

Notes on the use of flash guns

Prepared by Dick Saunders for Middleton Camera Club 2013

Rule 1 Learn when your flash can make a difference and when to save battery power and turn it off

We've all seen pictures on the television at sports arenas and pop concerts where the spectator area is awash with camera flashes. This display is produced by photographers who have no idea of how to set up their cameras and have simply left them in automatic mode.

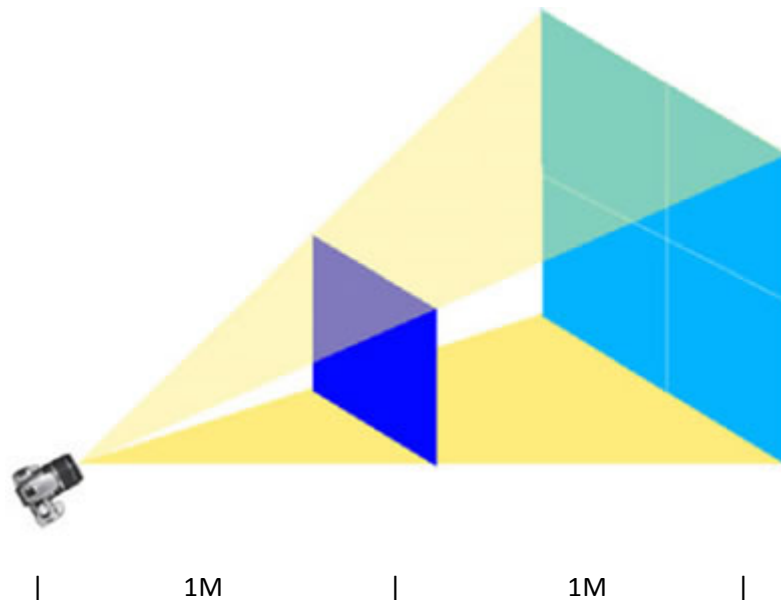
Camera flashes have a limited range of usefulness. You cannot take a picture of the Alps from Italy and expect that each mountain peak will be usefully illuminated by the flash on your camera.

Flash mechanisms come in many different guises, from the little round flash unit on an iphone to large studio strobes with huge light output potential. NOT ONE OF THEM CAN ILLUMINATE A MOUNTAIN.

Rule 2 Know your flash capability

Most compact cameras will state an effective range. A recent purchase of mine – a camcorder with still picture capabilities has no guide number and no effective range information – tests show that the effective range of this flash is less than one metre. Pretty useless.

What do we mean by effective range? Any light source has a predetermined power level be it a five watt 'nightlight' or a five hundred megawatt 'Lighthouse luminaire'. This power level radiates out from the light source as a sphere of light (or a beam of light if a reflector is used). As the light travels farther away from the source we can see that the same power level has to cover a larger and larger area, therefore as the level of light was fixed at the beginning, then the amount of light available decreases the farther out we go.



A point source of light travelling out in one direction loses its ability to illuminate a surface by a factor of four. So if a light source was capable of illuminating a surface with 100 lumens of light when that surface is one metre away, the same surface will receive only twenty-five lumens if we move it two metres away, and at four metres the light level is only a little over 6 lumens. I will leave you to work out how much of the original light level is still available when you are fifty metres, or so, away from the stage or arena.

The effective range may show a minimum and a maximum distance dependant on the zoom set on the camera. Remember it is possible to be too close to your subject, such that the flash has not had a large enough distance in which to spread out sufficiently to fully illuminate the subject.

Typically a compact camera may show flash information as:- Max W 40cm – 4.1M; Max T 1M – 1.6 M. This means that using the maximum wide angle setting on your camera, the flash has an effective range of 0.4M to 4.1M, and at maximum telephoto setting the range will be 1M to 1.6M. Below this distance, or beyond this distance, means that the camera will not be able to take an even half-way decent flash picture.

How the automatic camera flash setting compensates for differing distances.

All modern compact cameras, set in automatic mode, use some method of determining the distance from the camera to the subject (be aware that - this is not necessarily the same subject that you intended). With this information the camera calculates the light level falling on this area of the picture and determines whether or not to enable the flash and at what intensity to fire the flash. The camera also determines what shutter speed to use, what aperture to use and what ISO to use.

Although the flash duration may be as fast as 1/1000 of a second, typically the camera - flash synchronisation is such that, a shutter speed faster than 1/125 sec will not allow an exposure time for the whole of the picture area to be illuminated, giving rise to the characteristic band of light across the top or bottom of the picture (or left or right side dependent on the shutter operational plane). So the shutter speed is commonly set at this figure of 1/125s. The one exception to this is, if your camera has no shutter but enables and disables the sensor, for differing periods of time, to give the effect of differing shutter speeds. In which case a very much faster synch. speed may be available.

In automatic mode the camera will next determine what aperture to set and this will be dependent on the ambient light falling on the subject and the distance that the flash light has to travel. (Remember that the distance determines the light intensity left with which to illuminate the subject). If the light level is still too low to achieve a 'correct' exposure the camera will bump up the ISO rating, which as we all know leads to increased noise in the finished picture. Pushing the distance, from camera to subject, beyond that recommended, will give unacceptable levels of noise and/or increasingly incorrect exposure levels.

Rule 3 Know your flash guide number and what this means.

More expensive cameras with interchangeable lenses and built-in or pop-up flash units don't have recommended flash distances because this changes with so many different variables. Instead the camera flash is given a guide number.

Not all guide numbers (GN) for all cameras mean the same thing. You need to know what your camera's guide number means.

My Canon camera's flash information is given as:-

Guide No.: 13/43 (ISO 100, in metres/feet)

Flash coverage: 17mm lens angle of view

Recycle time approx. 3 sec.

So what does all this mean? Firstly, the guide number is given as 13 in metres and as 43 in feet, when an ISO of 100 is used, (notice the hugely superior flash coverage over that of my wife's camera given above). So in order to determine the exposure setting we must first know the distance from the flash to the subject that we wish to illuminate, in feet or in metres (don't forget if you use bounced flash this distance will change). Now, the GN is the distance multiplied by the f stop required to give a correct exposure, and therefore the f stop for the correct exposure is the GN divided by the distance. Thus if we know that the GN is 13 and the distance is 1.5M, a simple calculation of 13 divided by 1.5 (keep your calculator in your camera bag), gives a figure of 8.666666 or, as near as not, f8, which is the required aperture for a correctly exposed picture, at this distance.

Of course, if f8 does not give the required depth of field, then f11 could be chosen, and the ISO ramped up to 200 or f16 and ISO 400, which will all have exactly the same overall exposure effect.

Now for the flash coverage. As we have seen, the light from a point source spreads out in a sphere around the light, but camera flash units have a reflector behind them which sends out the light in only one direction. The shape of this reflector controls the spread of light leaving the camera. In my case a lens of focal length 17mm will give a field of view entirely covered by the spread of light from the flash and any longer focal length lens (meaning a narrower field of view) will still remain within the light spread. However if I choose a lens with a shorter focal length and consequently a wider angle of view, such as an 8mm extra wide angle lens, then the spread of light from the camera flash will not spread out wide enough to cover this field of view and I will have a photograph with dark edges.

Finally the recycle time. It is useful to know how quickly the camera flash will be able to recharge and therefore how soon it will be before I can take another picture. Do remember that this recycle time is dependent on having fully charged batteries and being in a warm ambient temperature, low temperatures and partially depleted batteries will have a dramatic effect on this quoted time.

The drawbacks of flash photography

Most photography benefits from a gentle, all enveloping light source, which is why a bright day with some cloud cover, or early and late in the day when the sunlight is diffused by traveling a long way through our atmosphere, is the best time to take photographs.

The problem with flash photography in general, and built-in flash in particular, is that the small size of the light source gives rise to harsh illumination, with burnt out highlights and heavy sharp edged shadows. A secondary problem, particularly with portraiture, is that the closeness of the on-camera flash to the lens creates an effect known as red-eye, where the light travels into a person's eye and is reflected back from the retina, picking up the colour of the blood vessels at the back of the eye in the process. (Options for double flashing, to trigger a subject's irises to narrow, are not one hundred per cent effective).

Because of the problems outlined above you might think that there is no point in having on-camera flash, however there is one very useful job that it can do exceedingly well.

Fill-in Flash

On-camera flash, and built-in flash in particular, are best used to supplement the natural light source.

Traditionally a photographer was admonished to always stand with his back to the sun (to avoid lens flare). The problem with this is that the subject of the photograph is now lit from the front giving rise to those grimacing features that the subject pulls whilst desperately trying to shade their eyes. The other option of placing the camera in the shadow of the subject has a rim light effect, giving a beautiful halo to the hair but leaving the face in deep shadow.

Most automatic cameras take an exposure reading based on the average light level falling in the area covered by the sensor. If your subject has their back to the light source (such as in the shade of a tree) the overall correct exposure will leave the subject's face underexposed because the camera is trying to balance the exposure needed by the much lighter background. However if the flash unit is then enabled to fire, the burst of light into the subject's face gives a pleasingly balanced light into what would otherwise be a heavily shaded area. On more expensive D-SLR cameras, you should set your exposure for a point reading and expose for the highlights in the background, then allow the flash to take care of the shadows on the subject..

Even indoors there is often a surprising amount of ambient light which will show up the background nicely when second-curtain synch. is used. The intensity of a flash gun at fairly short range will easily overpower any artificial ambient light, so for indoor use set your colour balance to Flash or Normal, not Tungsten or Fluorescent.

Flash Guns

Separate flash guns are a half-way house, between the on-board flash supplied with the camera and the large mains powered studio strobes of the professional photographer.

Dedicated flash guns have their own battery supply which means that they can be much more powerful than built-in units. Guide numbers of 58/190 at ISO 100 and recharge times around 1/10 second mean that you can take flash-lit pictures at much greater distances and more quickly than by using in-built equipment. Auto-zooming means that you can select any lens, and even any zoom position on a zoom lens, and know that the flash coverage will be adequate. High synch. speeds mean that you are not restricted to the 1/125s set by typical compact camera flash settings. Larger batteries give many more flashes (often in the thousands), before replacement batteries are needed.

Swivel and tilting heads enable you to bounce the flash light off the walls or ceiling to give a more diffused light source. Pull out reflectors enable catch lights to be reflected into people's eyes even when the flashgun is aiming at the ceiling. Push on diffusers give flexibility in colour temperature and light levels and some flashguns are even equipped with two flash heads allowing for diffused bounce flash and fill in flash to be used together.

More expensive flashguns are fully controllable on the gun itself. So if you want to reduce the flash output you can dial in a fraction of full-power.

But perhaps the most versatile thing about flashguns is the ability to take them off-camera all-together. With wired or wireless control you can now set up several flashguns in different locations giving complex lighting set-ups. With some units set at lower power and others lighting different parts of the subject, yet all being triggered simultaneously, you can have a very flexible set-up indeed.

Auto versus Manual flash set-up

The beauty of digital cameras is the ability to take as many pictures as you like without it costing more than a bit of battery power. Although most tutorials will tell you to set your camera on manual for full creative control, and it's difficult not to take this view, it can be best to set your camera to take a flash picture fully automatically and then to study the picture and decide how you would like to change things.

Would it be nice to see more background in your picture? Can you set your camera to second curtain synch? Could you incorporate a second flash unit to light some or all of the background?

Is the flash light falling on your subject too bright? Can you set your exposure compensation a stop or two darker or reduce the intensity of your flash? Don't forget that simply moving your off-camera flashgun further away will reduce the light falling on your subject. Even a piece of tissue paper or greaseproof paper, held in front of the flash, will diffuse the light and cut out flare and burnt out highlights.

Do you want to see some movement blur in your image yet still retain a sharp subject? Can you set your exposure time for a longer period than your flash duration? The duration of the flash is normally so fast as to freeze the movement of all but the fastest objects.

Do you want to illuminate a really large area? Can you set your camera on bulb and take your flash gun off camera firing it multiple times within the area to be illuminated?

I hope that this article has opened your eyes to the benefits of using flash, other than just in low light situations, and feeds your determination to find out more about the possibilities opened up when using flash.

