Electronic Flash Units

This is one of the marvels with modern photography. We are going to discuss different types and uses of the modern flash units. In this chapter, we are going to discuss the portable flash unit. You know the type – they are mostly found on top of the camera. However, as you are about to learn, there are other places for it also.

When the flash unit is in the manual mode, the f/stop must be changed each time the flash-to-subject distance changes. A scale on the flash unit indicates the proper f/stop to use for the various distances. To determine the flash-to-subject distance for on-camera flash, focus on the subject and read the distance directly from the focusing ring on the camera.

Single Flash

The majority of your indoor photographs will be produced using a single flash unit. There are various methods in which a single flash unit can be used to produce high-quality photographs. These techniques will distinguish you from the amateur snap shooter.

A commonly used flash technique is to have the flash unit attached to the camera in synchronization with the shutter and aimed directly at a subject. An advantage of having your flash unit attached to the camera is it provides you the chance to capture the unexpected. When spontaneity sparks the action and quick-camera handling is necessary, the fewer pieces of equipment you have to worry about or handle the better. Rather than two pieces of gear, you have only one – the camera with the flash attached to it; however, this technique usually produces objectionable shadows behind the subject. To help reduce the harshness of the shadows produced behind your subject when a single flash is used at the camera, place some diffusion material, such as a white handkerchief, or other such diffusion material, in front of the flash. Of course, diffusion reduces the intensity of the light, and the exposure has to be increased accordingly when using the manual mode on the flash unit.

Most photographers use flash brackets. This is a device, which holds the flash off axis to the lens. When you are using a flash bracket, it is possible to rotate the flash when changing formats

from horizontal to vertical, and still keep the flash over the lens. Always position the flash above the lens when shooting people in the vertical format using a flash unit. If the flash is below the lens, long objectionable shadows are cast behind the subject, and the subject has an unnatural, eerie, sinister effect. This is sometimes called the "monster light", since its affect is similar to that look.

Red Eye

A result that may appear with direct flash is "red eye." Red eye occurs in pictures of people and animals when the flash is used close to the optical axis of the lens and the subject is looking at the camera. Light reflecting from the blood vessels at the back of the eye causes this effect. The darker the room is, the stronger the effect, because the pupils of the eyes become more dilated. Red eye can easily be avoided by moving the flash away from the lens optical axis. In addition, the effects of red eye can be minimized by turning up the room lights.

Bounce Flash

One of the better methods to illuminate a subject or scene with a single-flash unit is to use bounce flash. There are times when you want a very soft light in order to lessen the tonal range between highlights and shadows and to soften harsh background shadows. You can achieve this soft lighting by bouncing, or reflecting, the flash off a light-colored surface. By doing so, you are changing the narrow spot of light from a flash unit into a wide diffused area of light. When shooting color film, avoid colored walls and ceilings. They reflect their color onto the subject, causing a colorcast over the entire subject area. You should use bounce flash in all situations where there is an eight to ten foot white ceiling. Most bounce flash pictures are made with the light directed at the ceiling somewhere between you and your subject. A somewhat of a silhouette effect can be produced by bouncing your flash off the ceiling behind the subject. To accomplish this, aim your flash unit so most of the light bounced off the ceiling falls on the background behind the subject and calculate the exposure for the background. For side lighting, bounce your flash off a wall to the side of your subject. This type of lighting helps add a feeling of three dimensions to your picture. For the best control, use a large reflector designed for bounce lighting. Special made reflectors are available that are lightweight, compact, and portable. For close-up work, the best bounce reflector is about three by four feet reflector, or a ring flash. For full-length subjects, try a reflector about six by six feet. To determine the exposure for bounce flash using the manual mode on your flash, you must determine the flash-to-ceiling-to-subject distance, and determine your f/stop and then open the aperture two additional f/stops. The two additional f/stops are added to compensate for loss of light due to scattering and absorption by the reflecting surface of the ceiling. When an automatic flash is used in the

automatic mode, it is not necessary to open up two f/stops. The sensor automatically cuts off when the proper amount of light is reflected from the subject to the flash unit. When the ceiling is high or dark, compensation to the basic exposure may be required. For effective use of the bounce-flash technique, a considerable amount of practice is required.

One of the funny things I see by many amateurs is that they try bouncing their flash when they are taking pictures outside. When I ask them what they are doing, they say they are using bounce flash, and they are surprised to hear me ask the question. So then, I ask them if they are bouncing their flash off the clouds.

As with any flash photography technique, identify any areas or surfaces that may be potential problems. Remember, one of the basic principles of reflected light is that the angle of incidence is equal to the angle of reflectance. Highly polished or glass surfaces should be considered before the subject is photographed. Items, such as windows, glass tabletops, glass framed photographs and polished metal, can cause glare or a "hot spot" in your photograph. When you are using bounce lighting techniques, "hot spots" of vertical surfaces are normally prevented, because the light source striking the surface is angled from above or the side; however, when you are using bounce lighting techniques, horizontal surfaces, such as glass coffee tables and overhead light fixtures, can cause a strange diffused lighting pattern in the photograph.

When using a single, on-camera flash, experiment with direct, diffused, and bounce-flash techniques and determine which method provides the best results under various conditions. The method you choose to light the same subject separates you from the average snapshot shooter.

Off Camera Flash

Some of your best flash pictures can be made with the flash unit off the camera. Holding the flash off the camera and above the lens tends to throw the shadows down and behind the subject. This is a good way to minimize distracting background shadows when a subject is standing close to a wall. A flash held high above the lens, either left or right, makes the viewer less conscious of the flash illumination. People are accustomed to seeing things lit from above, and by placing the flash above the subject; it closely resembles the lighting of the sun or ceiling lights. Light that is far enough off the camera to illuminate the subject from an angle produces modeling or depth. This type of light creates the illusion of a third dimension and is more pleasing to the viewer than the two-dimensional flat effect you get with direct, front lighting. Light from an angle can also be used to bring out the texture of a subject. We are not talking about lighting from the extreme side of the subject. We are talking about placing the light to the side of the camera.

Indoors, two factors are important when determining the modeling and texture effects you will get: first, the surface of the subject itself; second, the way you light that subject. To illustrate these points, try photographing a Ping-Pong ball and a tennis ball together. When you use direct,

front lighting, your picture records a two-dimensional visualization of height and width, but little of roundness, depth, or texture. When you light the balls from the side, both acquire the illusion of depth; however, only the tennis ball reveals texture. The Ping-Pong ball is much smoother and is almost without texture. Now photograph an old man who has wrinkles. With front lighting, most of the lines and wrinkles in the old person's face will be minimized by the evenness of the light; however, when lighted from the side, almost every crease will become a shaded area and the ridges will be highlighted. Thus, the texture of the old person's face is emphasized.

Lighting Ratio

Lighting ratio can be considered as a measure of contrast. Lighting ratios can be measured in two ways. In the end, they both tell us the same thing with different numbers. I will try to explain both of them to you.

Combined Method

Lighting ratios refers to the combined intensity (at the subject) of the main and fill lights as compared to the intensity of the fill light alone. For example, both the main and fill light of equal intensity are shining on the subject. A reflected light meter reading is taken off an eighteen percent gray card at the subject position that indicates there are one hundred units of light falling on the subject. Now, with the main light turned off and the fill light still illuminating the subject, the reflected meter reading indicates there are only fifty units of light falling on the subject; therefore the lighting ratio is 2:1.

Additive Method

Lighting ratios refers to the separate intensity (at the subject) of the main and fill lights. For example, the main light is delivering one hundred units of light, and fill light is delivering only fifty units of intensity on the subject. On the shadow side of the subject, we have only fifty units of light. On the bright side of the subject, we have one hundred fifty units of light because we add the light from both lights together and arrive at one hundred and fifty. In this situation, the lighting ratio is 3:1.

In both of these situations, the actual light output is the same. The light falling on the subject is also the same in both methods. The only difference is the math and how to understand it. In the end, it is all the same.

Lighting ratio is usually expressed as the comparison of two light intensities, such as 1:1, 2:1,3:1, and so on. The ratios can also be in halves – 1:2 1/2. The larger number in a lighting ratio indicates the most intense illumination at the subject position; for example, a 2:1 ratio indicates the most intensely lighted portion of the subject (highlights) is receiving twice the amount of illumination as the least intensely lighted portion of the subject (shadows). The light that produces the most intense illumination is called the main, key, or modeling light. The light that produces the least intense illumination is called the fill. A fill light, as the name implies, fills in and softens the shadows produced by the main light. Because a lighting ratio is a comparison of the combined main and "fill light", the fill light must be in a position so it completely illuminates the portion of the subject visible to the camera. This requires positioning the fill light close to the lens and pointing to give flat lighting on the subject.

Generally, 3:1 lighting is considered the best general lighting ratio for both black-and-white, and color photography. This 3:1 ratio provides normal contrast between the highlights and shadows and produces good natural-looking photographs. Some automatic electronic flashes allow you to control the output of light, sometimes called "dialing-in". When set in the manual position, you can adjust the light output by changing the intensity of the flash unit to 1/2, 1/4, 1/8, 1/16, and so forth. This allows you more control of flash-to-subject distance as well as aperture (depth of field) control. Achieving the desired lighting ratio with an automatic flash unit where the flash intensity can be controlled is quite easy.

In order to select a wider aperture to control depth of field, start by setting your main flash at one-half or one-fourth power and adjust your fill flash appropriately. Adjusting lighting ratios by flash-to-subject-distance is another method to control lighting ratios.

Another easy method to control the lighting ratios using an automatic electronic flash is to use the flash unit in the automatic mode. When set in the automatic mode, the flash-to-subject distance is not supercritical, and there is some leeway as long as the flash units are within their operating range.

Any lighting ratio can be obtained when using an automatic flash unit. By controlling the power output intensity, adjusting the film speed setting, changing the main and fill flash distances, or a combination of the three, you can manipulate the lighting ratio easily to any ratio. As with any stage of photography, practice and testing with your camera and flash combinations in various situations produces the best results.

When I am photographing men, I tend to use a stronger ratio than when I am photographing women. A stronger ratio makes the men look stronger and more macho.

Synchronization-Sunlight

Bright sunlight, used as the only means of illumination for an exposure, can produce deep objectionable shadows on a subject. When a flash unit is used as a fill light, it reduces these shadows and is called synchronization-sunlight photography. Improperly handled, the synchronization-sunlight technique can produce an effect that makes the photograph appear as if taken at night with a single flash. This effect occurs when the flash illumination is more intense than the sunlight. The first step for proper exposure with synchronization-sunlight is to calculate the correct exposure for daylight, and set the shutter speed and f/stop as though a flash is not being used. Keep in mind when using a focal-plane shutter; the shutter speed must be synchronized with the electronic flash unit. Avoid using a fast film in bright sunlight when using a camera equipped with a focal-plane shutter. In this case, you are limited only to your aperture to control the exposure of the film, because your shutter speed is nonadjustable. A leaf shutter has an advantage over a focal-plane shutter. When a leaf shutter is used, it provides more control over depth of field since the shutter synchronizes at all shutter speeds.

The sun is used as the main light, and your camera settings are determined directly from your light meter. The easiest method is to set the film speed (ASA/ISO) on your camera and flash unit. Then read your background lighting with your light meter. It would be recommended to open up one or two stops. Then set your shutter speed accordingly to give you a proper exposure. When shooting outdoors with bright sun, put the sun somewhere behind your subject. The sun does not have to be directly behind your subject. This is done for several reasons. These reasons include – you will not get as much squinting from your subject with the sun behind them; the lighting is better and more flattering in this position.

Multiple-Flash Units

Multiple-flash is the use of two or more flash units fired in synchronization with the camera shutter. The flash units can be auxiliary flash units, connected to the camera by extension cords, or they can be slave flash units. Slave units usually have self-contained power sources and are fired with a photoelectric cell when light from a master flash unit strikes the cell of the slave unit. Instead of a photoelectric cell, you could use radio control or IR. With multiple-flash, exposure calculations are based on the distance between the subject and the flash unit that produces the most intense illumination to the subject; therefore, you can have numerous auxiliary flash units or slaves for a scene and only calculate your exposure from the main-light source. All other flash units should be equidistant or at a greater distance from the subject as compared to the flash unit on which the exposure is based.

When two flash units of equal intensity and at equal distance from a subject illuminate the same area, the exposure for one unit should be determined and then the exposure should be halved because twice the intensity of light is reflected from the subject.

Open Flash

Flash pictures can be made without the camera shutter and flash being synchronized, using a technique called open-flash. In the open-flash method, the camera shutter is set at T or B, the shutter is opened, the flash unit fired one or more times, and the shutter is then closed. The open-flash technique is sometimes used when the level of light over a large scene is very low or at night. This method of flash photography allows the photographing of large scenes that ordinarily are quite difficult to illuminate with artificial light. The photographer can walk into a scene with the flash unit and illuminate sections of the scene or the entire scene. Any number of flashes can be used during the exposure while the shutter remains open. A silhouette of your body can be recorded if your body gets between the flash and the camera, so be careful.

To arrive at the exposure for an open-flash picture using a manual flash, determine your flash-to-subject distance and f/stop. Keep the distance equal to the objects being illuminated when using manual flash. For example, when the f/stop for the scene is f/5.6 based on a flash-to-subject distance of ten feet, every flash within the scene should be ten feet from that section of the scene being illuminated. When an automatic flash is used, the flash automatically shuts off when the proper amount of light is reflected from the subject, providing the object is within its distance range. When you are using a manual flash, the exposure for open flash is determined as previously discussed. This is true unless two or more flash units with equal intensities are used at equal distances, or two or more flashes from the same unit at the same distance are used to illuminate the subject.

Multiple Exposures with Electronic Flash

Interesting multiple exposures can be made with only one or two electronic flash units. Multiple-exposure pictures, besides being artistic and interesting, are often used to study subject motion and position. This can be accomplished by the following procedures:

1. Darken the room and position your subject against a black background.
2. Allow enough background area for the number of different exposures you intend to make. Make a pencil sketch to help you position the subject.
3. Set up the electronic flash lights so the minimum amount of illumination falls on the background itself.
4. Turn off all room lights and make your first exposure.
5. Without advancing the film, move your subject to the next position for the second exposure.
6. Repeat this procedure for each image you want to record on the film.

Photographing Action with Electronic Flash

Action of any kind, no matter how slight, can add interest to most pictures. Each type of action requires a different camera technique, but because of the short duration of light from electronic flash, it is ideal for recording any action ranging from a fleeting expression to a sports triumph. Most electronic flash units have a maximum flash duration (the length of time the light is on) of about $1/800^{th}$ of a second, and a minimum flash duration as short as $1/20000^{th}$ of a second. Thus, you can "freeze" almost any action with the flash. Indoors, where there is little existing light, you have no problem because the electronic flash itself stops the action; however, outdoors in daylight, you may encounter ghost images. Ghost images can occur when existing light and a slow shutter speed are used in conjunction with electronic flash. A ghost image appears as a blur when one image is recorded by the existing light and a second sharp image by the electronic flash. You can use a faster shutter speed if you are using a leaf plan shutter. It is probably more likely and easier to use a slower speed film (ASA/ISO).

Electronic Flash at Night

Flash photography, outdoors at night, can produce very underexposed photographs if not taken properly. Outdoors, flash does not carry very far; therefore, it can be difficult to light objects from a distance. However, this limited coverage also gives you great control. Indoors, part of the output of a flash unit may be reflected from the ceiling and walls back to the subject. Rarely do you find such reflective surfaces outside, so a good portion of the light is lost. To compensate for the light lost, you must open up your aperture when photographing objects at any distance. Because so much light is absorbed in these large areas, it may happen that you will open up your aperture two or three f/stops. Tests should be conducted before shooting in large, indoor areas, such as gymnasiums or outdoors at night, to determine which flash, camera, and film combination produces optimum results. At night, a single on-camera flash produces stark lighting, and your subject is flatly lit and the background goes completely black. Close foreground details become very overexposed, and it is better to exclude them. Such simple lighting is ideal for action shots, for example, capturing leaping karate fighters in midair at midnight.

Subjects such as these, benefit by being isolated from the background, but you may get more interesting lighting by using the unit off camera on an extension cord. If the necessary flash-to-camera distance is greater than the length of your extension cord, use the open-flash method. Do not allow the camera to "see" the flash unit during the open-flash exposures.