

What is a Digital Image?

- What is a digital image?
- What is a pixel?
- About Colour Depth.
- Image Formats.

Digital Images

- A digital image is a data file.
- It consists of a header (contains format information), the image as a matrix of pixels (picture elements) and a terminator.
- Each pixel relates to one point of information.
- The pixel count of the camera sensor determines the **maximum** number of information points in the image.
- Image file size is related to the pixel count, colour depth and format type.
- The file size when photo is taken is a measure of image **total information**.

What is a Pixel?

- A pixel is one point in the image.
- Maximum image **information** is determined by the **total number of pixels in the image** (*when photo is taken.*) This is a **RAW** image.
- Image **resolution** is pixels per inch (**PPI**).
- Image size is **PPI** times inches. The lower the **PPI** the larger the physical dimensions of the image in inches.
Total pixels = (PPI X width) X (PPI X Height)
- Changing **resolution** while maintaining **total pixels** results in an equivalent change to height and/or width. Information content does not change.
- Changing **resolution**, using image editing software, while maintaining height and/or width will change **total pixels**.
The quality of the results of this action will depend on the software used due to interpolation processes.

Colour Depth

- Colour depth is related to the number of bits occupied by each pixel.
- 2 colour (1 bit) – line drawings.
- 16 colour (4 bits) – gif files.
- Grayscale (8 bit) – black and white.
- 256 colour (8 bit) – icons, gif files.
- 16 million colour (24 bits) – inkjet printers, internet, projection, computer monitor. This is the default condition.
- 281 trillion colour(48 bits)

16 million Colour

- 16 million color has the following structure



- Each colour is represented by 8 bits or one byte.
- Values representing each colour can range from 0 to 255 (2 to the eighth).
- The left hand byte is only used in CMYK colour.
- Example – pure red would be 0,0,255
18% gray would be 128,128,128

Image Formats

- The basic formats are RAW, TIFF and JPG
- RAW - Unprocessed images, requires extra computer processing. Not compressed.
- TIFF – Uncompressed images, processed in the camera.
- JPG – Compressed images, processed in the camera.

Image Formats (RAW)

- Advantages – offers all possible adjustment possibilities (dependant on computer software.)
- Disadvantages – Large size processes more slowly in camera. Requires additional computer processing.
- Possibly more potential colour information if you work in 48 bit mode.
- Difficult to demonstrate advantage in image detail over other formats when working with inkjet printers or projecting.

Image Formats (TIFF)

- Advantage – No additional computer processing required and no “lossy” compression.
- Disadvantage- Large file size slows camera operations.
- No colour depth advantage over jpeg files.
- Difficult to demonstrate any image detail advantages over highest quality jpeg when using inkjet printers or projecting.

Image Formats (JPG)

- JPG or Jpeg is a “lossy” compression algorithm.
- Smaller size means faster camera processing and more images per memory card.
- Highest quality JPG’s produce images visually equal to RAW or TIFF for most usages.

Remember!

- Digital images are **not** electronic slides!
- The image is a matrix of numbers.
- Image adjustment is done by mathematical processes on this matrix. There are no theoretical limits to these processes.
- As digital images from a digital camera have no grain, final image size is limited only by the sophistication of the software used.
- The basics of good photography, i.e. composition, lighting, depth of field, etc. still apply to your image!