RAW versus JPEG
(Source: Martin Evening - *Adobe Photoshop CS3 for Photographers*)

If you are shooting with a professional back, digital SLR, or an advanced compact digital camera, you will almost certainly have the capability to shoot using the camera's raw format mode. The advantages of shooting in raw as opposed to JPEG mode are not always well understood. If you shoot in JPEG mode the files are compressed by varying amounts and this file compression will enable you to fit more captures on a single card.

Some photographers assume that shooting in raw mode simply provides you with uncompressed images without JPEG artifacts and the trade-off with this is that fewer captures can be stored. But there are some more important reasons why capturing in raw mode is better than shooting with JPEG>

FROM LIGHT TO DIGITAL
Let's begin by looking at the way the CCD chip in your camera converts the light hitting the sensor into a digital image. In order to digitse the information, the signal must be processed through an analog-to-digital converter (ADC). The ADC measures the amount of light hitting the sensor at each photosite and converts the analog signal into a binary form. At this point, the raw data simply consists of image brightness information coming from the camera sensor. The raw data must then be converted somehow and the raw conversion method used can make a huge difference to the quality of the final image output.

Most cameras will have an on-board microprocessor that is able to convert the raw data into a readable image file, which in most cases will be a JPEG type format. The quality of a digital image is primarily dependent on the lens optics used to take the photograph, the recording capabilities of the CCD chip and the analog-to-digital converter. **But it is the raw conversion process that matters most.** If you choose to process the raw data on you computer instead, you have much greater control than is the case if you had let your camera automatically guess which were the best raw conversion settings to use.

RAW IS THE DIGITAL NEGATIVE
You can liken capturing in raw mode to shooting with negative film, and the great thing about negative film is that it doesn't matter if someone makes a bad print, because you can always make an improved print from the original negative. When you shoot raw, you are recording a master file that contains all the colour information that was captured at the time of shooting.

To carry the analogy further, shooting in JPEG mode is like taking you film to a high street photo lab, throwing away the negatives and scanning from the prints. The difference in what can be achieved from a raw file compared to a JPEG is quite incredible and only goes to show that even on the more sophisticated digital

compacts, it is well worth saving the raw data and making the conversion later, at your leisure, on the computer.

RAW CONVERSION SOFTWARE

Camera that are capable of shooting in raw mode will usually come supplied with the software to process the raw data, make custom white balances, tonal corrections and save out as TIFF files that can be read by Photoshop or other image editing programs. The camera-supplied software programs are often disappointingly slow but there are programs such as Capture One that have proved popular with raw shooters.

The raw conversion is very important and the photographer must feel confident that the software they use is up to the task of making an optimum interpretation of the raw data. If you hang out on any of the photography Internet forums, it is quite obvious that this subject stirs the emotions of raw shooters just as much as the PC versus Mac debates have done in the past.

My personal view *(see source above)* is that when anyone invests their time and reputation in using a specific workflow they will inevitably become very defensive when someone tells them they are using the wrong raw processing software and software program "X" is the only one you should use. I don't believe there are necessarily any image quality differences between what can be processed in one program and another and it is mainly a matter of knowing how to use the adjustment controls ot their full advantage in the software you prefer using.

In the case of Adobe Camera Raw the criticisms I have read have usually been based on incomplete testing. Besides which, Photoshop CS3 now features an update to Camera Raw (V4.6) where the raw image processing option snow include new controls such as Recovery, Fill Light, Vibrance sliders in the Basic panel as well as controls for Hue, Saturation and grayscale conversion.

DNG FILE FORMAT

In the slipstream of every new technology there follows the inevitable chaos of lots of different new standards competing for supremacy. Nowhere is this more evident than in the world of digital imaging. In the last ten years or so, we have seen many hundreds of digital cameras come and go along with other computer technologies. And I have probably encountered well over a hundred different raw format specifications. It would not be so bad if each camera manufacturer had adopted a raw format specification that could be applied to all the cameras they produced. Instead we have seen raw formats evolve and change with each new model that has been released. And those changes have not always been for the better.

The biggest problem is that with so many types of raw format being developed, how reliable will a raw format be for archiving your images? Ten years ago I conducted a test report on a range of professional and semi-professional digital

cameras. Wherever possible I shot using raw mode. I still have the CD of master files. If I want to access those images today, in some cases I am going to have to track down a computer running Mac OS8.6 in order to load the camera manufacturer software required to read the data. If that is a problem now, what will the situation be like in 60 years time?

It is the proprietary nature of all these formats that is the central issue here. At the moment, all the camera manufacturers appear to want to devise their own brand of raw format and therefore if you wan to access the data from a raw file, you are forced to use their brand of software to do so. Now while the camera manufacturers are excellent at designing hardware, the raw processing software they have produced has mostly been quite basic. Just because a company is good at building digital cameras, it does not follow that they are going to be good at designing graphics software to read the raw data.

THE DNG SOLUTION

Fortunately there are third-party companies who have devised ways of processing some of these raw formats. So you are not always limited to using the software that came with the camera. Adobe is the most obvious example here of a company who offers a superior alternative.

In 2007, Adobe Camera Raw recognized raw formats from over 150 different cameras. The new DNG (digital negative) file format specification has come about partly as a means of making Adobe's life easier for the future development of Camera Raw and making Adobe Photoshop compatible with as many cameras as possible. DNG is a well thought out file format that is designed to accommodate the many specification requirements of all today's cameras and is also flexible enough to adapt to future technologies.

Because it is an open standard (a standard that is publicly available and has various rights to use associated with it) the specification is freely available to anyone to develop and to incorporate into their software or camera system. It is hoped that the camera manufacturers will adopt the DNG file format more widely and the DNG format will be offered as the main raw file format, or at least offered as an alternative choice on the camera.

This will bring several advantages. If DNG is adopted there will be less risk of your raw image files becoming obsolete, as there will be ongoing support for the SNG standard obsolete whatever computer operating system or platform changes take place in the future. Whenever a new camera is release, the DNG format will allow the raw files to be immediately accessible, assuming the camera is enabled to provide DNG raw files.