PHOTOGRAPHY GLOSSARY

WORDS AND PHRASES USED IN DIGITAL PHOTOGRAPHY

For more detail, see Chapters 5 and 9

On the Computer

File: a digital picture or a document.

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** store. An **external hard drive** is a plug in permanent **memory** of which there is an example below:

This can be used to store **files** and **folders** either as a back-up copy or instead of on the computer's **hard disk drive**. The capacity is measured in **gigabytes** and **terabytes**. Current models store several **terabytes.** They are not for long term storage.

CDs, **DVD**s and **USB Memory sticks** (also called **flash drives**):

are also **memories** for storing digital information – usually temporarily or to transfer between computers. **Archival gold CD**s are specially made for permanent storage, but the type we have used is now discontinued. Ordinary **CD**s and **Memory sticks** are not for long term storage.

Camera **memory cards** are its **memory** which can be downloaded onto a computer:

The most common look like this and are often called **SDs, SDHCs or SDXCs**.

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

Monitor: the viewing screen for a computer.

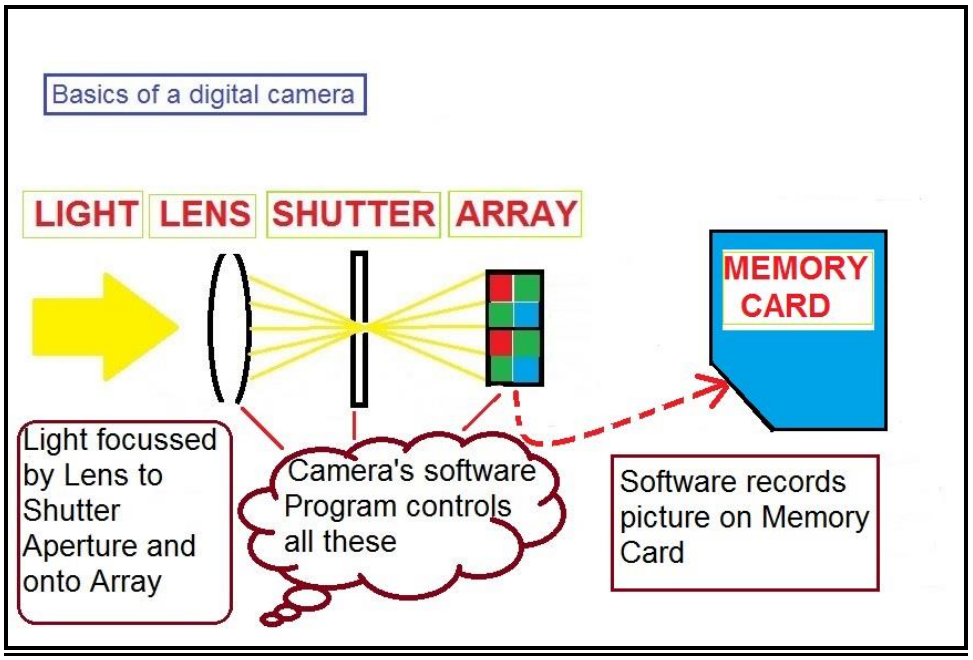
CD/DVD write/reader: a **disc drive** either built into the computer or external and plugged in, for playing and burning DVDs and CDs. The **drive** makes them work.

Program or the more modern term **App: '**application' software designed to enable an end user to execute a purpose e.g Word which enables **file** processing.

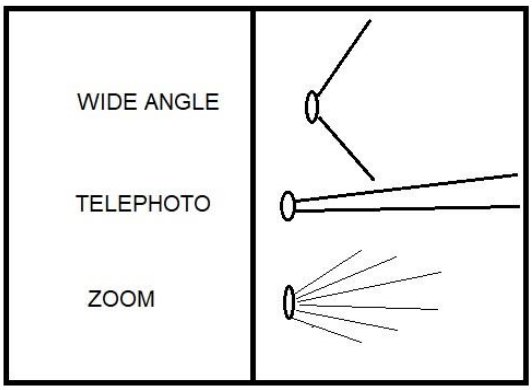
PC: a Microsoft Windows operating system computer. **MAC** and Apple Mac operating system computer.

Word and **Word for Macs:** the word processing **program** used for Church Recording because it has the highest compatibility between **PC**s and **Mac**s.

The Camera



Lens: one or several concave or convex, pieces of glass which can be moved forward or back to focus incoming light through the **shutter** onto the camera's **array of light sensitive sensors**. Modern cameras have autofocus, but the lens can be set manually. Available lenses include:



WIDE ANGLE for wide pictures, good depth of focus when a broad picture is required. For example Church E-W and W-E

TELEPHOTO for good shots of distant objects. Limited depth of field.

ZOOM the all-purpose adjustable lens

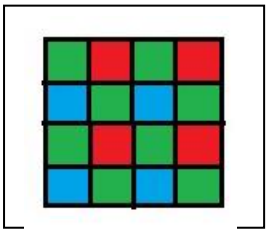
Macro lenses are for close up work.

Shutter: the diaphragm which opens briefly for the light to reach the **sensors** to take the photograph. It has 2 settings. How long it will be open (usually a fraction of a second e.g. 1/60th) and how large the hole (expressed as an f number). See **Chapter 5**

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 (normally) rectangular **array**. Visualise a camera taking a 5 **megapixel** picture **as** capturing 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 slide.

PHOTOGRAPHY GLOSSARY

8 bit, 12 bit and **14 bit photography:** a **sensor** collects light as **RGB** (red, green, blue). To visualise this, let's take 12 bit photography. Each sensor collects:



12 bits of light in shades of 4 red, 8 green and 4 blue. 2 greens for every red and blue to balance the colours. The number of colour combinations (shades) recordable is 2^{12} = 4096 shades. 8 bits is 2^{8} = 256 shades. Whilst 12 bit gives greater depth of colour, **8 bit** is sufficient for us. Above that, the files become too large and take too much memory space

Pixels and **megapixels:** each **sensor** translates a pinpoint of light into electronic form. Each **pixel** is an electronic record of the colour and the position of that pinpoint in the picture. The picture (a **file**) is made up of the millions of **pixels** each recording its colour and position (row and column) in **bits**. A million **pixels** is a **megapixel**.

Memory card: the removable card upon which the pictures (**files**) are recorded in the form of **pixels.**

Pixels and Dots

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

A **Dot** is that information as produced 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. We have called them pinpoints.

A **pixel** is in a **digital code** e.g.

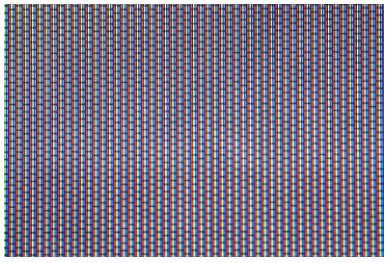
I00IIII0I00III0000I0I0IIII00II0000I0I0III
III00I0IIII0000II0I etc.

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 of the **sensors** and the quality of the **lens**.

Pixels and **Bytes**

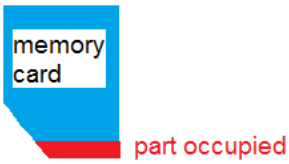
In any picture (**file**):

Pixels and **megapixels** are a measure of quantity in rows and columns;



PHOTOGRAPHY GLOSSARY

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.**

A **byte** is **8 bits.**

Megapixels (quantity) and **megabytes** (volume) are often confused.

Photography Formats

A digital photograph **file** is partly the picture and partly what the camera’s software program does and adds to the picture to make it work. Programs* handle and record 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. LZW compression is, also, based on an algorithm].*

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). The **File size** is **compressed** (reduced) by the camera to one quarter, or less, of the **uncompressed** picture initially recorded by its **sensors**. Partly this is done by reducing the shades of colour to 256* colours. The **megabytes** are reduced by 75%, or more. The photograph loses a further 10% approx. of detail every time “saved” or “copied and pasted”. **Jpeg** is a “**Lossy” Format**. It is the **Format** in which most ordinary cameras record pictures.

TIFF a **format** setting rare on modern cameras. It is, also, based on recording 256* shades of colour, but it is **Lossless**, meaning it does not lose quality when the **file** is saved or copied. For our purpose, **Jpeg files** are saved as **TIFF files** on the computer before any adjustments are done, to prevent loss. This is the preferred archival **format**. **LZW compression** is a permitted sophistication to reduce **file size** further without loss.

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* (taken as **12 bit**) 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. Reduce to **8 bit** for use.

**[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.**

PHOTOGRAPHY GLOSSARY

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.
f.2.8 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.
f.4 the largest hole on most amateur cameras. Use is the same as **f.2.8**.
f.8 and f.11 smaller holes, less light but much better depth of field. Good general settings.
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 used 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]*

Colour space: broadly speaking, a measure of the colour saturation and the range of colour. Cameras usually use RGB (red, green, blue). **AdobeRGB** is higher colour saturation and range than **sRGB**. **AdobeRGB** is for high end photography with sophisticated equipment. **sRGB** is the more common standard better suited to the computers and printers Church Recorders are likely to use. **CMYK** (cyan, magenta, yellow and black) is more commonly the colour space in which printing companies operate. Conversion from RGB to CMYK is not 100% reliable. See **Chapter 9**.