

# Digital Basics I

Welcome to the digital world of photography. Digital photography is not really that much different from using film. ISO, F stops, depth of field, focal length are all still part of digital photography.

## **So what is the difference between film and digital?**

1. Film, as you know, has been replaced with a CCD Charged Couple Device or CMOS. In other words: electronic film.  
  
Electronic film is made of an array of rows and columns of individual sensors which are light sensitive in much the same way as the emulsion on film. When the light strikes a sensor a binary number is created which represents the intensity, color, tint, of the light that fell on that individual sensor. Each sensor's output is one image PIXEL.
2. No chemicals are necessary, as they are for developing film and print paper. The computer has replaced the enlarger, and the inkjet or dye sublimation printer has replaced the chemical

process for making a prints. (Some photo finishing services do continue to use conventional photographic paper and chemicals for the printing of digital images)

3. There is no need to use a 3<sup>rd</sup> party for the development and printing of photographs. There are still these 3<sup>rd</sup> parties available for custom electronic printing. However, for the first time in photographic history, the everyday photographer has easy access to the technology and equipment to create and control the complete process of taking and printing their own photographs to their standards and satisfaction.

<http://www.shortcourses.com/pixels/index.htm>

### **Pixels: Why do I need them?**

Pixels are the basic building blocks for digital photography. Pixels equate to sharpness, resolution. The greater the number of pixels, the larger the photograph can be printed and retain good detail. Digital cameras are rated by, and often purchased based on, the

total number of pixels available. Image resolution is normally stated in millions of pixels, or “megapixels”. For example, a camera which produces an image that is 3,264 pixels wide by 2,448 pixels high, would be described as an 8 megapixel camera. (3,264 x 2,448 = 7,990,272) During the use of Photoshop you will be affecting the color, both hue and saturation, and luminance at the pixel level. You might ask, “What size is a pixel?” It can be whatever size you wish it to be. The size can be assigned in Photoshop (or other editing software). If it is set to 300 pixels per inch, then each pixel is one-three hundredth of an inch square. If it is set to two pixels per inch, then each pixel is one-half inch square. The pixel size should be set so that, at normal viewing distance, the pixels are too small to be seen individually.

## **CAMERAS:**

Digital photography is identical to film in that a great photograph begins in the camera. I know that the new software in the computer is touted to be able to work miracles and correct all of the errors

made at the time of exposure. It just is not so. Garbage in –  
garbage out!!!!

Although all cameras are different, they are all designed to conform to basic photographic principles. Today's digital cameras allow for control over the ISO, shutter speed, F stops, flash, delayed exposure, bracketing, shutter priority, aperture priority, and a view of the exposure just made along with a histogram its values.

We cannot answer specific questions regarding the operation of cameras across the board, other than make suggestions to check this or that. It is imperative the photographer become completely familiar with their camera. They must know the control locations and operations. A diligent study of the instruction manual is highly recommended.

It is my sincere belief that the camera should be operated in manual mode until all of the controls and features are mastered.

This is especially true with regard to the preview of the just completed exposure along with the HISTOGRAM. The preview gives a good idea as to the composition and field of view. The HISTOGRAM is by far the most important tool in determining the exposure, dynamic range of the scene, and if there are any parts of the exposure which lack detail as a result of either an over or under exposure.

[http://www.dpreview.com/learn/?/Glossary/Digital\\_Imaging/Histogram\\_01.htm](http://www.dpreview.com/learn/?/Glossary/Digital_Imaging/Histogram_01.htm)

## **HISTOGRAM**

The histogram is a graph presentation of the scene as recorded by the pixels. In a full-scale black and white image with eight bit pixel depth there are 256 shades of gray. As viewed on the histogram, the far left represents pixels that do not have sufficient exposure to detect any detail. (Underexposed). The right is just the reverse. It represents pixels that have too much exposure thus not having any details (overexposed). In a color exposure, the same principles are applied to each of three color image channels. Each channel is a

grayscale image which represents one color with 256 shades of gray. There are three primary colors: red, green and blue (RGB).

The total number of values in a color photo is  $256 \times 256 \times 256 = 16,777,216$ . The value of each pixel is averaged to display on the camera's histogram. The histogram is a bar graph with one vertical bar for each of the 256 values. The height of each bar is determined by the total number of pixels in the photograph which have that exact same value.

<http://www.wfu.edu/~matthews/misc/graphics/formats/formats.html>

<http://www.luminous-landscape.com/tutorials/understanding-series/u-raw-files.shtml>

<http://www.all-things-photography.com/digital-photography-explained.html>