

## Camera Controls

### **Automatic mode**

An image usually needs to be sharp (in focus) and faithfully record the colours in the scene (exposure). The correct exposure is achieved by balancing the amount of light coming through the lens (the aperture) and the time the light shines on the sensor (shutter speed). Compact cameras have very sophisticated electronics that automatically select focus and exposure settings which will cover at least 90% of situations when taking pictures on holiday etc.

However there may be occasions which call for some manual adjustments. The Programme modes offer more refined settings than the “general” auto mode. They are sort of halfway house between point and press and a manual approach.

### **Pre-Programme modes**

These options refine the general auto mode by enabling the camera to more closely adapt to particular (often “difficult”) situations. The mode programmes will try to match the focus, shutter speed, and flash requirement to the situation. Most cameras have the following basic programme modes:

**Portrait mode** - the main subject is stands out against a softened background. The degree of softening depends on available light.

**Landscape** - enhances outlines and colours. Increases contrast of sky and woodlands.

**Dawn/dusk** - preserves deep hues by adjusting the white balance (see below)

**Beach/snow** - compensates for the bright reflections from sand and snow again using the white balance.

**Museum** - switches off the flash and may use best-shot selector.

**Fireworks/night landscape** - uses slow shutter speed so camera needs supporting.

**[ NB The following three modes assume a greater photographic knowledge]**

### **Shutter Priority (S or SP)**

You control the speed of the shutter and the camera calculates and selects the appropriate aperture for the correct exposure. Useful in taking rapidly moving subjects

### **Aperture Priority (A or AP)**

Converse of SP where the speed is controlled and the aperture of the lens calculated to suit the light conditions. Useful in controlling the depth of field; shallow for portraits to blur the background or deep for landscapes.

### **Manual Mode (M)**

You set both the aperture and the speed guided by a light metering display on the LCD. Often used by those with experience of manual only cameras.

### **Zoom Lens**

The widest setting embraces the largest field of the view but can distort (eg close ups of the face) and makes the distant appear further away. The telephoto setting narrows the field of view and brings distant objects closer. Very useful in framing an image.

Using the Optical zoom setting the lens changes to magnify or reduce the image falling on the whole of the sensor using all the pixels. The digital zoom just selects the image on the central part of the sensor and spreads the pixels out, discarding the peripheral pixels. Digital zooms produce a degraded image with more "noise". They can be switched off!

### **Focus**

Using **AF** *autofocus* the camera automatically adjusts focus according to the distance from the camera by using one or more sensors. Centre weighted focus (CWF) uses a sensor in middle of sensor shown by [ ] in the viewfinder. Multiple sensor setting(MSS) uses 5+ sensors.

CWF does not work very well when photographing, for example, when a person off centre is set against a distant background. The autofocus is activated when the shutter release is pressed half way down so it is possible to set your focus by pointing directly at the person, press and hold the shutter release half way down and then point the lens to compose the picture. The foreground should be sharp and the background less so. MSS may help in these situations.

**Infinity** (often a mountain symbol) useful when shooting through a closed window at a distant scene. The AF will then ignore any blemishes on the glass that it might focus on otherwise.

**Macro** enables focussing on object as close as 2cm from the lens.

## **Exposure**

Combination of shutter speed and lens aperture determines the amount of light falling on the sensor. There are options to select how this calculation is arrived at.

Spot metering – the reading is taken from the centre of the image. Useful if you are taking an image against a strong light.

Centre-weighted – gives greater emphasis to the centre but will also consider the rest of the image.

Multi-pattern - where light readings are taken at many places on the image not just the centre. Probably the most useful “general” setting.

## **Flash**

In “auto” the flash will be automatically activated at low light levels. You can however switch the flash off (eg when in museums etc) but you will need to support the camera firmly if the image is not to be blurred during a long exposure.

Some flash help to reduce “red eye” by making a series of short flashes (helps to close the iris of eyes) before making the exposure.

A reduced power flash can be used to create a “fill in” light for example when photographing against the light.

See: [www.danheller.com/tech-fillflash.html](http://www.danheller.com/tech-fillflash.html)

## **White balance**

Normally our eyes compensate for lighting conditions with different colour temperatures. A digital camera needs to find a reference point which represents white. Digitally it records the whitest patch of the image as 255 and the darkest as zero<sup>1</sup>. It then calculates all the other colours based on this white point. For instance, if a halogen light illuminates a white wall, the wall will have a yellow cast, while in fact it should be white. So if the camera knows the wall is supposed to be white, it will then compensate all the other colours in the scene accordingly.

Most digital cameras feature automatic white balance whereby the camera looks at the overall colour of the image and calculates the best-fit white balance. However these systems are often fooled especially if the scene is dominated by one colour, say green, or if there is no natural white present in the scene.

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<sup>1</sup> To remind yourself about this look at the handout on *Pixels, bits and bytes*

<b>Type of Light</b>	<b>Color Temperature in K <sup>2</sup></b>
Candle Flame	1,500
Incandescent	3,000
Sunrise, Sunset	3,500
Midday Sun, Flash	5,500
Bright Sun, Clear Sky	6000
Cloudy Sky, Shade	7,000
Blue Sky	9,000

Keen photographers often carry a piece of white card which on some cameras can be used to set the white balance for the prevailing lighting conditions.

## **EXIF**

Besides information about the pixels of the image, most cameras store additional information, such as the date and time the image was taken, aperture, shutter-speed, ISO, and most other camera settings. These data, also known as "metadata" are stored in a "header". A common type of header is the EXIF (Exchangeable Image File) header. EXIF data are very useful because you do not need to remember the settings you used when taking the image. Later you can then analyse on your computer which camera settings created the best results, so you can learn from your experience.

## **Sensor sensitivity (ISO)**

The ISO number is a measure of the amount of light needed to achieve a certain "quality" of image with acceptable levels of "noise".

The image sensors in digital cameras can be adjusted, or can have their outputs adjusted for sensitivity measured as the ISO setting. This is usually done by simply amplifying the output of the image sensor, which increases image noise, sometimes beyond the level that the ISO standard says is acceptable (100 or 200).

Many cameras use an "auto" setting which automatically adjusts as light levels fall. In others it is possible to set manually to 100, 200, 400 or 800. In program modes it is usually set at 100 and this does not change as light levels change.

**Sensor size:** Sometimes called the charge coupled device (CCD) is usually described by the total number of pixels (eg 5 megapixels) or the maximum size of the image created (eg 3500 x 3200). In a digital camera this takes the place of film in a conventional camera.

The higher the megapixel value the more image information there is and thus the larger the print that can be made. But larger does not always mean better! A 17" computer screen with a resolution of 72 dpi<sup>3</sup> will

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<sup>2</sup><http://www.cambridgeincolour.com/tutorials/white-balance.htm>

<sup>3</sup> Dpi = dots per inch

display an image of 1152x864 pixels (ie about 1 megapixel). A reasonable size image for sending over the web would be about 640 x 480 (ie about 1/3 of a megapixel) but if this were printed<sup>4</sup> it would only be 2.13 x 1.6 inches!

<i>Image size (pixels)</i>	<i>Megapixels</i>	<i>Print size (inches)</i>
800 x 1200	2	6 x 4
2100 x 1500	3	7 x 5
3000 x 2400	7	10 x 8

But see: [www.design215.com/toolbox/images/megapixels.gif](http://www.design215.com/toolbox/images/megapixels.gif)

### **Memory cards**

Each image is saved electronically as a file on some kind of memory medium. In most cameras this is a removable “card”. Different cameras use different types of card (eg CF, SD, MiniSD, Sony memory stick etc). Each type is available in different storage capacities (256Mb, 512Mb, 1Gb etc). The bigger the card capacity the more images can be stored.

As the sensor size of cameras has increased so the number of pixels in the image, and therefore the file size, has also increased requiring ever larger storage cards. Check your handbook for a guide to the capacity of your card(s).

A second card is often useful if you are going on a long photogenic trip!

There are a number of “third party” manufacturers whose products may be attractive pricewise.

### **Batteries**

Your camera may use rechargeable and /or replaceable types. You may find it useful to carry a spare battery of the appropriate kind in case the one in the camera runs out while you out and about. The camera kit often includes a battery charger which plugs into the mains - essential to pack it on holiday together with a plug adapter for non UK sockets!

Batteries become much less efficient in cold weather (1% drop for each fall of 1°C) and sometimes benefit from being warmed up in a gloved hand or trouser pocket - not an intense heat source which might cause the cell to explode.

Again “third party” manufacturers may offer attractive alternatives for spares.

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<sup>4</sup> Most desktop printers print photos at 300ppi (pixels per inch)