

# CHAPTER 1

## THE CR HANDBOOK *PHOTOGRAPHY INFORMATION*

Read the 'Photography Information' section in the Church Recording Handbook first for the basic description of what is to be achieved. This Chapter explains it in greater technical detail for those who would like to know. Those not technically inclined, just take a quick look and pass on to [Chapter 2](#).

Summarising the **Photographer's Responsibilities** a) to c) in the Handbook, we are producing:

1. Archival quality photographs; and
2. The photographs to be inserted into a Church Record and for general use.

All photographs are digital.

You will need to know the basic technical details, which are:

Our **archival** quality photographs are **TIFF** format and will produce a clear, faithful print 9" x 6" (3:2) or 9" x 6.75" (4:3). This means they can be use for large prints, publications and similar purposes.

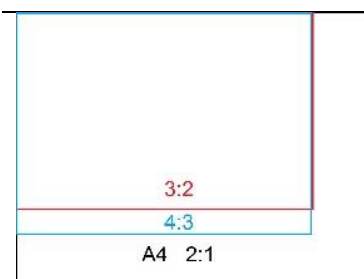
Our general use photographs are **Jpeg** format and will produce a good print 6" x 4" or 6" x 4.5", good enough for a Record produced in .pdf form.

The difference between **TIFF** and **Jpeg** is that when a digital camera takes a photograph, it records

millions of bytes of digital information, **Jpeg** 'compresses' this to a manageable size by clever techniques. The **Jpeg** format loses more information by compression every time it is 'saved'. **Jpeg** is good enough for taking, but not processing, Church Recording photographs. The more sophisticated **TIFF** format does not lose information, which is why it is an archival standard.

Our archival standard is based upon advice from the Photography Manager of Historic England's Imaging Research Group.

"9" x 6"



This diagram illustrates 9" x 6" and 9" x 6.75" in relation to A4.

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General rule - Church Record photographs are taken and applied in colour. Exceptionally, silver and similar Metalwork can be black and white (greyscale) if the Group prefers. Then it must all be black and white, not a mix.

Photographs can be taken in **Jpeg**, **TIFF**, **RAW** or in the camera specific versions of **RAW** installed on Nikon, Canon, Sony and other upper range cameras. The camera setting must be 5 megapixels or more.

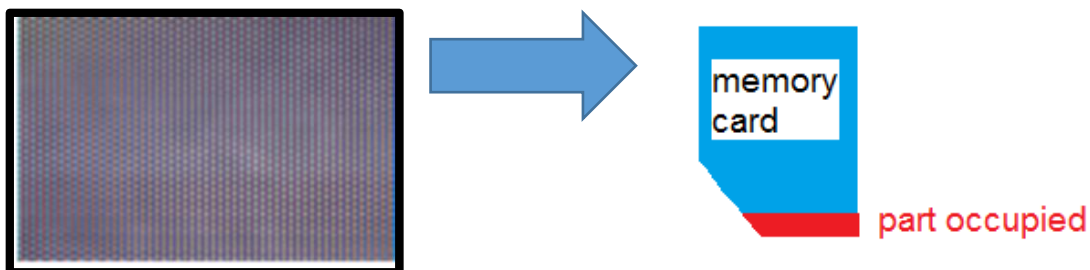
**Hint** - If you are new to this, few modern cameras have **TIFF** as an alternative to **Jpeg**. More have **RAW**, but to avoid the computer processing **RAW** involves, stick to **Jpeg** whilst you learn.

Now to explain basic technical terms:

#### **Dots and Pixels?**

A **print** of a digital photograph is millions of **dots** of ink (square or rectangular, not round). The density of the **dots** is measured in **dots per inch (dpi)**. Human eyes cannot detect **dots** in a print when the density is more than 260 **dots per inch**. The Standard for Church Recording is 300 **dpi**, to be sure.

**Pixels** are the electronic information captured by the camera's array of sensors, processed by it and recorded as a digital code onto its memory card.



The information is millions of digital **pixels**. A printing machine translates the **pixels** into the printed **dots**. A computer screen image is also **dots**. **Pixels** are measured in **pixels per inch (ppi)**. If the camera has recorded only 200 ppi, you cannot achieve a true 300dpi print.



**Summary - PIXELS** are information recorded. **DOTS** are the printed or on-screen output.

Digital cameras are rated by the maximum number of **megapixels** (1 million pixels) they could capture, often 20 megapixels or more these days. That is more than we need and we can use a lower megapixel setting. What do we need for Church Recording?

The calculation is that the camera must be set to take at 300 **ppi** or more to create a true 300 **dpi** print:

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<p>Multiply the width and the height by 300. Let us take 9 inches by 6 inches:</p>  <p>CHURCH RECORDING SOCIETY ARCHIVAL STANDARD</p>	<p>9" x 300ppi = 2700 pixels long side 6" x 300ppi = 1800 pixels short side</p>  <p>CHURCH RECORDING SOCIETY ARCHIVAL STANDARD</p>
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**2700 x 1800 = 4,860,000 pixels**

**Near enough 5 megapixels.**

The illustration above shows that this landscape 9" x 6" photograph must be 2,700 pixels wide by 1,800 pixels high to achieve 300ppi. [note: 9" is called the "long side" and 6" is the "short side" of a 9" x 6" photograph.]

**This is why we specify 5 megapixels or more**

**Sometimes it needs to be more:**

### **Cropped pictures**

When a photograph has been cropped, it might not be 3:2 or 4:3 shape. That does not matter.



For this picture, the sides have been cropped away. The vertical dimension has not changed. It went into the Record without being enlarged. It was still a 300 **ppi** original, printable at 300 **dpi**. 5 megapixels was good enough.

But, if a picture cropped from a photograph will be enlarged (the hallmarks below being an example) the photograph must be taken at more than 300 **ppi** (5 megapixels) to allow for the enlargement. It might require a setting of, say, 7 or 10 megapixels to ensure that enlargement does not reduce the **ppi** to less than 300. A picture of 300 **ppi** enlarged by 100% becomes 150 **ppi**, so take at 600 **ppi** (10 megapixels) or more:



**The Handbook specifies a faithful and accurate picture of the subject**

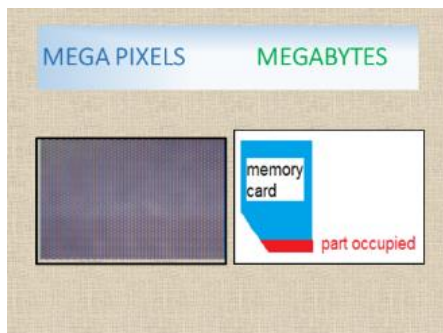
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Judiciously applied use of software to improve the clarity and accuracy is okay. Repair and artificial enhancement tools and “Scene” settings are not permitted.

#### The merits of TIFF

Distinguishing megapixels from megabytes is essential:



**Pixels** are measured by density (called the **resolution**). The number of pinpoints of recorded information. The higher the **ppi** (pixels in an inch) the higher the photograph quality. <sup>Note 1.</sup>

**Bytes** are a measure of information by volume. The amount of camera or computer memory space occupied, usually measured in bytes, kilobytes, megabytes and gigabytes.

Note 1. the quality of the lens and of the array of sensors also affect the quality of the picture. A high density of pixels is important, but not the only factor.

**Jpeg** is the most common format in which Church Recording photographers take photographs.

A camera taking **Jpegs** on a 5 **megapixel** setting will actually receive about 15 **megabytes** of information. To reduce the 15 **megabytes** of information to a useable quantity, the camera applies “**compression**”. Typically, a camera on its **fine** or **best** setting will reduce the quantity of **bytes** by an amazing 75%. 15 **megabytes** becomes 3.75 **megabytes**, on average <sup>see note on compression below</sup>

Every time a **Jpeg** is “saved” it loses a further 10% of the information, eventually becoming illegible. Whilst the initial compression loss is acceptable, this further loss is not.

**TIFF** format is cleverer, not losing information when “saved”. Therefore, it is suitable for processing and for permanent archives.

A 3.75 **megabyte Jpeg** photograph will “save as” a **TIFF** of 11-12 **megabytes** space in memory. It is still 5 **megapixels** in quantity, the correct density (**resolution**). The rest of the megabytes are **TIFF** processing information.

The target for **TIFF** photographs is 10-15 **megabytes**. Much beyond 20 **megabytes** takes up too much memory capacity. Memory storage costs money.

**JPEGs must be saved as TIFFs before any use or processing, to avoid this loss.**

#### RAW

Those taking photographs in **RAW** format may process in RAW format. For our archive photographs, they should be saved as 8 bit **TIFFs**, no more than 3,000 **pixels** long side.

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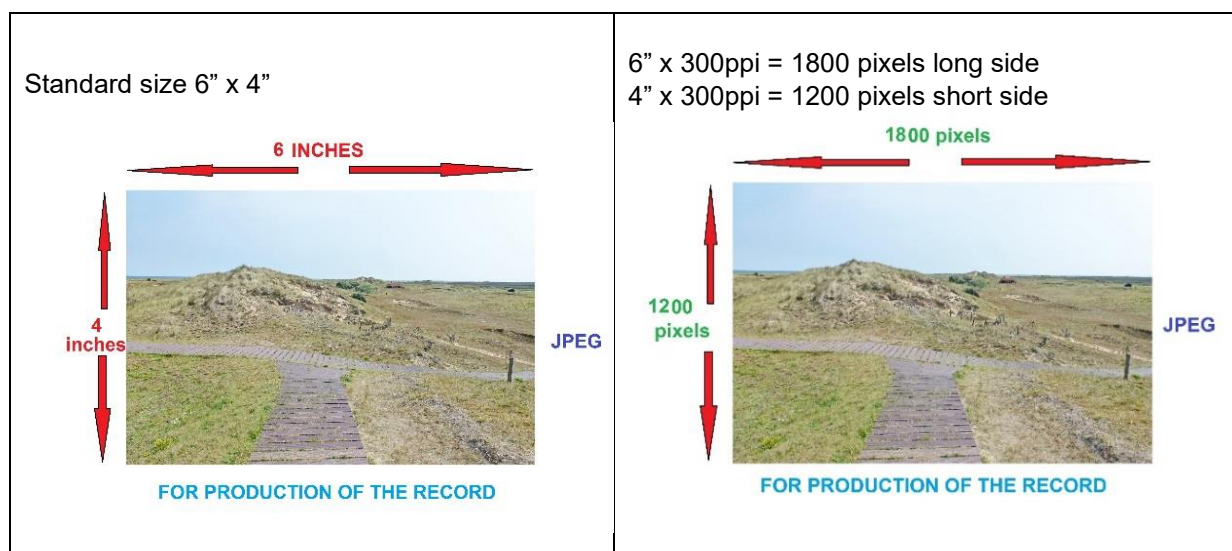
For those interested, there is more on **compression** in the *Note* below.

There is a suggested plan of working in [Chapter 7](#). But, continuing with what we are achieving:

### THE NEXT STAGE (Jpegs)

Whilst the **TIFFs** are the archival photographs, they are too big (too many **megabytes**) for production of the Record. The lesser standard for insertion into the text of the Record (both printed and digital copies) is 6" x 4", or a 4:3 equivalent. Sometimes it should be larger (an East Window, for example). Cropped photographs might be smaller.

This is what you are aiming for:



$1,800 \times 1,200 = 2,160,000$  pixels or 2.16 megapixels *approximately*

In practice, the Record production Jpegs will be between 1 and 3.5 **megabytes**. See Chapter \* for production of 1,800 x 1,200 ppi **Jpegs** from the **TIFFs**.

### Why not use the Jpegs as taken?

1. They are 5 **megabytes** or more, because they were taken to 9" x 6" Standard, not 6" x 4". They are too large. 1 – 3.5**MB** means easier handling, ease of transmission and better use of memory space;
2. The **Jpegs**, as taken, might need computer processing and must have been converted to **TIFF** before that was done;
3. **Jpegs** converted from the archival **TIFFs** will have numbering identical with the **TIFFs**, reducing the risk of numbering errors.

### Meanwhile - Working photographs for Recordors

The Photographer can help Recordors by supplying working copies of photographs during their research and writing for the Record.

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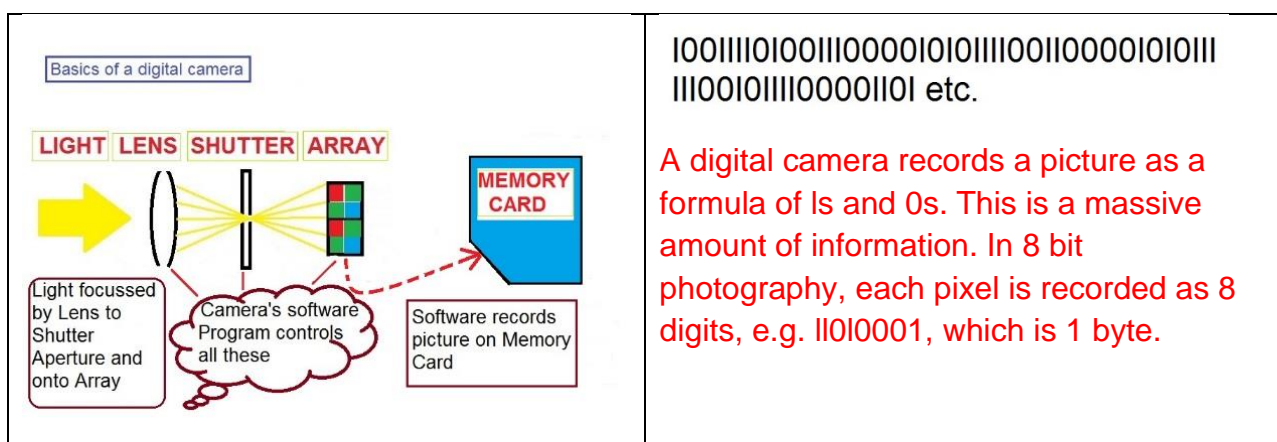
Recommended that these might be:

- Small **megabyte** size **Jpegs** for temporary use and easy transmission (possibly 1 megabyte or less);
- As requested by Recorders. But, do suggest to Recorders what you might do for them. Sometimes they do not know what a camera can achieve;
- Higher quality when detail is critical;
- Sometimes, helpful pictures are taken which are not intended to be included in the Record.

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### COMPRESSION NOTE *(for those who would like to know more)*

Distinguish between megapixels and megabytes (page 4 above)



A camera taking **Jpeg** photographs, set at 5,000,000 **pixels** (5MP) produces 15,000,000 **bytes** (15MB or 120,000,000 bits) of information. This is too much information for the camera to process and too much for our purpose.

The “**fine**” or “**best**” setting of a camera controls the amount by which its clever software reduces the bytes to a practicable quantity. This is compression. The highest quality setting, usually called fine or best, reduces the volume of **bytes** by roughly **75%** i.e. 15MB becomes 3.75MB on average

By recording infinite shades of colour as only 256 shades of colour and adjacent pixels of near enough the same shade as blocks, most of the compression is achieved.  $256 = (2^8)$  @ 8 bits a pixel. Unless the photograph is hugely enlarged, the human eye cannot detect the colour difference but, side by side, could notice that the un-compressed picture is brighter (higher definition).

**Note:** These are the specifications for Church Recording Photography, which mean a faithful record of the object with its faults and not using artistic photography techniques. Churches sometimes request photographs for guidebooks, promotions and other purposes for which a more artistic approach might be required. Providing these is good for the reputation of Church Recording. The Church Recording Society should be acknowledged.