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Some simple facts about the flash units.

A portable flash unit takes energy from a battery or power source and transforms it into high voltage, which is stored in a **capacitor** until the shutter is released and the circuit is closed. High voltage ionizes the **xenon-gas** in the flash tube and when current flows, it is transformed into light. When the flash is in an automatic setting, a sensor on the flash called a **thyristor,** measures the light reflected back to the sensor from the target subject and is calculated to shut off the flash strobe when the exposure is adequate. When a flash goes off, it can have a peak flash of 1/600 to 1/50,000 of a second. You also need to make sure your single lens reflex camera's focal plane shutter is set at the proper shutter speed. Usually at 1/60 of a second for the curtains of the shutter to be open fully during the flash.

Most flash units have an automatic mode to help in exposure. All flash units also have a maximum output when set on manual and full power. All flash units are also classified with a standard method of measurement called a guide number. Refer to your flash manual for this number, or, a **Guide Number** can be determined by the following equation:

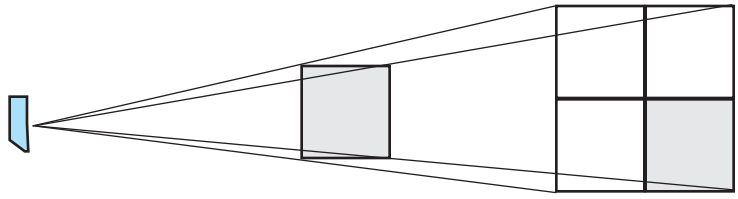
Guide Number = F/Number x Distance. Where you set your camera on a tripod. 10 feet from a subject, say a blank wall. Make a bracket of exposures and when you have determined which exposure has given you the best image. Refer to the corresponding F/Number and multiply it by 10. This will give you the Guide Number for that flash.

When estimating flash exposures, only an F-number need to be calculated, because the electronic flash duration is shorter than any standard shutter speed. To calculate the f-number needed, divide the Guide Number by the distance in feet from the flash unit to the subject:

$$\textbf{F/Number} = \frac{\textbf{Guide Number}}{\textbf{DISTANCE (From flash to subject, measured in feet)}}$$

For example, if the Guide Number is 110 and the distance from the flash to the person being photographed is 10 feet, then the aperture is set at F/11.

Inverse Square Law



$$\textbf{Intensity Range} = \frac{\textbf{(Near distance)2}}{\textbf{(Far distance)2}}$$

Because of the inverse square law, objects will vary in brightness depending on their distance from the flash. The closer they are, the brighter they will appear on the print. Small changes in distance from the light source to the subject make a big difference on the exposure (or to the apparent contrast). The intensity of the light on the subject is reduced by 1/4 each time the distance from the light to the subject is doubled, see the above diagram.

The inverse square law limits the usefulness of automatic exposure controls on the flash if there are a number of subjects in the scene being photographed. It is often wise to use bounce light under these conditions.