

- **ELECTRONIC FLASH (STROBE)** Light comes from a tube filled w/ an inert gas that glows intensely when charged w/ electricity as in neon tubes. Tube is usually encased in a reflective box -reflector that protects it and focuses the light.
- **FLASHBULB**--Light comes from similar source, an electrically charged container of inert gas, exhausted after one use. Can be used with or w/o reflector. There are a variety of bulbs w/ different duration, firing speed and peaking of light.
- **THREE TYPES OF ELECTRONIC FLASHES: MANUAL, AUTO, AND TTL (THROUGH THE LENS)**
- **SYNCHRONIZATION**-- All flashes, whether bulb or electronic, must be in synch w/ the shutter to open at the instant the flash of light reaches its peak. Various types of bulbs w/ different firing delays usually call for the M or manual synch on a camera. Since electronic flash has almost no delay before reaching its peak, set on X synch or the lightning bolt symbol.

Two ways to synch:

1. With hot shoe on top of camera, which is convenient, but axial lighting.
2. Synch with a PC cord from camera PC socket to flash- Short cord for a camera bracket or long for remote flash position.

A second flash may be synched w/ a slave cell which senses first flash and fires second instantaneously.

- **SYNCHRONIZATION WITH TWO TYPES OF SHUTTERS**

1. Leaf shutter. Looks similar to aperture but is closed until shutter button is pressed. Since it's built into the lens any shutter speed will synch with flash, although ambient light affects final image.
2. Focal plane shutter- moves across film as a curtain or blades so must be synched to flash at a specific speed usually 1/60 or 1/125.

- **GUIDE NUMBER:** Method of determining flash exposures. The light coming from any source falls off at a predictable rate. The Inverse Square Law- The intensity of illumination is inversely proportional to the square of the distance from the subject.

Plainly, means light decreases strength rapidly as the distance from flash to subject increases. Every time the distance doubles only 1/4 the light reaches the subject, So, if one knows the strength of the flash, She can determine the amount of light reaching the subject at a given distance. This strength is given in the form of a guide number. All flashes have guide numbers assigned to them by the manufacturer. This number indicates the power of that flash unit.

- **The formula for calculating flash exposure:** Guide no. divided by distance from flash to subject = F#. Guide number is always expressed in terms of a particular film speed and is expressed in meters or feet. Guide number of 100 at ASA 100.
- **MANUAL FLASH** has a consistent flash and a constant duration of flash, usually around 1/1000 sec. Exposure is controlled by the aperture and calculated by the inverse square law. If guide no. is 100 and subject is 10ft. away from flash = $100 \div 10 = 10$ so f10 which is closest to f 11. Or 5 ft away- $5/100=20$, f20 or f22. Most manual flashes give a chart on flash head.
- **AUTOMATIC FLASH**--Uses same principle, but has a built in sensor that reads the light reflecting off the subject and surrounding area and shuts down the flash when it calculates that enough light has reached the subject. The brightness doesn't vary, but the duration varies from about 1/400 to 1/50,000 of a sec. More exposure through time not brightness.
 1. Set flash to auto (most have a manual also)
 2. Set film speed (ASA) on camera and flash.
 3. Check dial on flash for general distance you will be shooting in. The dial will indicate the correct f-stop. Within the given range of feet the flash will expose automatically. The advantage is the photographer can move in and out from subject fast and it saves batteries. Disadvantage is it doesn't always work- mirrors, white walls etc. Also the sensor has to be mounted on camera.

- **TTL-THROUGH THE LENS FLASH:** Some more sophisticated camera and flash systems read the light from the subject and the flash fires as dedicated by the cameras meter. Most accurate, Also, matrix flash etc.

FLASH OPTIONS

- **BOUNCE FLASH:** Avoids flat harsh light caused by axial flash. Mimics a more natural light diffused sun or window light. More realistic. How: Point flash head at reflective surface, wall, low ceiling. As long as sensor is pointing toward subject, auto is fine. If not, use distance from flash to wall to subject. Use guide no. calculate f stop and open up a stop or two to compensate for light absorbed by wall etc.
- **FILL FLASH:** Flash used on the camera as an addition to the ambient light exposure to fill in or lighten shadow areas in a photo. The photographer can control how much light reaches the subject .

1. The flash can be stronger than ambient light-making the background darker,
2. The flash can equal the ambient light - still eliminating shadows on face, with the background "balanced" with the subject.
3. The flash can be somewhat weaker than ambient light- Shadows still exist, but have considerable detail. Most common use.

Using fill flash

1. Meter the scene as usual.
 2. Set the shutter speed to flash synch. i.e., 1/125 sec.
 3. Set the f-stop as meter indicates as usual.
 4. For an exposure equal to ambient light, place the flash as indicated on the distance scale on flash, use chart or calculate distance using guide no.
 5. For a traditional fill flash one or two stops less than existing light, diffuse the flash with a handkerchief, or increase distance from flash to subject, or cut in half or quarter two stops, if the flash has adjustable power or change ASA to a higher setting.
 6. Multiple fill flash- Camera on a tripod set on B locked open w/ cable release. Move flash and manually "pop" flash around area.
- **FILL LIGHT and RATIOS:** If large shadow areas measure three or more stops darker than gray card (mid-tones), they will be very dark-almost black in the final print, Use five finger rule in metering. If the brightest highlight is the little finger and the darkest shadow is the thumb, the mid-tones would be the ring finger or gray card gray in full light.

RATIOS

- A. 2:1 ratio means highlight is twice as bright as shadow or one stop difference. Makes shadows visible, with great detail. Most common portrait light and easiest to print.
 - B. 4:1 ratio means highlight is two stops brighter than shadow. Makes shadow dark but with visible detail and texture. Harder to print.
- **REFLECTORS--** Bounce main light into shadow to create fill light. Use foam core with foil on one side. White side creates softer light, foil side creates sharper light.
 - **Fill Flash/Flood:** Usually placed close to the lens so its shadow wont be visible. Not intended to eliminate shadows, just to brighten them, so isn't as bright as main light. Flood: Floods are lower wattage than main or are farther away or through a diffusing screen. Floods are also known as hot lights or continuous burning. So called because they get very hot. hot