

650-311

OWNER'S MANUAL

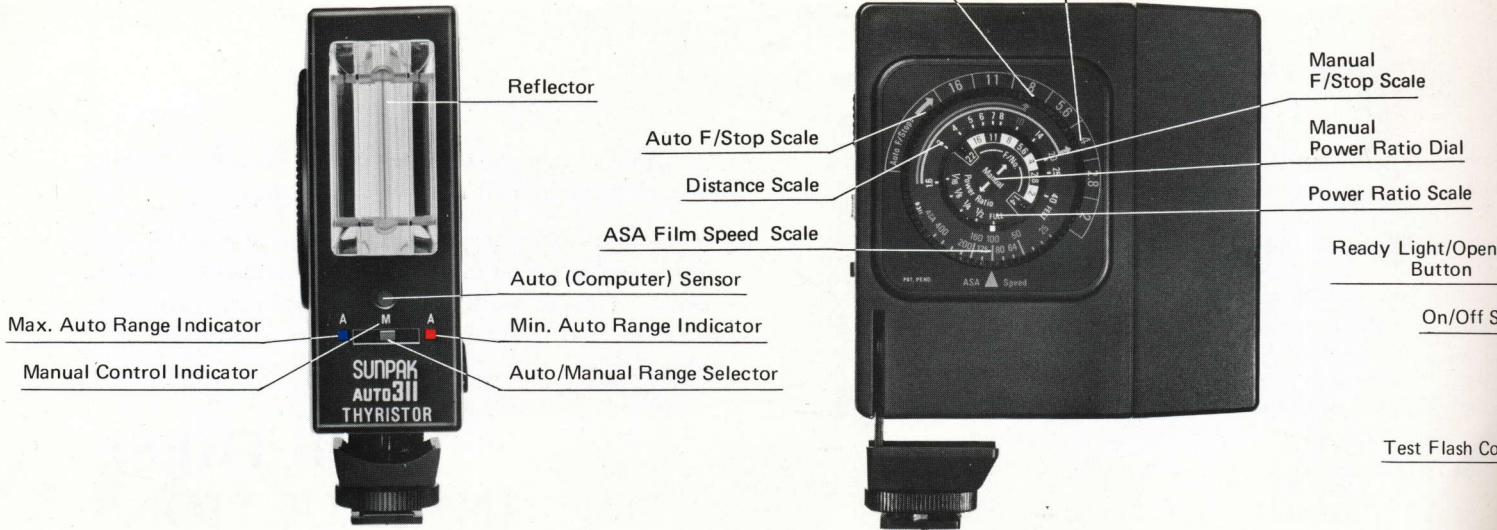
SUNPAK[®] AUTO311

ELECTRONIC FLASH UNIT

Thyristor



MAJOR PARTS OF SUNPAK AUTO 311:



A

B

tor

Battery Compartment Cover

Manual
F/Stop Scale

Manual
Power Ratio Dial

Power Ratio Scale

Ready Light/Open Flash
Button

On/Off Switch

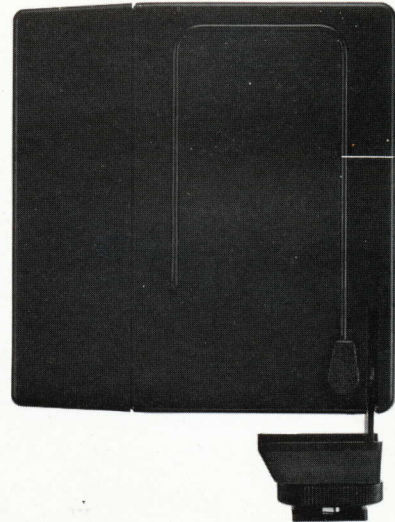
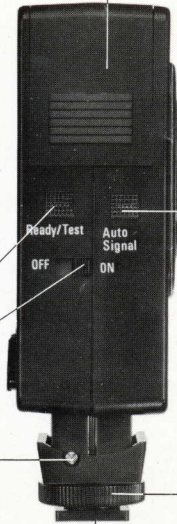
Test Flash Contact

Auto (Computer)
Signal Light

Knurled Locking Screw

Hot Shoe Contact

Recessed PC
Flash Cord





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INTRODUCTION

WELCOME to the world-wide family of *Sunpak* owners! Your Sunpak Auto 311 is an advanced electronic flash unit which gives you...

- **Automatic Computer Operation.** Perfectly-exposed flash pictures—automatically—at distances from 19 inches to 20 feet.
- **Dual Computer Range.** Gives you choice of lens openings for depth-of-field control.
- **Energy-Saving Thyristor Circuitry.** Gives you almost instant recycling and hundreds of extra flashes by conserving unused energy after each shot—in automatic *or* manual operation.
- **Exclusive Variable Power Ratio Control.** In manual mode, you can vary light output from Fullpower to an incredible 1/16th

power! Result: perfect fill-in flash outdoors.

In action photography, take pictures every second or faster—at any distance! Plus exciting special-effects applications.

- **Beautiful Color Pictures.** Sunpak's unique Gold-Toned Flash-tube and highly polished reflector make every shot a sure shot... and the light is the same color as daylight, so no filters are needed with daylight color films.

Since this flash is in many ways more versatile than conventional electronic flash units, please take the few minutes required to carefully read this Owner's Manual—with your Sunpak Auto 311 in front of you. You'll be rewarded by superior flash photographs starting with your first roll of film—and for many, many years to come....

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FOUR BASIC STEPS

Condensed Operating Instructions

To use your Sunpak Auto 311 Thyristor flash, here's all you have to do:

- 1) Install Batteries** (P. 8) The convenient hinged cover opens up to accept 4 AA Alkaline or Nickel-Cadmium batteries—enough for hundreds of flashes.
- 2) Mount on Camera.** (P.10) Slide flash into camera's accessory shoe, and lock in place by turning knurled black screw on flash. For 'Hot Shoe' cameras, no other connection is needed. If your camera requires a plug-in flash cord, pull out the built-in cord of the flash and plug it into the camera's 'X' outlet. Set shutter to fastest speed which is synchronized for electronic flash.
- 3) Select Lens Opening for Auto Operation** (P.13). Move Selector Switch (front) to Blue (maximum Range) or Red (Minimum

Range) position. Turn flash Calculator Dial (side) until correct ASA speed is shown by Orange triangle. The Blue and Red arrows at the top of the dial now point to the (Green) lens f /numbers for automatic operation in either range. Set your lens to the opening indicated for the Auto Range in use.

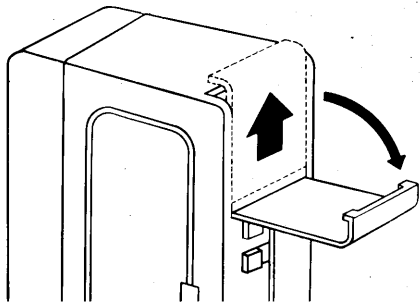
- 4) Take the Picture!** (P.16). Move switch on back of flash to 'On' position; in a few seconds, the Green (Auto) window lights up, confirming that you're set for automatic operation, next, the Red (Ready/Test) window lights up...and you're ready to take the picture!

To verify correct exposure, press the 'Ready/Test' button with your flash aimed at the subject. If exposure is correct, the green lamp will flicker rapidly immediately following your 'test' flash.

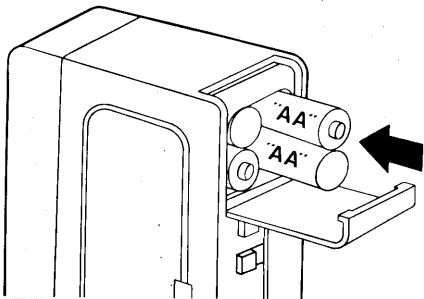
Picture after picture—different subjects, different distances, different surroundings. All perfectly-exposed, automatically, with your Sunpak Auto 311.....

OPERATION

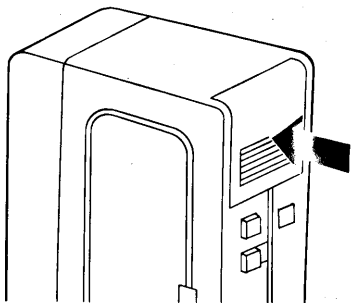
1) Install Batteries



1. Slide cover of battery compartment (back) partially towards top. Now, gently fold down cover in direction shown.



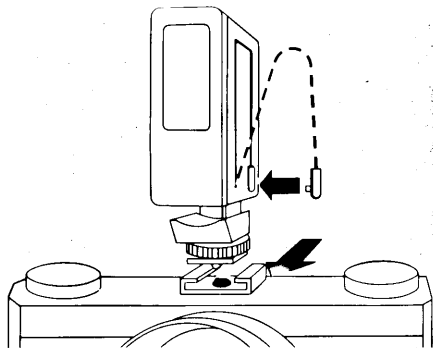
2. Insert four AA-size batteries (Alkaline or Nickel-Cadmium) as shown.



3. Press cover until it snaps into place.
For information on using Nickel-Cadmium batteries, see page 40.

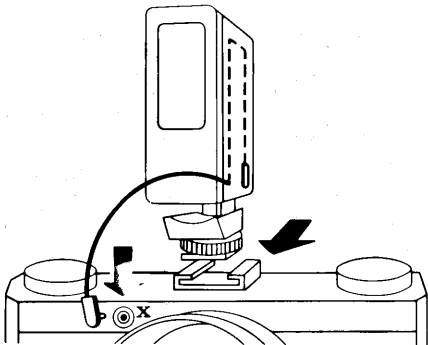
II) Mount on Camera

1. Raise the knurled Locking Screw on the flash by turning it clockwise. Slide flash into camera's accessory shoe (or shoe of flash bracket, if one is used). Turn the locking screw counter-clockwise fully to secure flash in shoe.



2. For cameras with 'Hot Shoe' (cordless) flash contact, no further connection is necessary. (Note: leave PC Cord plugged into retaining pin on Sunpak side; *if unplugged, flash will not fire through hot shoe.*)

If camera does not have 'Hot Shoe', pull out Sunpak's PC Cord (illustrated) and plug into camera flash outlet as shown.



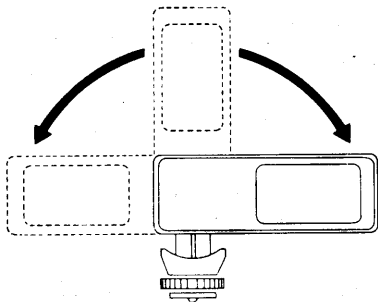
3. If camera has separate flash outlets marked 'M' and 'X' attach Sunpak cord to 'X' outlet.
4. If camera has switch (usually around lens barrel) marked 'M' and 'X', set switch to 'X' position.

5. Set shutter to fastest speed *synchronized with electronic flash*. For non-interchangeable-lens cameras, this is usually the fastest speed. With interchangeable-lens cameras, the highest usable speed is generally 1/60th second; however, cameras with the vertical-travel Copal 'Square' shutter (or similar type) permit electronic flash synchronization up to 1/125th second. Most cameras indicate the fastest 'X'-synch speed either by showing the letter 'X' on the speed dial, or by marking the fastest usable speed in a special color. If in doubt, check with your camera dealer (or in camera's instruction manual). Should this not be immediately possible, set shutter to 1/25th or 1/30th second: at this speed, *all* modern cameras are synchronized.

6. Select Flash Position

Your Sunpak flash is equipped with a unique 3-way mounting system. Simply turn the flash unit in the desired direction as shown. Select the position which is most comfortable, and gives you the best access to your camera's controls.

- * When shooting with wide-angle lenses, always place flash in horizontal position. This assures a wide light path, enabling you to use 35mm wide-angle lenses on your 35mm camera with excellent evenness of illumination throughout the entire picture area.

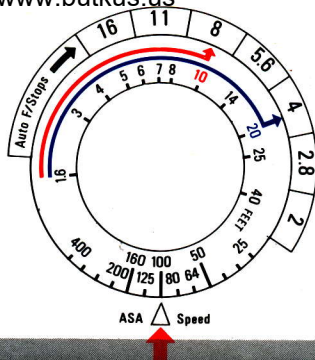


Note: Your flash is designed to provide optimum illumination over the field of a 35mm wide-angle lens. 28mm wide-angle lenses may also be used with acceptable results. If you own a 28mm wide-angle lens, take a series of test flash pictures to determine whether you will obtain satisfactory results under the conditions representative of your normal picture-taking.

III) AUTOMATIC OPERATION: SELECT LENS OPENING

Your Sunpak Auto 311 measures the light reflected by your subject—and automatically regulates lighting volume for correct exposure. The Auto ('Computer') sensor is housed in the front of your flash, below the flash reflector. By moving the selector switch (black) to either the Blue or Red mark, your flash is set for automatic operation.

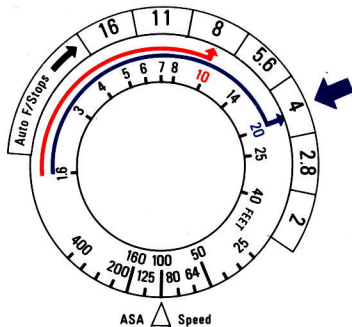
1. Move Calculator Dial on side of flash so that ASA Film Speed in use is shown by Orange Triangle at bottom. (Example: ASA 100.)



Note: If the ASA number for your film is not printed on the ASA Film Speed Scale, use an intermediate marking as shown:

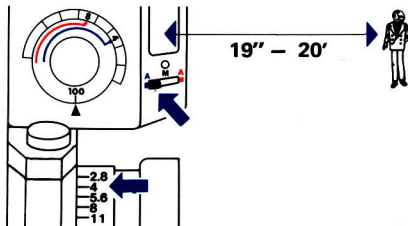
Marked ASA Speeds	400	*	*	200	*	125	100	80	64	50	*	*	25
Intermediate Nos.		320	250		160						40	32	

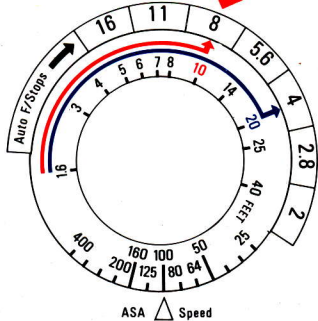
2. The Blue and Red Arrows (upper part of Dial) now point to the correct lens openings (Green f /numbers) for automatic operation. Set your camera's lens to the opening indicated for the Automatic Range you prefer. Then, move the Selector Switch (on front) to the matching-color symbol.



- A) For *maximum distance range* in automatic operation, set your lens to the opening indicated by the **Blue** arrow. (For ASA 100 film, the lens opening is $f4$.)
- B) Move Selector Switch (on front of flash) to the **Blue** symbol. Your flash and lens are now set for correct exposure at all distances between 19 inches and 20 feet.

For maximum distance range in automatic operation (Blue)

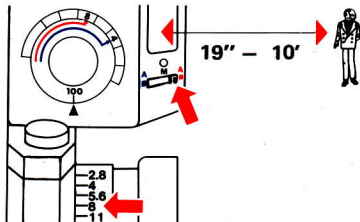




- C) For *maximum depth-of-field* (greatest sharpness in front of, and in back of, subject) set your lens to the opening indicated by the **Red** arrow. (For ASA 100 film, the lens opening is *f*8.)
- D) Move Selector Switch (on front of flash) to the **Red** symbol. Your flash and lens are now adjusted for correct exposure at all distances between 19 inches and 10 feet.

Note: Do not move Selector Switch to *White* symbol unless manual exposure control is desired (see p. 18).

For maximum depth-of-field in automatic operation (Red)



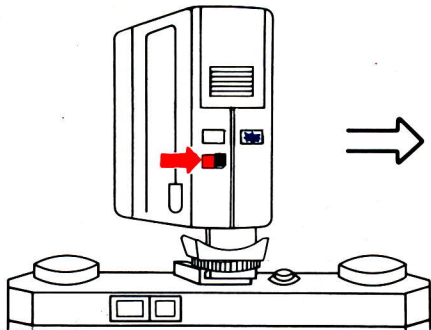
IV) TAKE THE PICTURE!

It's easy—just follow these steps:

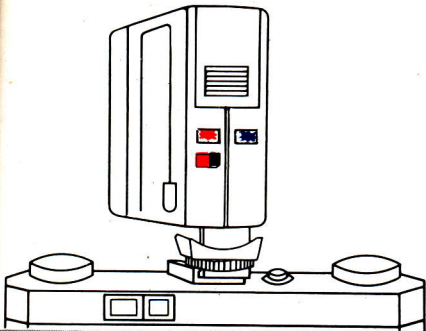
1. Move Off/On Switch (on back of flash) to 'On' position (so Red is visible). Within seconds, you'll notice the...
2. Green 'Auto Mode' window will light up. This confirms that your flash is set for automatic operation. Then, the...
3. 'Ready/Test' light will glow...showing that your flash is ready to fire at full power.

4. Take the Picture!

For succeeding exposures, just wait until the Ready/Test Light comes on; make sure you're within the distance range for Automatic operation (19"—10' at minimum range, 19"—20' at maximum range) . . . and shoot!



- * To verify correct automatic exposure, just aim your flash directly toward your subject and press in the 'Ready/Test' button. This will cause the flash to fire without actually exposing any film. If the automatic exposure is correct for your subject, the green 'Auto Signal' lamp will flicker rapidly immediately after the 'test' exposure. If



the lamp does *not* flicker, move closer to your subject (or, if you're shooting in Red/Minimum range, switch to Blue/Maximum range and adjust aperture accordingly). This green lamp thus provides positive verification that your picture will be correctly exposed automatically.

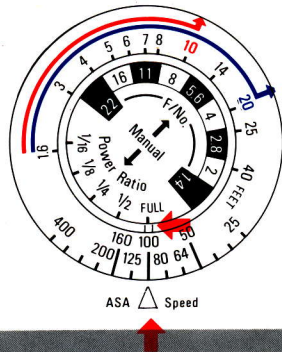
- * Because your Sunpak Auto 311 incorporates energy-saving Thyristor circuitry, you'll find you're able to take pictures within a few seconds—or fractions of a second! The closer you are to your subject, the less energy the flash requires—and the faster the interval between flashes ('recycling time'). When your subject is 3 feet away or closer, you'll be able to click off picture as fast as you're able to advance film in your camera!
- * When you're done taking flash pictures, turn the Off/On Switch to 'Off' position (Black is visible). No energy is now being consumed. (The 'Auto Mode' and 'Ready/Test' lights may continue to glow for several minutes; that's O.K.)

V) MANUAL OPERATION: At Maximum Power

Using your flash manually at full power is generally beneficial only when subjects are more than 20 feet away and/or use of smallest possible lens openings is desired.

Here's how:

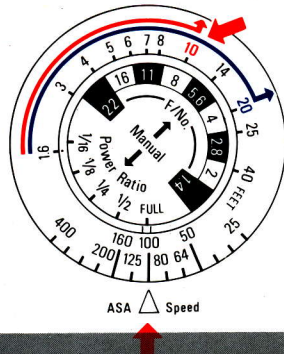
1. Move Selector switch on front of flash to center position (under the white 'M'). This disengages the auto computer circuit of your flash. You will note that the green auto signal light will not glow.
2. Move Power Ratio dial (on side, in center of calculator dial) so that the word "Full" is indicated by the white mark below the dial.
3. Move (outer) calculator dial to show correct ASA film speed. (Example: ASA 100).



VI) MANUAL OPERATION: Selecting Light Output for Different Lens Openings

Your Sunpak Auto 311 electronic flash has the unique capability of variable light output, even when used in manual mode. This enables you to shoot at wider or smaller lens openings for selective *depth-of-field control* and, as the energy-saving thyristor circuitry continues to function, simultaneously shortens recycling times and provides greater numbers of flashes. Yet, this remarkable feature is extremely easy to use:

1. Move Selector switch on front of flash to center position (under the white 'M'). This disengages the auto computer circuit of your flash.
2. Move (outer) calculator dial to show correct ASA film speed. (Example: ASA 100).

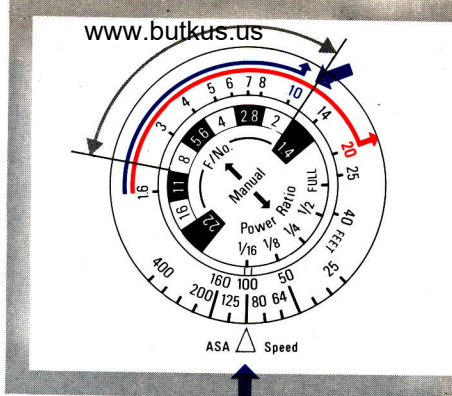


3. Focus as you normally do. Note the distance shown by the distance indicator on your lens. (Example: 10 feet).
4. Now, simply move the Power Ratio Dial (in center of calculator dial) until the desired lens opening appears under the correct flash-to-subject distance (10 feet). With ASA 100 film at 10 feet from your subject, you can select lens openings from f 2.0 (1/16th

power) to $f8$ (at full power).

If an intermediate lens opening is indicated, simply set your lens aperture ring to the in-between position as shown. However, ALWAYS MOVE THE POWER RATIO CONTROL DIAL TO A MARKED POSITION (such as Full, $\frac{1}{2}$, $\frac{1}{4}$, etc.). DO NOT SET POWER RATIO DIAL TO POSITIONS IN BETWEEN MARKED NUMBERS. (Should this be done, the flash will operate at Full power and over-exposure may result.)

5. Shoot! Your Sunpak Auto 311 flash will automatically deliver the correct volume of light for a perfectly exposed picture at the distance and lens opening selected.



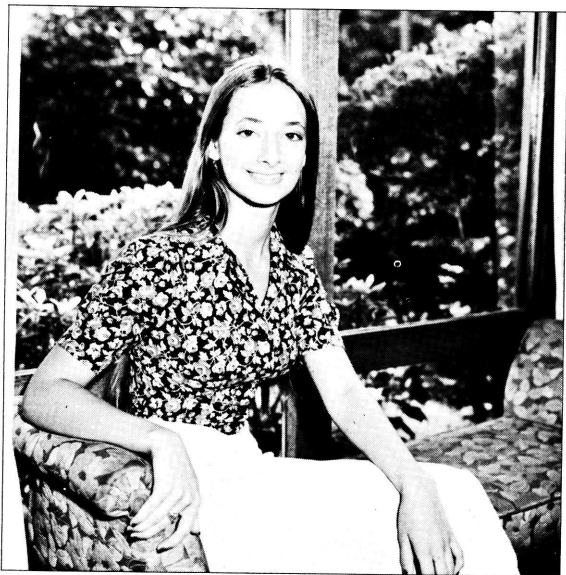
- * **Wider** lens openings ($f 1.4$, $f 2$, $f 2.8$) give the least depth-of-field. This effect makes the background appear blurred, while the subject is recorded sharply.
- * **Smaller** lens openings ($f 8$, $f 11$, $f 16$) record more background and foreground objects sharply. Use smaller lens openings when you wish to show the surroundings clearly, or when your subject is hard to focus on precisely (example: children at play).

VII) MANUAL OPERATION: Synchro/Sun Photography (Fill-In Flash) and Other Special Applications

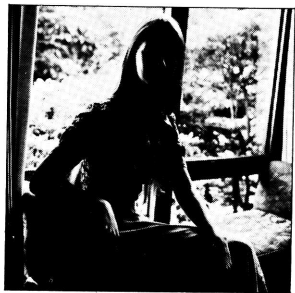
Your Sunpak Auto 311 electronic flash can be of significant benefit even in outdoor photography. Example: bright day at the beach... much too bright for your subject to face into the sun. So you turn her around, and shoot against the sunlight: a backlit shot. You even carefully take a close-up meter reading of her face, to insure that the exposure is based on the light on her face (relatively dim) and not the background light (extremely bright). While this technique will produce a well-exposed image of the subject, the background will be rendered far too light; the brightness values in the scene are beyond the ability of any film to record... Solution: Sunpak Auto 311... and its variable-intensity lighting selector.

1. With your camera's built-in exposure meter (or a separate meter), determine correct lens opening *for the brightest part of the scene* when exposed at the fastest speed at which your camera synchronizes with electronic flash. (Automatic cameras of the shutter-priority type, such as the Konica Auto-reflex T3 and A3, may be used in "Automatic" mode.)

Example: Set your camera's shutter to 1/125th second (or to whatever is the fastest speed synchronized for electronic flash). Your meter indicates correct exposure for the brightest part of the scene — usually the background. Example: *f*8. Set your lens to this opening. (Automatic cameras will, of course, set this opening auto-



Exposed with Fill-In Flash



Exposed by Daylight only

matically.)

2. Focus and read the camera-to-subject distance in feet from your lens' distance scale.

Example: 5 feet.

3. You have now determined the two required parameters for correct exposure - aperture and distance. Move Power Ratio dial so that the required distance (5') appears above the required aperture ($f8$). Your flash will now operate at the correct Power Ratio setting for perfectly-balanced fill-in flash. Example: Where an aperture of $f8$ is required at a distance of 5', a "Power Ratio" of $\frac{1}{4}$ is indicated for ASA 100 film.

Important — always move Power Ratio dial to a *marked* position — Full, $\frac{1}{2}$,

$\frac{1}{4}$, $\frac{1}{8}$ or $\frac{1}{16}$. Do not set Power Ratio dial to in-between positions or flash will operate at Full power and over-exposure may result.

4. Shoot! Your picture will be perfectly exposed, as the light of the flash is now balanced perfectly with the exposure required for the brightest part of the scene!

The technique described above provides equal brilliance on the subject and the brightest part of the overall scene. This effect is called "full" fill-in and gives excellent results with a majority of subjects.

The possibilities are almost endless: subjects partially in sunlight, partially in shadow; subjects under trees or foliage,



An Example of Full Fill-In Photography

which casts hundreds of small shadows across the subject; a subject indoors, gazing through a window, part of their face lit by the daylight and part unlit: in these and a thousand and one situations, your Sunpak Auto 311 will create strikingly beautiful daylight/synchro photographs for you.

- Should you prefer a slight fill-in effect (less light on subject), move the Power Ratio control to the next *smallest* position: for example $1/8$ when $1/4$ is indicated. Use this technique when your subject is in only slight shadow or is unusually light in complexion or appearance.

- Alternatively, you may wish to employ a *more pronounced* fill-in flash effect when your subject is either dark in complexion or is in extremely heavy shadows and thus much less well lit than the brightest part of the scene. This "extra" fill-in effect is achieved simply by dialing a Power Ratio one step *greater* than indicated — for example, $1/2$ instead of $1/4$.
- Experiment when possible, to determine the ratio most pleasing to you with subject representative of your normal picture-taking.

VIII) MANUAL OPERATION: Constant Aperture Control In Photomacrography

This chapter applies exclusively to close-up photography using extension rings or bellows units.

Macro is the world of the infinitesimal. Perhaps showing a specimen at life-size (1X) - or at 7 times it's size. Often, it is desirable to take photomacrographs at many different magnifications and distances...yet equally desirable to maintain a constant lens aperture for each shot (preferably the smallest usable aperture to gain maximum depth-of field).

1. Place your flash so that the reflector surface is approximately 19" (1.6') from the subject.
2. On your Sunpak Manual Power Ratio dial, align the distance (1.6') with the minimum available aperture of the lens.

Example: $f/16$. Set your lens to this opening.

3. Your flash is now set for the correct Power Ratio setting for normal photography.

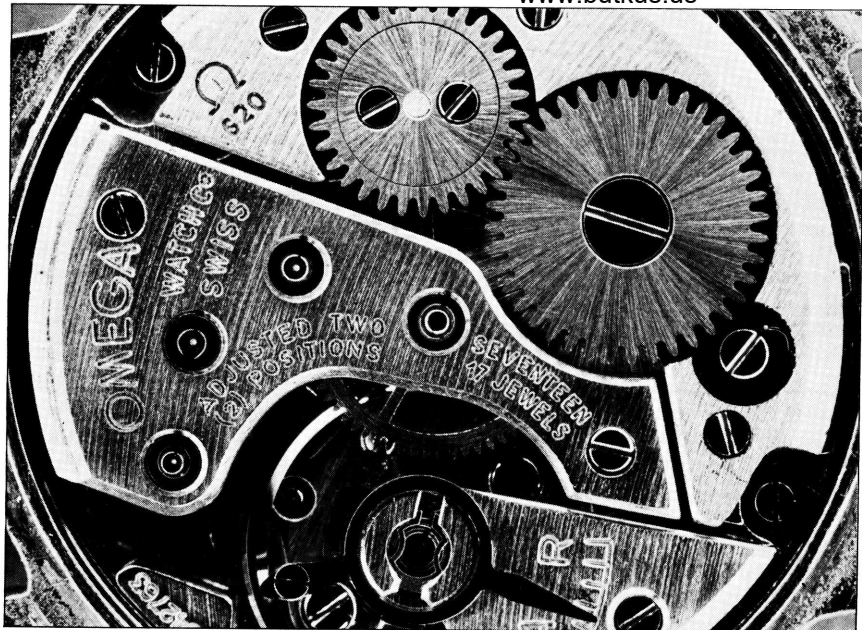
Example: With ASA 100 film, correct Power Ratio position is 1/8th.

This setting is the correct one for all exposures not requiring additional compensation for bellows extension or magnification. However, photography at a distance closer than about eight times the focal length of a lens requires additional exposure to compensate for the increased lens-to-film distance. This exposure factor is normally shown on scales attached to the bellows units, or in the instructional material supplied with extension tubes and bellows. Normally, this factor is applied by opening the lens to a wider aperture -

which is basically undesirable in close-up photography. To apply it, and continue shooting at the same lens opening regardless of the "exposure factor" simply....

4. Multiply the "exposure factor" by the Power Ratio originally obtained for uncompensated exposures at 1.6".
Example: Shooting at 1:1 (1X - life size), the indicated exposure factor with your bellows unit is "4". You have already determined a Power Ratio setting of 1/8th for uncompensated exposures. $4 \times 1/8 = 4/8 = 1/2$; the correct Power Ratio is in this case $1/2$. Set this Power Ratio...and shoot - no further adjustment of any sort is required.

- * This procedure is applicable not only to photography of three-dimensional objects but in slide duplicating as well. In use, the flash is placed 19" from the outer surface of the duplicator. A film test is suggested to determine the absorption factor of the diffusion shield normally used with slide copiers; this factor is then applied to the ASA film speed and operation from that point carried out as described above. If the original slide is under-exposed, adjust the Power Ratio control to provide more light. (For example, $1/2$ power instead of $1/4$). If the slide is overexposed, reduce brightness by adjusting the Power Ratio control to provide *less* light.



PHOTOMACROGRAPHY

* Placement of the flash at 19" or more from the subject is strongly recommended. At this distance, a wide light path is obtained: equally important, light output of the flash is uniform. Using your flash at closer distances may result in over-exposure as well as possible misdirection of the light.

* Individual photographers will immediately discern other areas in which the unique thyristor-linked variable power control mechanism will prove an aid to better photography. Obvious situations would include multiple-light portrait and product photography, where an entire series of pictures may be taken with the "ratio" or relative strength of main, fill, and back-lights adjusted by

means of the Power Selector - no need to move flash units or stands back and forth as before!

* Another important advantage: obtaining extra flashes in emergencies where replacement batteries are not conveniently available - if, for example, you're shooting a wedding...and half-way through the recycling time lengthens substantially, indicating that fresh batteries or recharging are needed. Solution: switch to "Manual" operation at a fractional power setting such as 1/4th or 1/8th power - and increase the available number of flashes - irrespective of distance - accordingly (4X as many 1/4 power, 8X on 1/8th, and so on).

IX) MANUAL OPERATION: Shooting at Controlled Recycling Times

On "Automatic", your Sunpak Auto 311 will provide exactly the volume of light required, then save the remaining energy for subsequent shots. Many photographers, however, require the ability to shoot shot after shot very rapidly irrespective of flash-to-subject distance.

Example: Photography of a sporting event with a motor-driven camera. Here the Sunpak Power Ratio control again provides a practical solution:

1. Follow this rule: each one-step reduction in operating "Power Ratio" reduces recycling time by approximately 50%.
2. Determine recycling time to "Full" power (manual) with your equipment and fresh batteries.
Example: Recycling speed is determined to be approximately 4 seconds at full power.
3. Select Power Ratio accordingly. If exposures every two seconds are required, operate at $\frac{1}{2}$ power. For exposures every second, a Power Ratio of $\frac{1}{4}$ is thus indicated.

Note: As battery power may diminish in use, it is recommended to choose an even smaller Power Ratio wherever

possible: For example, shoot a 1/8 power when it is known that 1/4 power will provide the approximate recycling speed required. This practice will compensate for inevitable fluctuations in battery voltage, differences in temperature, etc.

- * Individual tests are suggested with your equipment and power sources to determine exact recycling speeds under typical working conditions. These tests will accurately reflect usable recycling speeds with your "system".

X) MANUAL OPERATION: Creative Special-Effects Photography with The Sunpak Auto 311

Your Sunpak Auto 311 electronic flash unit opens up a whole new world of photographic enjoyment...with many important industrial and scientific benefits too. Because of this flash unit's unique electronic circuitry, you can actually control the duration (speed) of each flash...In Automatic operation, your flash will light for a brief fraction of a second (from 1/1500th second to as fast as 1/50,000th second depending on flash-to-subject distance.) Yet in manual operation, the unique power ratio control allows you to *control* the flash speed every time regardless of flash-to-subject distance! At "Full" power, flash speed is approximately 1/1500th second; at 1/2 power, about 1/3000th second...and so on; at 1/16th power,

the flash speed shortens to approximately 1/50,000th second—fast enough to virtually “freeze” any moving object!

- **Motion-Analysis Photography.** Subject: perhaps a stone being dropped into a bowl of water. Or a balloon being burst. Or an egg, dropped on a counter top.

Any of a thousand-and-one things in everyday life that we look at...but never really *see*. Now, we can:

1. Set up your camera with flash attached in a convenient location—preferably, mounted on a sturdy tripod.
2. Determine and set the correct lens opening for an exposure at 1/16th power, and set your flash unit's Power Ratio dial to this position.
3. Drop the stone (or egg, or whatever; or, have this done by a friend) and *snap the shutter as soon as the impact has begun*—that is, as soon as the object reaches the destination. Your photograph will be exposed at approximately 1/50,000th second—far faster than the costliest shutters permit.

You'll be amazed at the results!

XI) MANUAL OPERATION: Choosing Guide Numbers

A "Guide Number" is simply a number expressing the power of a flash unit in relation to the sensitivity (ASA film speed) of the film in use. In use, the photographer divides the flash-to-subject distance (in feet) into the Guide Number, and the result is the f stop for correct exposure. Normally, reference to Guide Numbers is not necessary as the computer mechanism (and calculator dial) of your Sunpak Auto 311 make such calculations unnecessary. However, there are two instances in which precise Guide Number information is needed:

1. **Use with "Flashmatic" Cameras or Lenses.** Many 35mm rangefinder-type cameras (such as the Konica Auto S3) incorporate their *own* automatic flash-exposure controls. With cameras (or lenses) of this type, the flash is set to Manual (selector switch to White symbol) and the lens aperture is automatically selected by the camera as you focus. For correct exposure with such cameras or lenses, the Guide Number for your film/flash combination must be set on the Guide Number Scale of the lens.
2. **In Certain highly specialized areas** of technical photography, the photographer may wish to judge the exposure by means of formulas based on Guide Numbers.

Here, the unique thyristor Power Ratio control of the Sunpak Auto 311 provides even greater versatility—for with any ASA film speed, you may in effect select the Guide Number...simply by moving the Power Ratio control to the position indicated in the Guide Number Chart (below):

Manual Power Ratio	ASA FILM SPEED															
	25	32	40	50	64	80	100	125	160	200	250	320	400	500	640	800
	GUIDE NUMBERS															
FULL	40	45	50	56	64	72	80	90	100	110	128	144	160	180	200	220
1/2	28	32	36	40	45	50	56	64	72	80	90	100	110	128	144	160
1/4	20	22	24	28	32	36	40	45	50	56	64	72	80	90	100	110
1/8	14	16	18	20	22	24	28	32	36	40	45	50	56	64	72	80
1/16	10	11	12	14	16	18	20	22	24	28	32	36	40	45	50	56

Important – always set Power Ratio dial to *marked* number – Full, 1/2, 1/4, 1/8 or 1/16. If moved to in-between position, flash will operate at Full power.

XII) HELPFUL HINTS

You'll get more enjoyment out of your Sunpak if you follow these handy tips:

- 1. Use Alkaline Batteries.** All brands are good, and all give you a lot more flashes than ordinary (zinc-carbon type) batteries. Alkalines hold their power longer, and are more stable (in warm or cold weather) than ordinary batteries. While Alkalines are somewhat more expensive, they pay for themselves in greater numbers of flashes and greater dependability. (Use of other battery types won't hurt your flash in any way, but it will mean you'll get fewer flashes per set.)

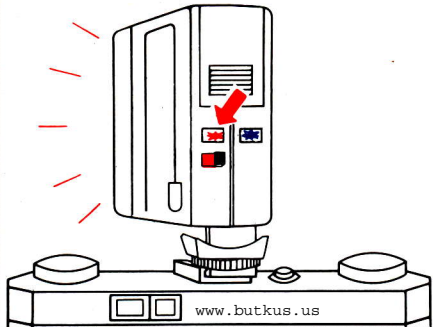
Alkaline Battery Numbers

Eveready E-91
Mallory MN-1500
Ray-O-Vac 815
Burgess AL-9
NEDA 15A

- 2. Check Camera Controls.** With cameras which do not have 'hot' shoe, make sure the flash cord is plugged into the 'X' outlet, or that the synch switch ("M-X") is set at 'X'. Of course, make certain the cord is firmly plugged in. And, remember not to exceed the maximum distance range of your flash (10' and 20') in automatic operation.
- 3. Use the Fastest Possible Shutter Speed.** If your camera 'synchs' with electronic flash up to 1/125th second, shoot at 1/125th (instead of a slower speed). The faster the speed, the less likely that the existing (ambient) light will cause an image to register on the film (this is called a 'ghost' image, and it's quite annoying). Use the fastest speed possible for best results.

4. Use 'Test Flash' to Check Lighting Effects. Your Sunpak can be fired without actually exposing film, to let you preview a lighting effect. (The feature is handy for a final check before taking important pictures, too.) How to do: Just Press the 'Ready/Test button'. This trips the flash without exposing any film.

If you prefer, you can "test" flash by touching the "open flash" pin at the rear of the unit with the tip of the built-in flash cord.



5. Check Auto Exposure For Important Shots. It's easy: just aim flash at your subject and press the 'Ready/Test' button to fire a 'test' flash. If the green Auto Signal lamp flickers afterward, the exposure is correct, and you can take the picture with complete assurance. If green light does not flicker, move closer to subject and make another test.

XIII) CHOOSING BATTERY TYPE

Your Sunpak electronic flash accepts both AA-size Alkaline batteries and rechargeable nickel-cadmium (Ni-Cad) cells. Each type offers practical advantages.

Alkaline batteries provide the greatest number of continuous flashes: approximately 200 - 1100 per set (depending on auto distance or manual Power Ratio in use).

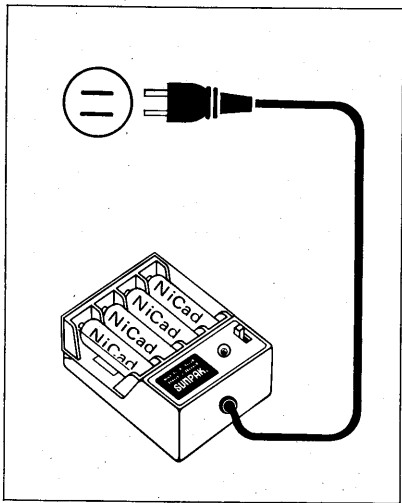
The interval between flashes (recycling time ranges from 0.5 second to about 7 seconds. When recycling time becomes much longer, the batteries should be replaced with a fresh set. Thus, Alkaline batteries represent an excellent choice for occasional use, use when several rolls of film are to be shot at one time, or simply as a dependable 'spare' energy source that's always ready.

XIV) USING RECHARGEABLE NICKEL-CADMIUM BATTERIES

Your Sunpak electronic flash unit accepts standard AA-size nickel-cadmium batteries (4). These let you take approximately 100-750 flash pictures; then, simply remove the batteries and recharge them in the Sunpak Nickel-Cadmium Battery Charger. A full charge is obtained overnight (14 - 16 hours), but you'll accumulate enough energy within minutes to permit 20 flashes or more - enough to expose an entire roll of 35mm film! Many photographers find it convenient to work with *two* sets of nickel-cadmium batteries, keeping one set in their flash while the other set is being recharged.

Battery Type. Your Sunpak dealer can supply you with General Electric GC-1, Eveready CH-500, Bright Star 8000, Sanyo N-500-AA, or equivalent 1.25v AA-size nickel-cadmium batteries.

Charger. The Sunpak Nickel-Cadmium Battery Charger is exclusively designed for use with AA-size nickel-cadmium batteries. It features a unique selector switch which lets you charge either two or four batteries at one time, and a convenient indicator lamp which lights up to show that batteries are correctly positioned. Another practical feature of this compact charger is a slot allowing you to wall-mount it if desired. You'll find it a welcome addition to your Sunpak system ...and probably find lots of other applica-

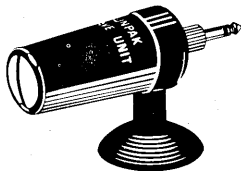


tions for using your nickel-cadmium batteries in radios, tape recorders, movie cameras, and other instruments using this popular battery type.

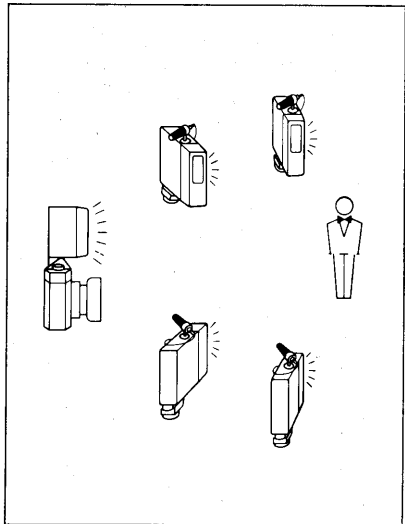
Performance. Nickel-cadmium batteries represent the most dependable power source for your electronic flash. In general, they provide faster recycling times than other battery types. The initial investment for nickel-cadmium batteries and charger is soon repaid by the ability to recharge the batteries literally hundreds of times...enough for a lifetime of flash photography.

XV) MULTIPLE FLASH OPERATION WITH SUNPAK AUTO SLAVE UNIT

Using two or more Sunpak electronic flash units can produce stunningly-attractive professional portraits. Equally, using additional flash units strategically positioned (for example, at different locations at a basketball game) can substantially expand photographic capabilities. How to do: use the compact, solid-state Sunpak Auto Slave Unit, available from your Sunpak dealer. This permits wireless synchronization of any number of Sunpak Auto 311 electronic flash units at distances up to 100' from the 'Master' unit. When the master unit (with shutter cord connected to the camera) is fired, all other slave-equipped units fire simultaneously.



1. Plug Sunpak Slave Unit into flash cord of auxiliary (second) flash unit.
2. Adjust sensor eye of Slave so that it faces master flash unit.
3. Determine correct lens opening manually (as a starting guide, close down lens one f /number from indicated aperture when using two directly-aimed flashes).
4. Connect main flash to camera in normal manner.
5. Shoot...when the light from the master (camera-connected) flash reaches the Sunpak Slave's sensor, the Slave automatically fires the second flash in perfect synchronization with the first! The Sunpak Slave operates at distances of up to 100 feet from the master flash, and is unaffected by even the brightest indoor lighting.



XVI) CARE OF YOUR ELECTRONIC FLASH

Your Sunpak electronic flash has been engineered to require almost no 'maintenance' in the normal sense of the word. Still, to insure best performance year-in and year-out, follow these basic pointers:

- 1. Inspect Batteries Frequently.** 'Inspect' means for reasonable recycling time (the length of time it takes the indicator light to come on between flashes): if it's more than 10 or 15 seconds, a fresh set of alkaline batteries should be obtained (or if nickel cadmium batteries are used, re-charged).

It's also wise to check your batteries for appearance: sometimes, even the best of batteries discharge or leak some chemical material through the jacket...and leave a whitish-powder on the battery, which passes onto your Sunpak's electrical contacts. (If this has happened, replace the batteries after cleaning the Sunpak's internal battery contacts with a pen-knife.) Finally, it's a good idea to remove the batteries once in a while and wipe them with a handkerchief — the cleaner the battery surface, the easier it is for the energy to pass through your flashgun's electrical system.

- 2. Remove Batteries.** If for some reason you do not intend to use your flash for a period of several weeks or more, remove the batteries and store them separately (inside a plastic bag is a good way).
- 3. Make Sure Flash is Securely Attached** to accessory shoe (and that accessory shoe is securely attached to your camera!
- 4. Service.** In the unlikely event that your Sunpak electronic flash requires service, return it to your dealer or the sole U.S. Distributor at the address shown on page 48. *Do not, under any conditions, attempt to disassemble and/or adjust it yourself:* electronic flash operates on pretty high voltage, and should not be taken apart. However, keep in mind that flash failure is more likely to result from weak batteries than any other single cause: if it doesn't fire, check batteries and contacts carefully.

XVII) Technical Specifications of Sunpak Auto 311 Electronic Flash:

Mounting	Fits standard accessory shoe or flash bracket; Horizontal or Vertical light path via 3-way adjustable mount	
Light Output in BCPS	1050	
Guide Numbers	80 with ASA 100 film; 56 with ASA 50 film; 40 with ASA 25 film	
Power Sources	4-AA Nickel-Cadmium Batteries	4-AA Alkaline Batteries
Number of Flashes	100 - 750	200 - 1100
Optimum Recycling Time	0.5 - 4 seconds	0.5 - 7 seconds
Recharging Times: 20 Flashes : Full Power	10 minutes - 1 hour 14 hours	
Exposure Control System	Automatic Computer Control with manual override	
Automatic Aperture Options ...	<i>f</i> 4 and <i>f</i> 8 with ASA 100 film; <i>f</i> 2 and <i>f</i> 4 with ASA 25 film	
Automatic Distance Range	19" - 20' at maximum aperture; 19" - 10' at minimum aperture	
Sensor Acceptance Angle	28°	

Flash Duration	1/1500th sec.-1/50,000th sec.
Angle of Illumination	50° Horizontal x 60° Vertical; allows use of 35mm lenses on 35mm cameras, 75mm lenses on 2¼ x 2¼" cameras, 90mm lenses on 2¼ x 2-3/4" cameras
Color Temperature	5500° kelvin, balanced for standard daylight color films
Synchronization Contacts	Built-in PC Cord and Hot Shoe Contact
Dimensions	1.5" x 3.5" x 4.0" (exclusive of mounting shoe)
Weight	9.4 oz. (less batteries)
Other Features	Computer Signal lamp glows to confirm auto operation; verifies correct auto exposure by flickering after exposure.
Optional Accessories	Sunpak Nicad Charger and Nickel-Cadmium Batteries; Sunpak Auto Slave Unit

Notice: Features and specifications are subject to change without prior notice.