



Professional RAW Editor for iOS and iCloud Photo Library (v1.0)

A screenshot of the RAW POWER app interface on an iPad. The top navigation bar includes icons for list view, add, albums, search, and select. Below the bar, there are three sections: "RECENTS" showing five thumbnail images (purple flowers, girl at a pumpkin patch, two children in a toy car, a nautilus shell, and an orange leaf); "BUILT-IN ALBUMS" showing five thumbnails (All Photos, Favorites, Recently Added, Panoramas, and Videos); and "MY ALBUMS" showing five thumbnails (Woodfires, Boulder Creek, Farmer's Market, Cape Cod, and Art Museum). Each thumbnail has a caption below it indicating the album name and the number of photos or videos.

INTRODUCTION

Thank you for downloading RAW Power. RAW Power is the first RAW editor for iOS 11 that can read and modify the iOS Photo Library and iCloud Photo Library. As a result, it allows you to organize your library and edit images, including RAW images on iOS. Any changes you make with RAW Power are immediately applied to the iOS Photo Library and synchronized over iCloud Photo Library (if you are using it).

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

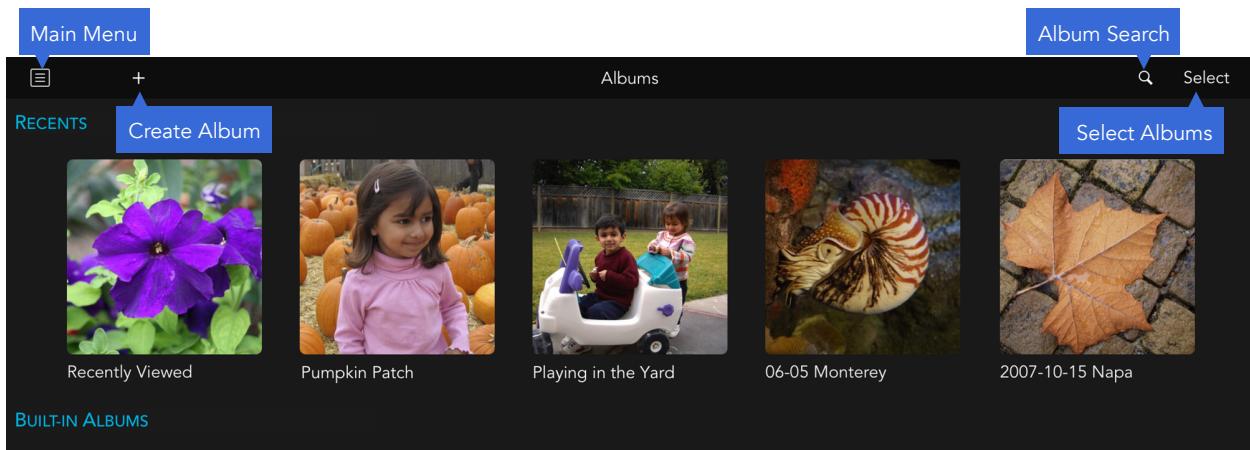
RAW Power uses Apple's RAW engine to decode images, so any image you open in RAW Power looks the same as it would in Photos for Mac or Aperture. In contrast, Photos for iOS does not decode RAW images at all. Instead, it displays and edits the camera-generated ("embedded") JPEG stored within the RAW file. This is one of RAW Power's key advantages. The app 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/UC7I78rOzFxaHG-e5AT-MGWQ>.

ALBUM VIEW

When RAW Power's first opens, it asks for access to your photo library. This allows you to view all of the albums in your library and enables to make changes to the library. The main window displays your built-in (system) albums, as well as any albums you have created on the Mac or iOS. If your library was on the Mac and you used folders to organize your albums, you will see far more albums in RAW Power than in the built-in iOS Photo Apps. In this Album view, you can also create, rename, and delete albums (except built-in albums). Those controls are at the top of the screen.

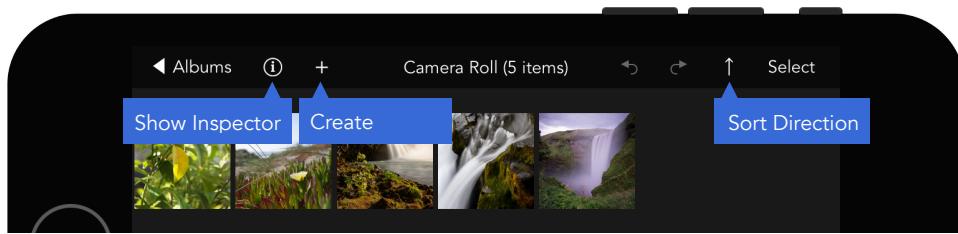


The Main menu at the upper left of the screen provides access to Frequently Asked Questions, the feedback email form, and more. The “+” button creates albums, while the “Select” button lets you choose albums to rename or delete. You can also tap the magnifying glass to search for an album by name. As you use RAW Power, a new section called Recents will appear at the top of the screen. In that section, RAW Power displays albums you have recently looked at, as well as images you have recently viewed, edited, or shared.

Tap any album to view the Photo Grid, discussed below.

PHOTO GRID VIEW

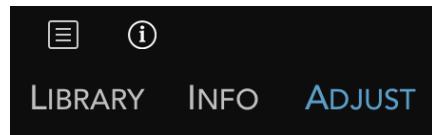
The Photo Grid shows you all of the photos and videos in the currently selected album. At the top of the view are additional controls:



You can change the order that pictures are shown. When the Sort Direction arrow is pointing up, the pictures are

sorted in ascending order (oldest to newest). If you tap on the arrow, it will point down, and the images will be sorted newest to oldest. The order you choose here will be reflected in the thumbnail strip (shown later). The Select button allows you to share images, delete them from the photo library, or remove them from the current album (but keep them in the library). Note: you cannot remove images from built-in albums (e.g., "Videos", or "Screenshots").

The Inspector can be shown or hidden here as well. The Inspector includes three tabs: Library, Info, and Adjust.



Library: a column version of the Album View; it allows you to jump from album to album without needing to return to the album view. It's very handy when trying to find an image across a variety of albums. You also use the Library tab when adding images to albums.

Info: summary information about albums when in the Photo Grid. In the 1-Up view (described below), it shows the current photo's metadata.

Adjust: used in 1-up for editing images (discussed below).

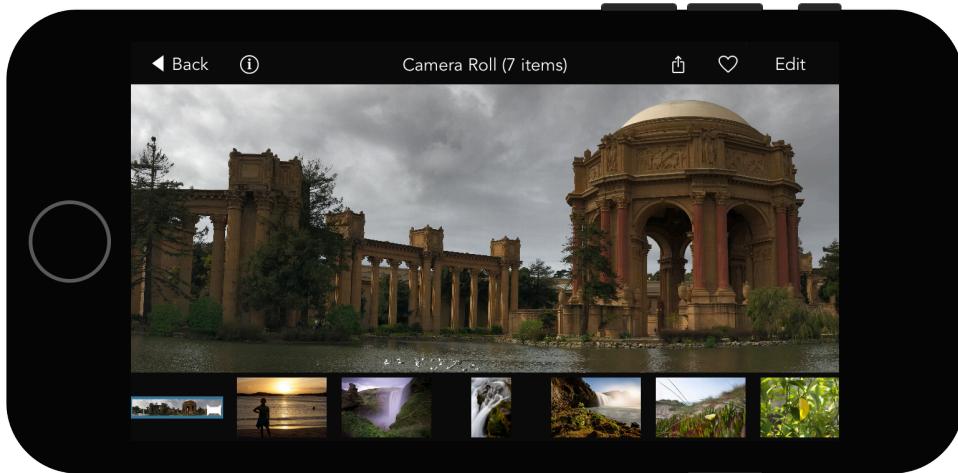
You can move the Inspector to the right side of the screen by dragging it with your finger. Tap and hold on one of the three tabs (Library, Info, or Adjust) and drag to the other side of the screen. Note: The Inspector is only visible when the device is oriented horizontally (landscape).

To add images to albums, you use "Drag and Drop", which is a new gesture in iOS 11. This gesture can take a little practice to master. Here are the steps to add images to an album:

- 1) Tap and hold on an image.
- 2) Move your finger slightly while touching the screen so that the image also moves. This starts the drag gesture.
- 3) Tap using your other fingers (on either hand) to add more images to the drag.
- 4) Drag your finger on the screen to the target album.
- 5) Release.

1-UP VIEW

Tap on an image in the Photo Grid to enter 1-Up View:



In this view, you can share, favorite or edit images. There is a thumbnail strip at the bottom to access other images in the album. When the inspector is visible, metadata about the photo is shown in the Info tab, including file name, flash status, file type, shooting information, camera and lens.

If the photo has GPS information, a map is also displayed with the address. You can pinch the

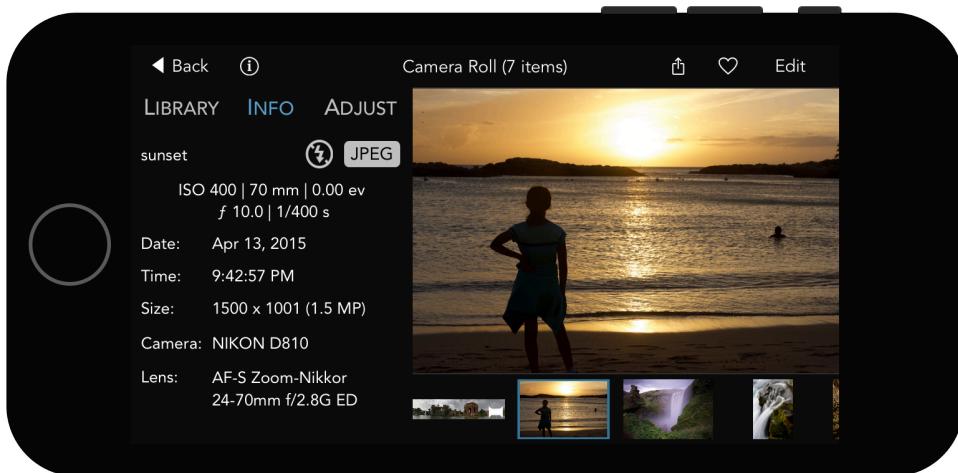
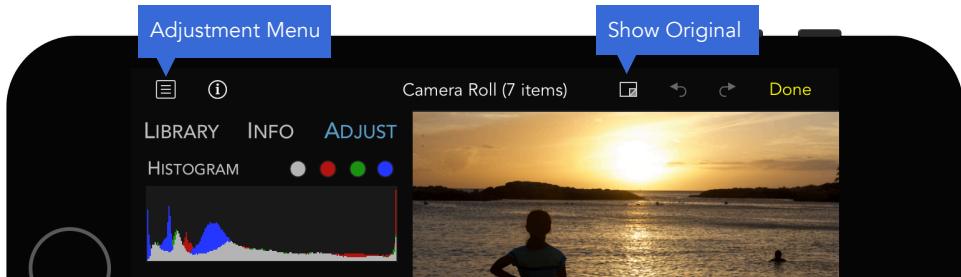


image to zoom, or double-tap to jump to 100% zoom. You can zoom up to 800% in RAW Power. Tap on the image to enter or exit Full Screen mode. Tap on the Adjust tab or the Edit button in the upper right to enter Edit View.

EDIT VIEW

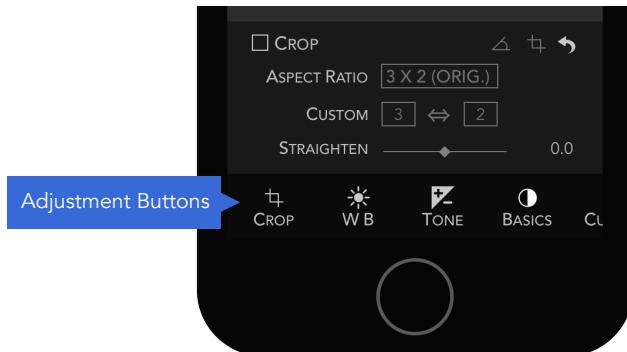
RAW Power's image adjustments appear in the Adjust Tab. Adjustments are undoable and non-destructive; RAW Power never modifies your original file.



The Adjustment menu includes controls for rotation and flip, as well as copying and pasting adjustments. There is additional help accessible in that menu. You can move the Inspector to the right side of the screen by dragging one of the labels at the top (Library, Info, or Adjust).

Tap and hold the Show Original button to see the image without adjustments. When you press Done or go to a different image, RAW Power will ask to save your adjustments. Any changes you make are saved in the iOS Photo Library; you can see your adjusted image in the Photos app, and you can revert those adjustments at any time in either RAW Power or Photos.

When you use RAW Power with your device held upright (portrait orientation), the adjustment interface's layout changes to one appropriate for a narrow screen:



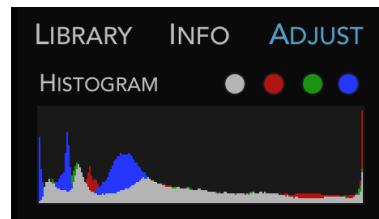
Tap on the buttons on the bottom to switch the current adjustment.

ADVANCED ADJUSTMENT PACK

RAW Power is free to download, although some features are unlocked via in-app purchasing. In 1.0, there is a single item that can be purchased. This item, the Advanced Adjustment Pack, consists of three adjustments: White Balance, Depth Effect, and Curves. To purchase the Advanced Adjustment Pack, tap on any lock icon and follow the directions. As a reminder, in the descriptions below, each of those three adjustments has a lock  next to its name.

HISTOGRAM

The histogram shows the distribution of color values in the image (after 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 double-tapping on the word "Histogram" or using the Adjustment menu. When the screen is held vertically, the histogram appears as a floating view over the image.



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

The circles next to the word "Histogram" are clipping indicators. They are computed continuously and indicate whether the image has "clipped data," that is, data too bright to be displayed and 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; in the above histogram picture, the image is clipped in all channels and in luminance overall.

Luminance is a weighted average of red, green, and blue that corresponds to 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 tap 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 in the middle of the image are overexposed and lack detail. In addition, part of the cliff face is very dark and also lacks detail.



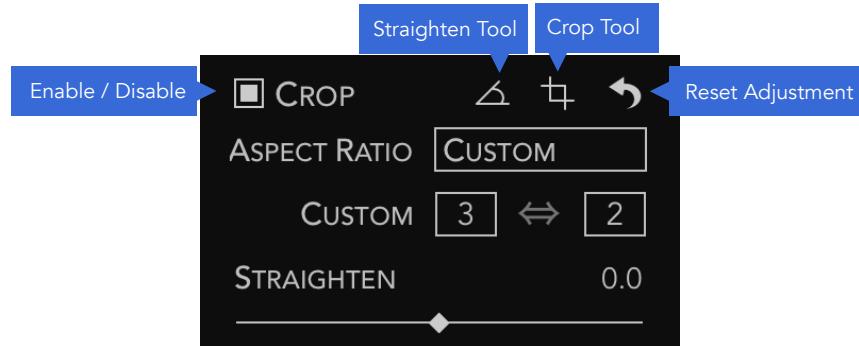
If you click the gray clipping indicator, you will see this:



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 clipped in those channels. Those indicators do not show cold pixels, as that feature is unique to the gray (luminance) control.

CROP AND STRAIGHTEN

RAW Power combines Crop and Straighten into a single adjustment.

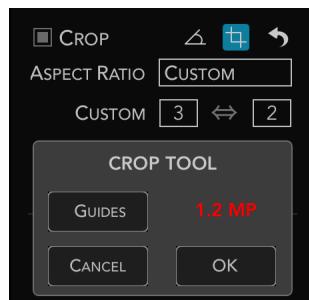


Aspect Ratio: This popup allows you to constrain the crop to a specific aspect ratio. There are also options for Freeform (unconstrained) and Custom aspect ratios. When Custom is selected in the popup, the Custom fields immediately below the popup become enabled.

Straighten: This slider allows you to rotate the image from -20 degrees to +20 degrees.

Straighten Tool: This tool allows you to draw a line on the image to straighten it. This makes it easy to align the image by using a horizon, wall or other straight feature. A panel appears when the tool is engaged showing the current angle.

Crop Tool: With the Crop Tool, you can drag and position the crop box. A panel appears with the megapixel size and a checkbox to show / hide rule-of-third guidelines. If the megapixel size appears in red, then the cropped image will be smaller than 2 megapixels, which is fewer pixels than in a standard HD television set.

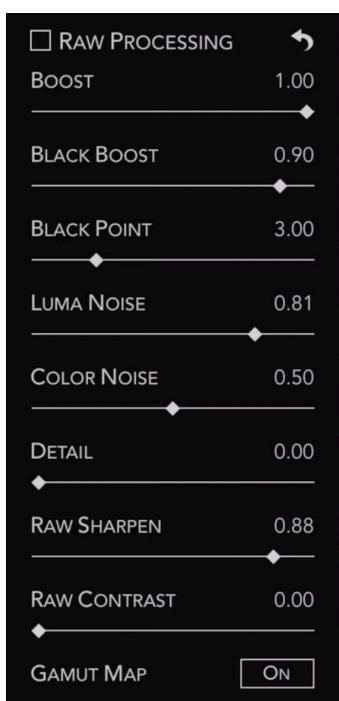


Unlike most adjustments, you must first tap the Crop checkbox to enable it, before using any of the crop controls.

RAW PROCESSING

RAW Processing is the adjustment at the heart 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 through software updates. As of this writing, the list of supported cameras (and any limitations) is at: <https://support.apple.com/en-us/HT207972>. Support for cameras is essentially identical between macOS and iOS.

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 greatly affect how these sliders operate and affect the default values of those sliders.

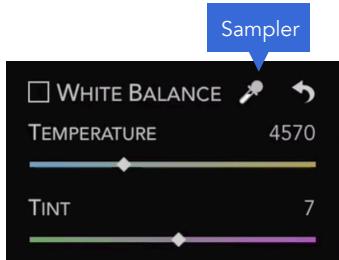
Gamut Mapping: In its final processing step, Apple's RAW engine ensures colors do not exceed the range of the working color space (Adobe RGB or P3). This is called Gamut Mapping. Colors that are near or outside the limit of that color space are changed to fit within the gamut. Without gamut mapping, colors that exceed the limit of the gamut will be clipped. Gamut Mapping usually provides good results, but having control over gamut mapping is helpful in some situations. For example, sometimes you may want the colors to be clipped rather than mapped because you prefer the appearance. Or, you may want to use other filters in RAW Power to bring the colors back into gamut.

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

Double-tap any slider to reset it to its default value.

🔒 WHITE BALANCE

White Balance adjusts the image's color balance and tint.



Temperature: This slider controls the color temperature of the image, expressed in degrees Kelvin, where lower temperatures result in a bluer image and higher temperatures in a redder image.

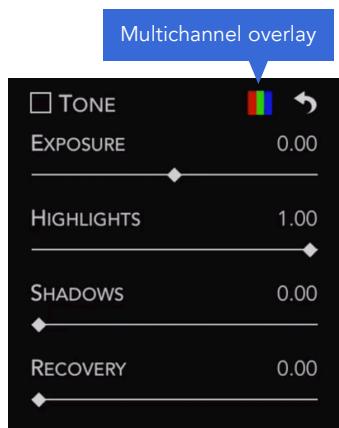
Tint: This slider tints the image along, usually in conjunction with the temperature slider.

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

If you drag the sampler on the image, the white balance values will update continuously until you release the mouse button (this depends on the performance of your device - slower devices are not able to continuously sample).

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.

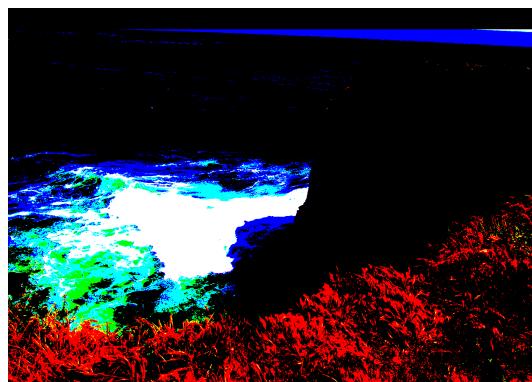
Highlights: this slider darkens just the brightest pixels of the image.

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 (or a combination).

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

Tap the Multichannel Clipping Overlay 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. Here is an example image with the overlay enabled.

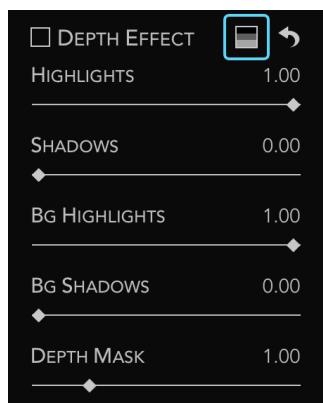


If the overlay is enabled while changing the Shadows slider, RAW Power will show pixels that are at 0.0 in each channel. Thus, blue indicates that the pixel's blue channel is 0 and yellow means the pixel's red and green channels are both zero. Because it gets complicated when more than one channel is either 0.0 or 1.0, below 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

🔒 DEPTH EFFECT

The Depth Effect adjustment is available for images with the dual camera system available on some iOS devices, including the iPhone 7 Plus, iPhone 8 Plus and iPhone X. The adjustment allows you to adjust the highlights and shadows of the background and foreground independently. It also provides control over the definition of foreground and background by manipulating the depth mask.



Highlights: darkens the brightest pixels in the foreground.

Shadows: brightens the darkest pixels in the foreground.

BG Highlights: darkens the brightest pixels in the background.

BG Shadows: brightens the darkest pixels in the background.

Depth: controls what the other sliders consider foreground and background. Sliding it to the left makes more of the image "foreground" and sliding to the right makes more of the image "background". So, if you move the slider all the way to the left, the entire image is considered "foreground" and the two background sliders have no effect. If you move the slider all the way to the right, then very little of the image will be affected by the foreground sliders, while most will be affected by the background sliders.

If you tap the Depth Overlay (blue box, above), you will see a overlay of the depth mask itself. Here is an example depth mask at its default value and with the depth slider at 5.0. Lighter shades of gray denote foreground and darker shades denote background.



Original Image



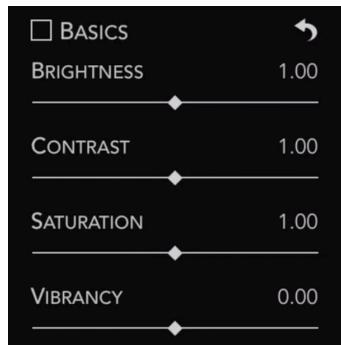
Depth Mask, Depth = 1.0



Depth Mask, Depth = 5.0

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.

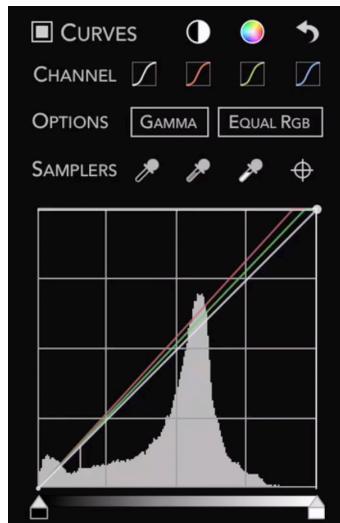
CURVES

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.

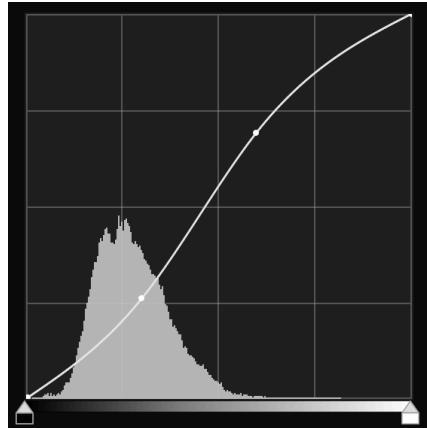
The Curves adjustment consists of four separate curves, one for "Red," "Green," and "Blue" and a "Combined" curve. The red, green, and blue curves only affect one channel of each pixel, while the combined curve affects all three channels.

You can tap 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 does that, and also 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 it's 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.

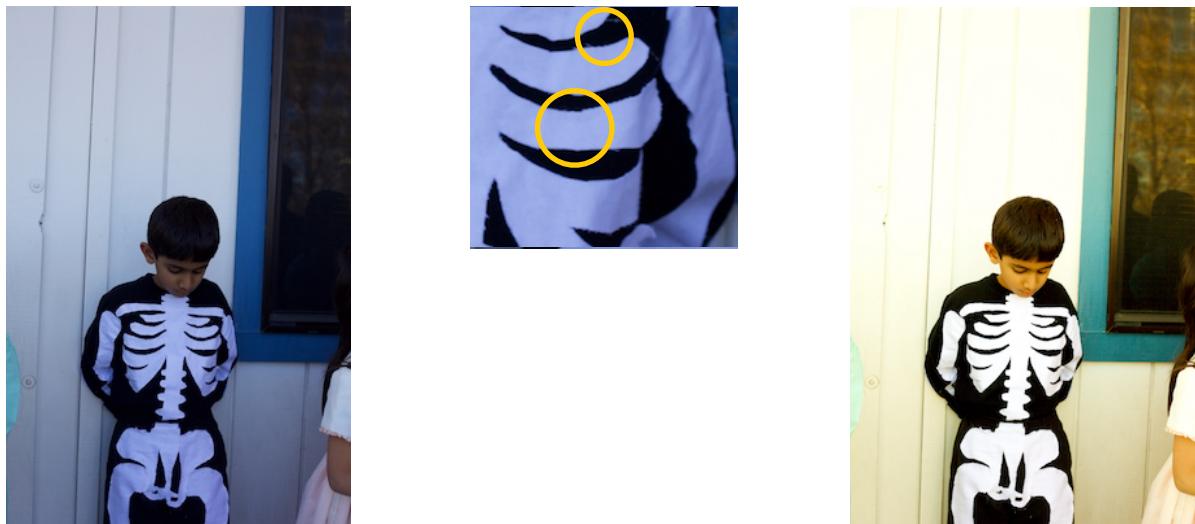
Here is an example using an image with an S-shaped contrast curve. On the left is the image in Equal RGB mode and on the right, in Luminance mode:



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 tap on. Except in extreme cases, the target sampler does not affect the image.

Like the White Balance sampler, the curves samplers update continuously if you drag on the image while using them.

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



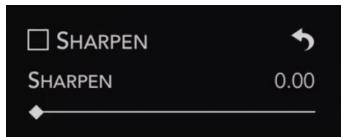
Once any point is placed on the curve, you can move it around to adjust the colors similar to the one you sampled. Double-tap on a point to delete it.

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.



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.

COPY AND PASTE

You can copy the current adjustments on the image and paste them onto another image. Since RAW Power only supports adjusting one image at a time, use this feature as follows:

- Adjustment Menu > Copy Adjustments
- Tap to select a different image
- Adjustment Menu > Paste Adjustments
- Tap Done to save your changes.

ROUNDTrip EDITING

RAW Power is also available on the Mac App Store. It runs as a standalone application and as a Photos Extension. The Mac and iOS versions of RAW Power are completely compatible, which means that if you are using iCloud Photo Library, you can edit an image on iOS and continue editing on the Mac (or vice-versa). All editing is completely non-destructive — the adjustment information is transmitted through iCloud. Currently, this feature is limited to JPEGs due to a bug in Apple's software. To use this feature, try the following steps:

- Open a JPEG in RAW Power for iOS
- Edit it in some way (for example, adjust exposure)
- Tap Done to save the changes
- Go over to the Mac and open Photos.
- Find the same image in Photos on the Mac and enter Edit
- Select the RAW Power Photos Extension
- You will see the exposure slider moved from its default position, indicating that the iOS changes were sent over to the Mac. Continue editing.