On-line camera manual library

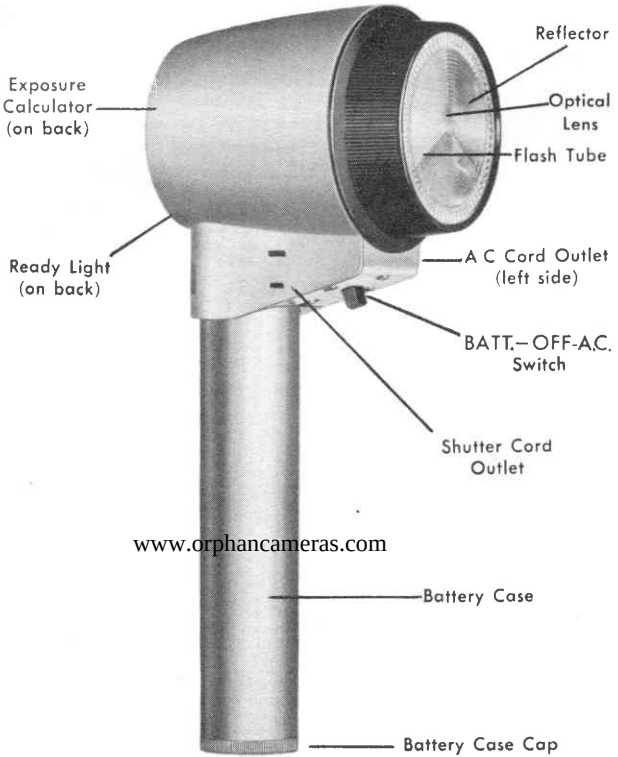
If you find this manual useful, how about a donation of $2 to:
M. Butkus, 29 Lake Ave., High Bridge, NJ 08829-1701
and send your e-mail address so I can thank you.
Most other places would charge you $7.50 for a electronic copy or
$18.00 for a hard to read Xerox copy.

This will allow me to continue this site, buy new manuals and pay their shipping costs.
It'll make you feel better, won't it?
If you use Pay Pal, go to my web site
www.orphancameras.com **and choose the secure PayPal donation icon.**

HOW TO TAKE BETTER PICTURES WITH THE

HEILAND FUTURAMIC STROBONAR

64 SERIES



Two tone Model 64-B illustrated.
Model 64-BX similar, with dark gray switch panel.
Model 64-A identified by solid color head.

THE FUTURAMIC STROBONAR

DUAL TRANSISTOR MODELS 64-B AND 64-BX
VIBRATOR POWERED MODEL 64-A

A revolutionary new product in the field of photography, the Futuramic is the only lifetime flash unit that is self-powered and completely contained in one unit the size of a conventional flash gun. A handsome match for miniature, reflex and folding cameras, it gives you a convenience of operation heretofore unknown in flash photography. Because of its utmost simplicity and easy handling, you can use the Futuramic for all your pictures—not only indoors, but for supplementing daylight as well.

The Futuramic is ideal for color pictures. The daylight-type light matches daylight color films without the need for any filters. The new circular light source and reflector provide daylight-type light with maximum efficiency. This scientific design gives an even distribution of light over the entire picture area covered by normal and all but extreme wide-angle lenses. The light has a special quality that gives you soft, natural-looking illumination ideal for portraits and candids alike. A repeating source of light capable of lighting many thousands of pictures, the Futuramic eliminates the need for carrying and changing bulbs. It "freezes"

action at 1/2000 sec., regardless of the shutter speed you use. Thus, camera and subject movement are eliminated, giving you sharp, clear pictures every time. Operation of the Futuramic is economical. It may be powered with "D" photoflash batteries (standard flashlight size), rechargeable nickel cadmium "D" cells, or by household alternating current.

Operation of the Futuramic is as simple as any flashlight. Just insert the batteries and turn on the switch. The easy-to-use exposure dial allows you to quickly determine the lens setting for lamp-to-subject distance, and eliminates the guesswork and mental calculations usually necessary in flash photography.

You'll find that the Futuramic gives you all the advantages of the highest quality lighting equipment. Its components are the finest made, specially designed for photographic application. This unit is precision engineered and, like all good photographic equipment, will last a lifetime with normal care. The convenience, efficiency, and economy of operating the Futuramic will make your photography more fun than ever.

CAMERA-FLASH SYNCHRONIZATION

The Futuramic is designed for taking pictures with cameras having built-in flash contacts. If your camera has a between-the-lens shutter with X-contacts ("O" delay), the Futuramic will synchronize with it at all shutter speeds. If your camera has a focal-plane shutter with zero-delay synchronization, it will synchronize only at slower speeds—up to 1/25 or 1/50 sec. (See Shutter Speeds, page 10, and your camera instruction manual.) Most cameras without built-in X ("O" delay) synchronization can be easily adapted for the Futuramic by a competent camera repairman. If you wish to check the synchronization yourself, see instructions on page 10.

Strobonar photo by Chuck Sauer

FUTURAMIC OPERATION

Futuramic Photography is simple and easy. These outlines for AC and Battery operation are provided as convenient check lists. Use them only after you read and understand the information on operation of the Futuramic in the paragraphs that follow.

Battery Operation

1. Insert batteries*
2. Mount on camera
3. Attach shutter cord
4. Set guide number on exposure dial (from page 14)
5. Determine exposure and set lens aperture
6. Push switch to BATT
7. Wait for Ready-Light
8. Shoot picture
9. Turn switch to OFF-AC during any delays *

AC Operation

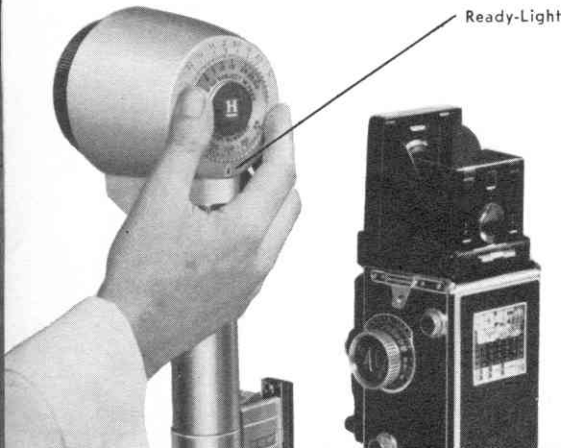
1. Mount on camera
2. Attach shutter cord
3. Attach AC cord to Futuramic
4. Plug AC cord into wall outlet
5. Switch remains at OFF-AC
6. Set guide number on exposure dial (from page 14)
7. Determine exposure and set lens aperture
8. Wait for Ready-Light
9. Shoot picture

*With the "+" end first. See page 5.

Top—Futuramic ready
for battery operation
Bottom—AC line cord connected
for AC operation

READY-LIGHT

The Ready-Light (see illustration) indicates that the unit is ready for operation. Wait for this light to appear, then shoot your picture.* The Futuramic is fast. On AC operation you can shoot a short sequence of pictures at 8-second intervals. Slightly more time is required between flashes on battery operation (see Battery Operation, page 5). A progressively longer time will be required as the batteries grow weaker—a condition which the Ready-Light signals by taking longer to glow.



Futuramic Strobonar back view showing Ready-Light and exposure dial

*The Ready-Light may flicker or light with a steady glow. In either case, operation is normal.

EXPOSURE DIAL

Another feature for your convenience is the Futuramic exposure dial. This easy-to-use calculator gives you the f/stop setting for lamp-to-subject distance when the Futuramic is used as the main source of light. Simply set the exposure dial so the guide number for the film you are using aligns with the point of the Ready-Light opening. (Find your guide number in the table on page 14) Read the proper lens opening opposite the lamp-to-subject distance on the dial. The calculation normally made to determine the proper exposure in flash photography is: Guide Number ÷ distance in feet = lens opening. With the Futuramic's handy exposure dial this calculation is done for you.

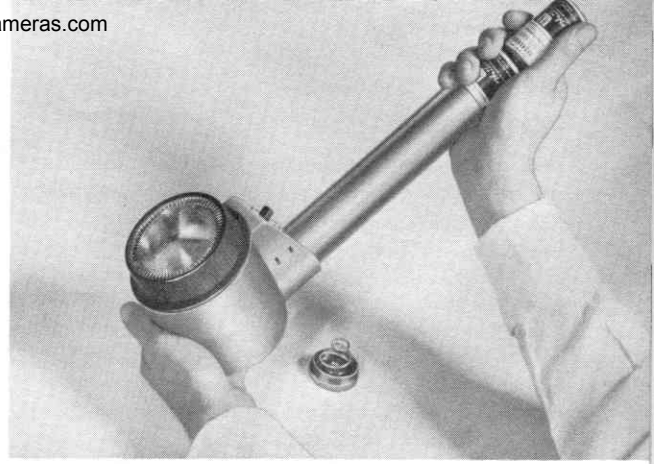
Example: The film you are using has a guide number of 120, listed in the table of guide numbers. Set quide number 120 on the dial at the pointer. The lamp-to-subject distance is 15 feet. Opposite 15 feet on the dial, you find the proper lens opening is f/8.

BATTERY OPERATION

Batteries are the ideal power supply for situations that demand maximum freedom of movement, for outdoor shots, and for casual, intermittent use. Three size "D" photoflash batteries are used to power the Futuramic. These batteries are available at all camera shops and most drug stores where photo supplies are sold. For the ultimate in batteries, Heiland rechargeable nickel-cadmium Permacad batteries are recommended.

To install the batteries, remove the screw cap on the base of the battery tube. Insert the three batteries as in an ordinary flashlight (with the "+" ends first)*. Then push the switch to the "BATT" position, where the red dot is visible, and wait for the Ready-Light to glow.

*Batteries must be inserted + end first in Models 64B and 64-BX Dual Transistor Units, otherwise the transistors may be permanently damaged.



TOP—Inserting batteries in Futuramic Strobonar
BOTTOM—Push switch to the "Batt" position.

BATTERY OPERATION CHARACTERISTICS

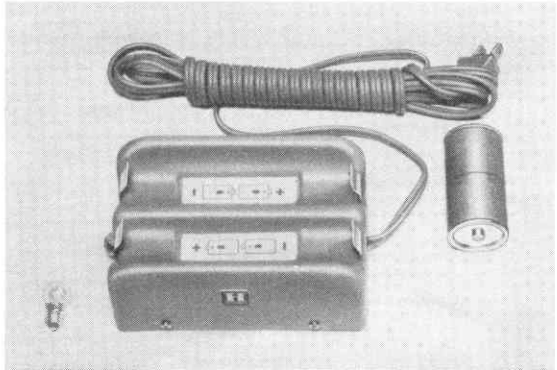
Average cycling time between flashes with fresh photoflash batteries is 8-12 seconds. When there is a relatively long interval between flashes, turn the unit off to save your batteries. TO SAFEGUARD YOUR FUTURAMIC FROM THE BATTERY CORROSION THAT SOMETIMES RUINS FLASHLIGHTS, REMOVE BATTERIES WHEN STORING THE UNIT FOR ANY EXTENDED LENGTH OF TIME. Since the cost of only 3 standard "D" photoflash batteries is extremely low, we suggest that these batteries be replaced whenever the unit has been in storage for a period of months, or when you are uncertain as to their condition. With average intermittent use, you can expect over 250 flashes from a set of Eveready E-95 batteries, or 100 flashes from ordinary D-cell photoflash batteries. (Double these numbers for 64-B and 64-BX transistor models.)

If the Futuramic has not been used for a period of a month or longer, plug the unit into the wall outlet for about five minutes, and flash it 9 or 10 times, using either the camera flash contacts or the Heiland manual tripping cord (#53-1). This will bring the Futuramic up to peak efficiency and conserve your batteries. The Futuramic thrives on frequent use—use it often!

PERMACAD BATTERY FEATURES

Heiland Permacad "D" Batteries are rechargable nickel-cadmium cells. One set of these batteries (which are charged in the Permacad Charger described below) will give a long life of convenient and economical service. Cycling time between flashes is 6-10 seconds and as many as 100** flashes can be obtained from each full charge. The Permacads may be charged as often as necessary and, when stored in a fully charged condition, will hold their charge for several months. Make it standard practice to give the batteries a full charge before storing them, and your Futuramic will be ready to use when you need it.

**Double this number for 64-B and 64-BX transistor models.



Permacad battery charger

CHARGING PERMACAD BATTERIES

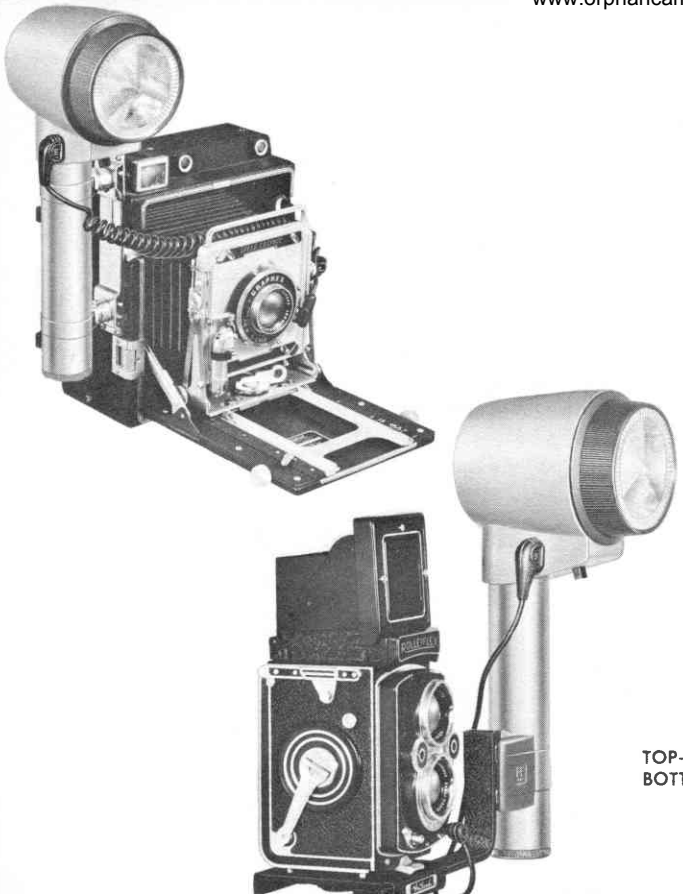
The Permacad Charger is designed to charge 4 Permacad Batteries. For use with the Futuramic, the 3 Permacads and one dummy battery (#900743) are placed in the charger, which is then plugged into any household AC outlet. The charger may be left plugged in overnight and the batteries will take a maximum charge in 12 to 16 hours. The Permacad Charger is an accessory every Futuramic photographer will appreciate.

AC POWER OPERATION

AC power is the most economical means of operating your Futuramic, and is ideally suited for indoor photography. Models 64-A and 64-B are designed to operate from a 115-volt source of alternating current, standard in most U.S. localities. Model 64-BX, which operates from a 220-volt source of alternating current, is designed primarily for use in countries other than the U.S. Just connect the line cord to your Futuramic and plug the other end into a wall outlet. The switch located under the flash reflector has two positions: "BATT" and "OFF-AC." For AC operation the switch must be in the "OFF-AC" position, where the red dot is not visible. The unit will not be damaged if the AC cord is connected when the switch is in the "BATT" position—you simply would be operating from battery power instead of AC. To turn off the unit, just disconnect the cord, either from the wall outlet, or from the Futuramic.

Futuramic ready for AC power operation

Strobonar photo by Glen Fishback



MOUNTING THE FUTURAMIC ON YOUR CAMERA

Heiland manufactures the finest line of mounting brackets, clamps, and other flash accessories on the market. Illustrated are a few of the ways of mounting the Futuramic on your camera. Custom mountings are also available. For snap-on mounting, which permits instant release of the unit for off-camera flash, use the Heiland Quick-Release Clamp with one of these brackets:

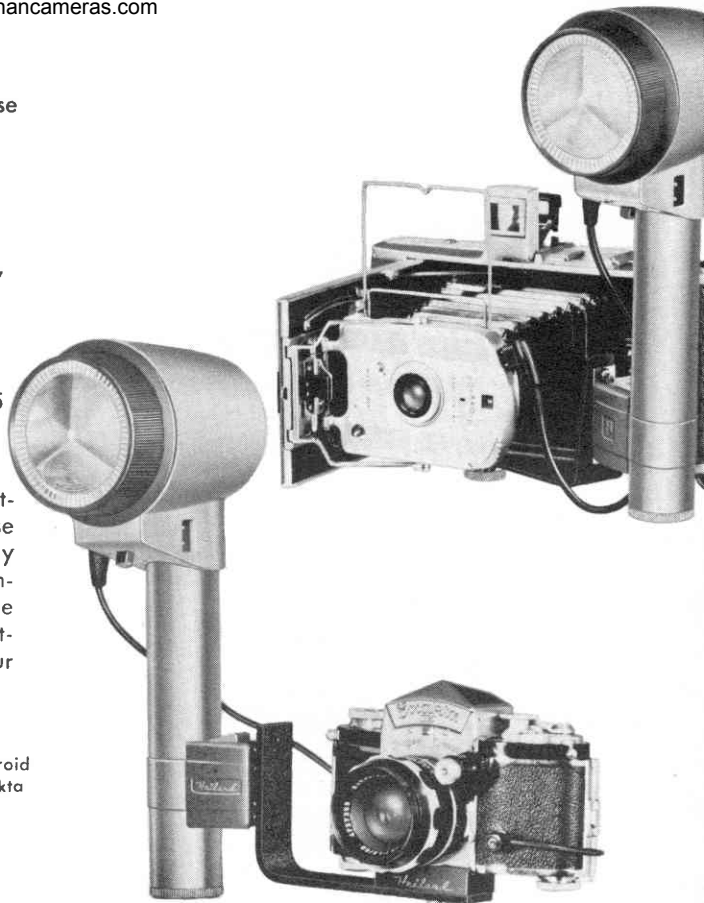
Bracket	Camera
Standard Camera Bracket	for most miniature and roll film cameras
R-7	most reflex cameras
B-1	Zeiss Super Ikonta B
135	Kine Exakta
135-VX	Kine Exakta VX
335	Retina 1, II and IIa Retina IIC and IIIC
Leica	All Leicas

TOP—Futuramic with heavy duty mounts on Graphic
BOTTOM—Futuramic with R-7 bracket on Rolleiflex

Or you may use the Futuramic with one of these snap-on Heavy Duty Mounts:

Heavy Duty Mounting Bracket	Camera
70	Anniversary Speed Graphic, all sizes
71	Meridian, 2¼ x 3¼ Busch, B & J Press, Press King, Ramlose
72	Crown-Speed Graphic "23"
74	for flat mounting
75	Crown-Speed Graphic "34"
76	Crown-Speed Graphic "45" and 1955 Pacemaker Speed Graphic
R-7A	most reflex cameras

Select the proper Heiland shutter cord for connecting the Futuramic to your camera. You may choose a 12-inch cord for on-camera use, or you may desire the versatility of a Koiled Kord for both on- and off-camera flash. Your Heiland dealer will be happy to assist you in selecting the proper mounting combination and connecting cord for your camera.



TOP—Futuramic with Standard Camera bracket on Polaroid
BOTTOM—Futuramic with 135-VX bracket on Exakta

GENERAL PHOTOGRAPHIC INFORMATION

SHUTTER SPEEDS

If your camera has a conventional between-the-lens shutter, you will usually use the higher shutter speeds. When photographing action in bright daylight, the higher shutter speeds will give a good sharp image and avoid any secondary (ghost) images. If your camera has a focal-plane shutter, use the highest speed which will afford a completely opened shutter at the instant of exposure.

Arrangement for checking synchronization

CHECKING SYNCHRONIZATION

If you are not sure about the shutter speeds at which your camera is synchronized for flash, you can make this test yourself. Connect your camera to the Futuramic with the shutter cord. Set the camera at the widest lens opening and point the Futuramic at a light colored wall so the *reflected* flash will be visible through the lens. Open the camera back, and watch for light coming through the lens when you trip the shutter at various speeds. When you can see a full circle of light, synchronization is good, and you are getting the benefit of all the light from the Futuramic. You may use any of the shutter speeds that give a full circle of light.

COLOR FILMS

Because its light is approximately the same as noon daylight, the Futuramic is ideally suited for use with daylight color films without corrective filters. Even though colors are clear and true without the use of filters, your personal preference may be toward slightly warmer colors. If so, a Harrison C ¼, Ansco UV-16, or Wratten 81A filter may be used with Kodachrome Daylight film. The filters recommended for electronic flash in the data sheets packaged with Daylight Ektachrome and Anscochrome may also be used. The smooth, evenly distributed light from the Futuramic will give you real pride in your color photography.

TAKING BETTER PICTURES WITH THE FUTURAMIC

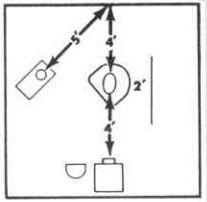
First of all, be sure your Futuramic and camera are ready to go. Be sure the batteries are properly installed; the proper shutter speed is set; and the shutter cord is connected from the Futuramic to the camera. If your shutter has adjustable synchronization, make certain that it is set at "X" ("O" delay). Then, before taking a picture, consider the elements of any good picture—composition, lighting, balance of mass and color, depth of field, background, scale, and center of interest. Plan your picture carefully. Consider the lighting effect you desire. Remember that your picture is made when you click the shutter.

Strobonar 60-S Slave Light on Hold-it.

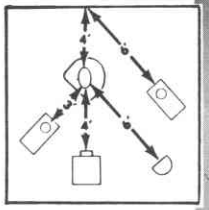
For general use, mount the Futuramic on your camera. The angle of light distribution is sufficient for all but extreme wide-angle lenses. This gives the even distribution of light, called "flat lighting," most desirable in group pictures and many candids. For color pictures, this flat lighting is especially good, bringing out smooth, true colors with soft, open shadows. For portraits or pictures where you desire modeling or a dramatic effect, use the Futuramic off the camera with light directed to the subject. This gives you better light control and enables you to get finer modeling with the use of one light source.

STROBONAR 60-S "SLAVE" UNIT

For the ultimate in flash photography, you will want one or two additional lighting units. The ideal secondary light is the Strobonar 60-S, a completely self-contained "slave" unit. The 60-S is triggered remotely by the flash of the Futuramic at the camera, without the use of any connecting or power cords. The examples of multiple-lighting arrangements reproduced here show the results you can expect using the Futuramic with one or more 60-S units.



Strobonar 60-S high above model, for background light, white reflector 2 feet from model to reflect light from Futuramic on camera. Exposure: f/22 at 1/500 on Verichrome Pan.



Strobonar 60-S slightly above model at left for main light source. One 60-S used as back-ground light, with Futuramic held to right and rear for fill light. Exposure: f/22 at 1/500 on Verichrome Pan.

GUIDE NUMBERS

A "guide number" is an indication of the relation between the light source and the film speed and distance from flash to subject. Guide numbers are used only for flash photography. The proper exposure for pictures taken by natural light is determined by and varies with the amount of light available. With flash, however, a fixed amount of light is packaged in each flash. The amount of light reflected from the subject is important, however, and this depends on the distance from flash to subject. With a fixed amount of light it is possible to determine the proper aperture (f/stop) if the distance (from lamp to subject) is known. Likewise, with a fixed amount of light, it is possible to determine the proper lamp-to-subject distance if the aperture is known. Thus it is possible to calculate a "guide" number which will give an indication of the proper exposure.

If experiment shows that a given flash unit gives the proper exposure at f/8 when placed 20 feet from the subject, its guide number is 160, or 8×20. Using the same equipment and same guide number at 40 feet, the calculation is as follows: $160 \div 40' = f/4$. At 15': $160 \div 15' = f/10.6$ (or, using the nearest marked f/stop on shutter: f/11). If an aperture of f/16 is wanted, calculate as follows: $160 \div f/16 = 10'$. At f/6.3: $160 \div f/6.3 = 25.4'$.

With the Futuramic, you do not have to go through these calculations. Simply turn the exposure dial to the guide number of the film you are using, and set your lens to the f/stop shown opposite the distance to your subject.

With the conventional flash lamps a new guide number must be computed for each shutter speed. This is not necessary with the Futuramic. All the light output from the Futuramic passes through the lens while the shutter is wide open; none is lost or wasted as the shutter opens and closes.

SUGGESTED GUIDE NUMBERS

The guide numbers shown were determined by developing the listed films in fresh, energetic developers according to manufacturers' instructions.

BLACK AND WHITE

	Guide Number
ANSCO	
Supreme	80
All-Weather	90
Superpan Press	120
DUPONT	
S-X Pan	200
Superior	80
Superior Press	160
High Speed Pan	140
ILFORD	
FP-3	90
HP-3	160
HP-S	220
KODAK	
Panatomic X	60
Verichrome Pan and Plus X	80
Tri-X and Royal Pan	160
POLAROID	
Types 31, 41	60
Types 32, 43	80
Type 44	110
Types 46, 46L	160

COLOR (DAYLIGHT)

	Guide Number
ANSCO COLOR	
Anscochrome (Daylight)	65
Super Anscochrome	90
KODAK COLOR	
Kodachrome (Daylight)	35
*Kodacolor (Use 85 Filter)	35
Ektachrome (E-2, Daylight)	65

For fine-grain development the guide number should be reduced by approximately 30%. For extended development the guide number should be increased by approximately 20%.

USING THE GUIDE NUMBERS

When the Futuramic is used indoors, or outdoors as the *main* source of light, simply set the guide number for your film on the Exposure Dial and read the f/stop for the proper lamp-to-subject distance. Most guide numbers are intended to give the proper exposure in a medium size room of average light colored walls and ceiling. When shooting pictures in a very large room or hall, the lens should be opened up one f/stop more than is indicated by the guide number. When shooting outdoors at night it will usually be necessary to open up two full f/stops.

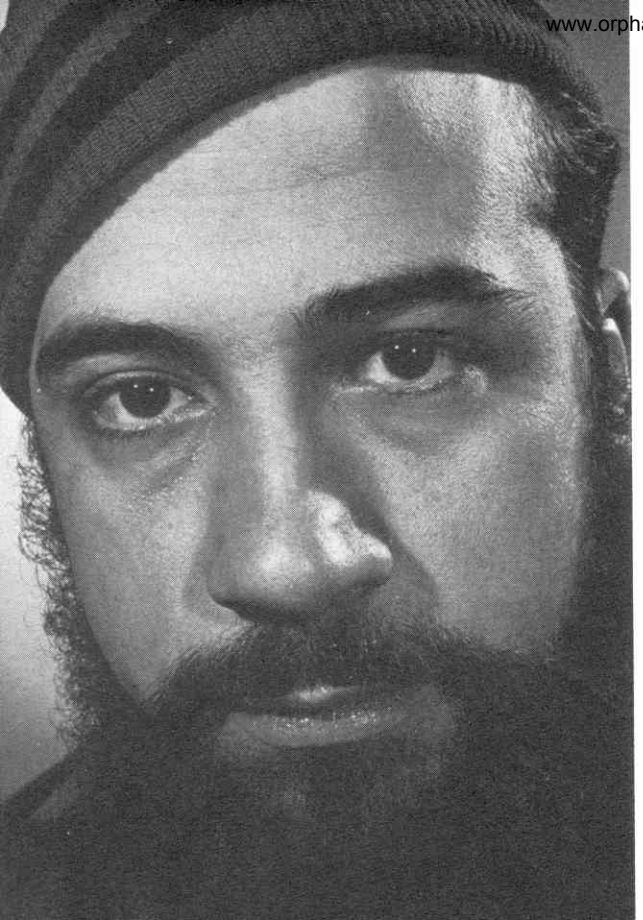
*A guide number of 55 **without** an 85 filter may be used, but the negatives will require custom printing for correct color balance.

OUTDOOR USE (As fill-in light)

Using the Futuramic as a fill light in sunlight requires a special exposure determination. There are now two light sources and both must be considered. Otherwise, the picture may be overexposed and look as though two suns were shining. For best results, let the sun do most of the lighting, and add just the right amount of light to fill in the shadows cast by the sun. With the guide number set on the Exposure Dial, read the f/stop for your lamp-to-subject distance. Now, *stop down* 1 *additional* f/stop for color film, and 2 f/stops for black and white. This keeps the flash-fill secondary to the sunlight. Since the flash duration of the Futuramic is too short to be affected by shutter speeds, you may now adjust the shutter speed for the outside light conditions. Use an exposure meter on the sunlit or highlight side to determine the proper shutter speed for the f/stop already determined.

EXAMPLE 1: Using Ektachrome (ASA Index 32), subject 12 feet away. The guide number, from the table on page 14, is 65. Set guide number 65 on the Exposure Dial and read the f/stop opposite 12′ on distance scale. Note that indicated f/stop is shown as f/5.6. *Stop down 1 f/stop, setting the*

TOP—Backlighted subject in bright sunlight. BOTTOM—Strobonar fill-in eliminates shadows and gives crisp detail. Meter reading was taken



camera at f/8. Now, with an exposure meter or guide, determine the shutter speed for f/8 with the *brightest area* of the daylight lighting conditions.

EXAMPLE II: Using Ansco Supreme (ASA Index 50), subject 10′ away. The guide number, from table on page 14, is 80. Set guide number 80 on Exposure Dial and read the f/stop opposite 10′ and note that recommended aperture is f/8. *Stop down 2 f/stops, setting the camera at f/16.* Now, with a meter or exposure guide, determine the shutter speed for f/16 with the *brightest area* of the daylight lighting conditions.

EXPOSURE

Proper exposure requires that the important shadow areas of the subject be exposed enough to afford detail in the final print. It also requires that the important highlight areas shall not be "blocked up" by too much exposure. The Futuramic helps obtain proper exposure because the extremely short duration of light prevents the highlights from blocking, even when the shadows are fully exposed.

To achieve proper exposure, make your first test exposures using the guide numbers suggested on page 14. The results should be satisfactory, but

for the very best results, make some exposures at a smaller lens aperture and some at a larger aperture. Then determine the guide number which will give the best exposure with your own equipment and processing combination.

Photography developed to the highest order of technical perfection requires careful control of all the variables that enter into equipment, supplies, and techniques. If you do your own processing, it is suggested that your techniques be standardized and you become familiar with your supplies and equipment. Only in this way will you be able to produce pictures of the highest technical quality. However, photography is a hobby to most people, and by reasonably following manufacturers' instructions excellent pictures can be made.

Enjoy yourself — photography is fun!

THE PHOTOS TELL THE STORY

See how the Futuramic distributes the light corner-to-corner over the entire picture area—not merely "spot-lighting" the center of the picture and leaving the corners dark. EVEN WITH ALL BUT EXTREME WIDE-ANGLE LENSES, the Futuramic gives the even light distribution over the entire picture area that is absolutely vital for good pictures.

TOP—The Futuramic gives full 70° light distribution—ample for most wide-angle lenses.
BOTTOM—"Hot Spot" caused by narrow beam

GLOSSARY OF PHOTOGRAPHIC TERMS

Aperture—The opening which admits light. The size is controlled by the diaphragm, which is marked in f/stop numbers.

Between-the-lens shutter—A device for controlling the length of exposure, located between the lens elements. Most cameras have this type shutter.

Blocking ("blocked up")—Overexposure of the highlight areas, resulting in loss of detail.

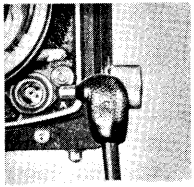
Color correction—Use of a filter or filters to achieve a difference in color.

Color temperature—Measured in degrees Kelvin, color temperature refers to the warmth or coldness of color. A "warm" color transparency, for example, is one more on the red side than blue; a "cold" transparency, one where blue tones predominate. An example of warm lighting is late afternoon sunlight.

Contrast—The range of tones, from lightest to darkest, in a picture. A print is "flat" when it is too low in contrast; "full scale" when all tones from white to black are present; "soft" when the contrast is moderate; and "hard" when there is too much contrast with lack of detail.

Diaphragm—Thin metal blades which "open up" or "close down" to regulate the amount of light admitted through the aperture of the lens. Regulated by the f/stop lever.

Flat light—The type of light that results from a subject being lighted "face on" by the sun, or by flash on the camera; it provides little or no contrast of light and shade.



Flash Terminals—The terminals installed in a camera for connecting to the flash unit. Different type terminals require different tips on the connecting cord. Heiland makes a cord for almost every popular camera, and your dealer will be glad to show you which type to use.

Focal Plane Shutter—A device for controlling the length of exposure, located just in front of the film. Usually made of cloth or metal, the shutter is composed of curtains, and the exposure is governed by the size of the slit or opening between the curtains as they move across the film.

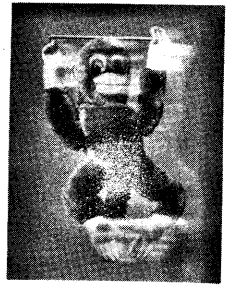
Focus—Adjustment of the camera-to-subject setting to make the subject appear sharp.

f/stops—Numbers which indicate the size of the diaphragm opening. The larger the number, the smaller the opening. For example, when you set your camera at f/16, you are admitting ½ the light of f/11; at f/22 you are admitting ¼ the light of f/11.

Grain—The texture caused by the small clumps of silver particles that form the image on a negative. The grain is excessive when it enlarges to a size that detracts from the print.

1710 = 60 Watts
ECPS

GLOSSARY OF PHOTOGRAPHIC TERMS (cont.)



Ghost Image—The secondary image that results when electronic flash is used, at too slow a shutter speed, to supplement daylight-illuminated action subjects. Here's how this happens: During the time shutter is open, one image is recorded with natural light, a second image is recorded by the split-second burst of electronic flash light. Because the subject is moving, the two images do not coincide.

Lens Opening—The size of the aperture (as indicated by the f/stop of the diaphragm).

Modeling—Using flash off camera (or keeping the sun off to one side of the subject) to achieve better contrast, detail, texture, etc.

Stop—Two photographic meanings: (1) to halt or "freeze" action in a picture; (2) as a synonym for "aperture"—i.e., stop 6.3, instead of f/6.3, or "stop down to f/8."

Synchronize—To time the firing of the flash with the the camera shutter so that all the light passes through the lens when the shutter is open.

X-Contacts—Flash contacts designed to fire an electronic flash unit at the exact instant the shutter is fully opened.

Zero ("0") Delay—Synonym for X-Contacts.

FUTURAMIC CHARACTERISTICS

Light Output	*Kodachrome guide number 35. 45 watt seconds stored energy.
Reflector Coverage	70°, ample for most wide-angle lenses.
Effective Exposure Time	1/2000 sec.
Color Temperature of Light	Approximately noon daylight, ideal for daylight color films.
D.C. Power Source	3 internal dry "D" size photoflash batteries or 3 "D" size nickel cadmium rechargeable batteries.
A.C. Power Source	64-A and 64-B: 105-125v, 50-60 cycles per sec. 64-BX: 210-250 v, 50-60 cycles per sec.
Height	11½ inches
Head Diameter	3¾ inches
Battery Tube Diameter	1½ inches
Total Weight	32.5 oz. without batteries 2 lbs., 15 oz. with 3 "D" size photoflash batteries.

*The ECPS formula used by some photographers is weighted to take into consideration the fall-off of light characteristic of ordinary reflectors. Since the superior reflector-tube design of the Futuramic eliminates this, the ECPS formula does not apply to the Futuramic. It is suggested, instead, that the guide numbers listed on page 14 be used as a starting point for any test exposures.