

A Brief Guide To Digital Cameras

By Laurence Fenn

If you're thinking of buying a digital camera, there are a number of keywords that will be used. Here is an explanation of most of them.

Optical/Digital Zoom

Most cameras have both optical and digital zoom. Optical zoom works just like a zoom lens on a film camera. The lens changes focal length and magnification as it is zoomed. Image quality stays high throughout the zoom range. Digital zoom simply crops the image to a smaller size, and then enlarges the cropped portion to fill the frame again. Digital zoom results in a significant loss of quality. It's pretty much a last resort, and if you don't have it in camera, you can do a similar job using almost any image-editing program.

Pixels

A pixel is a contraction of the term PICTURE ELEMENT. Digital images are made up of small squares, just like a tile mosaic on your kitchen or bathroom wall. Though a digital photograph looks smooth and continuous just like a regular photograph, it's actually composed of millions of tiny squares.

Pixel Count

One of the main ways that manufacturers categorize their digital cameras is in terms of pixel count. What this is is the number of individual pixels that go into making each image. This number can vary between 1 million (1 Megapixel) to around 14 million (14 Megapixels). A million pixels is abbreviated to MP, so a 1MP camera has 1 million pixels and a 3MP camera has 3 million pixels. Currently most popular consumer digital cameras have between 2MP and 5MP. A 3MP camera can make excellent 4"x6" prints and very good 5"x7" prints. If you intend to make lots of 8"x10" prints, then perhaps a 4MP or 5MP camera would be a better choice.

Aspect Ratio

The aspect ratio of a camera is the ratio of the length of the sides of the images. For example, a traditional 35mm film frame is approximately 36mm wide and 24mm HIGH. However, video monitors typically use a 4:3 aspect ratio. For example a monitor with an 800x600 display has a 4:3 aspect ratio. With this in mind, most consumer level digital cameras use a 4:3 aspect ratio for their images.

White Balance

With film you can buy "daylight balanced film" for shooting outdoors or "tungsten balanced film" for shooting indoors under normal domestic lighting. If you use daylight film under tungsten light the images will be very yellow. If you use tungsten film in daylight the images will be very blue. With film you have to correct for the "colour temperature" of the light using filters or by the right choice of film.

With digital cameras you can pick your white balance to suit your light source, so that white looks white, not yellow or blue. Normally there is an automatic setting and the camera decides what white balance setting to use. However if you know what your light source is you can usually set the camera to it and this may give better results. Most digital cameras have settings for sunlight, shade, electronic flash, fluorescent lighting and tungsten lighting. Some have a manual or custom setting where you point the camera at a white card and let the camera figure out what setting to use to make it white.

Sensitivity

Sensitivity settings on digital cameras are the equivalent of ISO ratings on film. Just about every digital camera will have settings with a sensitivity equivalent to ISO 100 film and ISO 200 film. Quite a few digital cameras have an "auto" ISO setting, where the camera will pick from ISO 100, ISO 200 and sometimes ISO 400, depending on the light level and the mode in which the camera is operating.

Picture Format

When you take a picture with a digital camera, it is saved in one of a few formats.

JPEG (Joint Photo Experts Group) is an algorithm designed to work with continuous tone photographic images which takes image data and compresses it in a lossy manner (this means you do lose some information). The more you compress, the smaller the file but the more information you lose. However, you can reduce file size by a factor of 10 or so and still get a very high quality image, just about as good as the uncompressed image for most purposes.

There are also lossless ways of saving files using TIFF (Tagged Image File Format). These keep all the original information, but at the cost of much bigger files.

Some cameras offer a third option that of saving the actual data generated by the sensor in a proprietary format. Canon calls their version of this "RAW", Nikon call it "NEF". These files are compressed, but in a non-lossy manner. They are significantly smaller than equivalent TIFF files, but larger than JPEGs. The only disadvantage of these formats is that the image must be converted to either JPEG or TIFF for most software to be able to display them. The conversion is quite a complex process and can be time consuming if you have a lot of images to convert and a PC that's not very fast.

LCD Panel

A colour LCD panel is a feature that is present on virtually all modern digital cameras. It acts as a mini interface, allowing the user to adjust the full range of settings offered by the camera and is an invaluable aid to previewing and arranging photos without needing to connect to a PC. Typically this can be used to display a number of thumbnails of the stored images simultaneously, or provide the option to view a particular image full-screen, zoom in close and, if required, delete it from memory.

Few digital cameras come with a true single-lens reflex (SLR) viewfinder, where what the user sees through the viewfinder is exactly what the camera's CCD "sees"; most have the typical compact camera separate viewfinder which sees the picture being taken from a slightly different angle. Most digital cameras allow the LCD to be used for composition instead of the optical viewfinder, thereby eliminating this problem. The other downside is that prolonged use causes batteries to drain quickly.

Macro

For close-up work, a macro function is often provided, allowing photos to be taken at a distance as close as 3cm but more typically supporting a focal range of around 10-50cm. Some digital cameras even have swivelling lens units, capable of rotating through 270 degrees and allowing a view of the LCD viewfinder panel regardless of the angle of the lens itself.

Effects

Features allowing a variety image effects are becoming increasingly common. For example, a user may have the option to select between monochrome, negative and sepia modes. Apart from their use for artistic effect, the monochrome mode is useful for capturing images of documents for subsequent optical character recognition (OCR). Some digital cameras also provide a "sports" mode - which adds sharpness to the captured images of moving objects - and a "night shooting" mode, which allows for long exposures.

Self-Timer

A self-timer is a common feature, typically providing a 10-second delay between the time the shutter is activated and when the picture is taken and all modern day digital cameras have a built-in automatic flash, with a manual override option. The best have a working range of up to 12ft and provide a number of different modes, such as auto lowlight and backlight flash, fill flash for bright lighting shadow reduction, force-off for indoor and mood photography and red-eye reduction. Red-eye is caused by light reflected back from the retina, which is covered in blood vessels. One system works by shining an amber light at the subject for a second before the main burst of light, causing the pupil to shrink so that the amount of red light reflected back is reduced.

Batteries

The fact is that a digital camera is a high drain device that uses up batteries at an alarming rate. Turning off the LCD display helps considerably as does running on AC power whenever possible - such as when transferring images to a PC or viewing images on a TV. While digital camera batteries come in all shapes and sizes, the AA format is by far the most common. However, traditional alkaline AA batteries should be relied on only in emergencies. They are simply not strong enough for a power-hungry instrument like a digital camera for more than a few dozen images.

Rechargeable cells are much better at handling the high output currents required by digital cameras and despite the fact that some types have a notoriously poor "shelf life" - the length of time they'll hold a charge - they're generally the most cost-effective option in the long run. They come in a variety of types such as Nickel cadmium (NiCd), Nickel metal hydride (NiMH) and Lithium ion (Li-ion).

Memory

A memory card is the equivalent of a reusable film to a digital camera, and it's worth investing in at least a few. This will ensure that you never run out of space for your images while on that all-important shoot. If there was just

one type of card life would be easy, but it's never that simple with photography, just as with film there are different types, brands and capacities available, and each one has its own advantages and disadvantages.

In general, digital cameras support only one or two types of card, so when you buy a camera you're locked into these card types. And with so little difference in quality and performance between camera models, it pays to have a closer look to make sure you're buying into the right thing. No one wants to buy a camera with a card type that is on the way out or over-priced.

With cards there are two main issues to consider - transfer speed and storage size. The transfer speed (often shown as 16x, 40x, etc) dictates how fast data is transferred from camera to card and a fast or 'Pro' card can mean a reduced delay between shots. Not all cameras are compatible though, so check the manufacturers website before you buy. Storage size is the most important thing, as this determines the amount of data that will fit on the card - the greater the capacity, the more pictures you can shoot.

SmartMedia (SM)

This card has been around since day one and has reached its storage limit at 128Mb, which is not ideal for cameras with high pixel counts. If you're looking on the second-hand market, it's worth remembering that some older cameras may not be able to use 64Mb or 128Mb cards, so always check before you buy. The two major users of this format are Fuji and Olympus who are both moving away to xD cards, so expect this type to become extinct in the near future.

Picture Cards (xD)

xD is the replacement for SmartMedia and is physically much smaller, which makes it ideal for tiny cameras. With this being the current trend, xD is being adopted by more and more manufacturers. However, at the size of a postage stamp it is very easy to lose. Currently, storage sizes of 256Mb and 512Mb are available but with a theoretical maximum size of 8Gb, this type will be future-proof for a while yet.

MemoryStick (MS)

Sony released this storage card back in 1999 and it's pretty much exclusive to Sony gear. Original MemorySticks are limited to 128Mb, so Sony has provided two solutions: the Memory Stick Select and the Pro. Select uses the same technology but combines two 128Mb cards in one body, effectively doubling the storage capacity to 256Mb. MemoryStick Pro uses newer technology and has a massive theoretical size limit of 32Gb - it also boasts vast improvements in transfer speed, too. Pro isn't compatible with older cameras, so look for the logo.

Multimedia Card (MMC)/SecureDigital (SD)

MMC and SD are look-alikes, and are ideal for smaller cameras because of their tiny size. Although most cameras can use either type, they do work differently so make sure you get the right one. Storage sizes are currently up to 1Gb.

Compact Flash (CF)

This is the most commonly used card and is the professional's choice. With storage sizes currently up to 4Gb, with 6Gb on the way, there's certainly no problem with storage space - the large sizes are also more readily available. CF cards also come in two flavours, Type I and the thicker Type II but many cameras will support both types.

MicroDrive (MD)

The Microdrive is essentially a tiny 1 inch hard disk drive, much like the one in your computer, and is available up to 1Gb. It's essentially a Type II CompactFlash card, but not all cameras support it. Microdrives have moving parts and are more delicate than standard solid-state cards, so handle with care and avoid bumping your camera when it's writing to, or reading from, the card.

Just about all cameras can connect to a PC, using a cable supplied (or with Kodak, a docking station that stays plugged into the PC), but it's sometimes easier to remove the memory card from the camera and insert it into a dedicated card reader. You can get a card reader for as little as £9, or a multi-card reader (that reads all the different card types) for £35.

Showing your pictures

Once you have taken your pictures, how do you show them to your friends and family? You can transfer them to your PC and print them out, or you can use one of the following methods:

Print Service

High street shops now offer a print service for memory cards (in Boots they even have a self service machine that takes most of the popular formats) or CD-ROMs. You can delete the bad pictures and then take the good ones to be printed. You can also tweak the pictures using software on your PC (remove red-eye, correct colours, etc.) and save them before getting them printed.

TV Output

Some cameras have a TV out socket, so you can plug the camera into your television and show them directly on screen.

Burn To CD

You can make a picture CD if you have a CD-Writer, which can then be played on most DVD players. You can create slide shows with music and special effects to enhance your pictures.

Checklist

The main features to check when buying a digital camera are:

Price (of course), number of mega pixels, optical zoom, battery type and whether a spare/charger is supplied, what storage card the camera uses, whether a case is supplied, and how long it takes to save the picture to the storage card.