



JPEG and RAW

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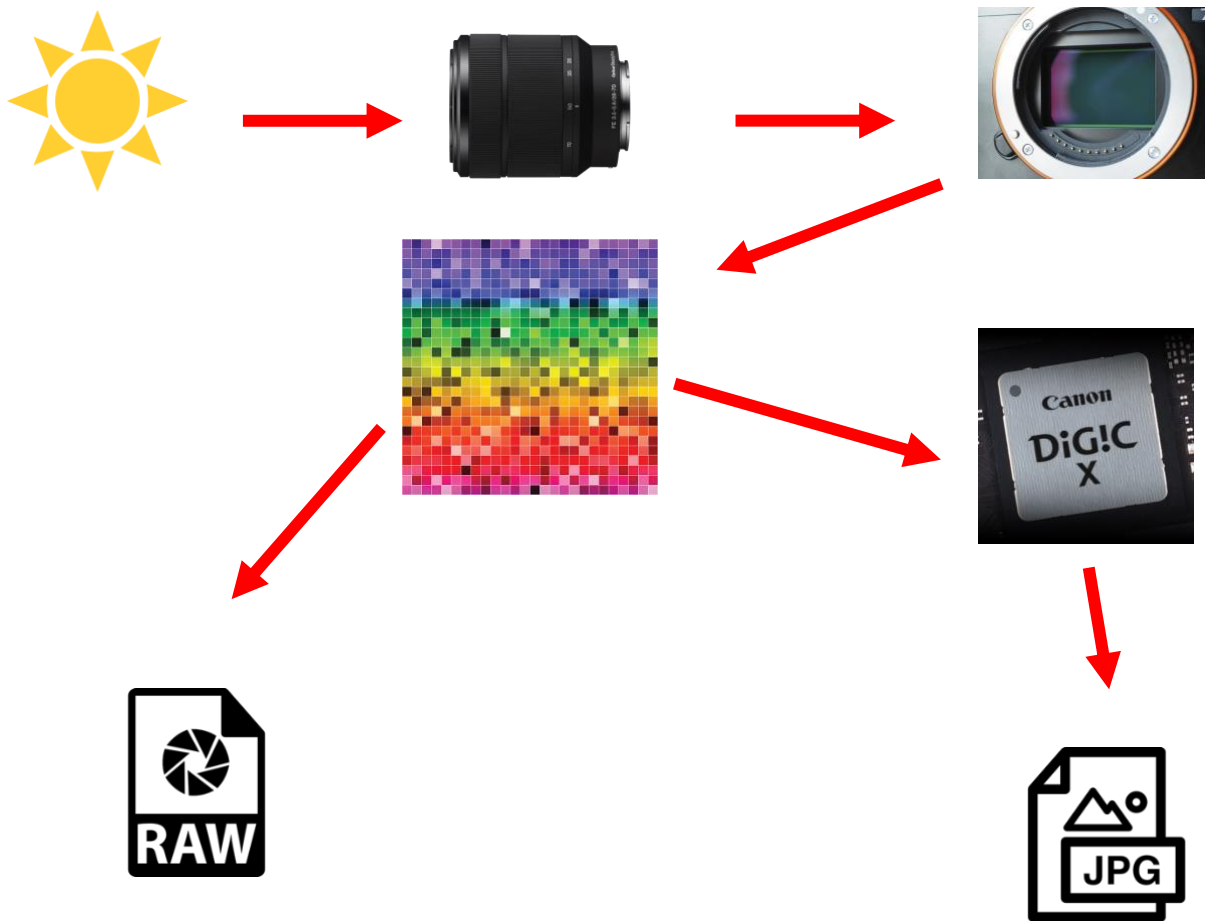
1. Digital Process

Before we dig in, let's look at how a digital camera creates a digital image.

Light enters the lens which projects it onto the image sensor.

As soon as the exposure ends the sensor creates a Data Block, which is all the information that the pixels recorded during the exposure.

Then depending on the image file type you have chosen the camera either just saves that data untouched as a RAW file or processes it and creates a JPEG file.



This process is important in understanding the decision-making process you'll need to undertake as you begin deciding which format you'd like to shoot in.

2. JPEG and RAW

2.1. What is a RAW file

RAW files contain uncompressed and unprocessed image data.

These files store the largest amount of data of any raster file type and are ideal for photographers to use for editing.

A RAW file is not a final representation of your photograph. It is simply all the data your sensor is able to record stored in a file.

2.2. What is a JPEG file

JPEG stands for Joint Photographic Experts Group. The JPEG file type is one of the world's most widely used image file formats. Able to compress impressive detail into a shareable file size, JPEGs are most helpful in storing and sharing digital images. They're ideal for social, email, and blog content.

JPEG files use the .jpg extension.

2.3. JPEG smaller than RAW

To understand the differences between the two file formats, we need to get a little technical.

Information is digitally stored in bits. 1 bit is essentially 2 possible variations like on and off. 2 bits doubles this to 4 variations. 3 bits doubles this again to 8 variations and so on.

Your camera can produce a RAW file between 12 to 16 bits. Most cameras will be able to achieve a 14 bit RAW file.

This translates to your camera being able to store up to 68.7 billion colours at any given pixel on your sensor.

As RAW is a lossless standard, no information is discarded.

JPEG is an 8 bit compressed standard or lossless standard. It is only capable of representing up to 16.7 million colours at any given pixel.



While 16.7 million seems like a lot, and your final file that is produced, whether by the camera or using software may be a JPEG, the decisions in how your photograph ultimately looks is being left to your camera.

2.4. How your camera creates a JPEG file

When your camera saves a photograph as a JPEG file, it is making a lot of decisions for you.

Settings such as contrast, sharpness, colour saturation, tone and vibrance (to name a few) all get “locked in” to the file.

Other settings your camera may also make are lens correction, aspect ratio and noise reduction.

Information that your camera believes isn't necessary to record is discarded. This makes post processing your photograph not impossible, but rather limited.

2.5. The power of RAW

As a RAW file is all the data your sensor could store for a given image with not camera processing applied, the decisions as to how they are processed and what the result looks like is up to you.

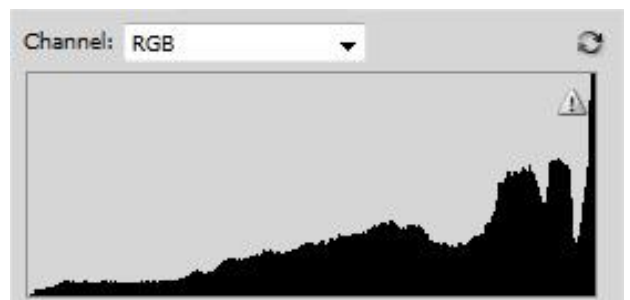
2.5.1. RAW in highlights and shadows

Consider the histogram to the right. In it we can see an image that would appear to have areas that are over exposed.

This would generally mean data is now missing in the highlights.

While this is usually your camera representing a JPEG version of your image, your RAW file will likely have additional information making it possible to reclaim some of that data. Of course, if the image is too over exposed then even your RAW file would not contain that information.

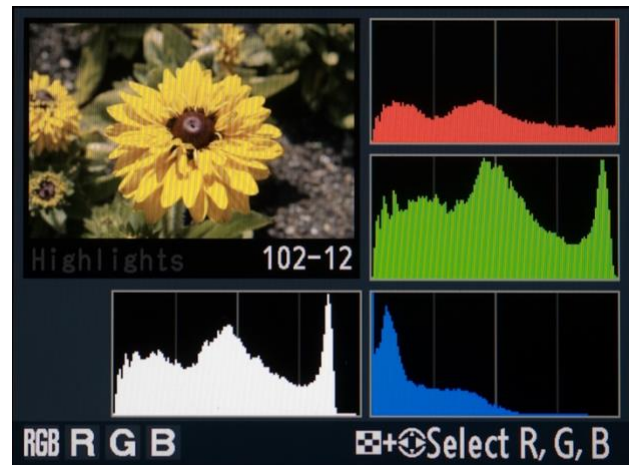
The same rule applies to the other end of the histogram into shadows. While a JPEG file may have discarded information, the RAW file would contain more data making it possible to recover some of it unless the image was underexposed by a great deal.



2.5.2. RAW in colours

The same rules apply with colours. A JPEG file would have discarded any colours it didn't need for the final photograph. Having all the colour information in a RAW file means you can adjust those values.

While clipping (over or under exposing) can occur on a global level, it can also occur in each of the RGB colour areas too.

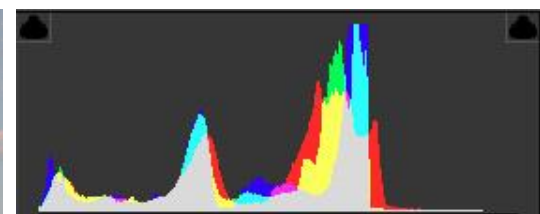


2.6. Should I get it right in Camera?

When shooting JPEG, yes. You need to be sure your image is correct as you don't really have any leeway.

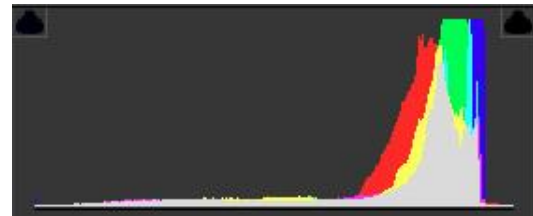
With RAW you have the ability to shoot in a way that takes into consideration your image may not be exactly right in camera knowing you'll be applying judicious editing later.

In our image below we have a sunset that, by our histogram, suggests we have a properly exposed photograph.

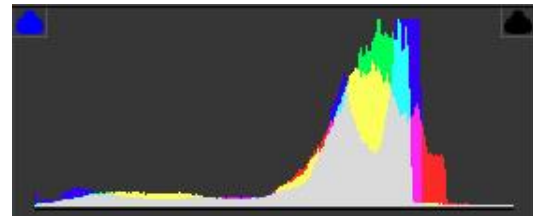


The photography however looks quite dull with our foreground rather dark.

If however, we took an exposure accounting for what our RAW file would give us we can increase our exposure to reveal more of the foreground so long as we were careful not to clip the highlights.



Now, using our RAW editor on our computer or device, we can balance the sky to create a much more balanced photograph.



3. Editing RAW Files

The list of software that can read and edit RAW files is generally in a state of flux. New companies begin producing software while others end up disappearing.

What is written here should not be taken as a definitive list and you should research your own options.

3.1. Software

3.1.1. Camera Software

Your camera brand will generally have software that will be able to read and process your RAW file, to a point.

Software such as Canon DDP or Nikon Capture will generally provide enough tools to give you the same control as the camera does without any bells or whistles that can elevate your photograph. They are more a RAW converter than an actual photo editor.

3.1.2. Free Editing Software

Companies producing free software to not only process your RAW file but also allow for additional editing do exist. RAW Therapee, Scarab Darkroom and darktable are all worth considering.

Free software comes with the caveat that not all features work properly and new cameras which have an updated RAW format may not be supported for a while.

Learning any software can be quite a daunting task and while some may have better support or youtube accounts to follow, it will be entirely up to you to learn it.

3.1.3. Commercial Editing Software

Commercial software provides not only a robust product which is generally well supported but ongoing improvements in areas such as AI (artificial intelligence) tools.

Adobe Lightroom/ Photoshop is probably the most well-known. A subscription to this service will set you back about \$172.00 per year (at the time of writing) but is considered one of the best tools available with constant updates and a combination that elevates what you can do with photography beyond the simple photograph.



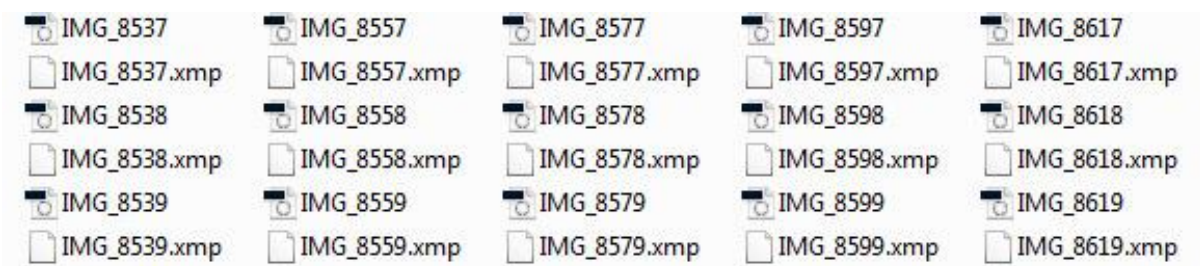
Capture One Pro, DxO Optics and Affinity Photo are other well-known companies which all offer their own take or spin on how photographs can be edited.

3.2. RAW Editing is Non-Destructive

When you edit a RAW file, you aren't making any changes to the physical file.

The adjustments are saved in a separate file called a sidecar file called an XMP file.

This means that at any time you can go back and re-edit your file which is particularly beneficial as your editing style changes or improvements with your editing software allow you to do things you couldn't previously do.



3.3. Exporting your Photo

Once you've made your adjustments, it's time to export your photo.

The destination format really depends on where you intend to use the photo.

If you're storing it on your phone, tablet or for social media, you'll likely export a copy as, you guessed it, JPEG. Once you've made all your own changes to the photo, saving it as a JPEG copy is perfectly acceptable.

If you are planning on sending it to a commercial printer or print studio, it is worth first checking with them as to the file they want. Some are happy for carefully prepared JPEG images while others require different file formats such as TIFF.