

To RAW or not to RAW

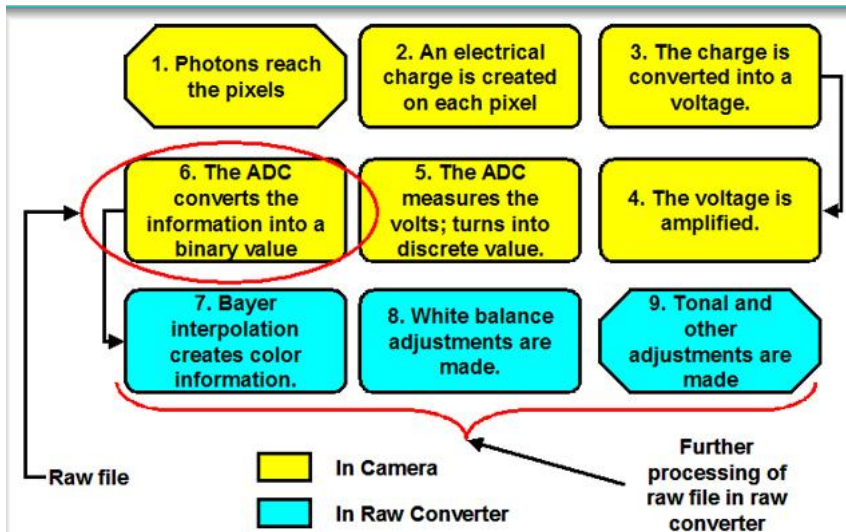
1) What is it?

2) What are the advantages and disadvantages?

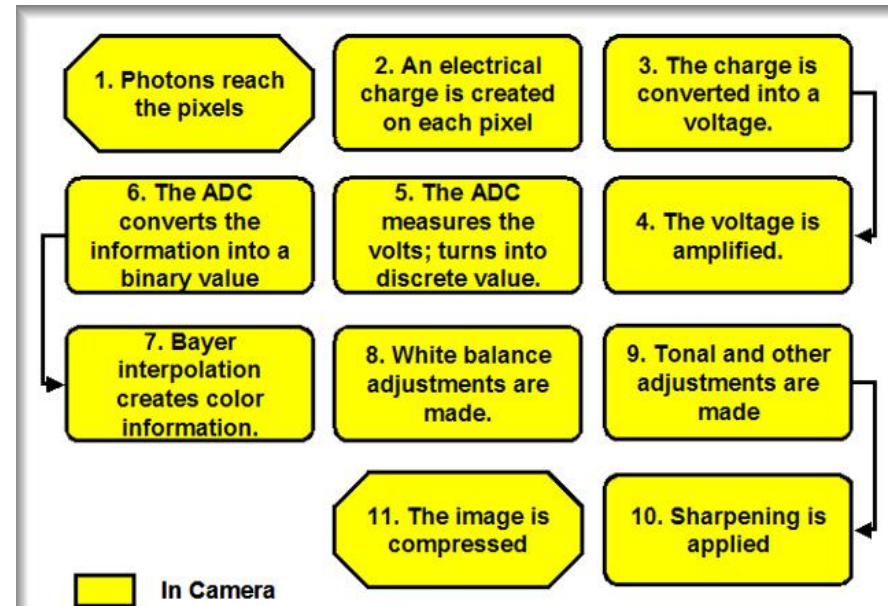
Keith Truman, Oct 2012

What is RAW?

RAW process



JPEG process



Steps 1 -- 6 are the same as for a raw file.

Steps 7 -- 9 are similar (performed in camera for JPEG files, performed in a raw converter for raw files)

Step 10 is also performed in camera for JPEG (raw files can be sharpened either in the raw converter or an image editing program)

Step 11 is unique to JPEG files.

Advantages/Disadvantages

RAW offers flexibility and control

Comparison

- white balance, tonal curve, sharpening, compression, and other choices are burned into JPEG not RAW
- Sharpening and compression are irreversible in JPEG (you can blur the JPEG image to reduce the sharpening, but that is not the same as undoing the sharpening which will degrade the image)
- Colour and tonal problems created by improper white balance or tonal curve can be adjusted *somewhat* in a JPEG file, but will cause some degradation of the image

Advantages of RAW

- In RAW...
 - white balance, tonal curve handled in the raw converter
 - sharpening can be handled in the raw converter or in an image editing program.
 - Changing WB, contrast, sharpening etc causes no degradation of image quality because the original raw image is never changed.

Tonal Range

- **Sensors in digital cameras have a dynamic range of about five to six F stops**
- **JPEGs can capture light across 256 tones**
- **RAWs can capture light across 4096 tones**
- **Means that tone changes may not be smooth across tones in JPEG –posterization**

Recovering Highlights

- RAW gives much more flexibility if parts of image are overexposed. Lost highlights in JPEGs can never be recovered
- Attempting to adjust overexposed or underexposed areas of file post-processing always results in more noise in JPEG
- In JPEGs there's just much less detail and less highlight flexibility
 - Really important in challenging light conditions

Recovering detail in shadows by increasing exposure

(+3 EV RAW 5) Sample 11



(+3 EV JPG 5) Sample 12



Recovering detail in Highlights by reducing exposure

(-1 EV RAW B) Sample 15



(-1 EV JPG B) Sample 16



COMPRESSION

- **Raw files are not compressed (no data is lost)**
- **JPEGs are compressed**
- **JPEGs have the advantage that they are smaller files than RAW**
- **However, every time a JPEG file is opened, edited and saved image quality is degraded**
- **When saving from RAW to jpeg, always use 100% image quality setting**

Artefacts when 100% image quality not used

Original file Zoomed



File saved as 30% quality jpeg Zoomed

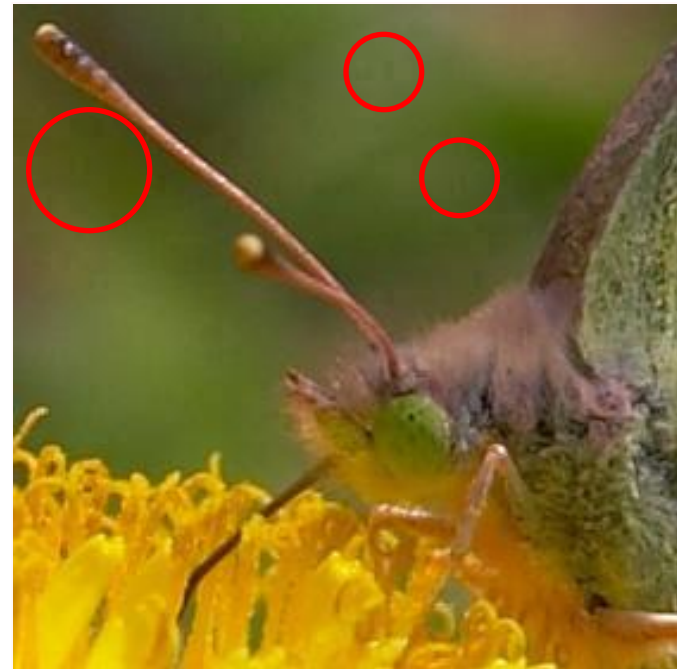


Loss of JPEG quality each time image opened

Image opened 1 time



Image opened 10 times



JPEGs with less detail to recover



RAW + 3.5 stops

More detail
retained in RAW



JPEG+ 3.5 stops