

The Big Four in Digital Photography

Alan Detrick

Digital photography is a new world. It has new parts and seemingly a new language. Four major terms are the starting point in understanding this new technology. The following is a very brief description of the four terms, how they relate to equipment and how they are used in photography.

Resolution: Resolution is used to describe both the total amount of information as in a camera's capability (e.g. a 12 megabyte camera) and also the density of information in a digital file (e.g. 300 ppi.).

Dpi and ppi: These are technical abbreviations used to describe the density of information in a digital file, display device, or print. Dpi stands for dots per inch and is used to describe the density of information for any hardcopy (e.g. prints). Ppi represents pixels per inch and is used to describe the density of information for non-hardcopy files (e.g. computer files). However, dpi is commonly used incorrectly for everything relating to the density of information in digital files as well.

Lo-Res/Hi-Res: Lo-Res files are generally considered 72 ppi. Hi-Res are generally 300 ppi.

Cameras: The resolution number of a camera is the maximum amount of information the camera has the ability to capture. The actual file size will depend upon the capture mode (Raw, Jpeg, Tif) and the digital workflow (how the image file is processed).

Monitor: The resolution of a monitor is the density in pixels the monitor displays of a digital file (e.g. 1600 pixels x 1200 pixels.). The greater the number of pixels, the higher the definition in the image.

Printer: The resolution of a printer is the density of dots of ink the printer puts on paper in a given area (e.g. 720 dpi equals 720 dots per inch). These settings are software controlled.

Projector: The resolution settings of the printer equal the amount of information in pixels the projector is able to project both for the horizontal and vertical axis. The projector resolution (e.g. 1024pixels

x 768pixels) can be found in the specification section of the projector manuals.

For the best quality projected images, the digital file size should be adjusted so that it is the same as the projector resolution. As an example, for an XGA projector, the best file size is 1024 pixels on the longest dimension @144 ppi for horizontal images and 768 pixels on the longest dimension @144 ppi for vertical images in a Powerpoint or Keynote presentation.

8 vs. 16 bit: Digital photographers work with 8-bit and 16-bit files. An 8-bit file displays 256 possible colors or values. A 16-bit file can display 65,536 colors. A 16-bit file contains much more information and allows for more adjustments resulting in a better final file. A 16 bit file can be converted to an 8 bit file after all adjustments have been completed.

Color: Color modes are computer mathematical definitions used to describe the different color values of the pixels in a digital file. There are four major color modes: Grayscale, RGB, Lab, and CMYK.

Greyscale is the black and white mode.

RGB: a three-channel mode of Red, Green and Blue. Within the RGB color mode there are four major color spaces.

a. sRGB is the smallest color space with the fewest number of colors. This is the color space of all internet images.

b. ColorMatch is a color space based upon the colors that the old Radius monitor can display. It is the closest color space to CMYK (cyan, magenta, yellow, black).

c. Adobe 1998 is a larger color space than sRGB and Colormatch. It is the current standard space used in publishing.

d. ProPhoto is a very large color space. It has more colors than can be printed and displayed at this time. Many photographers use ProPhoto for their master files in the belief that inks and paper are constantly improving and will eventually be able to handle much if not all of ProPhotos colors.

Lab is a three channel mode comprised of the 'L' channel for

lightness, the 'a' channel for red/green, and the 'b' channel for blue/yellow.

CMYK is the commercial printing mode. C is cyan, M is magenta, Y is yellow and K is black.

Color Management: All output devices (monitors, printers and projectors) should be tested and adjusted to assure that the digital file is accurately presented. The first adjustment should be made on the monitor. As monitors age, their colors change. LCDs are better at holding their calibration than CRTs. Adjusting the color of a digital image file on a non-calibrated monitor is wasted time. Profiling devices and software are able to quickly calibrate the monitor to known color standards so that the digital file seen on the monitor is accurate. When properly calibrated, the image appearing on the monitor will accurately represent the information in the image file.

File Formats. - There are many different file formats. The letters in the extension following the ID number will indicate the type of file (e.g. ALD-060725.jpg or ALD-060725.tif). Some of the more commonly file formats and their extensions used are:

JPEG (jpg, jpeg) - Joint Photographic Expert Group: This format is the standard format of all the images on the Internet. It is a lossy compression format meaning that information is discarded every time the file is saved. It is an 8-bit file and best used for sending files for viewing only(internet). This is not a good format to use when additional work or adjustments will be performed on the file.

Tiff (tif, tiff)- Tagged Image File Format: This is currently the industry standard format for service bureaus, photographic labs, stock agencies and publications.

RAW is not a true format but is included in discussions under file formats. This is a 16-bit capture format. It is a linear range of light values that can be converted into a Jpeg, TIFF or PSD. The advantage of using this format for capturing an image is that adjustments to the entire image as well as to a selective area can be made to the file before it is converted to a Tiff or Jpeg.

PSD is a Photoshop file format. Computers not using Photoshop software will not recognize this file.

PDF - Portable Document Format: This is used for document layouts or any file where text and images are combined.