

piRAWnha

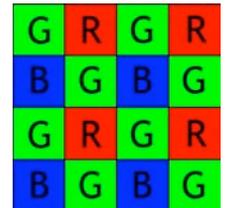
raw image developer for iPad
version 1.0

What is piRAWnha?: piRAWnha is a powerful raw image developer for iPad. The iPad allows users to view the JPEG thumbnail image embedded in the raw image file, but cannot process the raw data itself. With piRAWnha, you can edit the raw data itself and, once you've found the settings you want, export a high-quality JPEG image file to your Photo Library (under Saved Photos). Currently, piRAWnha only supports raw images transferred to the iPad with the Apple iPad Camera Connection Kit and does not support editing JPEG files from digital cameras.



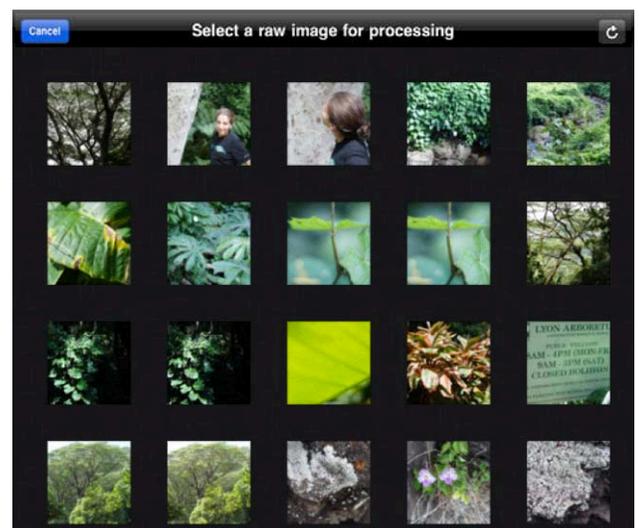
Processing raw files requires a basic understanding of how digital imaging works. We will explain the sliders and menus in piRAWnha, and with a little experimentation, you can get the most out of your digital negatives with piRAWnha for iPad.

What is raw?: Raw images contain data from a digital camera's sensor with minimal processing. As such, they can be considered to be a "digital negative" containing nearly all of the information originally captured by the digital camera. A raw file can be "developed" to create, for example, a standard JPEG file for viewing on the web. All high-end digital cameras, and many mid-range cameras, offer the option to save images and raw files.

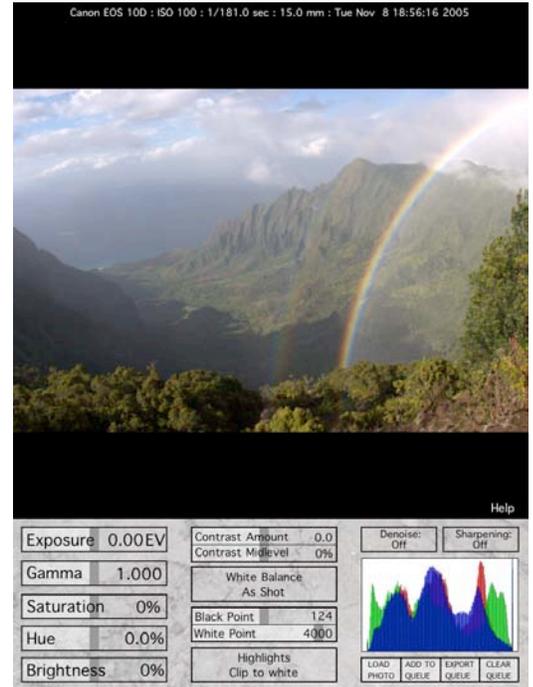


Supported Cameras: piRAWnha supports the raw files that are recognized by iPad. A list can be viewed here: <http://support.apple.com/kb/ht3825>. We will, of course, update piRAWnha to support the latest digital cameras as they become available.

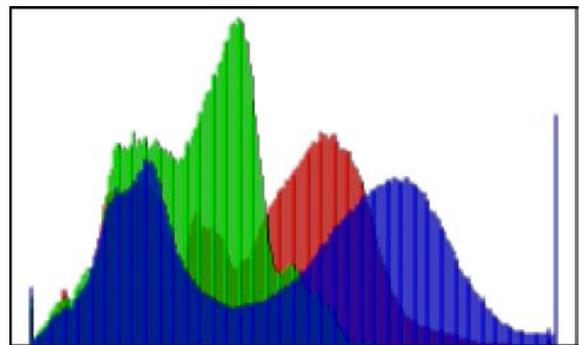
Raw Photo Chooser: When piRAWnha is opened, you are presented with a screen (the Raw Photo Chooser) showing the square thumbnails of the raw files on your iPad. These are the raw files that you transferred to your iPad via the Apple iPad Camera Connection Kit or by syncing with iTunes. Choose the file you wish to develop with piRAWnha. Included with piRAWnha is a sample raw image which you can experiment with to explore the features of the app. This image is of a rainbow over the cliffs of the Na Pali coast in Kauai, Hawaii, and will always be visible in the Raw Photo Chooser.



Main Screen Overview: The raw image you chose will then be loaded into piRAWnha. Now you see the main piRAWnha screen where you will edit your raw image. Once loaded (it will take a few seconds, during which time the activity wheel will be spinning), you will see your raw image displayed in the large **Image Display** on the main screen. This image is zoomable and scrollable, by the familiar pinch, flick, drag motions of the iPad. Above your image, you will see the image EXIF information— camera’s owner: camera make and model: equivalent film sensitivity ISO : shutter speed : focal length : date and time when the image was captured. This information disappears when you zoom in on your image. On the bottom-right of the Image Display screen you will see the word “Help”, touching this will flip the screen and display the help documentation which you are reading now. Occupying the bottom portion of the main screen is the **Image Adjustments Area**. This area contains the sliders and popup menus with which you will edit your raw image, as well as the image histogram, and buttons to load a new image and export the current image.



The Histogram: A standard digital image is made up of many pixels, each of which has an amount of red, green, and blue. For the 8-bit images that piRAWnha develops, each pixel consists of an amount of red, green, and blue between 0 and 255. Each pixel can represent nearly any color by adjusting the relative amounts of red, green, and blue. If you ask the question: How many pixels have a green value of zero? How many green pixels have a value of 1?...all the way up to 255, you have just constructed a histogram of the green pixels. You can do this for red and blue as well. The resulting red-green-blue histogram is displayed in the right-hand column of the Adjustments Area. Dark pixels will appear on the left, bright pixels appear on the right. As you adjust the various parameters in the Adjustments Area, the histogram tells you a lot about what’s happening to the image data. For example, if you are losing information by making some pixels too bright in a particular color, the far-right bin (the 255 value) will become high. Similarly, making pixels too dark will cause the far-left bin (0 value) to become high. If you’re not already familiar with it, the histogram will quickly become very helpful to you as you adjust your digital images.



Editing a raw file: piRAWnha makes two types of adjustments on your raw image: during manipulation of the raw data itself and after the raw data has been extracted. The first type of adjustment takes a lot of number-crunching, the second takes less (and depend on the results from the first!). Additionally, certain functions take longer to process than others. For these reasons, piRAWnha operates fastest when you make edits in a certain order. That order is:

- 1) First edit: “Exposure”, “White Balance”, “Black” and “White Point” and “Highlights”
- 2) Then edit: “Gamma”, “Saturation”, “Hue”, “Brightness”, “Contrast”
- 3) Finally, edit “Sharpening” and “Denoise”

You will also notice that your image shown in the Image Display is not the full-size image. piRAWnha shows a downsized (25% of the length and width) of your image in order to speed up preview processing. However, when the image is exported (see below), piRAWnha exports the full-size, high-resolution image for images less than 15 megapixels. At this time due to available memory on the iPad, raw images larger than 15 megapixels will be exported as smaller images that are one-half full-size in width and height. However, these images contain most of the data captured in the original RAW file (in a smaller and more manageable size). We think these images are as good, or even preferable, to the full-size images for all uses except to make very large prints.

Freeing more memory: If piRAWnha alerts you that memory is low, you can free up memory to speed up piRAWnha by closing open apps on your iPad. This is done by double-tapping the home button and then pressing and holding the icons until the icons wiggle and little red minus sign comes up in the upper left of the icon. Clicking this minus sign above the app will close that app and free up memory.



LOAD: Tapping this button will bring up the Raw Photo Chooser where you can select a new file for editing. Changes in the editing options you made on the previous file will all be reset.

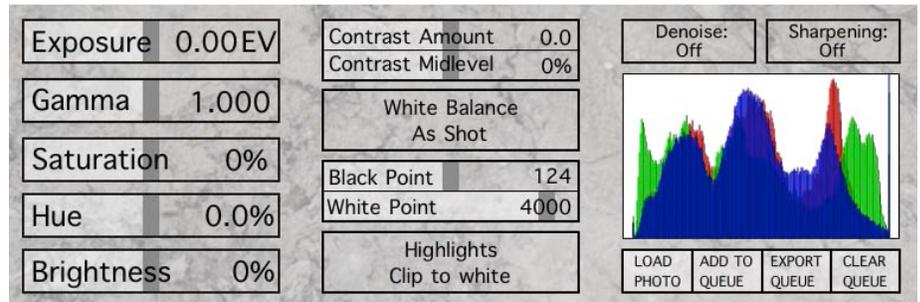
Exporting and the Queue: When you are finished editing a raw image (by adjusting the sliders and pull-down menus) and wish to export the full-size image (in the sRGB colorspace and JPEG format with high-quality, low compression) to your iPad’s Photo Library, tap “ADD TO QUEUE” below the histogram. At this point you can either load and edit more images (by tapping “LOAD”) or you can export just this photo by tapping “EXPORT QUEUE”. A progress bar will appear in the lower-center of the image-view area if the main image is zoomed out indicating the progress in the export of the queued raw images, and text will appear in the lower right indicating how many pictures are left in the queue to be exported. You can choose to edit several raw images (we recommend no more than ten) and add them to the queue before exporting. The length of time for an export is longer for larger images; a single 14 megapixel image takes about a minute to export. During exporting, it is not possible to edit another photo in piRAWnha—you must wait for the export to finish. However, you can exit piRAWnha and the raw images will continue to be

exported in the background. You must re-enter piRAWnha in order for the images to be written to your iPad's Photo Library.

To clear the queue of all images tap "CLEAR QUEUE". An alert will prompt you to ensure you want to do this. Be careful, you don't want to accidentally erase all the raw image editing you've done on the images in the queue.

Using the Adjustment Sliders:

The sliders are moved by touching the dark gray vertical bar inside the black rectangle and dragging the slider to a new position. The value of the slider is registered by the number on the right-side of the black rectangle. Releasing the slider, while your finger is still inside the black rectangle, causes your raw image to be processed with this edit (for example, increase the saturation to +27%). If you move your finger outside the black square before lifting your finger, the slider will return to its previous position and no edit will be made. Similarly, if you try to move a slider while your image is being processed (indicated by the activity wheel spinning in the middle of the Image Display), the slider will return to its previous position. If you double tap the gray vertical bar of the slider, it will return to its default position (for example, Exposure = 0.00 EV) and the image will be reprocessed with this value.



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Using the Popup Menus: The popup menus are used for editing parameters which can be changed by discrete values, rather than continuous values like the sliders. Touching inside the black rectangle of a popup menu (for example, Highlights) causes a vertical list to appear. Selecting one of these values causes piRAWnha to adjust your image corresponding to this value. To exit out of the menu without adjusting your image, simply touch somewhere on the screen outside the popup menu.

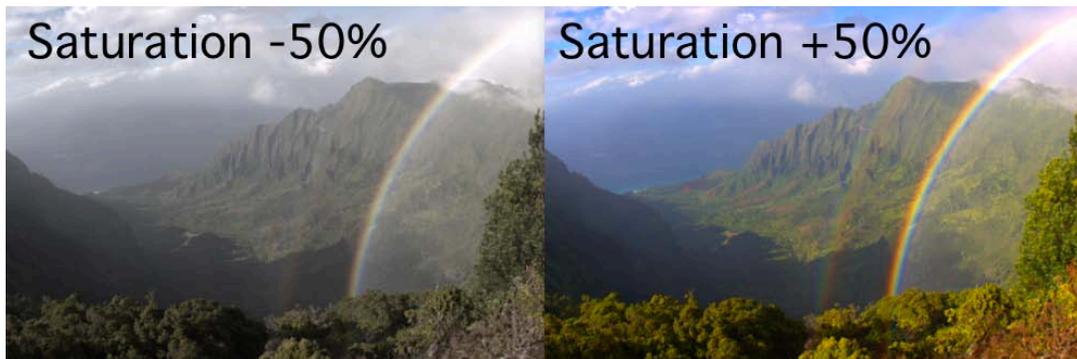
Adjustments—Exposure: correct an under- or over-exposed image for overall brightness using the raw image data, particularly in the brighter parts of the image (see: Adjustments—Brightness to adjust brightness in mid-tones). Exposure adjustments are given in EV, that is, equivalent f-stops. Moving this slider to +1.00 EV will cause an increase in brightness similar to decreasing the shutter speed by a factor of 2 (for example, from 1/200 s to 1/100 s).



Adjustments—Gamma: change the brightness of an image by a power-law. A gamma greater than one makes dark regions of the image brighter, a gamma less than one make shadows darker.



Adjustments—Saturation: adjust the color saturation of an image in the HSL (hue-saturation-lightness) domain. Smaller values decrease the amount of color, larger values increase the amount of color. A value of -100% creates a monochrome grayscale image.



Adjustments—Hue: adjust the hue of an image in the HSL (hue-saturation-lightness) domain. Changing the hue is equivalent to rotating the colors in an image. piRAWnha offers fine control and a limited range of hue adjustment, for subtle changes of color rotation in an image.



Adjustments—Brightness: adjust the brightness of an image in the HSL (hue-saturation-lightness) domain. This slider will affect brightness of the mid-tones especially (see: Adjustments—Brightness to adjust the brighter tones).



Adjustments—Contrast: apply sigmoidal non-linear contrast to an image. piRAWnha employs this advanced contrast control, which is superior than regular contrast adjustments which can result in a loss of detail in the brightest and darkest parts of an image. piRAWnha’s contrast control will not “blow-out” bright highlights in your image, or send the shadows to pure black. The top slider, “Contrast Amount” controls how much contrast is to be applied to the image. The “Contrast Midlevel” slider controls where mid-tones end up in the adjusted image: negative values brighten the image mid-tones, 0% neither brightens nor darkens the image, positive values darken the mid-tones. If the “Contrast Amount” slider is set to 0, moving the “Contrast Midlevel” slider does not cause any changes in the image.



Adjustments—White Balance: select the white balance method to be used in processing the raw image data. Incorrect color balance gives the image a color cast: white objects no longer appear white, colors can look dull and inaccurate. piRAWnha can use the white balance setting as recorded by the camera when the image was captured: “As Shot”, it can calculate a white balance based on the entire image: “Automatic”, a neutral white balance based on an artificial light source and grey card: “Neutral”, or you can specify your own white balance with “Multipliers”. When the “Multipliers” option is selected, two sliders appear (“Red” and “Blue”), moving these sliders will cause the custom white balance to be applied to the image. Increasing the “Red” multiplier will cause the image to take on a warmer cast, increasing the “Blue” multiplier will cause the image to

take on a cooler cast. The initial values of the Red and Blue sliders are calculated from a whole-image average.



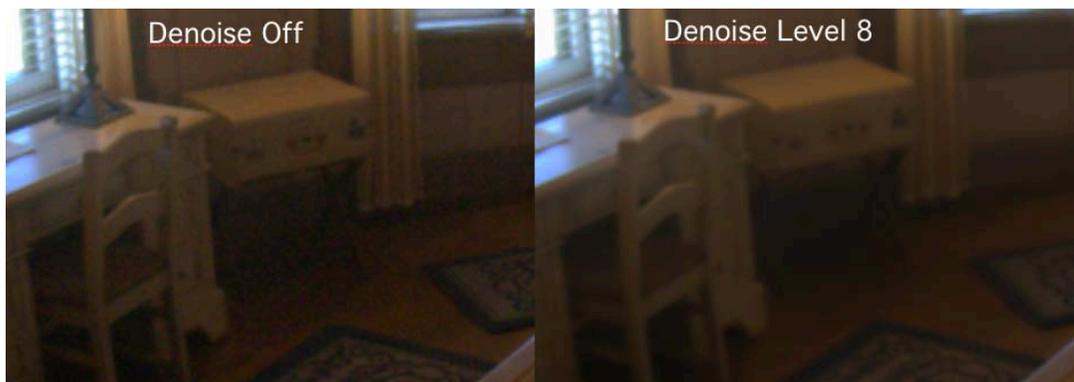
Adjustments—Black and White Point: These two values are usually correct as calculated by piRAWnha. The black point is calculated by piRAWnha from hidden sensor pixels. However, if shadows appear foggy, then the Black Point slider should be increased from its default position. If there is a magenta cast on an image, it is possible that the white point used in the raw developing is incorrect; decreasing the white point slider could fix this issue. If the white point slider is too low, bright regions in the image (highlights) can be turned totally white, resulting in a loss of information in these areas.



Adjustments—Highlights: By default, piRAWnha clips highlights to white (“Clip to White”), that is, the very brightest regions of the image are turned white, resulting in a loss of information in the highlights. If no pixel in the image has been recorded at its maximum white value (the 255 bin for red, green, and blue in the histogram; called “saturated”), selecting “Unclipped (pink)” will ensure your developed raw file retains all of the detail in the bright and dark parts of the image. However, it is unlikely that no pixels are saturated and if any are, they will be turned an unpleasant shade of pink. Therefore, “Unclipped (pink)” should be used only sparingly and with caution. “Blended (grey)” is similar to “Unclipped (pink)” except these unpleasant pink shaded highlights will be rendered a shade of grey. “Recovery” will reconstruct saturated pixels to recover lost detail in the highlights in the image, using neutral tones to reconstruct the saturated pixels.



Adjustments—Denoise: Digital images can suffer from the equivalent of “film grain”. Noise appears as a speckled pattern where there should be none, such as in blue sky. Images shot at higher ISO (as displayed in the text above the image when zoomed out all the way) are noisier than images shot at lower ISO. To remove this noise, piRAWnha uses a wavelet denoising algorithm on the raw data itself. By default, denoising is turned off. You can choose from very subtle and gentle denoising (“Level 1”) to very aggressive denoising (“Level 10”). High levels of denoising will result in smudging of fine details in the image, and an overall slightly blurry appearance. Denoise levels above 5 should only be used in the noisiest images.



Adjustments—Sharpening: piRAWnha uses the well-known unsharp mask, similar to what is used in popular desktop image editing programs. Sharpening should be adjusted last. The preset values correspond to: all-purpose use (“General”), gentle sharpening of soft subjects (“Soft”), portrait photographs (“Portrait”), low, moderate, and aggressive sharpening (“Low”, “Medium”, “High”), and for web use (“Web”).



Final Word: piRAWnha will encourage you to better understand digital imaging by getting you intimately familiar with the raw data that makes up your photographs. Experimentation is the best way to learn about raw image development. We believe it will help you get the most out of your photography.

Acknowledgements and Licensing Information:

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dcraw

piRAWnha utilizes dcraw, a program written by Dave Coffin. See link for more information: (<http://www.cybercom.net/~dcoffin/dcraw/>)

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The Adjustments Area Background Image

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