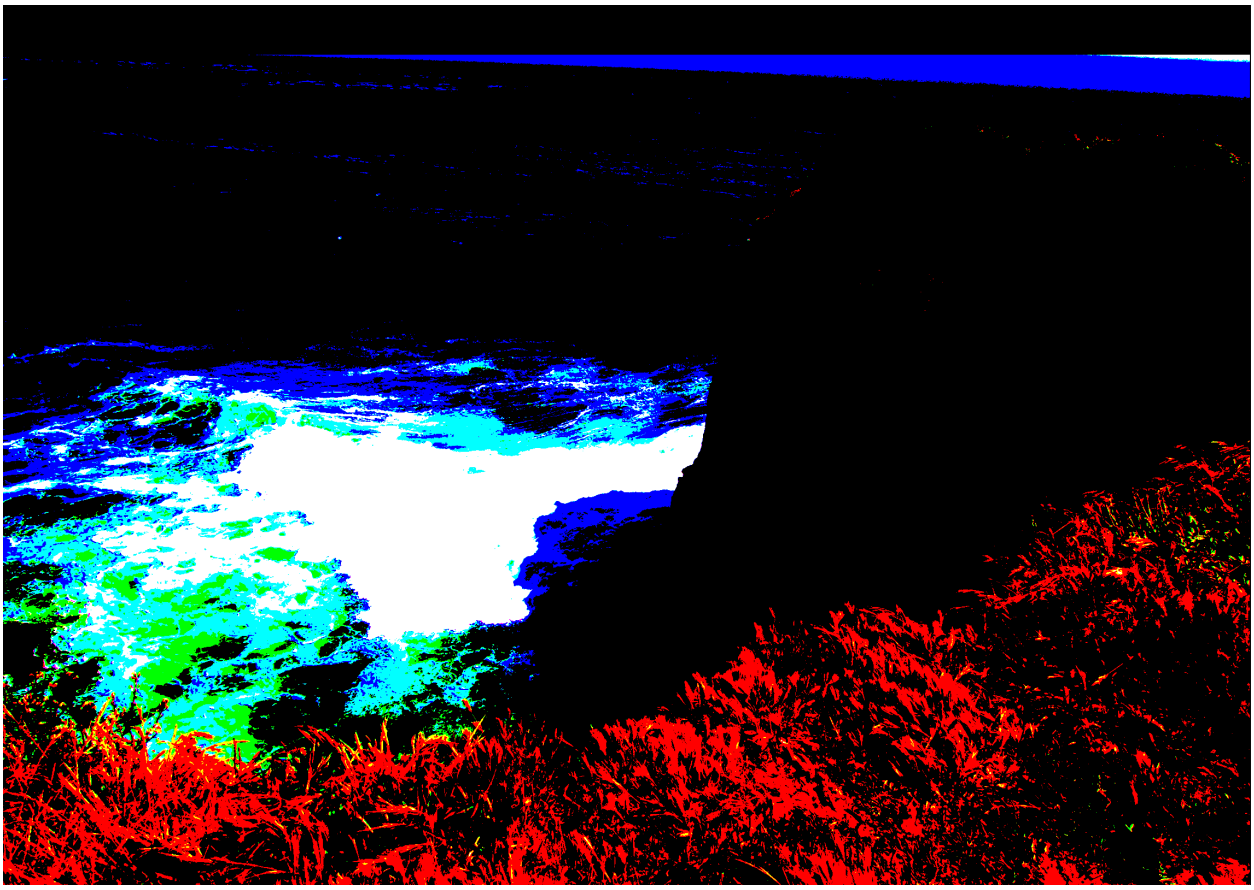
Highlights: this slider darkens just the brightest pixels of the image.

Shadows: this slider brightens the darker pixels of the image.

Recovery: this slider works like a "selective exposure". Only the brightest pixels are affected, but unlike highlights, it adjust the brightness just like exposure. Sometimes you will get better results with Recovery and other times Highlights will work better.

TIP: If you have an overexposed image, the following can give decent results quickly: Boost = 0.5; Recovery = 0.5, Shadows = 0.3. You can then fine tune the results.

Press the Command key when dragging any slider in the Tone adjustment to show another type of clipping indicator. For Exposure, Recovery and Highlights, the indicator draws black for pixels that aren't clipped, and draws red, green, blue, or a mix of those colors for clipped pixels. For example, if a pixel is clipped in red, you will see red. If it's clipped in red and green, it draws yellow, because yellow = red + green. If it's clipped in all three channels, you will see white. This technique replaces every pixel in the image, unlike the hot pixel overlay. Below is the same image, but with the Command key pressed while moving Exposure.

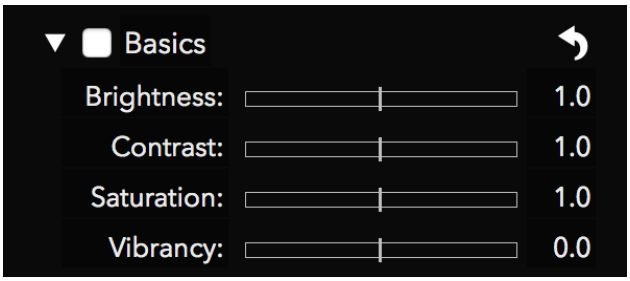


If you hold the Command key while dragging the Shadows slider, RAW Power will shows pixels that are at 0.0 in each channel. Thus, blue indicates that the pixel's blue channel is 0 and yellow means the pixel's red and green channels are both zero. Because it gets complicated when more than one channel is either 0.0 or 1.0, here is a chart that describes what pixels are drawn in each multi-channel case.

Pixel Shown	Channels that are clipped
Yellow	Red and Green
Cyan	Green and Blue
Magenta	Red and Blue
White	Red, Green and Blue

BASICS

The Basics adjustment provides some simple, familiar tools.



Brightness: makes the image brighter or darker using a gamma function. A gamma function ignores black pixels and white pixels, but all other pixels are made darker or lighter depending on the value of the slider.

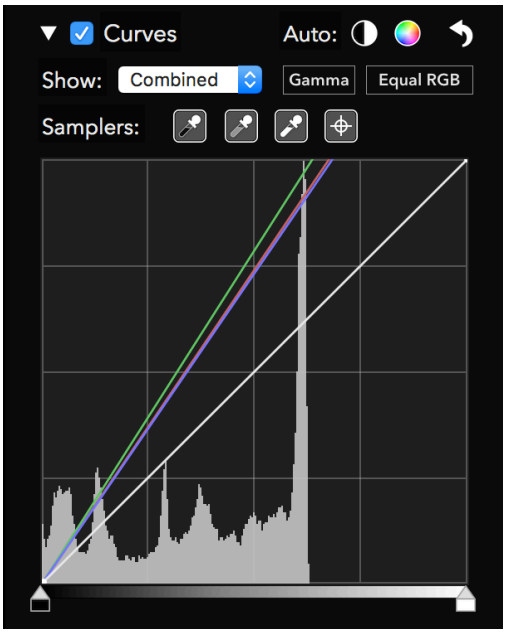
Contrast: this is a simple contrast slider to make an image look more or less "punchy." While this is a simple tool to use, consider using Curves for precise control (discussed below).

Saturation: this slider controls the richness of colors in the image. Be careful with this slider when people are present in the image, as it can make skin look orange. Moving the slider to the extreme left creates a simple black and white image ("fully desaturated")

Vibrancy: this slider is related to saturation but doesn't affect skin tones. As a result, it is a better choice for images with people in them but may not provide the best results for sunset images.

CURVES

Curves is a very powerful adjustment that allows precise manipulation of pixel data. Curves can

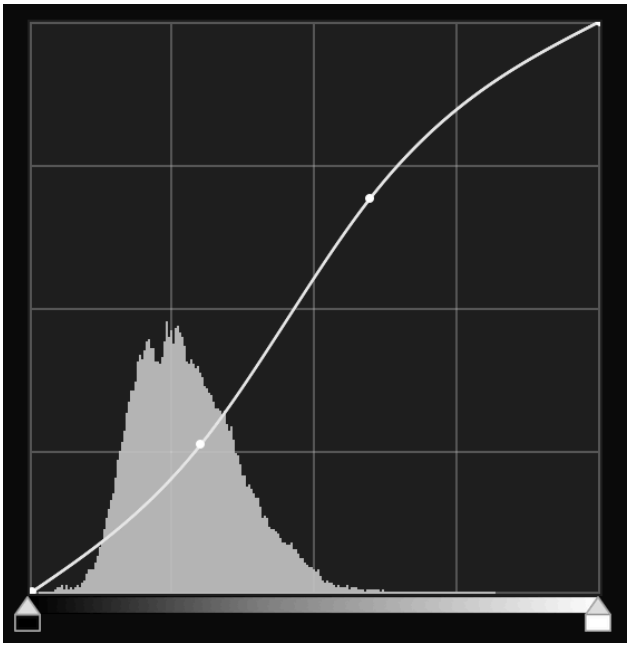


be thought of as a custom adjustment where you precisely describe the effect on each channel of each pixel. Each curve expresses a mathematical equation. The X coordinate is the input value, and the Y coordinate is the output value. In other words, y = f(x). By default, the input and output is the same, resulting in no change to pixels. This is expressed as a 45 degree line, because at every point on such a line, y = x, and therefore no change occurs. Black (0.0) is on the left, and white (1.0) is on the right.

The Curves adjustment consists of four separate curves, one for "Red," "Green," and "Blue" and a "Combined" curve. The red, green, and blue curves only affect one channel of each pixel, while the combined curve affects all three channels.

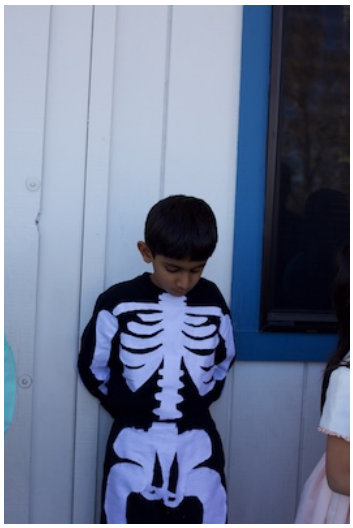
You can click on a curve to add a point, which you can then drag to the position of your choosing. The image updates in real-time to account for the change in the curve. There are limitations on how close points can be to each other, so sometimes the RAW Power will prevent you from adding or moving curve points.

People often use Curves to adjust contrast. To do that, make an S-shaped curve in the Combined channel as follows:



The more it looks like an"S," the greater the contrast.

At the top of the Curves adjustment are two automatic buttons: Auto Black and White and Auto RGB. Auto Black and White is a good way to make sure your image has good contrast. Auto RGB also does that, and corrects color casts in the image. It does this by changing the red, green and blue curves. Here is an example image using the Auto RGB control to eliminate the color cast in the image:



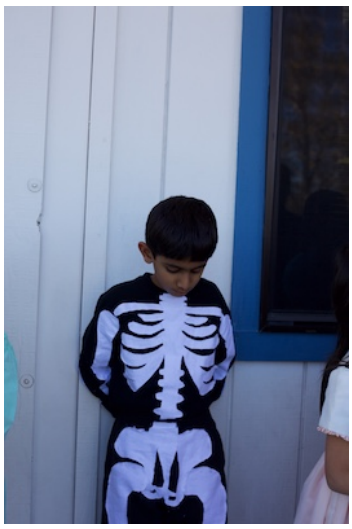
The Gamma button switches Curves between a Gamma mode and a Linear mode. The current state of the button indicates the current mode — by default, Curves is in gamma mode. When in Gamma mode, Curves gamma-corrects the data before applying the curve data and then reverses the correction before sending the image data to the next adjustment. Gamma is generally a good default, but if you want maximum control over the bright areas of the image, Linear can be a better bet.

The Equal RGB button controls the way Curves processes the Combined channel. If its set to Equal RGB, then red, green, and blue are affected equally. However, if it is set to Luminance, then the combined curve affects the red, green and blue curves according to the luminance equation, which weights green more heavily, and blue the least. This approach avoids enhancing color casts and is much easier than converting the image to the "Lab" color space in Photoshop and manipulating it that way.

Here is an example using an image with an S-shaped contrast curve. On the left is the image in Equal RGB mode and on the right, in Luminance mode:

The Samplers section of the Curves interface lets you place points on the curve by clicking on portions of the image. The first control sets the black point for the image; the second sets the 50% gray point, and the third control sets the white point. Each of these can cause the image to change appearance. The last sampler is the "target" sampler. It places a point on all of the curves at the color value of the pixel you click on with the mouse. Except in extreme cases, the target sampler does not affect the image.

In the following example, the color cast is removed using the black and white samplers. The sampled points are circled.



Once any point is placed on the curve, you can move it around to adjust the colors similar to the one you sampled. You can delete points with the delete key on the keyboard, or right-clicking on the Curve to get a contextual menu.

At the bottom of Curves are the black and white point controls. These are simple controls to set the darkest and lightest colors for a given curve as shown below.

TIP: Hold the Command key when dragging the black and white controls to get the same overlay as appears with the Tone adjustment sliders.

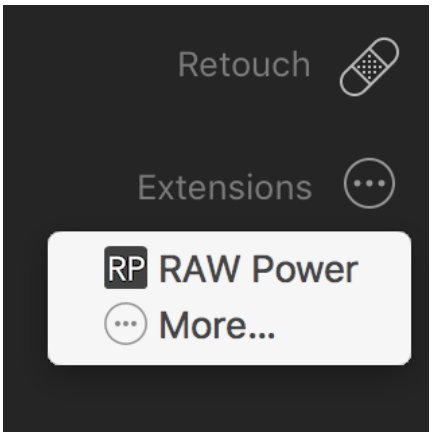
SHARPEN

The Sharpen adjustment is a simple but very effective sharpener. It sharpens just the luminance channel of the image, which provides good results without accentuating color noise, unlike Unsharp Mask.

This sharpener is a different algorithm than the one in RAW Processing, so you can try each to decide which looks better for your images.

Modes of Operation

RAW Power runs in two different ways: as an extension to the Apple Photos app on macOS, and as a standalone editing application. You access the extension through the Edit interface of Photos as shown below. Click on the Extensions button at the bottom of the list of Edit modes:



If you do not see RAW Power listed, then select the More… option to enable it in Photos.

To use RAW Power as a standalone app, open it from LaunchPad or from the Applications folder in the Finder. RAW Power automatically opens the last file you used with it. There are virtually no differences between the extension and standalone modes, except as follows:

	Extension	App
Output Options	JPEG only	JPEG and TIFF
Preferences	Button in window	Menu item
Adjustment storage	Inside Photo library	Sidecar files in sandbox container
Target file	Depends	User selected

The last line demands clarification. When using the standalone app, you choose which file to work on. When you use the Photos extension, you choose the "image" to work on, not a specific file. Photos decides which file to send as shown below:

Image State	What RAW Power receives
Unadjusted	Original file
Adjusted by Photos	Full-size JPEG with adjustments applied
Adjusted by other extension	Full-size JPEG with adjustments applied

If you adjust the image in Photos or in another extension, then Photos sends a JPEG image to RAW Power that includes those adjustments. RAW Power does not receive the original in that situation (and there is no way for it to get the original). For example, if you apply Auto Enhance to a RAW in Photos, and then select RAW Power, then Photos will send a JPEG to RAW Power that has been auto-enhanced. The same is true for crop, straighten, filters, rotate, etc. For best results, do not adjust the image in Photos before using RAW Power. You can tell if this happened because a yellow warning triangle appears in the toolbar at the top right of the RAW Power interface, and by the absence of the RAW Processing adjustment.

Apple requires Photos extensions to produce JPEGs and does not support other formats produced from extensions. The extension stores its adjustment data in the Photo library. In contrast, the standalone app stores adjustment information in its "sandbox container" which is located at:

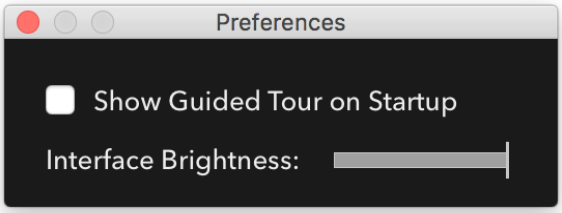
(Home)/Library/Containers/com.gentlemencoders.RAWPower/Data

A separate sidecar is stored for each original file that is adjusted. RAW Power connects the sidecar with the original using a combination of original file name and certain metadata (like image size). The directory or volume are not considered, so you can move the original file anywhere and RAW Power will still be able connect it to the adjustment sidecar. However, if you rename the original file, RAW Power will not associate the original with the old sidecar. Both the extension and the app are sandboxed, so they have very restricted access to your files.

Export and Preferences

The RAW Power standalone app can output full-size images in one of two formats: 8-bit JPEGs in sRGB, and 16-bit TIFFs in Adobe RGB (1998).

You can set the following preferences:



Show Guided Tour: controls whether the Guided Tour (tutorial) appears automatically or not. In the standalone app, the Guided Tour will appear when the application is opened. In the extension, it appears each time the extension is chosen in Photos' Edit interface. In the standalone app, you can also bring up the Guided Tour by going to the Help menu.

Interface Brightness: controls the brightness of the adjustment panel.