# Flash Photography I (Rev. 2)

By Gerry Gerling

**First, a little flash history** -

Flash powder -

Flash photography started with the burning of a strip of flash powder held up high and to one side on a tee stick by the photographer.

The emulsion on the glass plates in those days was so slow that most exposures were several seconds long and the lenses probably had a speed of f/11. The flash powder gave off a bright light for a short duration and was a godsend in avoiding subject blur. The emulsion was so slow there was no need for a shutter mechanism. The photographer removed the lens cap, fired the flash powder and replaced the lens cap.

Flash bulbs -

The next breakthrough came with the invention of flash bulbs. Flash bulbs are a single-use device in which an electrical current from a small battery is used to ignite a wad of magnesium filament resembling coarse steel wool contained in a celluloid bulb giving off a relatively long burst of high intensity light.

The duration of the light from a flashbulb is approximately 1/50 sec. whereas an electronic flash has a duration of approx. 1/1,000 sec. and can be further shortened when less light is needed.

I have an example here for you to see, of a flash gun with a reflector on my 35mm camera that I used back in the 50's. A sync cord was required as the camera had a cold shoe. The regular #5 flashbulbs were larger and had a bayonet base.

These are what they called peanut bulbs. They were smaller, less expensive and had almost as much power as regular #5 bulbs. An adapter made them fit in regular flashguns.

Blue flash bulbs were colour corrected to 6,000 deg. K. and were used with daylight colour film. I also have a blue peanut flashbulb here for you to see.

Flash cubes and strips were available on some point & shoot cameras.

Initially, all cameras had to be sync'd to the flashgun with a cord but when cameras came out with hot shoes the sync cord was not required for on-camera flash.

A cold shoe is just a device for holding a foot, like the ones on the light stands; there are no electrical contacts. If the shoe on your camera has a contact in the middle, it is a hot shoe.

Electronic flash (strobes)

When portable electronic flash units came on the scene they were big cumbersome devices and were called strobes.

They required a large heavy lead/acid battery which weighed about five pounds and the photographer carried it with a shoulder strap.

A coiled power cord from the battery was attached to a capacitor in a handle and a stroboscopic bulb in a reflector was on top of the handle.

The unit was attached to the camera by a bracket usually screwed onto the camera's tripod socket.

A cord from the camera to the flash head triggered the flash when the shutter was released.

Big battery and 2 power cables - not very convenient - but if you had one of these you were right up-to-date and the envy of your peers.

This is my Braun Hobby strobe from 1957

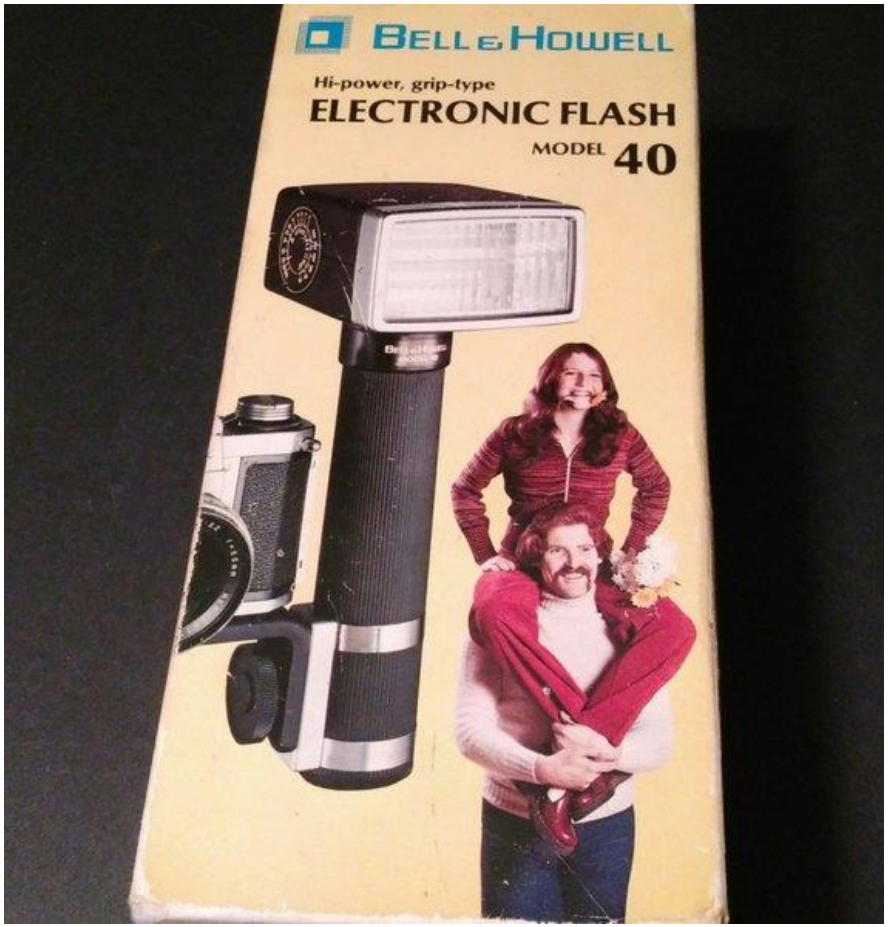
Unlike flashbulbs the electronic stroboscopic bulbs would last for thousands of flashes and you only had to recharge the battery when it ran down and had the added advantage of being able to freeze action.

Electronic flash always occurs at its maximum intensity. For example full power will have a flash duration of 1/1,000 sec.

If you dial in half power the intensity remains the same but the duration will be reduced to 1/2,000 sec. and 1/10 power will have a duration of 1/10,000 sec. etc. so for exposure purposes the amount of light is adjusted by the flash duration.

A significant side effect of reduced power is that with shortened flash durations less battery power is consumed, recycle times are shortened and battery life is extended.

As with all electronic devices there were continual improvements. The heavy lead/acid battery gave way to more compact nickel cadmium batteries and the whole device (although smaller, but still pretty big) was now on the bracket on the left side of the camera.

- 

Shortly after, the size was further reduced and this gave birth to the speedlight.

The most significant improvement of the speedlight was a sensor on the flash head which measured the light reflected off the subject and cut off the light duration when proper exposure was achieved.

NO MORE GUIDE NUMBERS OR MENTAL CALCULATIONS. HORRAY!!

This feature is still available on some modern speedlights.

At the time, this type of flash was simplicity at its finest and we thought that it could never get any better. But, technology being what it is, it had to “improve” and improve it did, at the expense of simplicity.

Speedlights evolved into the marvels that we know today.

Flash photography now can be so complicated that to become fully proficient you have to take courses.

Modern speedlights have LED screens, menus, different mode settings and a plethora of options which will make your head spin. And to set them up will make your head really spin!

As much as I thought I knew about flash photography, the first time I read the user's manual for my first Nikon speedlight I don't think I was able to absorb more than about 5% of what I read.

I'll save you the head spinning for now and tell you about some of the neat things you can do with a modern speedlight. But first let's back up and talk about the built-in flash on your camera.

**On-Camera Flash** -The built-in flash which is on almost all modern cameras is an electronic flash with a stroboscopic bulb.

It functions slightly different than the previous generation of electronic flash in that the camera measures the amount of light TTL (through the lens) reflected off the subject and cuts off the flash duration when proper exposure is reached.

If you have your camera's exposure mode set to AUTO the flash will pop up whenever it thinks you need more light.

This can be very annoying because most of the time when you are seriously composing a shot and studying the lighting and shadows you don't want flash at all.

You can eliminate this problem by getting out of AUTO and choosing any other mode, and you can still flip the flash up manually whenever you want.

The built-in flashes on cameras are very close to the axis of the lens so redeye will occur if the subject is looking at the camera but it can be corrected in post processing.

Redeye occurs when the subject is looking at the flash and the flash is close to the axis of the lens. The light enters the iris and is bounced off the red retina at the back of the eye and back at the lens. In the picture, what you are seeing is the red retina through the iris of the eye.

The redeye reduction feature on some flashes just gives a pre-flash which momentarily causes the iris to reduce in size but is not always effective.

Also, when the flash is close to the axis of the lens, a large lens and/or lens hood can cause a semicircular shadow at the bottom centre of the picture because it is blocking the light from the flash and casting a shadow.

The main artistic problem with on-camera flash is that the lighting is flat.

Flat lighting may be acceptable for snapshots of family members or pictures at events or other pictures which have no artistic value but flat lighting is boring.

The output power of the camera's built-in flash is relatively low and is only really effective up to about ten feet at ISO 100.

As you can see, the built-in flash on your camera has limited value for serious photography.

However, it can effectively be used for fill-in lighting.

If you are taking a picture of a person with the sun at their back and a lot of sky showing, your camera's light meter will usually expose for whatever there is most of in your frame and the person's face will invariably be underexposed.

The flash can be used to effectively give proper exposure to the face and even though the lighting will be flat it will be preferable to the underexposed face.

Even though electronic flash has a very short duration and can freeze action, shutter speed still plays an important roll.

Ordinarily you only have to ensure that the shutter is completely open (max. of 1/60 sec. for a focal plane shutter) when the flash is fired but the illumination of the background is dependent on the length of time the shutter stays open.

The flash will give a constant exposure for the foreground but the exposure of the background can be varied by changing the shutter speed.

If your speedlight has a 'TTL Balanced Fill Flash' setting, both the subject and the background will be properly exposed automatically.

But there is one other very useful feature that your built-in flash can provide.

Your camera's flash may be able to be used to trigger one or more speedlights wirelessly.  More on this later.

No matter where you use flash you should avoid having your subject too close to the background so that the subject's shadow will not show in the picture.

**Macro Flash** -

There are electronic flash devices intended for macro photography.

One such device has two small flash heads, one mounted on each side of the front of the lens which are aimed at the subject.

Another type is a ring flash, also mounted on the front of the lens.

Both of these have the advantage of providing lots of light which would allow a smaller aperture and subsequently greater depth of field which we all know is a good thing in macro work.

But you will need another light source for composing and focusing.

And of course, the electronic flash will freeze action, but fast moving subjects are not usually associated with macro photography.

Macro flashes are relatively expensive and are only good for macro photography.  Here are three examples of macro flashes


Nikon


D-FLASH


Nikon

I have found that a ring light is more suitable for macro works because your subject is illuminated while you are composing and focusing and it is more affordable.
You can still take advantage of the greater depth of field afforded by small apertures by decreasing your shutter speed.

**Speedlights** -

The first thing you should remember when purchasing your first speedlight is that cute and small just doesn't cut it!

There are several levels of speedlights. The small cute ones are not speedlights and are only slightly more powerful than the one built into your camera and have no additional features. Some of them don't even have movable heads and cannot be used for bounce flash. Don't waste your money.

Mid level speedlights have more power than your built-in flash, have TTL exposure, can be used remotely as a slave and have the ability to be used for bounce flash. The top-of-the-line speedlights have even more power plus the ability to accept an additional battery pack and do more exotic tricks such as repeat flash and high speed sync.

So as you climb the levels they become more powerful and gain more features. The OEM speedlights made by your camera manufacturer are usually the best but they can be expensive.

Third party speedlights are said to be equivalent to the brand name ones but may not have all the features and their quality and reliability are somewhat unknown, so do your homework.

If you simply cannot afford a new brand name speedlight get a used one or get a third party speedlight rather than go without. Every photographer should have at least one speedlight.

Serious flash photography simply doesn't exist if you are limited to the built-in flash on your camera.

A speedlight will give you much more control of flash lighting than your built-in flash but using it directly on the camera's hotshoe facing the subject will also give flat lighting and redeye.

There are many other features built into some speedlights, such as power zoom. The bulb in the reflector will move forward for wide angle coverage or move back to give a more concentrated beam of light when you zoom to telephoto The longer focal length does not need a wide coverage of light so less light is wasted.

This is done continuously and automatically whenever you zoom your lens (when the speedlight is on the camera's hotshoe or tethered to the flash bracket) but can be manually adjusted on the speedlight at any time. Some even adjust to a narrower beam for crop sensor cameras.

This zoom feature has a significant effect on the guide number at longer focal lengths because when a broad beam is not needed the light can be directed into a narrower more intense beam which can reach further resulting in a higher guide number.

For example, if the guide number is 98 at a focal length of 18mm it will increase to 177 at 200mm. A very significant increase. But the changing zoom settings change the guide numbers and makes their use awkward.

When choosing a speedlight, the higher the guide number the better.

Two guide number are usually given, one for feet and one for metres.

A mid-level speedlight would have a guide number (for feet) of about 80 (for a crop-sensor camera at ISO 100 and the zoom head positioned at 18mm).

A top of the line speedlight would have a guide number of about 100 under the same conditions.

There are many ways to effectively use a single speedlight on (or near) your camera.-

1. **Bounce Flash** - Speedlights can be tilted and/or swiveled for bouncing the light off ceilings or walls. For brevity I will use ceilings in the article but walls are just as pertinent.

The area being used for bouncing should be white or at least a light pastel as deeply coloured ceilings will give a colour cast to your subject. But thankfully, most ceilings are white. Set your camera to auto white balance

The speedlight should be aimed at the ceiling halfway between you and the subject but can also be used pointing straight up.

Bounced flash light is very soft and flattering, giving slight shadow modeling to facial features and gives the effect of natural light because the light is coming from above.

Only a trained eye will be able to know that bounce flash was used.

The reason that bounce lighting is so soft is because the larger the light source, the softer the light will be and as far as the subject is concerned the whole ceiling is in effect the light source.

**Note**: To every photographer who uses artificial light - No matter what light source you use, the larger it is, the softer the illumination will be.

The soft boxes that the club has are an example of a larger light source and you have seen how soft their light is.

Your speedlight can be used for bounce lighting when it is placed either on the camera's hotshoe or on a flash bracket.

Keep in mind that the bounced light will be travelling much further (camera to ceiling then ceiling to subject) and some light will be absorbed by the ceiling and much light will be spilled.

Therefore you will not have the range that you would with direct flash but if you are within range your exposure will be taken care of automatically TTL.

If you have a powerful speedlight (high guide number) you should have no problem.

For direct flash the guide number divided by the distance to the subject gives the aperture.  For example, in manual flash mode, if the guide number is 80 and you are 10 feet from your subject, the aperture for proper exposure will be: (80/10 = 8) therefore the aperture will be f/8.

In bounce flash, the distance of the light source to the subject is the distance from the flash to the ceiling mid-point plus the distance from there to the subject.

So if you are 15 feet away from your subject and the distance from the flash to the ceiling halfway to the subject is 10 ft. and the distance from that point on the ceiling to the subject is also 10 ft. the aperture will be based on a 20 ft. distance not a 15 ft. distance.

As in the example above (with a guide number of 80): 80/20 = f/4, that is two stops more opening than if you used direct flash. Of course you could always increase your ISO which would in effect increase your guide number.

Be warned that digital noise is quite pronounced when high ISO values are used with flash so carry out an experiment to see how your camera reacts to higher ISO values with your speedlight.

I have used guide numbers here the make a point regarding how the strength of the light quickly diminishes as distance increases but modern speedlights that zoom the light also zoom the guide numbers.

So it is best to use TTL and let the camera and speedlight do all the heavy work regarding exposure calculations.  You will know when you have reached the limits of your equipment and settings when the images on your LCD screen are too dark.

Bouncing the light off the ceiling is not good for close-up portraits because of the resulting heavy shadow under the chin.

In a normal house room, swivel the speedlight head 45 deg. up and 45 deg. back over your left shoulder to get a pleasing lighting effect for head & shoulder portraits.  This will not work in a large room such as a banquet hall.

Bounce lighting is not really practical in a banquet hall because the walls and ceilings are too far away, in fact a ceiling height of twelve feet is about the limit for practical bounce flash.  Under these conditions you can obtain softer diffused light by using a diffusion dome or a light scoop.  (I'll show one of these later.)

**2**.  **<u>Bounce Card</u>** - Most speedlights have a white bounce card which can be popped out from the flash head.

This bounce card will face the subject when the flash head is pointed up for bounce flash off the ceiling.

Ordinary bounce lighting will not give a catch light to the eyes but the bounce card will capture just enough light and direct it straight at the subject providing a very desirable catch light to the eyes.

**3. <u>Tethered Off Camera Flash</u>** - Your speedlight can be positioned on a flash bracket attached to the bottom of your camera. You will need a coiled cord tethered from the camera's hotshoe to the speedlight.

This will place the light higher and off to the left giving better light modeling than when on the speedlight is on the hotshoe and reduce the probability of red-eye.

For an even greater light modeling effect you can remove the speedlight from the bracket and hold it up with your left hand and the lighting effects are only limited by your creativity.

**4. <u>Light Painting</u>** - In the dark, you can put your camera on a tripod, open the shutter and walk around a scene firing off the speedlight at the surroundings, effectively painting the scene with light.

This will have a very dramatic effect on buildings or wooded areas. Since it is dark only the illuminated areas will be exposed.

You can close the shutter when you have finished.

Do not place yourself between the camera and where you are aiming the flash or your silhouette will appear in the picture and be sure to wear dark clothing or some of the spill light may illuminate you.

No matter how you use your speedlight it will have far greater power than any built-in flash. Some powerful speedlights can properly expose subjects a hundred or more feet away depending on ISO and flash extenders.

Note:  Your present camera may not support all the features that a good speedlight can provide but your next camera probably will.

It should also be noted that every electronic flash should be fired a few times once a month to keep the capacitor formed.

I have found the best time to carry out this exercise for your built-in flash is just before you change the battery.  In that way the fresh battery that you install in your camera will be at its maximum charge.

If your speedlight is not used very often it is best not to leave the batteries installed.

**Flash Modifiers** -

You can use flash modifiers with your speedlight.  Flash modifiers are diffusers, flash extenders, snoots, softboxes, Litescoops, umbrellas, gels and various miscellaneous devices.

Diffusers -

Most speedlights come with a white plastic diffuser which you snap onto the flash head.

It gains its softness by spilling a broad beam of light all over the place and some is bounced back onto the subject

Although it will give a softer light effect, it is comparatively small and we all know that the larger the light source the softer the light will be.

The most widely known large speedlight diffuser is known as a Gary Fong Diffuser.

It is an overpriced white plastic irregularly shaped globe which attaches to your speedlight with a Velcro strap.

There are many others on the market which work just as well at a fraction of the price.

The uncovered core of my large reflector is also a translucent diffuser.

The cover has various reflective surfaces but the core is a diffuser.

By the way, the pop-out clear 'diffuser' on some speedlights is not intended to give a soft diffused light but is intended to optically spread the light to a wider beam to accommodate a wide angle lens.

You will need this wide angle diffuser for focal lenses below 24mm focal length for a full frame camera and below 16mm for a crop-sensor camera.

Flash Extenders -

There are devices such as the Better Beamer and the Magbeam which attach to the head of a speedlight. They have a Fresnel lens which concentrates the light into a very narrow beam.

The lights in lighthouses use a Fresnel lens to project their narrow beam of light far out onto the ocean.

Flash extenders are usually used with a long telephoto lens to provide fill-in lighting for wildlife pictures.

By concentrating the light they will give about 2 1/2 stops more light.

## Examples of Flash Extenders


Better Beamer

Magbeam

The Magbeam has a rubber telescopic Fresnel housing which can be manually zoomed to suit the focal length of the lens.

(The Magbeam gets better reviews than the Better Beamer.)

Snoots and grids -

Snoots and grids can be used whenever only a specific area is to be illuminated.

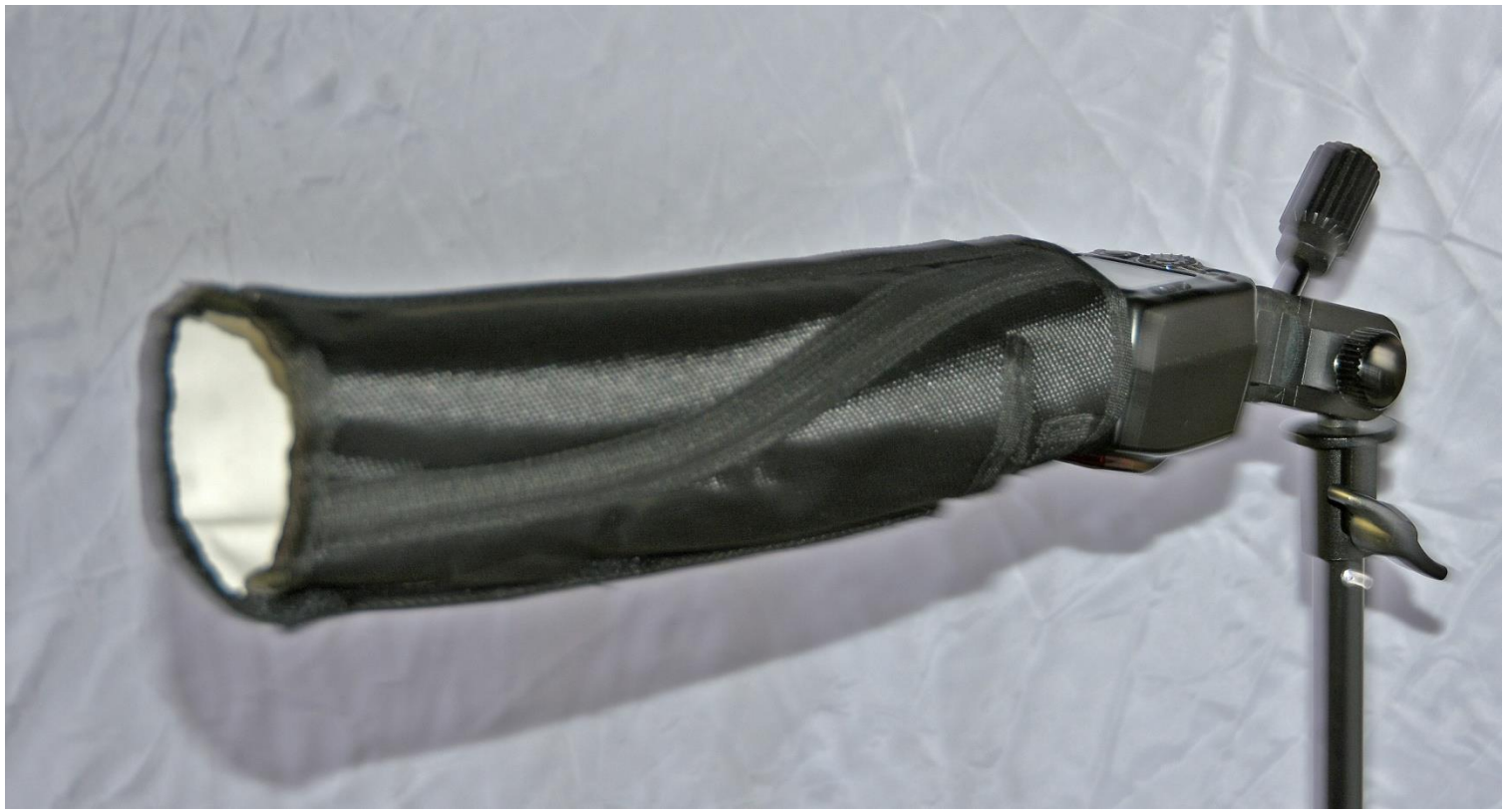
Snoots and grids are used in portraiture to give a desirable highlight to the back or side of the hair.  If both the hair and the background are dark, a highlight on the hair is a must for a good portrait.

A flash snoot is an inverted cone or tubular attachment which directs a narrow beam of light onto a specific part of the subject with little or no spill effect.

A grid is a speedlight cover with long parallel honeycomb shaped dividers which direct the light beam in straight lines.

The resulting narrow beam covers a smaller area with concentrated light with little spill effect.

This is a picture of Litescoop which I have refolded to become an improvised snoot.




This is a grid.  It directs the light straight ahead with little or no spill.

Softboxes -

The studio lights that our club has are softboxes. The concentrated light source (bulbs or flash) is bounced around in a contained space and exits through a much larger diffused opening as very soft light.

Umbrellas -

In studio lighting a light source such as a speedlight is directed into an opened umbrella. The light is then bounced off the inside surface and is directed by the shape of the umbrella.

The large surface gives a soft light. Umbrellas are another item where "bigger is better".

They are not usually used outdoors because of the wind.

Some umbrellas are translucent so you can fire the flash through them to diffuse the light.

Gels -

Flash gels are used to change the colour temperature of the light.

Electronic flash has a colour temperature of approx. 6,000 deg. K. so it can be mixed with daylight with no problem.

But if you are in a situation where the main lighting is incandescent and you want to use fill-in flash you will have to use the yellow gel on the flash head to match the colour temperature of approx. 3,200 deg. K.

The green gel will be used with some types of fluorescent lighting.

Keep in mind that anything you put in front of the flash will cut down the light somewhat and reduce the guide number but as long as you are within range your camera will automatically compensate for it.

Dedicated gels and diffusers for some speedlights have the ability for the speedlight to recognizes them and make adjustments to suit.

# - INTERMISSION -

**Flash Power** -

Before we continue on to the complexities of off-camera flash we should understand a little more about flash power.

Any light beam will become weaker as it is moved farther away from the subject.

It diminishes not proportionally, but according to the square of the distance, so it becomes weaker very quickly as the distance increases.

This is called the inverse square law. For example when you double the distance only a quarter of the light reaches the subject.

Flash power for speedlights is usually stated as a guide number (at ISO 100 and zoomed to 18mm). The higher the guide number the more powerful the flash. The power of studio strobes is stated in watt/seconds but we will not discuss these in this tutorial.

Some manufacturers don't make it easy to compare flash power. They state their guide numbers at the maximum zoom of the unit so that they can boast a higher guide number.

Some speedlights zoom to 85mm or 120mm and some zoom to 200mm making it impossible to compare flash power at different zoom settings.

So you will have to do your homework to compare the power of different speedlights.

Find the guide number at ISO 100 and zoomed to 18mm for each one you want to compare.

Guide numbers are usually expressed in feet but can also be expressed in metres.

The metric guide number will be smaller than the imperial numbers but they work the same way.

The guide number divided by the distance from the flash to the subject in equals the aperture.

Before TTL (through the lens) exposure we had to mentally carry out this calculation for every flash shot. Modern cameras instantaneously cut off the flash duration when sufficient light for proper exposure is reached. Canon call their system 'E-TTL' and Nikon call theirs 'iTTL'.

**Off-camera flash** -

Before wireless flash triggering, cords were used to attach off-camera speedlights to the camera. They were unwieldy, and a tripping hazard, especially if several off-camera speedlights were used.

The long cords got tangled and there always seemed to be a faulty cord or connection to slow things down. A real pain.

Enter pre-flash signals and radio triggers. **No more pain!!!**

An on-camera speedlight or your camera's built-in flash can be used as a Commander, sometimes called Master to wirelessly trigger one or more remote speedlights.

## No more long wires!!!

If your camera and speedlight are capable of this you will be in for a real treat.  It is a 'line of sight' device so make sure that the light sensor on the remote can 'see' the on-camera commander flash.

The on-camera flash must be set as a 'commander' in the menu and the remote speedlights must be set as a 'remote' or 'slave' in TTL mode.

Both the commander and the remotes must be set to the same channel.

When you have set up the remote flash and take the shot, eleven things happen in an instant to automatically and wirelessly, properly expose your subject.

When the **(1.)**shutter is released, the on-camera flash (in commander mode) **(2.)** emits a pre-flash at the remote speedlight signaling it to **(3.)** send a pre-flash at the subject and the speelight **(4.)** sends the pre-flash.

The camera **(5.)** measures the light reflected off the subject, **(6.)** calculates the exposure, then **(7.)** sends another pre-flash telling the speedlight what flash duration to use for proper exposure and the speedlight **(8.)** sets its flash duration.

The **(9.)** shutter will then open and the **(10.)** 'real' flash will fire.

Also, if the camera's focus mode is set to AF-S the speedlight will **(11.)** emit an infrared grid to aid focusing in low light conditions. (You can also use this grid for focusing when the flash is turned off.)

All of this in less than a blink of an eye. Pretty amazing!

This works for one speedlight or up to three (or groups of three).

**A Portrait With One Speedlight** -

So now that we know how it all works, let's pretend to set up a simple portrait session using one speedlight.

Place your subject far enough away from the backdrop so that shadows cannot be seen in the frame. Set the on-camera's flash to Commander mode in the menu and turn the built-in flash off or to very low power.

Set the speedlight as a remote at full power on a light stand angled at about 45 deg. between the camera and the subject and about 45 deg. down on the subject. This will be a good starting point

This main light will be called the key light and will illuminate one side of the face, with a shadow of the nose down on the opposite cheek, also giving a small triangle of light below the eye on the shaded side. This set-up will give what is called 'Rembrandt lighting'.

Your speedlight may have a 'modeling illumination' setting which you can choose to be able to see the effect of the shadows.

Note:  Remember to take it off this setting before the actual flash.

You can try taking a picture and see if you are satisfied but chances are you will find it very contrasty and you will want more light on the opposite side of the face.

But I said that this will be a portrait with only one speedlight!

Enter the reflector, it can be used very effectively to catch some of the main light and bounce some soft fill-in light onto the dark side of the face, softening, but still retaining the desirable shadows.

Note:  manually zoom the key light speedlight and the fill speedlight (if one is used) to their widest beam because accurate placement is sometimes difficult.

You will have to place the reflector much closer to the subject than you thought but you can change the distance to give the desired effect. The closer the reflector the more light will be bounced onto the cheek.

Voila, a studio type portrait with a single speedlight.

**A Portrait With Multiple Speedlights** -

If you have a second speedlight you could use it to give a desirable highlight to the hair.

You should use a snoot or a light focusing grid to concentrate the light to a small area of the head so that stray light will not wash out your desirable shadows.

If you have a third speedlight you could put it in a softbox or an inverted umbrella to give soft lighting in place of the reflector. Or you could use it to illuminate the backdrop but set this light for manual control.

If you have one or two more speedlights you could place them beside the main light to make a group which will give more lighting power to the key light and allow a smaller aperture.

The power of each speedlight or group can be set independently and remotely from the camera to give the desired effect.

A dedicated master flash controller could also be used on the camera's hotshoe to provide these adjustments.

Many high-end and Pro cameras do not have a built-in flash so a dedicated master flash controller is ideal for them.

**Radio Triggers** -

A radio trigger set-up consists of a transmitter mounted on the camera's hotshoe and a receiver attached to each remote speedlight. Some attach via the hotshoe and some require a sync cord.

They range in price from about $80. to several hundred dollars.

Some more expensive radio triggers will let you change the power of each remote or group of remotes from the transmitter and some less expensive ones don't.

When you press the shutter release the transmitter on the camera sends a radio signal to the receiver which fires the flash.

The radio trigger device has the big advantage of not being a line of sight system and one transmitter can fire multiple flashes at greater distances, over 1,000 ft.

Most studio strobes are fired with radio triggers.

So you will have to decide if the advantages of a radio trigger are worth the price and before you decide to buy one - do your homework.

**Motion triggers** -

Have you ever wondered how someone could take a macro picture of a fly, properly illuminated, in sharp focus, showing every detail, **in flight**?

There is a device called a motion trigger which has a small transmitter and a receiver which passes an invisible beam between them.

The feat is accomplished by placing the fly in a bottle and having the invisible beam pass over the bottle opening.

The lens is pre-focused on the exact point where the beam passes over the opening of the bottle and the flash is also aimed at that point.

Take the stopper off the bottle and wait. When the fly escapes and breaks the beam the shutter is triggered, the flash is fired and you will have a picture of the fly, frozen in flight.

Some can also use sound, light or vibration to trigger the shutter.

**Front curtain and rear curtain sync** -

The default setting for basic flash is front curtain sync. When the front curtain of the shutter first fully opens the flash fires. The rear curtain then closes according to what shutter speed you have chosen.

However, you can set the flash to fire just before the rear curtain closes. This is called rear curtain sync.

Suppose you wanted to take a night picture (with your camera on a tripod) of a car traveling from right to left across the frame showing strips of red light trails from the tail lights.

But you also wanted to freeze the movement and illuminate the car. You may have set a shutter speed of say 1 sec. to give the length of light trail that you wanted.

(Note: This is not a panning shot)

If you had not set your camera for rear curtain sync the shutter would open, the flash would fire exposing a firm image of the car on the sensor on the right side of the frame then as the car proceeded to the left for one second the light trails would wipe their image across the car from back to front.  Not what you wanted.

For this type of picture set your camera for rear curtain sync and the light trails would be exposed first on the right side of the frame then just before the rear curtain closed the flash would fire and you would have a picture of the car on the left side of the frame with the light trails behind the car.  Just what the doctor ordered!

**Old Speedlights** -

You might ask "can I use my old speedlight that I used way back then on my 35mm camera as a remote?"

Or you might also say "Speedlights are so expensive that I can barely afford one, let alone a stable of them so can I buy older, inexpensive, second-hand speedlights that do not have a remote setting?"

The answer to both questions is "probably yes".

You can get optical slave triggers which mount on a light stand and have hotshoes onto which you mount the older speedlights.

Or you could get a set of radio triggers to use with your older speedlights.

The optical slave trigger is simply a low cost device (about $15.) with a photocell onto which you mount your speedlight. The photocell is a line of sight device which will 'see' the on-camera flash and simultaneously fire the speedlight. The next picture shows my old Vivitar speedlight on an optical slave trigger.


Vivitar
285HV ZOOM THYRISTOR
vari
power

Both the slave adaptor and the radio trigger systems will not give you automatic exposure with a really old first generation speedlight.

You will have to either use guide numbers or do some trial and error test shots to get your exposure right.

However, many later second generation 'old' speedlights like my Vivitar 285's have the ability to shut off the light when the subject is properly exposed. Set the dial on the speedlight to whatever ISO setting you are using. Estimate the distance to the subject and look on the dial to see the corresponding aperture.

Set your camera to manual exposure with a shutter speed of 1/60 sec. and the corresponding aperture mentioned above. The speedlight will automatically shut off the light when the subject is properly exposed and the optical slave trigger made it wireless.
Pretty good for an 'on the-cheap' set-up.

I liked my old Vivitar 285HV speedlight which I bought back in the seventies so much that I bought another on Kijiji for $25. They both work well with optical slave triggers.

**Note**: Before you buy an old speed light make sure that the trigger voltage is compatible with your camera in case you want to use it on your hotshoe or on a flash bracket tethered to your hotshoe.

If possible, get a trigger which has a sensitivity adjustment because if you mix them with TTL remote flashes on the same shoot they may be triggered by the pre-flash. (Just turn the sensitivity down.) Or you can set your speedlight for no preflashes. Read your manual for that one.

Another way to obtain proper exposure with flash is to use a light meter. Now I mentioned that I would show you a couple of neat things with a high-end speedlight. They are repeat flash and high speed sync.

**Repeat Flash** -

Some speedlights are capable of firing several flashes at short intervals so that you can get multiple images on the same frame.

There are many possibilities of subject matter for repeat flash, for instance, a ballet dancer doing a long leap; you could have several images of him/her from the take-off to the landing, all on the same frame.

The next picture is an example of a girl doing a cartwheel in front of a black backdrop. I set the camera to shutter priority and set the shutter speed to 2 sec. The flash was programmed to fire three times while the shutter was open.

You may remember that this picture was taken here on a Thursday night in March of last year.

**High Speed Sync** -

Let us first be sure that we understand how a focal plane shutter works.

Most modern cameras have focal plane shutters consisting of a front curtain and a rear curtain.

The front curtain opens to exposes the image to the sensor and rear curtain follows and closes all light to the sensor, completing the exposure. They usually travel from top to bottom.

For a slow shutter speed e.g. 1/60 sec. (or longer), the front curtain opens all the way and the whole sensor is exposed to the image for 1/60 sec.

(For a simple flash picture this is where the flash would normally be fired).

Then the rear curtain closes.

For a faster shutter speed, the first curtain starts to open but before it has gone very far, the second curtain starts to close off the light of the incoming image and only a horizontal strip at a time of the image is projected onto the sensor.

As the first curtain continues down the second curtain follows and the image is essentially wiped onto the sensor from top to bottom.

The faster the shutter speed, the narrower the gap between the curtains.

When you set a shutter speed on your camera you are essentially setting the gap between the two curtains.

If you wanted to use a fast shutter speed but also wanted additional illumination which was not readily available you could use high speed sync if your speedlight has this feature.

Speedlights with this feature will allow you to programme a single burst of flash to fire when the shutter exposes the first strip of image on the sensor and then another burst when the second curtain reaches the place where the first curtain was, when the flash first fired and so on until the last strip of image was exposed at the bottom of the shutter travel. This involves many flash bursts.

This extremely fast series of flashes takes a lot of battery capacity which must rush in and recharge the capacitor in time for the next burst. An external battery pack will provide the extra capacity required.

Speedlights usually take four AA cells but the battery pack provides an additional eight AA cells which gives the speedlight the capacity it needs.

High end speedlights which support high speed sync have a port where you can plug in the external battery pack.

That is a lot of batteries and you may say "this can get expensive".

However, I use Eneloop rechargeable batteries for everything I own and although the initial outlay is more, it basically costs me nothing more to use my electronic equipment.

Common rechargeable batteries can lose their charge over a period of a couple of months or less but Eneloop batteries will hold 80% of their charge even after being stored for five years and are capable of 2,000 charges. These are what the Pros use. Good stuff! (buy them on Amazon, in large packages the cost per battery is less).

I have a picture which I took last year at the skateboard park. I chose to use a shutter speed of 1/1,000 sec. to freeze the action. I set the camera to shutter priority at 1/1,000 sec., programmed the speedlight for high speed sync, plugged in the external battery pack and took the picture.


VANS
OFF THE WALL

Both the subject and the sky are properly exposed. A single flash would have illuminated the subject, and frozen the action but the sky would have been black.

It should be noted that when flash bursts are fired in quick succession the power is reduced as the capacitor will not be fully charged.

As I said before, modern speedlights are capable of so much more than when flashbulbs were used but they are very complex.

What I have shown you tonight is true and accurate but for simplicity I left out the complicated set-ups required to accomplish the feats.

Although this may not be <u>everything</u> you wanted to know about flash photography, I hope it has wet your curiosity and shown you what can be done.

However, **are you a photographer or not?**

Nobody said that it would be easy but they said it would be fun, and you should never stop learning.

So if you want to dig your teeth into the wonderful world of flash photography get your first speedlight and start the fun.

New mid-range speedlights from Nikon or Canon which will function as a TTL remote will run you about $300.or $400. and a fully functioned name brand speedlight can run over $600.

Of course, they can be picked up much more reasonably on Kijiji second hand and as new models come out the predecessors drop in price.

I have some flash and lighting equipment here that I acquired over the years and you are welcome to look at it.

If you asked me what I would have done differently, there are only three things:

1. I would have bought larger umbrellas, 40 in. dia. minimum (remember, bigger is better);

2. I would have bought sturdier light stands; like the one I use for my reflector (again, bigger is better);

3. and for my first Nikon speedlight I would have bought one which was fully featured instead of the intermediate one. (what do you know, bigger is better again).

Now, in spite of what some of you may think (and I know who you are), I was not around when flash powder was used, but during all of my adult life as an amateur photographer, I owned at least two of most of the other flash guns strobes and speedlights which I described.

I would be happy to answer any questions that you may have.

- The end -