TERMINOLOGY USED IN NADFAS DIGITAL PHOTOGRAPHY

The Computer

File: a photograph or a document saved on a computer.

Folder: on a computer, a container for **files** usually shown:

File size: the volume of memory space taken up by a **file** measured in **bytes**, **kilobytes** and **megabytes**

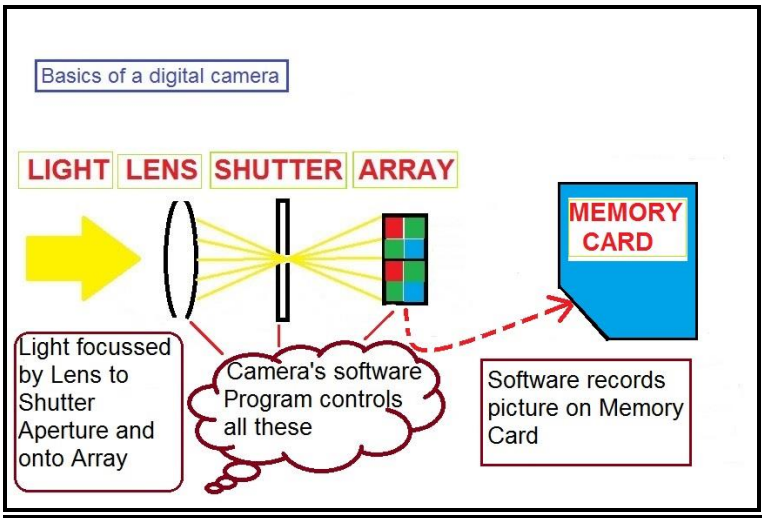
Memory: anywhere that **files** and **folders** are stored in digital form. On a computer, its **hard disk drive** is its permanent **memory**. An **external hard drive** is a plug in permanent **memory** of which there is an example below. Can be used as a back-up or to store **files** and **folders** instead of on the computer's **hard disk drive** or as a back-up. Capacity is measured in **gigabytes** and **terabytes**.

CDs and **Memory sticks** (also called **flash drives**):

are also **memories** for storing digital information – usually temporarily or to transfer between computers. But **archival gold CD**s are specially made for permanent storage. **Memory sticks** are not. Camera **memory cards**, often looking like this, are its **memory** which can be downloaded onto a computer.

Ports: the sockets on computers, cameras and electronic devices into which connections and devices can be plugged. The most common ones are **USB**, **HDMI**, **small HDMI** (often on cameras) and, on newer Apple devices, **Lightning.**

The Camera



Array of sensors: old cameras recorded the picture on light sensitive film. Digital cameras have an **array** of light sensitive **sensors**, millions of them in a rectangular **array**. Visualise a camera taking a 5 **megapixel** picture **as**

recording it through an **array** of 5 million **sensors**. In most amateur cameras, the **array** is thumbnail size. In a **full format** camera (professional quality) it is the size of the old 35mm film.

Pixels and **megapixels:** each **sensor** creates a digital dot (not round, but square or rectangular) of colour. This is a **pixel**. The picture (a **file**) is made up of the millions of **pixels**. A million **pixels** is a **megapixel**.

Memory card: the removable card upon which the pictures (**files**) are recorded.

Pixels and Dots

A **pixel** is information recorded as a digital code and stored in a **memory**.

A **Dot** is that information as seen on a screen or printed (dots of ink).

Resolution is the density of **pixels** or **dots**, measured in **pixels per inch (ppi)** or **dots per inch (dpi)**.

A 300ppi **file** *can* be printed at 6,000dpi. But the printing technology is inventing dots. It looks lovely, but is not a true picture of the object. To achieve a true 300dpi print, the **file** must be 300ppi or more.

The words **Pixel** and **Dot** are often used loosely, which can confuse. This is partly because the easiest way to perceive **pixels** is as rows of dots making up a picture.

A **pixel** is a colour dot, plus its position in the picture (which row and column), plus information which makes it work – all in a **digital code** e.g.

lOOIIIIOIOOIIIOOOOIOIOIIIIOOIIOOOOIOIOIII
IIIOOIOIIIIOOOOIIOI etc.

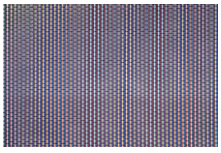
1 **megapixel** = 1 million **pixels**

Modern cameras are marketed as being, say, 10 **megapixels**, 20 **megapixels** or more. A high number of **megapixels** does not imply quality. Quality depends upon the quality, not the quantity, of the **sensors**.

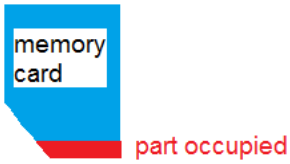
Pixels and **Bytes**

In any picture (**file**):

Pixels and **megapixels** are a measure of quantity;



Bytes, kilobytes and **megabytes** are a measure of volume, namely how much **memory** does the **file occupy**?



Descriptions of **files** as “large” or “small” means a large or small number of **bytes.**

Megapixels and **megabytes** are often confused.

Photography Formats

A digital photograph **file** is partly the picture and partly things which the camera’s software program does and adds to the picture to make it work. Programs* can handle and produce the **file** in different ways. Each way is a **Format**.

[explanatory note of technicalities, for those wanting to know more. Everyone else should skip – computer programs are complicated mathematical systems. Each one is based on an **algorithm which is a set of rules determining its working. **Algorithms** can be simple (to a wizz kid) or extremely complicated. Jpeg format is based on a comparatively simple algorithm, TIFF on one more complicated and LZW compression even cleverer].*

The **Formats** used in Church Recording photography are:

JPEG high quality pictures, subjected to adjustments by the camera's software (e.g. white balance and sharpening). **File size compressed** by the camera to 256* shades of colour and the **megabytes** to one quarter, or less, of the **uncompressed** picture initially recorded by its **sensors**. Loses a further 10% approx. of detail every time "saved" or "copied and pasted". **Lossy**. The **Format** by which most ordinary cameras record pictures.

TIFF a **format** setting rare on modern cameras. 256* shades of colour, but **Lossless**, meaning it does not lose quality when the **file** is saved or copied. **JPEG files** are saved as **TIFF files** on the computer before any adjustments are done, to prevent loss. The preferred archival **format**. **LZW compression** is a permitted sophistication to reduce **file size**.

RAW the camera does not make any adjustments to the light recorded as **pixels**. The **digital code** is, literally, raw as taken. No **compression**. 4,096* shades of colour, or more. Adjustments are made on the computer and the result "saved as" **TIFF**. Higher quality than required for Church Recording, but the choice of the experts.

**[explanatory note of technicalities, for those wanting to know more. Everyone else should skip – Church Recording uses 8 bit format for JPEG and TIFF so that file sizes are manageable. A digital bit can only be 0 or I, giving 2 possibilities for each bit. For a set of 8 bits, each of which has 2 possibilities, the range of possibilities is $2^8 = 256$. RAW is frequently 12 bit. $2^{12} = 4,096$ shades. It can be 16 bit or more. RAW files should be saved as 8 bit, not 16 bit, TIFF files. 16 will be too large.]*

Camera settings

0.3m, 5m, 10m, 14m etc. The number of **megapixels.**

Fine, best, standard or equivalent words the quality of the photograph. The lower the quality, the more the **file** is **compressed** by the camera. Always use the highest quality setting for minimum **compression**.

3:2 and 4:3 The traditional photograph shape is **3:2.** Sizes of print this can produce include 6" x 4" and 9" x 6". Better for wide pictures. Many digital cameras take **4:3**, the equivalent print sizes being 5.33" x 4", 6" x 4.5" and 9" x 6.75". A squarer picture.

Aperture The size of the hole in the **shutter** through which light passes from the lens to the **array.** Measured in **f** numbers. **Depth of field** means the distance between nearest and furthest objects in the picture which will be in focus.
f2.8 is the largest hole likely to be available. Maximum amount of light. Use for relatively flat objects in low light with long exposure. Depth of field is minimum.
f4 the largest hole on most amateur cameras. Use is the same as **f2,8**.
f.11 smaller hole, less light but much better depth of field. A good general setting.
f.16 smaller hole, even less light but even better depth of field. Better for sunlight.
f.22 smallest on many cameras. Best depth of field.

A or **Aperture priority** when set enables the photographer to choose the best **f** number. The camera decides how long (in time) the exposure should be.

Scene a setting giving choices for taking pictures in specified conditions e.g. Sports, night scenery, beach, sunset. Except for **macro** (taking close up) never use in Church Recording.

S or **Shutter priority**. Used for taking moving objects. Not used in Church Recording of stationary objects.

ISO is a sensitivity setting for the camera's **sensors**. The best pictures are taken at **ISO 100***, the lowest sensitivity setting. The **aperture** and the **shutter speed** have to be wide and slow enough to enable the **sensor** to absorb the light. Higher **ISO** numbers allow smaller **aperture** and faster **shutter speed**, especially in low light. But, the camera's straining to pick up the light means it picks up **noise** (seen as speckles, lines or other interference on the photograph). High **ISO** settings cameras are using software to eliminate the noise artificially, affecting the integrity of the picture. The higher the **ISO** number, the greater the volume of **noise** elimination and the more the integrity deteriorates.

[experts will argue that their high performance cameras produce a true picture at higher settings, but the rest of us should not go beyond **ISO 200]*