Vivitar

A GUIDE TO ELECTRONIC FLASH

Introduction

Electronic flash, despite its often complex appearance, is relatively simple to operate. Successful results can be easily achieved without going beyond an elementary understanding of how to attach it to the camera, turn it on, and make simple exposure adjustments...all within the ability of any person who has mastered the basic operation of a camera.

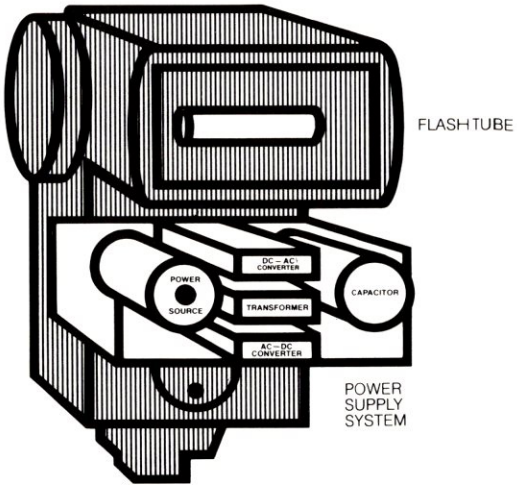
However, a more thorough knowledge of the vast array of available options and accessories will greatly enhance your ability to select the electronic flash that's best suited to your particular photographic needs. A more thorough knowledge of its inner workings will greatly enhance your ability to realize the full creative potential of its controlled light.

A more thorough knowledge of electronic flash is the object of this Guide...to help you get the pictures you want.

Basic Electronic Flash Technology

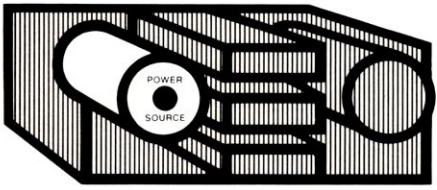
"Photograph-able" Light All electronic flash units, the simplest and the most complex, share a common goal: to produce light...at the moment in time captured by a still photograph...light that will properly expose a negative.

Stripping away layers of accessories, you'll find a simple gas-filled Flash Tube and Electrical Power Supply System creating "photograph-able" light.



The gas is xenon (zee-non), trapped inside a Pyrex tube. The Power Supply System charges the xenon with high voltage electricity. The xenon atoms emit light as long as the electricity is applied, usually for about 1/1000th of a second.

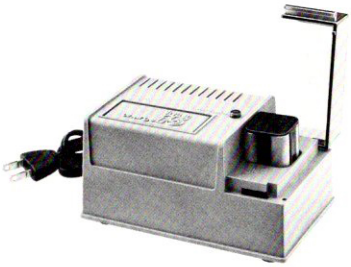
The Power Supply System



Portable Power Since the flash tube and the electrical circuits can be built into a package weighing a few ounces, electronic flash units are as portable as their power sources; as portable as a small battery or as portable as an extension cord plugged into a standard AC outlet. Your best choice is a balance between the capabilities of each and your intended use.

Alkaline batteries are best suited for occasional use. They're an inexpensive power source for the electronic flash unit that's used with a few rolls of film a few times each year. (Although common carbon zinc batteries are even cheaper, they do not satisfy the energy requirements of modern electronic flash units.)

Rechargeable NiCad batteries are best suited for more frequent use. Their higher initial cost is quickly offset by their ability to repeatedly store power until they've matched the energy output of hundreds of throw-away alkaline batteries.

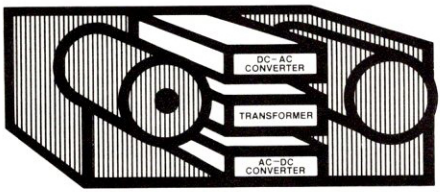


Vivitar Charge 15 and NC-3 NiCad Battery Pack give 50 flashes with a short 15 minute charge.

With either choice, make sure you carry enough battery power to match the number of flash exposures you anticipate making whenever you travel far from your source of resupply. Your flash will be rated for a specific number of flashes from each available battery source based on tests prescribed by the American National Standards Institute. However, always remember that extremely cold temperatures, long periods between flashes, and age will detract from every battery's ability to attain this rated performance

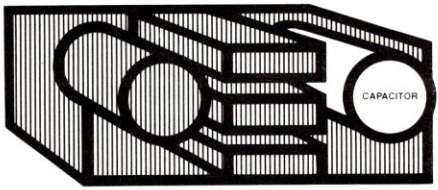
standard. Experience will quickly teach you how to judge the effect of these factors with the flash battery you use.

Of course, with an AC power source, whatever you lose in portability you gain in endurance. Your unit will flash as long as your standard AC outlet supplies the current. But remember to check the definition of a "standard AC outlet." Different countries have different standards for household electrical current, some of which could damage your electronic flash unit when you're far from home. (The same caution applies to recharging NiCad batteries.) If you plan to travel with your camera and flash, you might look for a "multi-voltage" option with AC operation.



The "Singing" Flash The characteristic high-pitched "whine" of electronic flash units is the sound of the battery's DC electricity being converted to AC power which is transformed to the higher voltage needed to create a brilliant flash of light. The higher voltage AC power is then converted back to DC for storage in the capacitor.

Don't be surprised if your electronic flash unit doesn't "sing" when using the power from a standard AC outlet. Some units bypass the battery during AC operation so that there is no conversion from battery DC power to AC power.



Getting "Ready" to Flash The high voltage DC power charges a Capacitor which acts as a reservoir in the Power Supply System. It stores the DC power until released to create the flash. The process of charging the Capacitor is called "recycling."

If your electronic flash hasn't been used for a long time, sitting on your dealer's shelf or in your home, the Capacitor will lose some of its ability to store a "full" charge. Several flashes of the unit, called "reforming the Capacitor," will quickly restore it to its rated performance.

The time required for recycling will vary as battery power

fluctuates. Since this is an invisible process, a Ready Light is connected to the Capacitor to signal when it has stored a uniformly predictable amount of power and is "Ready" to create a uniformly predictable burst of light.

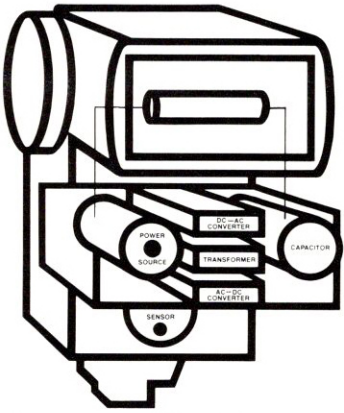
The American National Standards Institute prescribes testing procedures for rating the recycling times of electronic flash units. These ratings are helpful in matching the capabilities of various units with your specific photographic needs. However, remember that recycling times will lengthen as the batteries age, operate in extremely cold temperatures, or deplete their power through use.

The Power Supply System produces heat during recycling. Rapidly repeated use of the flash—more than 5 or 6 quick flashes per minute at full power output without a "rest"—can build this heat until its circuits are damaged. Many Power Supply Systems will have a heat-sensitive switch to turn off the power until the electronic flash unit has a chance to cool, thereby protecting it from heat damage.

Electronic flash units contain a complex array of printed circuits, resistors, and other sophisticated components to accomplish these simply described operations. All repairs should be done by qualified technicians only...technicians who have the proper tools and replacement parts and who know how to avoid the severe electrical shock that remains in the Capacitor even when the unit is turned off.

Synchronization

Closing the "Gap" The illustrated flash isn't flashing because there's a "gap" in its electrical circuit. You may have noticed it there; the space from one end of the Flash Tube to the other end.

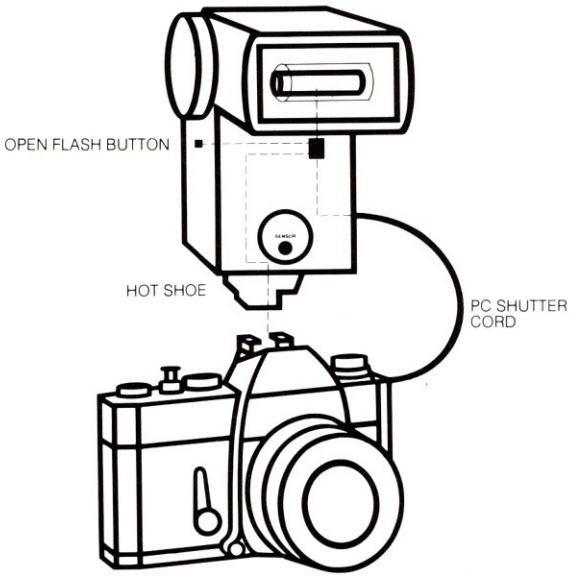


Normally the xenon gas filling the Flash Tube isn't electrically conductive. However, by allowing some of the

Capacitor's charge to flow through a transparent conductive coating on the Flash Tube, the normal structure of each xenon atom is temporarily altered and the xenon becomes electrically conductive. The "gap" is closed by the altered xenon and the flash occurs.

This transparent conductive coating is part of the electronic flash unit's "Trigger Circuit."

Closing Another "Gap" The Trigger Circuit has its own "gap" which is closed to command the firing of the flash unit. This gap may be closed by simply pressing an "Open Flash" button or by connecting the Trigger Circuit with your camera's shutter mechanism which has a switch (Flash Contacts) to synchronize the flash with the exposure of the negative.



The "Hot Shoe" and PC Shutter Cord are simple direct connections between the Trigger Circuit and the camera's Flash Contacts. The "Hot Shoe" provides the convenience of making the connection by merely attaching the flash unit to a camera accessory shoe mount that is designed for "Hot Shoe" operation. The PC Shutter Cord provides the flexibility of making the connection when the flash is not mounted on the camera or on a camera without "Hot Shoe" contacts.

An accessory called the Remote Flash Trigger commands the firing of the flash when it senses the light of other flashing units. Since the speed of light is faster than the fastest camera shutter, the Remote Flash Trigger activates the flash

instantaneously. It permits the simultaneous use of more than one flash without "ankle-grabbing" extension cords.

"X" Marks the "Sync" Electronic flash and flashbulbs have different operating characteristics. Your camera probably has different flash synchronization controls for use with each. They're designed to command the firing of the flash at a time when the negative will be evenly exposed to the maximum available light produced by these different types of flash. "X" Synchronization is designed for electronic flash.

With focal plane shutters, the "X" Sync will command the firing of the flash when the first shutter curtain reaches the far side of the frame, before the second curtain begins to move. At some of the faster shutter speeds, the second curtain begins moving before the first reaches the far side. "X" Sync is, therefore, limited to the slower shutter speeds. Remember to check your camera's shutter speed requirements for "X" Sync.

With between-the-lens diaphragm shutters, the "X" Sync will command the firing of the flash when the shutter is fully opened. Since the shutter must open fully at all shutter speeds, "X" Sync is always available.

Color Temperature

Unlike the process by which we see, film can't automatically adjust to perceive slightly colored light as being white. If a photographic view is illuminated by slightly colored light, the photograph will appear with different colors and tones than those seen through the viewfinder.

Color temperature is a scale used to express the color of light emitted by various sources. The sun, tungsten lamps, flashbulbs, and electronic flash, all emit light of all colors which combine to appear as white. The relative proportions of these different colors vary according to the temperature of the source. Color temperature is measured by heating a standard light source until it glows with the same proportions of colors as the source being tested. When they match, the temperature of the standard light source is measured in Degrees Kelvin (°K). 273°K=0° Centigrade.

"Naturally White" Electronic flash units typically produce light which most modern "Daylight Type" films perceive as being "Naturally White." (5500°K to 6000°K).

Make sure the electronic flash unit you select meets this requirement.

Calculating Flash Exposures

An Interesting Coincidence The photographs in Groups A and B were all taken with the same camera and lens. Obviously, the camera-to-subject distances remained the same. All were taken using the same film (DIN 22/ASA 125). All used the same electronic flash unit as a single source of light. The only changes were f-stop settings of the camera lens and the flash-to-subject distance.

Note the f-stops for the properly exposed photographs in each group. Multiplying those f-stops by their respective flash-to-subject distances, you'll find an interesting coincidence.

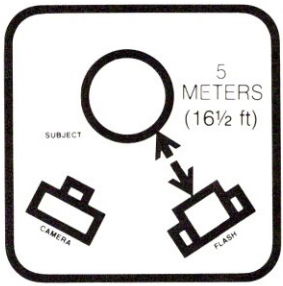
f5.6

f16

f8 (PROPER)

f22

f11



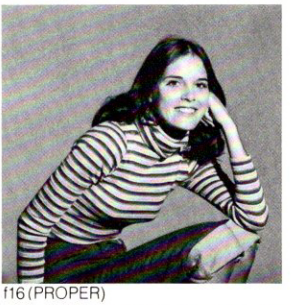
GROUP A

Group	F-stop	Flash-To-Subject Distance	Result
A	8	5 meters (16½ ft)	40 (135)
B	16	2½ meters (8¼ ft)	40 (135)

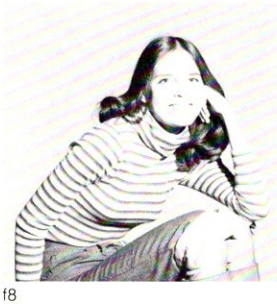
Interesting, isn't it? Both result in 40 (135 when measuring the flash-to-subject distance in feet).

It's not only interesting, it's useful for predicting exposure with flash. Using the number 40 (135) as a "Guide," you can determine the proper exposure setting for any normal flash-to-subject distance by simply dividing that distance into this "Flash Guide Number," as was done with the photographs in Group C on the next page.

f5.6



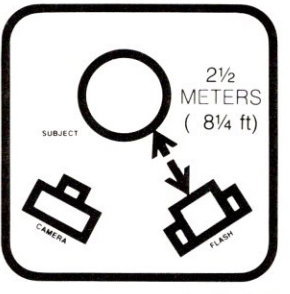
f16 (PROPER)



f8

f22

f11

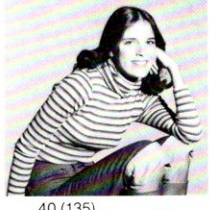


GROUP B

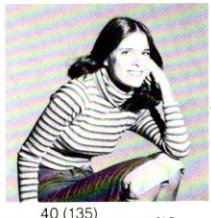
GROUP C

$$\frac{40\ (135)}{7\text{m}\ (23\ \text{ft.})} = \text{f5.6}$$

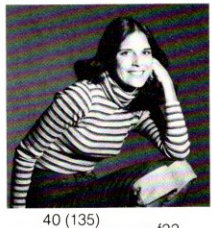
$$\frac{40\ (135)}{5\text{m}\ (16\frac{1}{2}\ \text{ft.})} = \text{f8}$$



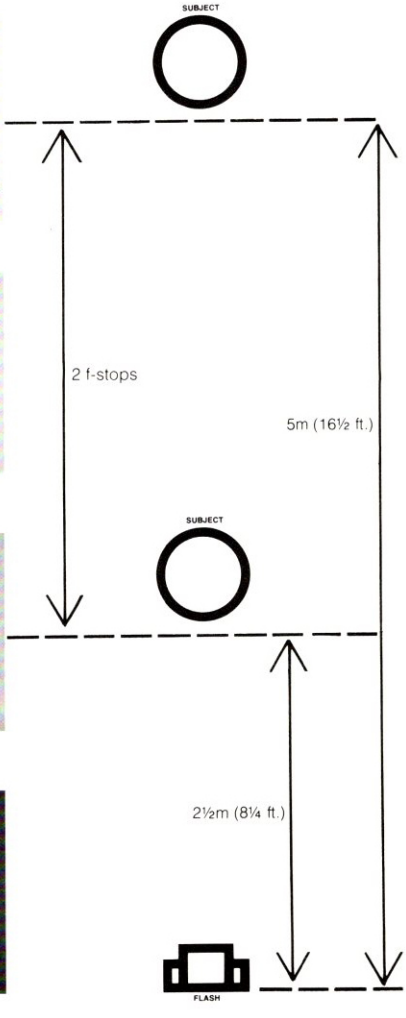
$$\frac{40\ (135)}{3\frac{2}{3}\text{m}\ (11\frac{3}{4}\ \text{ft.})} = \text{f11}$$



$$\frac{40\ (135)}{2\frac{1}{2}\text{m}\ (8\frac{1}{4}\ \text{ft.})} = \text{f16}$$



$$\frac{40\ (135)}{1\frac{3}{4}\text{m}\ (6\ \text{ft.})} = \text{f22}$$



Of course, 40 or 135 are only valid Flash Guide Numbers for this particular combination of electronic flash and film. With other combinations, you'll need different Flash Guide Numbers which you may find listed in the Owner's Manual supplied with your new electronic flash unit or by repeating the simple experiment demonstrated in Groups A and B. Your own Flash Guide Numbers will, of course, be more valid since they are based on experience with your actual photographic conditions. However, those established by the manufacturer, based on average conditions, are normally adequate for most situations.

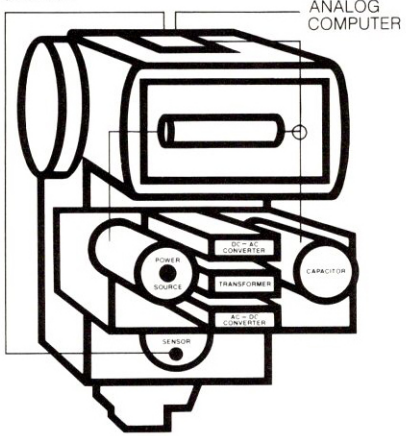
Beyond "Ten-finger" Math Since most Flash Guide Number arithmetic works with numbers larger than ten, a simple Exposure Calculator (Dial or Chart) is added to the electronic flash unit. After dialing in the DIN (ASA) rating of your film, these Exposure Calculators will indicate the proper f-stop for all normal flash-to-subject distances.

Many Vivitar Calculator Dials are illuminated for easy reading when you're working in the dark.

Of course, the Exposure Calculator is designed with the Guide Numbers established by the manufacturer for average conditions. If you wish to re-program your Exposure Calculator with the Flash Guide Numbers you've developed for unusual conditions, simply divide your Flash Guide Number by 10 and align the resulting f-stop with the 10 foot marking on your Exposure Calculator. Now, the Exposure Calculator will display the proper f-stop for all normal flash-to-subject distances based on the Flash Guide numbers you've developed.

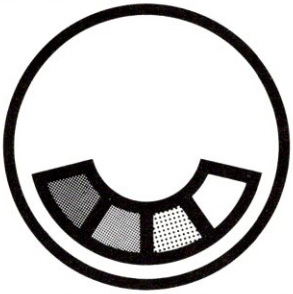
Automatic Exposures Sometimes your photographic subjects are moving too fast for you to stop and change your lens f-stop, let alone read an Exposure Calculator! If your flash photography plans include sports, children at play, or other fast moving action, keep your eye on the action, look-

ing for the best shots, and let Automatic Flash keep its "eye" on the exposure.



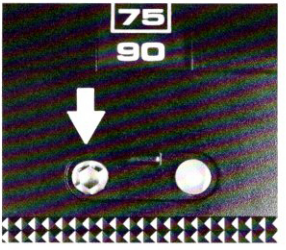
The flash's "eye" is a light-sensitive cell that observes the light being reflected by your subject. It sends electrical signals to a solid state analog computer which turns off the light when a pre-determined amount of light has been reflected.

Generally, the sensor will be equipped with aperture stops which allow you to pre-program the automatic flash exposure system for specific combinations of film and lens aperture settings. Once set, you'll be able to make flash exposures at varying flash-to-subject distances without further adjustments. A large number of sensor aperture stops provides a larger number of creative alternatives when using automatic flash exposure.



Some automatic flash units will have a Sufficient Light Indicator. If, during the pre-programmed exposure, the unit's analog computer receives signals that the exposure was taken within the maximum operating range of the unit, this light will assure you of proper exposure. You can also use this feature to check the lighting before exposure. Simply

aim the camera and flash, press the Open Flash Button, and watch for the signal.



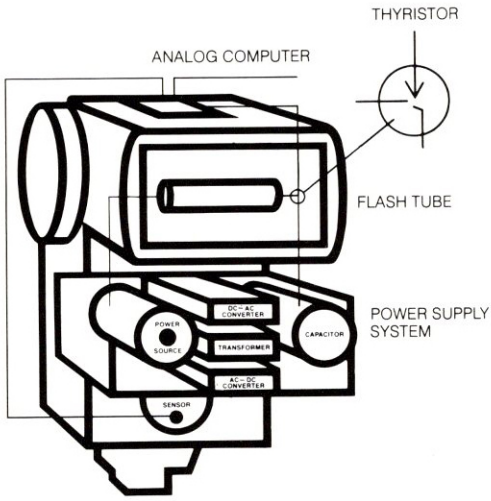
Sufficient Light Indicator

Since automatic flash exposures are based on reflected light, make sure it's "watching" the source of reflected light ...your subject! Some special lighting techniques involve pointing the flash away from the subject. If you plan on using these special techniques, make sure your unit keeps its "eye" on the subject with either a remote sensor or a sensor that is designed to be aimed separately from the flash tube.

Conserving Power

Despite great advances in battery design, their power is limited. Two new features have been added to some electronic flash units to help you get the most out of your portable power sources.

Thyristor Circuitry Thyristor circuits are high speed switches which save power when making automatic flash exposures. They enable the automatic flash exposure system to turn off the light without losing the unused portion of the capacitor's charge. Less power is then needed to recharge the capacitor. Less time is needed to recycle.



Non-thyristor automatic flash units turn off the light by merely redirecting the electricity away from the flash tube. The unused power is wasted.

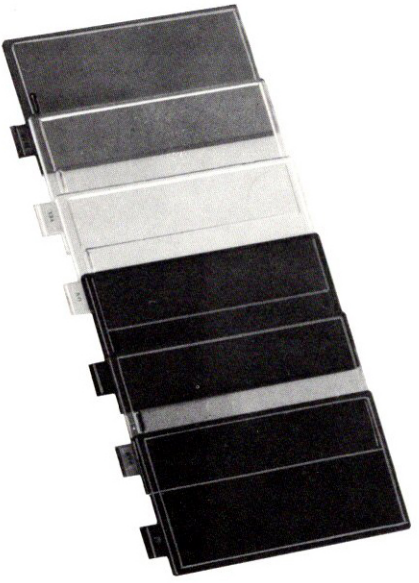
Monitor Circuits Obviously, the best way to save battery power when the flash unit is not being used is to turn it off. However, if you're waiting for a special moment in fast-paced action, you may not have time to turn it back on.

The Monitor Circuit intermittently switches the power supply off and on, maintaining the capacitor in "Ready" condition and greatly reducing power drain between flashes. The Ready Light blinks to indicate that the Monitor Circuit is in operation.

Systems Flash

The "systems approach" to design gave 35mm SLR cameras interchangeable lenses, integrated exposure systems, and multi-component accessories, making them the most versatile cameras available to photographers. The same "systems approach" in the design of electronic flash has added new dimensions to the photographer's control over the illumination of photographic scenes.

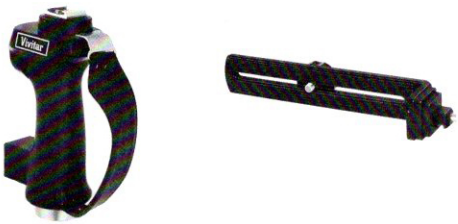
Color Control Flash filters may be utilized to adapt the electronic flash's "Naturally White" light to use with other types of films. Some filters may simply add color to create surrealistic effects as demanded by your imagination.



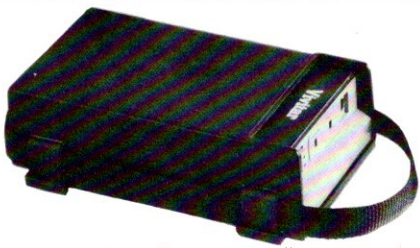
Light Intensity Control Neutral density flash filters may be utilized to diminish the flash's light output for close-ups or to balance fill-in effects. Their effect on light output is accurately predictable which is the first requirement for accurate exposure calculations.

Variable power modules are a more recent innovation which greatly extend your control over light intensity. They may be limited to a few power settings or they may be continuously variable for infinite creative control. In either case, they control light output in much the same manner as automatic exposure systems pre-program exposures. Coupled with thyristor circuitry, Variable Power Modules allow you to extend battery life and shorten recycling times whenever you don't need your flash's full power.

Light Coverage Control The reflector and lens of most electronic flash units are designed to evenly disperse the light over an area which approximates the view of your camera's normal lens (50mm lens with 35mm cameras). Variable Angle Flash Lenses alter this coverage for the view of wide angle and telephoto lenses.



Integrated camera and flash bracket systems give greater control as well as more comfortable operation.



Multiple battery options allow you to tailor your system's flash to specific shooting requirements.

Innovative accessories are the tools of experimentation.

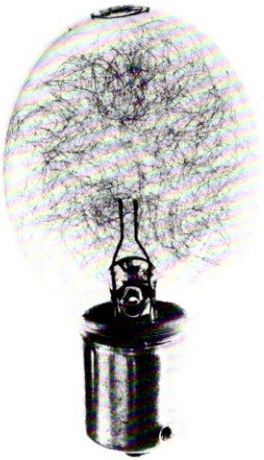
Exploring With Flash

Flash photography is an adventure that never ends. Every picture reveals a unique photographic view that exists only in the light of your flash. Hidden details can be exposed. Textures can be emphasized. Dimensions can be animated. Unknown facets of people, places, and events can be discovered when you explore them with flash.

Almost a century of flash adventures have been chronicled by skilled photographers. Their numerous books and pamphlets describe imaginative techniques that you may experiment with in developing your own creative style of electronic flash photography.

Since electronic flash wasn't universally available until recent years, many of these texts are based on experience with flashbulbs. However, you may simply adapt these techniques, as well as those you may have learned through your own experience, if you understand the basic differences between flashbulbs and electronic flash.

Bottled Explosions Flashbulbs produce light through the rapid burning of combustible metals. An electrical current passing through a thin filament ignites an explosive paste which scatters throughout a maze of magnesium or zirconium wire. The wire then burns in the oxygen rich atmosphere enclosed within the bulb. The entire process of ignition, scattering, and burning sometimes requires more than full second, depending upon the size of the flashbulb and the burning characteristics of its combustible material.



Their design remains virtually unchanged from their inception.

Translating Techniques The basic techniques of employing flashbulbs (or other sources of "photograph-able" light) can be directly related to the use of electronic flash. Mostly, you'll simply ignore many technical notes dictated to overcome the shortcomings of these pioneer light sources.

You may ignore the various problems concerning multiple Flash Guide Numbers with flashbulbs. Since they often burned longer than the time during which the camera shutter was open, changes in shutter speeds added a new variable to the problems of relating flash-to-subject distances with film speed ratings and f-stop adjustments.

You may ignore the great variety of films and filters developed to compensate for the fact that flashbulbs could not produce "naturally white" light.

You may ignore the schematic drawings of PC Shutter Extension Cords and electrical relay units that were developed to synchronize the firing of multiple flashbulbs. Unlike electronic flash, flashbulbs couldn't be effectively synchronized with convenient light-sensitive Remote Flash Triggers.

The Creative Approach To Flash Photography

The inherent economy of electronic flash offers you an unparalleled opportunity to quickly develop and master a creative style of flash photography. After making the initial investment to purchase your new electronic flash unit, each flash exposure is almost free of cost for the light you use.

Since mastery of the photographic art comes with experience, use this economy and use it often. Practice the concepts presented in this and other guides until you can duplicate their described effects. Then, experiment! Force old rules to work in new ways: your ways.

Keeping accurate records of each exposure is an ideal method for comparing your flash techniques with their resulting pictures. However, if record keeping doesn't turn you on, simply experiment with one new flash technique at a time so that you don't become confused trying to associate a varied assortment of unrecorded techniques with their results.

Objectives Your use of electronic flash can make the difference between a good picture and a truly great photograph. Basically, your objective should be to use electronic flash to compensate for the inherent limitations of photographic films.

Simple Illumination – Every photographic film has a limited sensitivity to light as indicated by its film speed rating (ASA or DIN). Although these limits may be extended through special processing, image quality and color rendering are severely degraded when they're "pushed" too far. Simply

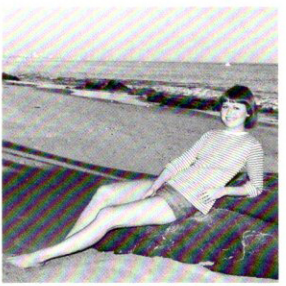
adding light with your electronic flash unit may permit use of your film at its normal rated speed for the best possible image quality.

Without Flash

With Flash

Balancing Illumination – Every photographic film has a limited ability to properly expose contrasting light and dark areas in a photographic scene. This limitation is similar to your inability to see details inside a tunnel while standing in the bright sunlight outside. Once inside the tunnel, your eyes adjust to perceive details in the dark and the problem reverses...you can't distinguish the brightly lit details outside. Film is even more limited in this respect than your vision. The shadows cast by direct sunlight will often appear black without showing the details you see through the viewfinder. Simply adding light with your electronic flash to "fill in" dark areas may permit proper exposure of all important details, those in the dark areas as well as those in the light.

Without Flash



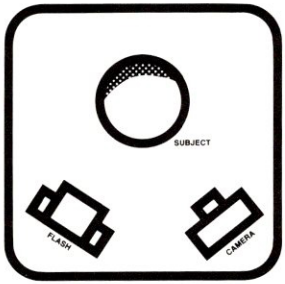
With Flash

Balancing Color – As previously mentioned, every color photographic film has an extremely limited ability to perceive slightly colored light as being white. Exposing for electronic flash rather than existing light (when using daylight type films) will often negate the color imbalances created by colored light sources.

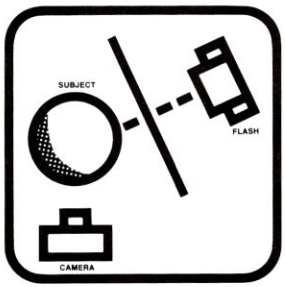
Basic Flash Techniques Although you may read of a confusing array of flash techniques, simply remember these two basic categories.

Direct Flash – All direct flash techniques employ the electronic flash unit pointed directly at the subject. The resulting photographs appear with the same effect as produced by any direct lighting situation.

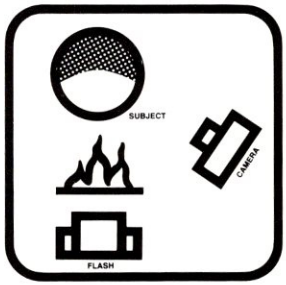
With the flash mounted on the camera, the photograph appears with the same view a coalminer might see in the light of his headlamp. Distracting shadows are cast. The subject appears flat and lifeless. However, mounting the flash on your camera does allow greater freedom while shooting fast-paced action.



With the flash placed outside the window, the photograph has a sense of realism.

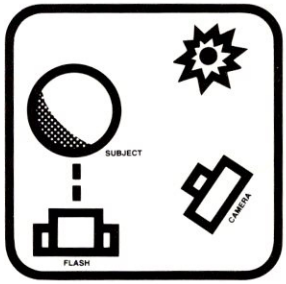


With the flash hidden outside the camera's view, on the far side of the fire, the subject appears to be illuminated by the fire itself.

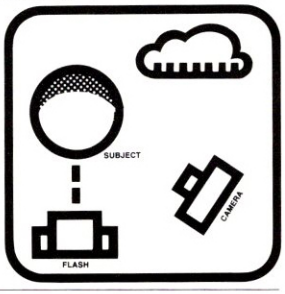


Exposure is simply calculated by dividing the flash-to-subject distance into the Flash Guide Number.

Direct flash is used to fill-in shadow areas. Exposing for the existing light, the electronic flash is placed at a flash-to-subject distance that just slightly underexposes the shaded areas. (A Varipower Module or Neutral density filter may be used to control the fill-in light as opposed to adjusting the flash-to-subject distance.)

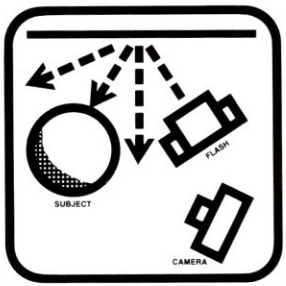


Here, under an overcast sky, the roles were reversed. The electronic flash, held off the camera and slightly above the subject, simulated the sunlight and the existing light provided the fill-in. The flash-to-subject distance was adjusted to provide slightly more light than the existing light and the photograph was exposed for the flash.

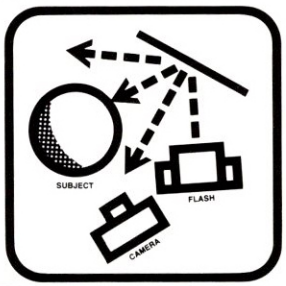


Indirect Flash – All indirect flash techniques employ the electronic flash unit pointed away from the subject. The resulting photographs appear with the same effect as produced by diffuse light.

The light may be bounced off any white ceiling or wall to recreate the diffuse light found inside a room or hall. (Bouncing the light off colored surfaces will create objectionable color casts.)

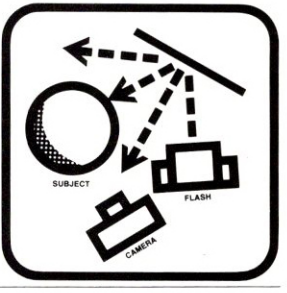


The light may be bounced off a large white reflector to recreate the diffuse light found outside on an overcast day.



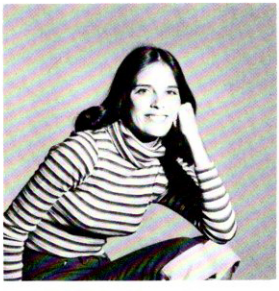
Again, exposure is simply calculated by dividing the flash-to-subject distance into the Flash Guide Number. But, remember that the flash-to-subject distance includes the distance from the flash to the ceiling or reflector, then to the subject. Also, rough reflecting surfaces may cause additional light loss which must be compensated for by opening the camera lens slightly larger. Automatic Flash Exposure Systems will automatically compensate for these variables if the flash's sensor remains pointed at the subject.

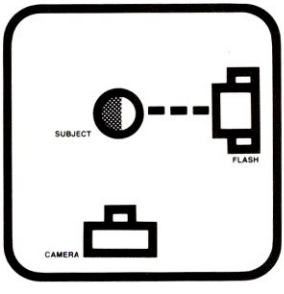
The light may be bounced off reflectors to prevent shiny metal and glass from creating distracting reflections. Exposure at extremely close ranges must be calculated based on experience since Flash Guide Numbers are not effective whenever the size of the flash lens is larger than the area photographed.



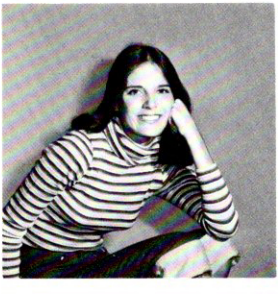
Multiple Flash – Using more than one electronic flash unit provides the ultimate control over the illumination of your photographic subjects.

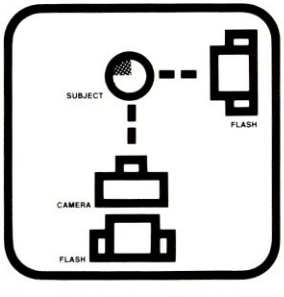
In the typical multiple flash situation, one "main" light will provide the primary lighting.



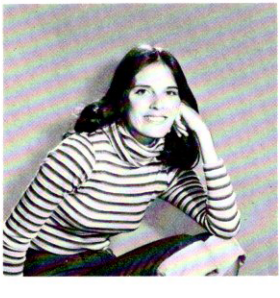


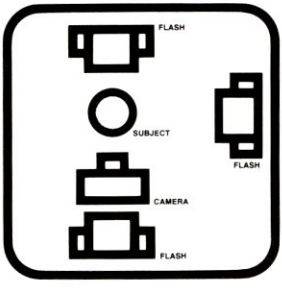
A "fill-in" light will soften the shadows created by the main light.



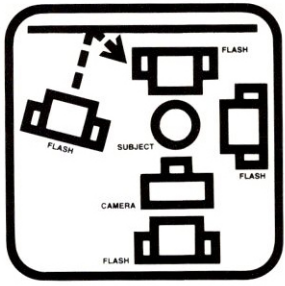


A "back" light may be utilized to emphasize the texture of hair.





A second "fill" light may be used to illuminate the background thereby eliminating distracting shadows cast there by the other lights and making the subject stand out more dramatically.



In this setup, exposure is based on the main light and the flash-to-subject distances of the other lights were adjusted to provide slightly less light than the main light.

Buyer's Guide To Vivitar Electronic Flash

Many of the well-known names in electronic flash started out as manufacturers of primitive flashbulb units, and later expanded into electronic flash. Vivitar started with electronic flash and its basic concept was to develop a complete selection of highly reliable, miniaturized popularly priced electronic flash units. Its current position as the world's largest manufacturer and distributor of electronic flash reflects the success Vivitar has attained in providing photographers with the electronic flash equipment they want.

In this section, we will show you the complete line of Vivitar electronic flash models and accessories. Here, you may select a simple light producing device or a multi-component systems flash that lets you manipulate the color and intensity of light according to the demands of your imagination. At either extreme, or in between, simply note your best available price next to each model and you'll be ready to select the one that best matches your specific photographic needs as well as your budget.

Vivitar Model 283 Automatic Electronic Flash Unit With Thyristor Circuitry and Removable Remote Sensor

- Built-in computer automatically delivers exact amount of light needed
- Thyristor system provides fast recycling and more flashes per set of batteries
- Battery Saving Circuit
- Four Automatic Modes
- Maximum Automatic Operating Range 3 to 43 feet
- Recycles from 0.5 to 9 seconds with 4 fresh Alkaline AA 1.5V batteries
- Up to 800 flashes per set of fresh batteries or fully recharged NiCad Battery Pack
- Guide Number of 60 with Kodachrome 25 (ASA 25 film)
- Sufficient Light Indicator
- Automatic Bounce Compensator Circuit
- Adjustable Tilting Flash Head
- Switch Lighted Calculator Dial
- Remote Sensor and Sensor Holder for off-camera flash with Automatic light control

Accessories for the 283 Automatic Flash Unit

Soft Light/Bounce Diffuser Kit—Easily adapts to the 283 to hold a Kodak Grey Card (with its white side to the flash) in position for controlled, predictable bounce lighting. Special effects with Filters.

Lens/Filter Adapter for Variable Angle Lens Kit and Filter Kit—Holds one or both.

Variable Angle Lens Kit—For adapting angle of illumination to the angle of view of telephoto or wide-angle camera lenses, and for special effects. Kit includes case, 4 lenses (2 wide-angle, 2 tele) and guide number label.

Filter Kit—Includes 6 special filters in a case: 4X ND for close-up flash, UV, Type B, Red, Yellow, and Blue for special effects.

Automatic Operation

Auto f-Stop Settings to Closest Half-stop—ASA 25 film: f1.4, 2, 4, and 5.6,ASA 80 film: f2.4, 3.5, 6.7, and 9.5, ASA 160 film: f3.5, 4.7, 9.5, and 14

Maximum Automatic Operating Range—3 ft. to 43 ft. (0.9m to 13m)

General Specifications

Guide Numbers—ASA 25: 60, ASA 80: 108, ASA 160: 150

Recycle Times—DC—Alkaline Batteries 0.5 to 9 sec (automatic, depending on flash-to-subject distance), (9 sec manual), NiCad Batteries 0.5 sec (automatic, depending on flash-to-subject distance), (5 sec manual), AC—0.5 to 7 seconds (with Optional SB-4 AC Adapter)

Flash Duration (approx.)—1/1000 second (manual), 1/1000 to 1/30,000 second (automatic)

Color Temperature—5500° Kelvin

Angles of Illumination—45° vertical, 60° horizontal

Power Sources—DC—Four 1.5 volt size AA alkaline batteries (Mallory MN 1500, Eveready E91 or equivalent). Optional Vivitar NC-3 NiCad Battery Pack, and HVP-1 High Voltage Battery Pack for use with 510V batt., AC—Optional Vivitar SB-4 AC cord (105-125V AC)

Flashes Per Power Source

Source	Auto*	Manual
Alkaline Batteries	75-800	75
NiCads (optional)	50-800	50
HVP-1 (optional)	**	750
AC (optional)	infinite	infinite

*Number of flashes in the auto mode depends on flash to subject distance, room reflectivity and auto f-stop setting used.

**Over 750 flashes possible in Auto, but the number is dependent on flash to subject distance, room reflectivity and auto f-stop.

Operating Positions—Vertical mount with variable tilt head (0 to 90° with click stops at 0°, 45°, 60°, 75°, and 90°)

Camera/Electronic Flash Synchronization Connections—Shutter Cord, Hot Shoe, Sensor Holder

Weight without Batteries—14 oz. (400g)

Dimensions—5⅞" x 3½" x 1⅞" (149mm x 89mm x 48mm) (less the mounting foot sensor)

Accessories Included—Removable Sensor, 1.2 Meter Sensor Connecting Cord with Sensor Holder, Vivitar PC-1 12" Shutter Cord (30.5cm)

Quick Release Pistol Grip—For 35mm or 2¼ format (optional brackets) provides a solid, controlled platform for the 283, with a flash shoe that swivels 360°. The Quick Release lets you remove the Pistol Grip for off-camera flash. The pistol Grip handle has an adjustable safety strap and accepts the optional Cable Release.

HVP-1 High Voltage Battery Pack—Converts the 510 volts of an E-497 or equivalent photo battery to the 330 volts usable in Vivitar Flash Units and maintains the voltage to ±10 volts, a ¼ f-stop variability, recycle times from 0.5 to 2 seconds.

NC-3 NiCad Battery Pack—Offers quick re-cycle times, and fast re-chargeability.

Charge 15 charges NC-3's in 15 minutes—Maintains trickle-charge rate if NC-3 is left in (safety measure). For use with NC-3 only.

C-1 Soft Pouch Case—Carrying case with belt clip, zipper. Vivitar C-1

Vivitar SB-4 AC Adapter

Vivitar Model 292
Automatic Electronic Flash Unit With Thyristor Power Conservation System

- Built-in computer automatically delivers exact amount of light needed
- New thyristor system provides incredibly fast recycling and more flashes per charge
- Recycles in from 0.8 to 8 seconds
- Automatic operation from 2 to 33 feet
- Up to 700+ flashes from only a one hour charge
- Accurate guide number of 65 with Kodachrome II (ASA 25)
- Multiple f-stop settings for maximum depth of field control
- Illuminated calculator dial
- Auxiliary PC socket for wireless slave units
- 180° swivel shoe with new safety lock

Automatic Operation

Auto f-Stop Settings to Closest Half-stop—Kodachrome II (ASA 25) f2 or f4 or f8, Kodacolor X (ASA 80) f3.5 or f6.8 or f13.5, High Speed Ektachrome (ASA 160) f4.5 or f9.5 or f19

Maximum Automatic Operating Range—2 ft. to 33 ft. (0.6m to 10m)

Automatic Sensor Measuring Angle—20°

General Specifications

Guide numbers—Kodachrome II (ASA 25) 65, Kodacolor X (ASA 80) 120, High Speed Ektachrome (ASA 160) 165

Recycle Times (AC or DC)—8 seconds (manual), 0.8 to 8 seconds (automatic, depending on flash-to-subject distance)

Flash Duration (approx.)—1/1000 second (manual), 1/1000 to 1/30,000 second (automatic)

Color Temperature—6000° Kelvin

Angles of Illumination in Vertical Position—Normal—45° horizontal, 65° vertical, with wide angle attachment—65° horizontal, 70° vertical

Power Sources—DC—Interchangeable rechargeable NC-2 NiCad Battery Pack, AC—Multiple voltage (110V/220V) with optional SB-3 Multi-Voltage AC Cord

Battery-saving Circuit—Built-in circuit automatically regulates power flow from batteries to capacitor

Flashes per Change—50+ (manual), 50 to 700+ (automatic, depending on flash-to-subject distance)

Camera/Electronic Flash Synchronization Connections—PC cord, Hot Shoe

Weight with Batteries—17½ oz. (496 g)

Dimensions—4⅝″ x $3^{15}/_{16}$″ x 1¾″ (118mm x 100mm x 45mm)

Accessories Included—MV-3 Multiple Voltage Charger (110v/220v), wide angle attachment, pouch case, PC-1 12″ PC Cord

Vivitar Model 273
Automatic Electronic Flash Unit with Thyristor Power Conservation System

- Built-in computer automatically delivers exact amount of light needed
- Thyristor system provides incredibly fast recycling and more flashes per set of batteries
- Adjustable tilting flash head for softer bounce lighting
- Recycles from 0.5 to 7 seconds
- Automatic operation from 3 to 25 feet
- Up to 800 flashes from four AA alkaline batteries
- Guide number of 50 with ASA 25 film
- Multiple f-stop settings for creative depth of field control
- Illuminated calculator dial
- Balanced corner-to-corner illumination
- Detachable Shutter Cord

Automatic Operation

Auto f-Stop Settings to Closest Half-stop—ASA 25 film: f2 or f2.8 or f4, ASA 80 film: f3.5 or f4.5 or f6.3, ASA 160 film: f4.5 or f6.3 or f9.5

Maximum Automatic Operating Range—3 ft. to 25 ft. (0.9 m to 7.6 m)

Automatic Sensor Measuring Angle—20°

General Specifications

Guide Numbers—ASA 25: 50, ASA 80: 90, ASA 160: 125

Recycle Times—DC—7 seconds (manual), 0.5 to 7 seconds (automatic, depending on flash-to-subject distance), AC—0.5 to 5 seconds (with optional AC Adapter)

Flash Duration (approx.)—1/1000 second (manual), 1/1000 to 1/30,000 second (automatic)

Color Temperature—5500° Kelvin

Angles of Illumination—Normal—45° vertical, 60° horizontal, with wide angle attachment—60° vertical, 65° horizontal

Power Sources—DC—Four 1.5V AA Alkaline batteries (Mallory MN 1500 or equivalent), AC—105-125V with optional AC Adapter

Flashes per Set of Batteries—170 to 800+ (automatic, depending on flash-to-subject distance)

Camera/Electronic Flash Synchronization Connections—Shutter Cord, Hot Shoe

Weight without Batteries—10.4 oz. (295 g)

Dimensions—5¼" x 3½" x $1^{11}/_{16}$" (133 mm x 89 mm x 43 mm)

Accessories Included—Wide Angle Attachment, Vivitar PC-1 12" Shutter Cord

Vivitar Model 253
Automatic Electronic Flash Unit

- Built-in computer delivers exact amount of light needed
- Automatic operation from 2 to 17½ feet
- Multiple f-stop settings for depth of field control
- Accurate guide number of 35 with ASA 25 film
- Operates on alkaline battery or 110v/220v AC
- Illuminated calculator dial
- Recycles in 5 seconds with fresh battery
- 170 flashes from one 9V alkaline battery
- Color-corrected lens for natural skin tones

Automatic Operation

Automatic f-stop settings to the closest half-stop—ASA 25: f2 or f4; ASA 80: f3.4 or f6.7; ASA 160: f4.8 or f9.5

Flash Duration—1/1000 to 1/35,000 second

Automatic Operating Range—2 feet to 17½ feet

Automatic Sensor Measuring Angle—20°

General Specifications

Guide Numbers—ASA 25:35; ASA 80:63; ASA 160:89

Recycle Time: (AC, or DC with fresh battery)—5 seconds

Color Temperature (approx.)—5500° Kelvin

Angles of Illumination—55° vertical, 55° horizontal

Power Sources—DC—One 9V alkaline battery, AC—110V/220V with optional AC Adapter

Flashes per Battery—170

Camera/Electronic Flash Synchronization Connections—Shutter Cord, Hot Shoe

Weight without Battery 4¾ oz.

Dimensions—1¼" x $3^{11}/_{16}$" x $3^{5}/_{16}$" (less the mounting foot)

Accessories Included—PC-1 12" Shutter Cord

Vivitar Model 252
Automatic Electronic Flash Unit

- Built-in computer delivers exact amount of light needed
- Automatic operation from 2 to 17 feet
- Multiple f-stop settings for depth of field control
- Accurate guide number of 32 with Kodachrome II (ASA 25)
- Operates on Alkaline batteries, optional NiCad batteries or 110V/220V AC
- Illuminated calculator dial
- Recycles in 7 seconds with fresh batteries
- 160+ flashes per set of AA Alkaline batteries
- Balanced corner-to-corner illumination
- Color-corrected lens for natural skin tones

Automatic Operation

Auto f-Stop Settings to Closest Half-stop—Kodachrome II (ASA 25) f1.8 or f3.5, Kodacolor X (ASA 80) f3.5 or f7, High Speed Ektachrome (ASA 160) f5 or f10

Maximum Automatic Operating Range—2 ft. to 17 ft.

Automatic Sensor Measuring Angle—15°

General Specifications

Guide Numbers—Kodachrome II (ASA 25) 32, Kodacolor X (ASA 80) 60, High Speed Ektachrome (ASA 160) 82

Recycle Time (AC or DC)—7 seconds (average)

Flash Durations (approx.)—1/1000 second (manual), 1/1000 to 1/30,000 second (automatic)

Color Temperature—6000° Kelvin

Angle(s) of Illumination—55° horizontal, 55° vertical

Power Sources—AC—Multiple voltage (110V/220V), DC—2 AA 1.5v Alkaline batteries or Vivitar NC-1 NiCad Battery Pack

Flashes per Set of AA Alkaline Batteries—160+

Flashes per Charge with Optional NiCad Battery Pack—80+

Camera/Electronic Flash Synchronization Connection(s)—PC cord, Hot Shoe

Weight with Batteries—7 oz.

Dimensions—3½" x $1^{9}/_{16}$" x $3^{1}/_{16}$"

Accessories Included—Multiple Voltage (110V/220V) AC Cord, pouch case

*For Vivitar Models 152 and 252 only

Vivitar Model 202
Automatic Electronic Flash Unit

- Built-in computer delivers exact amount of light needed
- Automatic operation from 3 to 11 feet
- Accurate guide number of 30 with Kodachrome II (ASA 25)
- Recycles in 4 seconds with fresh batteries
- 400+ flashes per set of AA Alkaline batteries
- Balanced corner-to-corner illumination
- Color-corrected lens for natural skin tones
- Detachable PC cord

Automatic Operation

Automatic f-Stop Settings to Closest Half-stop—Kodachrome II (ASA 25) f2.8, Kodacolor X (ASA 80) f4.5, High Speed Ektachrome (ASA 160) f8
Automatic Operating Range—3 ft. to 11 ft.
Automatic Sensor Measuring Angle—15°

General Specifications

Guide Numbers—Kodachrome II (ASA 25) 30, Kodacolor X (ASA 80) 55, High Speed Ektachrome (ASA 160) 75
Recycle Time—4 seconds (average)
Flash Durations (approx.)—1/1000 second (manual), 1/1000 to 1/30,000 second (automatic)
Color Temperature—6000° Kelvin
Angle(s) of Illumination—55° horizontal, 55° vertical
Power Sources—4 AA 1.5V Alkaline batteries
Flashes per Set of Batteries—400+
Camera/Electronic Flash Synchronization Connection(s)—PC cord, Hot Shoe
Weight with Batteries—7¼ oz.
Dimensions—1⅜" x 3" x 3⅛"
Accessories Included—Detachable PC cord

Vivitar Model 200
Automatic Electronic Flash Unit

- Built-in computer delivers exact amount of light needed
- Automatic operation from 2 to 10 feet
- Accurate ASA 25 guide number of 28
- Over 200 flashes from a single 9V Alkaline battery
- Recycles in 3½ seconds with fresh battery
- Balanced corner-to-corner illumination
- Color-corrected lens for natural skin tones

Automatic Operation

Automatic f-Stop Settings to Closest Half-stop—ASA 25: f2.8, ASA 80: f4.7, ASA 160: f6.7

Automatic Operating Range—2 ft. to 10 ft.

Automatic Sensor Measuring Angle—20°

General Specifications

Guide Numbers—ASA 25: 28, ASA 80: 50, ASA 160: 71

Recycle Time—3½ seconds with fresh battery

Flash Duration (approx.)—1/1000 second (manual), 1/1000-1/35,000 second (automatic)

Color Temperature—6000° Kelvin

Angles of Illumination—55° vertical, 55° horizontal

Power Source—1 9V Alkaline battery

Flashes per Battery—200+

Camera/Electronic Flash Synchronization Connections—Hot Shoe or optional PC Cord

Weight with Battery—6 oz. (170.1 g)

Dimensions—3¼" x $1^{5}/_{16}$" x $2^{11}/_{16}$" (83mm x 34mm x 69mm) (less the mounting shoe)

Vivitar Model 102 Electronic Flash Unit

- Accurate guide number of 30 with Kodachrome II (ASA 25)
- Recycles in 4 seconds with fresh batteries
- 400+ flashes per set of AA Alkaline batteries
- Balanced corner-to-corner illumination
- Color-corrected lens for natural skin tones
- Detachable PC cord

Guide Numbers—Kodachrome II (ASA 25) 30, Kodacolor X (ASA 80) 55, High Speed Ektachrome (ASA 160) 75
Recycle Time—4 seconds (average)
Flash Duration (approx.)—1/1000 second
Color Temperature—6000° Kelvin
Angle(s) of Illumination—55° horizontal, 55° vertical
Power Sources—4 AA 1.5V Alkaline batteries
Flashes per Set of Batteries—400+
Camera/Electronic Flash Synchronization Connection(s)—PC cord, Hot Shoe
Weight with Batteries—7 oz.
Dimensions—1⅜" x 3" x 3⅛"
Accessories Included—Detachable PC Cord

Vivitar Model 50 Electronic Flash Unit

- Accurate ASA 25 guide number of 22
- Over 200 flashes from a single 6V alkaline battery
- Recycles in 3½ seconds with fresh battery
- Balanced corner-to-corner illumination
- Built in Hot Shoe contract for cordless synchronization with the camera
- Color-corrected lens for natural skin tones

Guide Numbers—ASA 25: 22, ASA 80: 39, ASA 160: 56
Recycle Time—3½ seconds with fresh battery
Flash Duration (approx.)—1/2,000 second
Color Temperature—5500° Kelvin
Angles of Illumination—45° vertical, 55° horizontal
Power Source—One 6V alkaline battery (Mallory 7K67 or equivalent)
Flashes per Battery—200+
Camera/Electronic Flash Synchronization Connection—Only for use on cameras with Hot Shoe
Weight w/o Battery—2¾ oz. (78g)
Dimensions—1⅝" x 2¼" x 1¾" (41.9 mm x 57.2 mm x 35.6 mm), (less the mounting foot)

Vivitar Model SL-1 Remote Flash Trigger

Features

Light-Sensitive Triggering Device—Enables you to fire a number of remotely positioned electronic flash units in perfect synchronization to the prime electronic flash attached to the camera.

Operating Distance—Approximately equal in feet to guide number of flash with Kodachrome II (ASA 25).

Example:	Guide No.	Operating Distance
	30	30 feet
	50	50 feet

Triggers Electronic Flash Without Long Wires—Attaches to Standard PC tip of any electronic flash unit

Use In Sunlight—Can be used in daylight when directional hood is attached.

Patented Sunceram® Cell—Can be actuated from side or front.

Synchronization Connection—Standard PC

Time Delay—1/2000 second

Angle of Acceptance—180°

Trigger Voltage—350V maximum, 30V minimum

Power Source—Self-contained solid state circuitry requires no batteries.

Weight—½ ounce (14.2 g)

Dimensions—$^{15}/_{16}$" x 1" (24 mm x 25.4 mm)

Complete with Compact Carrying Case and Directional Hood

Vivitar Model SL-2 Remote Flash Trigger

Features

Light-Sensitive Triggering Device—Enables you to fire a remotely positioned flash unit in perfect synchronization with a main on-camera flash. Any number of SL-2 remote flash combinations will respond to the main flash.

Ambient Light Selector Switch—Allows you to use the SL-2 under-varying available light conditions.

- "LO" setting for low light level situations
- "HI" setting for very bright situations

Synchronization Connections—Accessory Hot Shoe or Standard PC

Angle of Acceptance—180°+

Maximum Trigger Voltage—330 volts

Power Source—Self-contained solid state circuitry requires no batteries

Weight—0.95 ounce (27 g)

Dimensions—Height: 2½" (63.5 mm), Diameter 1⅜" (30.5 mm)

Vivitar Electronic Flash Accessories

HVP-1 High Voltage Battery Pack—Converts the 510 volts of an E-497 or equivalent photo battery to the 330 volts usable in Vivitar Flash Units. Maintains the voltage to ±10 volts, a ¼ f-stop variability. Provides 750 flashes in the manual mode, and more in auto, depending on flash to subject distances, room reflectivity, and auto f-stop settings used. *Vivitar HVP-1

The HVC-1 Connecting Cord is for use with Models 273 and 283 Flash Units to connect the unit with the HVP-1. *HVC-1

The HVC-2 Connecting Cord is for use with Model 292 Flash Unit to connect the flash unit with the HVP-1. *Vivitar HVC-2

C-1 Soft Pouch Case—Carrying case with belt clip for Electronic Flash Models 273, 283.

Quick Release Pistol Grip With 35mm or 6 x 6 Bracket—This bracket provides a solid, controlled platform for shooting flash with either 35mm or 2¼ format cameras (choice of brackets). The quick release lets you remove the pistol grip/flash unit for off-camera flash and aim it anywhere you want for bounce or direct lighting. The pistol grip handle has a safety strap and tooling for the optional Cable Release. The flash shoe rotates 360° for complete control of direction and angle.

Vivitar PC Shutter Cords—Spares and Coiled Extra Long Cords—The PC-1 12" cord is for Electronic Flash Unit Models 100, 102, 200, 202, 253, 273, 283, 292.

The PC-4 Hot Shoe to PC Shutter Cord for Electronic Flash Unit Model 50.

The PC-31 3' Coiled Shutter Cord is for Electronic Flash Unit Models 100, 102, 200, 202, 253, 273, 283, 292.

RS-1 Remote Sensor for Model 292—Makes possible off-camera and bounce-flash with a choice of five f-stops, and fully automatic exposure control.

MV-1 Multi-Voltage Charger for Model 252—The MV-1 charges the NC-1 Battery Pack used in Electronic Flash Unit Model 252.

NiCad Battery Packs—The NC-1 NiCad Battery Pack is for use with Electronic Flash Unit Model 252.

The NC-2 NiCad Battery Pack is for use with Electronic Flash Unit Model 292.

AC Adapters—The SB-1 AC Adapter is for use with Model 253, and is a replacement for Model 252. Vivitar SB-1

The SB-3 AC Adapter is for use with Model 292. Vivitar SB-3

The SB-4 AC Adapter is for use with Models 273 and 283. Vivitar SB 4

Comparison Chart

Comparative Specifications And Features

	50	102	200	202	252	253	273	283	292
ASA 25 Guide Number	22	30	28	30	32	35	50	60	65
DIN 15 Guide Number	6.6	9	8.5	9	10	11	15	18	20
Recycle Time In Seconds (average)	3.5	4	3.5	4	AC/DC 7	AC/DC 5	DC: 0.5 to 7 AC: 0.5 to 5	DC: 0.5 to 9 AC: 0.5 to 7	AC/DC 0.25 to 8
Automatic Exposure Control			Yes	Yes	Yes	Yes	Yes	Yes	Yes
Thyristor Power Conservation System							Yes	Yes	Yes
Multiple f-stop Control					Yes	Yes	Yes	Yes	Yes
Replaceable Alkaline Battery (Batteries)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Built-in NiCad Batteries									
Interchangeable NiCad Battery Packs					Opt.			Opt.	Yes
Recharge Time (Hours)					3			15 min.	1
Number of Flashes per Alkaline Battery Load	200+	400+	200+	400+	160+	170+	170 to 800+	75 to 800	
Number of Flashes per Charge with NiCad Batteries					80+			50 to 800	to 700+
AC Operation					Yes	Opt.	Opt.	Opt.	Opt.
Battery Saving Circuit								Yes	Yes
Wide Angle Attachment							Yes		Yes
Illuminated Calculator Dial					Yes	Yes	Yes	Yes	Yes
Shutter Cord	Opt.	Yes	Opt.	Yes	Yes	Yes	Yes	Yes	Yes
Built-in Hot Shoe	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Vertical or Horizontal Mounting									Yes
Color Correction to Daylight	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
UL and CSA Electrical Listings	N/A	N/A	N/A	N/A	Yes	Yes	Yes	Yes	Yes
Open Flash Control		Yes		Yes	Yes	Yes	Yes	Yes	Yes
Automatic Bounce Flash							Yes	Yes	Opt.

Opt. = Optional
N/A = Not Applicable

Vivitar®

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Models & Specifications subject to change without notice