

Histogram Basics

by Jerry Miller, May 17, 2007

What is a histogram?

A histogram is graph used in digital photography to help determine exposure information after an image has been taken. The horizontal side of a histogram is divided into 256 individual columns each of which shows the tonal level of the image. The vertical side shows the number of pixels involved in that tonal range. In simple terms, it's a fancy light meter that shows how much of the image is dark (black or in shadow) on the left and how much of the image is light (white or in the highlights) on the right. Histograms come in a combined channel (luminance) histogram or a three channel RGB (red, green and blue) histogram. Most cameras, except the professional top of the line ones, use a luminance histogram to give an overall view of exposure levels. Photoshop and several super high end cameras offer the RGB histogram which breaks down the exposure information by color so you can see if individual colors are being clipped. An RGB histogram is the better of the two.

How do I set my camera to show a histogram?

Each camera varies on the histogram options. On Canon models depressing the info button in review mode will turn on the histogram option or you can set the histogram to appear each time your image shows up for review by setting the right custom function. For histogram options with other camera manufacturers, see your camera manual.

How do I use a histogram?

Each time you take an image, review the histogram of it on your camera review screen. The histogram will show you a rectangle with a curved or spiky graph. Ideally, the histogram should be the shape of a bell curve with the highest point in the center and tapering off to each end of the graph. If you have a histogram that shows a lot of black at the left side of the graph, your image is underexposed. You need to either increase your aperture (i.e. – from f-11 to f-8) or increase your exposure time (i.e. – from 1/125 to 1/60). If you have a graph that shows a lot of black at the right side, your image is overexposed. You need to either decrease your aperture (i.e. from f-8 to f-11) or decrease your exposure time (i.e. – from 1/60 to 1/125). A normal histogram might show a smooth curve or a spiky one. Don't be too concerned one way or the other (unless you have a very flat histogram) as this does not have much effect on the final exposure. A flat histogram may mean the image doesn't have a lot of "punch" and throwing in some additional light with a flash or reflector might produce better results

Something to consider is that your camera can only see the range of tonal values and colors inside the confines of the histogram. Any time you have a graph that has a great deal of black against the left or right walls, you have lost details in either your shadows or highlights. This information cannot be retrieved. It is permanently gone. You can adjust your histogram in Photoshop by opening a levels box and dragging the arrows left or right, but if the information is not there to adjust due to improper exposure in the first place, the image will still look terrible. That is one of the key advantages to digital photography. You will know before you leave the spot you are shooting whether or not you have a properly exposed image.