How to use your Honeywell Universal Repronar

REPRONAR

Welcome to Honeywell's Family of Fine Photography

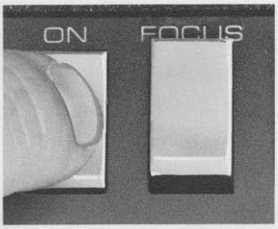
We hope your new equipment never causes problems. But if something should go wrong, please let us help. Our national network of Honeywell owned and operated service centers is staffed by trained technicians who know Honeywell equipment better than anyone else. You can get in touch with the center nearest you through your Honeywell photo dealer or by contacting the center directly. They're listed at the back of these instructions.

Please write to me directly if you have comments or suggestions on how we can serve you even better. We'd really like to hear from you.

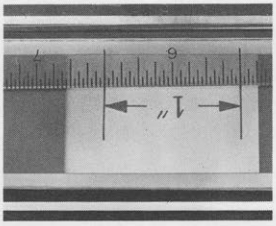
Robert M. Spangler, Director Consumer Affairs
Honeywell Photographic Products
5200 East Evans Ave.
Denver, CO 80222

Contents

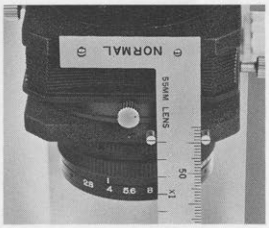
Operating sequence

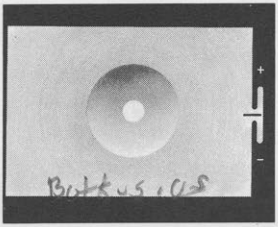


1. Turn on Repronar. See page 7.

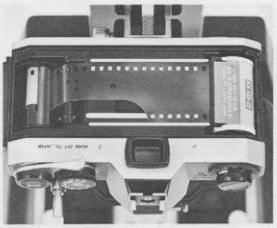


2. Set for 1:1 magnification. See page 10.

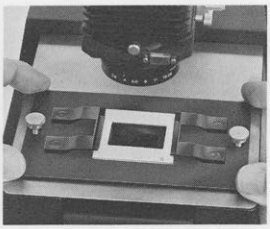




3. Calibrate light meter. See page 13.

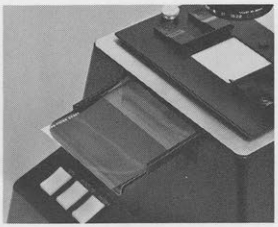


4. Load film.



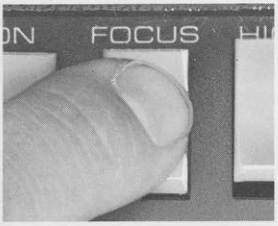
5. Turn on FOCUS light. Compose and focus slide. See page 16.

DO NOT leave focus light on unnecessarily. It can damage your filters. Focus light must be off when you snap your picture.

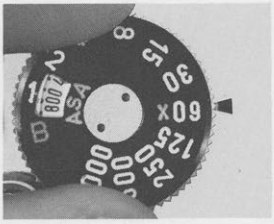


6. Insert filter pack. See page 18.

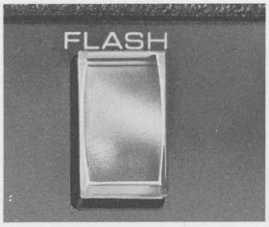
7. Turn on light meter and adjust for proper exposure using **only** lens f/stop. NOTE: Be sure to meter your slide at the shutter speed listed in Table 1, Page 14.



8. Turn off focus light.



9. Set your camera shutter control to the highest speed it will x-sync at, usually 1/60 sec. (See your camera Owner's Manual).



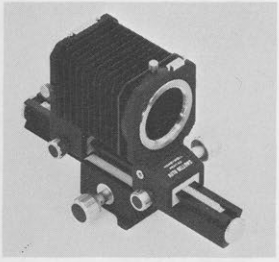
10. With READY light on, take your picture.

11. Repeat steps 5 through 10 for additional slides.

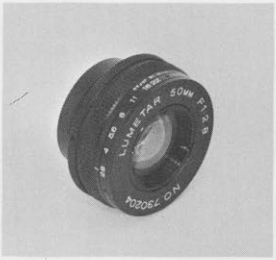
12. Perform steps 1 through 11 each different shooting session.

Recommended equipment

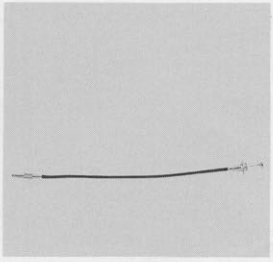
35 mm Single Lens Reflex Camera with stopped-down through-the-lens metering capability.



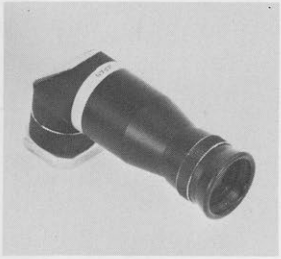
Pentax Auto Bellows



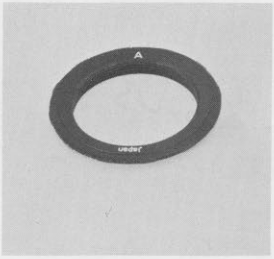
50mm f/2.8 Enlarging Lens



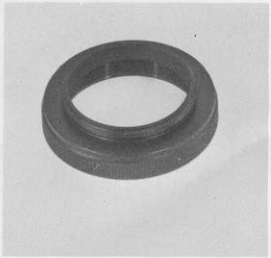
Locking Cable Release



Right Angle Finder

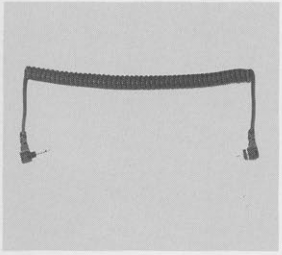


Leica "A" Adapter



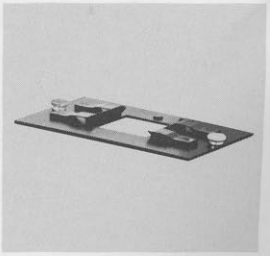
"T"-Adapter

Supplied equipment



Shutter Cord

Bellows Ring with "T" Thread



Slide Holder

Read this first

Your Honeywell Universal Repronar Slide Duplicator is designed to accept most 35mm SLR cameras with through-the-lens light metering capability. For mounting and alignment purposes, the Repronar is designed to be used **only** with the Honeywell Pentax Auto Bellows available from your Honeywell dealer as an accessory. Most 35mm SLR cameras can be adapted to the Pentax bellows by selecting the specific "**T**" adapter for that camera.

Your Repronar will accept a variety of different brand cameras. So reread your owner's manual for your camera, particularly the areas covering light measurement. You'll use stopped-down (manual) aperture metering with most cameras.

If your camera has both spot and average metering systems, you'll usually get better results with the average setting.

If you want to use your Repronar with SLR cameras that do not have a through-the-lens metering system, you'll have to determine exposure by making test exposures.

See page 4 for recommended equipment. Major parts of your Repronar are illustrated on the outside flap (page 22) of this manual.

For best results, read this Owner's Manual through before attempting to use your Repronar. It'll take only a few minutes. **Then use the simple steps on page 3 as a key for day-by-day operation of your Repronar.**

Choosing a lens

Normal camera lenses are not recommended for use with the Repronar. They're just not designed for flat copy work. Most normal lenses (especially fast ones) exhibit too much curvature of field to provide sharpness over the entire picture. If you focus on the center, the edges will be out of focus. If you focus on the edges, the center will be out of focus.

If you want sharpness, use a lens designed for close-up or copy work. An enlarging lens or a reproduction lens will give good results and prove more satisfactory. An enlarging lens such as the Honeywell Lumetar 50mm f/2.8 (Catalog Number 5074) or a 50mm macro lens is recommended.

Choosing films for copying

In any copy process, there is some loss of quality. The copy may lose some sharpness and detail when compared to the original. The contrast of the copy may be too high and have less saturated colors than the original. The colors of the copy may differ in hue from those of the original. So, the first consideration is to choose a film that will minimize these losses.

In general, with color reversal films sharpness decreases as film speed goes up. Therefore, the better films to use from the standpoint of sharpness will be those that have lower film speeds.

The Kodak Ektachrome slide duplicating film 5038 is an excellent choice. It's made specifically for slide duplicating. You can process it yourself, or you can have Kodak or the processor of your choice process it. This film only comes in 100 foot rolls, so you'll have to load it yourself in 20 or 36 exposure rolls.

Duplicates made using most films with electronic flash generally have less contrast build up than experienced with tungsten lighting. The flash duration is extremely brief (1/500 second or less). Color films produce lower contrast when the exposure time is very short. Electronic flash resembles daylight in color. If you use film balanced for tungsten light, be sure and use appropriate color correcting filter.

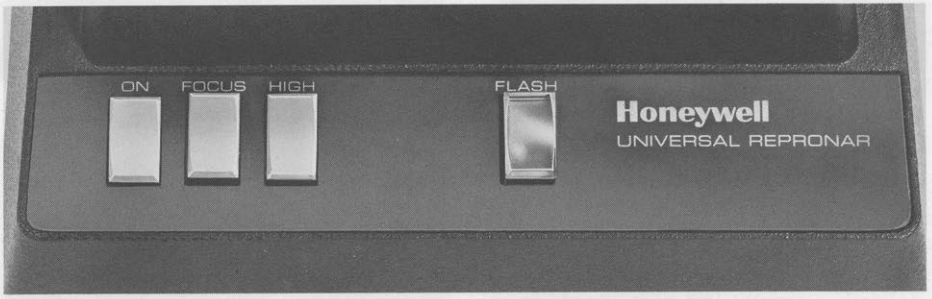
If you do your own processing you can control both film speed and contrast by modifying your process. Some custom labs also offer special processing.

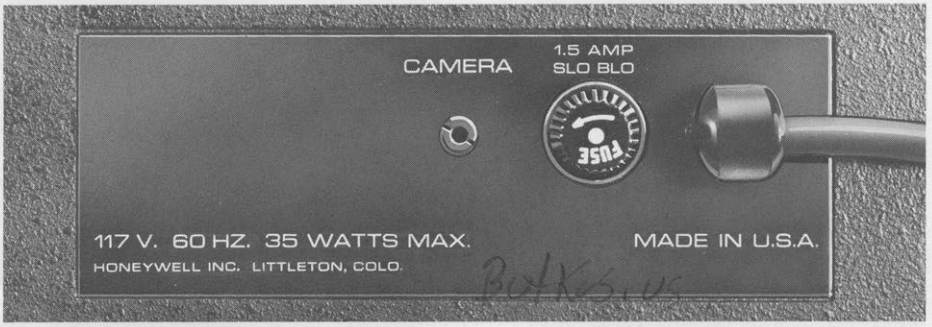
Film manufacturers are constantly making improvements in their films. The instructions packed with the film should be considered a prime source of information. Additional information concerning the film of your choice can be obtained by writing the film manufacturer.

The following basic publications are recommended reading. These can usually be purchased from photo dealers.

Producing Slides and Film Strips.	Kodak Publication No. S-8
Color as Seen and Photographed.	Kodak Publication No. E-74
Filters.	Kodak Publication No. AB-1

What the buttons do





ON ..... Depress to turn on your Repronar. Then depress to turn off.
(Push-Push Switch

FOCUS ..... Depress to turn on focus light. Then depress to turn off.
(Push-Push Switch)

HIGH ..... When in depressed position (IN) the Repronar is switched for high flash output.
(Push-Push Switch)

When **not** depressed (OUT), the Repronar is switched for low flash output.

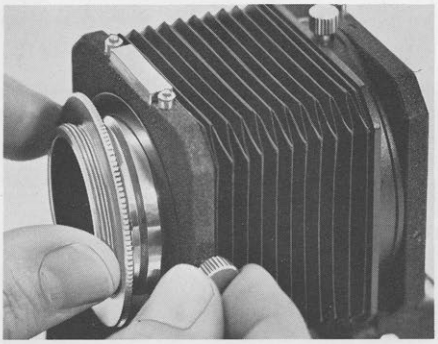
FLASH ..... When lit, Repronar is ready to be flashed. Momentarily depress for open flash photography.
(Momentary Switch + Ready Lamp)

CAMERA ..... Camera shutter sync receptacle. Accepts shutter cord with Honeywell 100 Jack connector, provided with Repronar.

1.5 AMP SLO BLO ..... Fuse Holder.

POWER CORD ..... Connects to standard household outlet, 120V, 50 or 60 Hz.

Attaching the parts



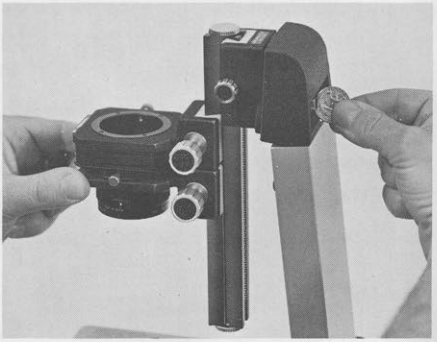
1. Remove the camera mount ring from your bellows. This ring is supplied with your Pentax Auto Bellows.

2. Install "T" adapter for your camera.
NOTE: You may disregard this step if you're using a camera with Pentax lens mount thread.

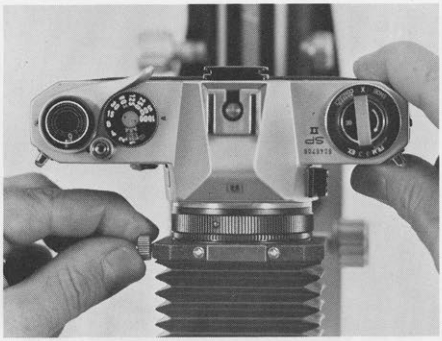
3. Install the bellows camera mount ring. If you're using "T" adapter, use bellows camera mount ring with "T" thread supplied with your Repronar.

4. Install "A" adapter if you're using an enlarging lens with Leica thread.

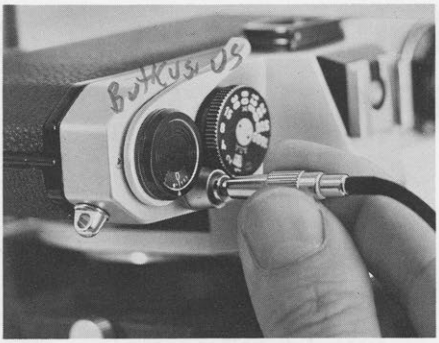
5. Install lens on bellows.



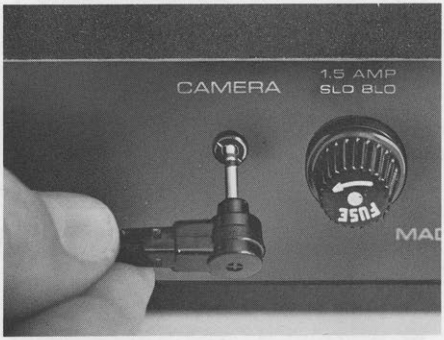
6. Mount bellows to Repronar.



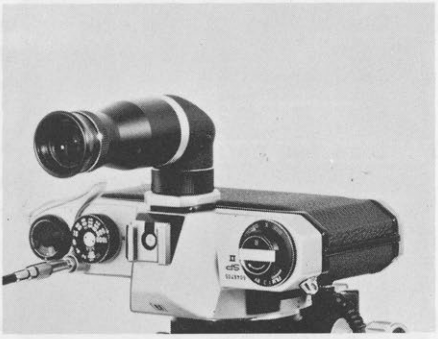
7. Attach camera to bellows.



8. Install cable release.



9. Connect shutter cord.

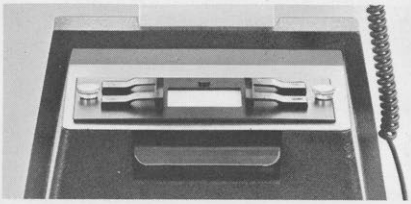


10. Install right angle finder if you intend to use it.

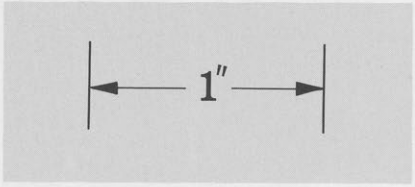
11. You're now ready for initial set-up for 1:1 magnification. See page 10.

Initial set-up for 1:1 magnification

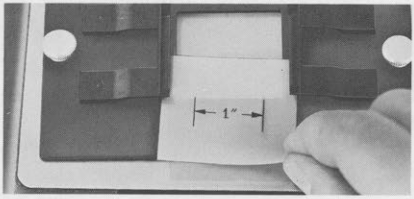
1. Install slide holder. **DO NOT** tighten thumb screws. You should be able to move slide holder easily.



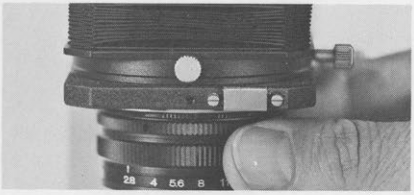
2. Cut a 2" x 2" piece of matte acetate (generally available at Artists Materials and Drafting supply stores) to fit slide holder.
3. Draw two parallel lines one inch apart on the matte acetate. See picture.



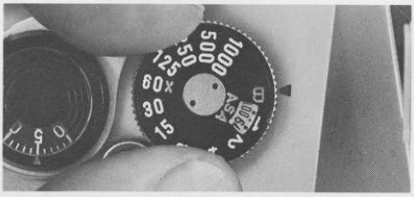
4. Insert the matte acetate in the slide holder.



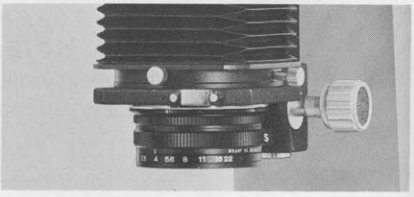
5. Open lens to full aperture.



6. Set camera shutter for B (BULB operation) and lock shutter open with cable release.



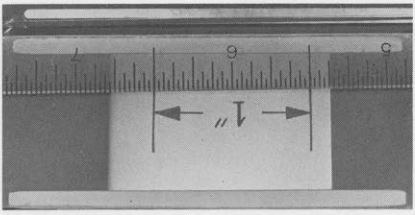
7. Position lens mount so it is against bottom stop of bellows and lock by tightening lens carriage locking screw. The lens mount should remain in this position for slide copying with Repronar.



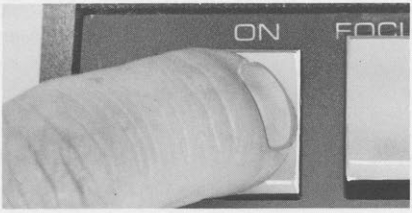
8. Position camera so bellows is all the way closed, but **DO NOT** lock camera mount.

9. Open camera back. Place a small piece of ground glass or matte acetate (about 1¼ x 1½ inches) over the tracks at the film plane of your camera.

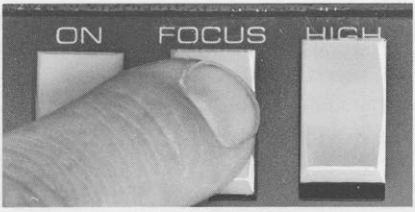
10. Place a small transparent ruler over the ground glass or matte acetate in the film plane.



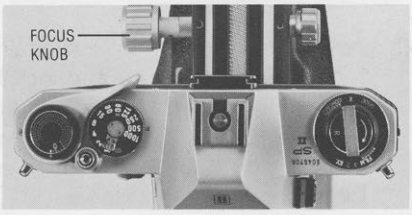
11. Plug in and turn on Repronar.



12. Turn on FOCUS light.



13. Focus your camera by turning FOCUS knob on bellows. **NOTE:** Always focus by positioning entire bellows assembly. Be sure to lock bellows assembly after focusing.



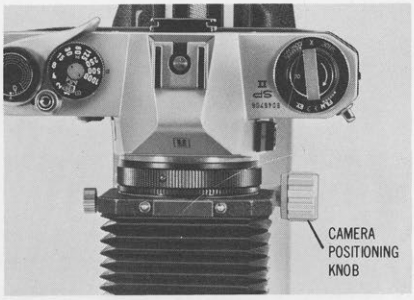
(Continued on page 12)

(Continued)

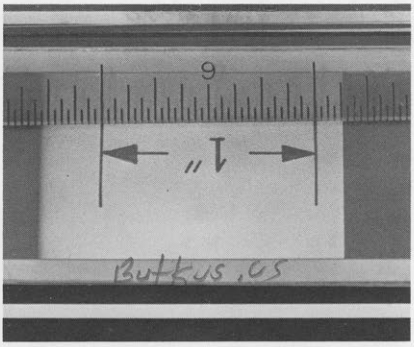
14. Turn camera positioning knob until the 1-inch marks appear exactly 1 inch apart. See picture.

Your're at 1:1 magnification when the 1-inch marks are 1 inch apart as viewed and measured in the film plane of your camera, and your camera is focused sharply.

It's easy. Here's a hint. If the 1:1 marks appear less than 1-inch apart, move camera back up slightly and lock mount. Then refocus. Continue in this manner until the marks are 1-inch apart.

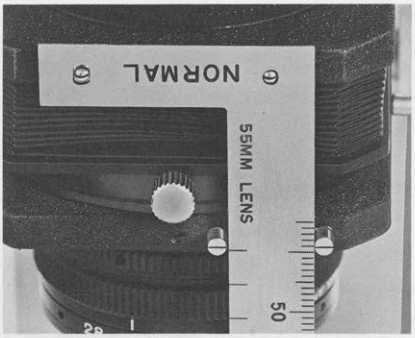


15. Now that you've established 1:1 magnification with your particular lens, use your bellows scale to measure the distance between the camera mount and lens mount as shown in the picture. Use the millimeter portion on the normal side of the scale. Do not use the magnification scale (X times) portion of your scale. It's not correct for this application. Record the measurement.



Once you have the measurement, all you have to do to reestablish 1:1 magnification in the future is to adjust camera mount to this measurement. Then focus your camera on a slide with focus knob and you're there.

If you change to a different lens, then perform steps 1 through 14 to establish 1:1 magnification for the new lens and record the new measurement.

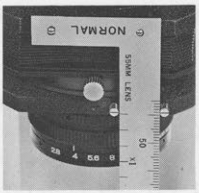


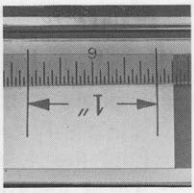
16. Turn off FOCUS light. Remove 2 x 2 inch matte acetate from slide holder.

17. Remove ground glass or matte acetate and ruler from film plane. Close camera shutter and back.

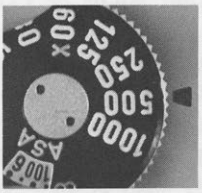
Calibrating your camera light meter for slide copying

1. Set for 1:1 magnification. See page 10.

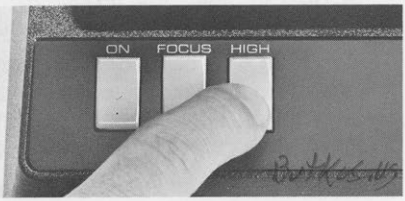




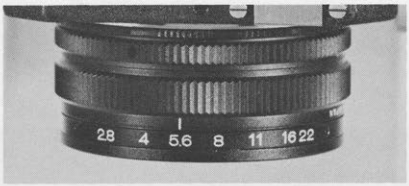
2. Set shutter speed for 1/500 second. Note: If you're using Pentax ES set shutter control for AUTOMATIC. (See your camera Owner's Manual.)



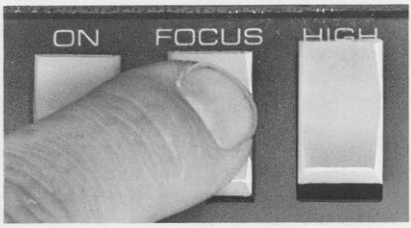
3. Using Table 1, (see page 14) decide if you want to use your Repronar on either **HIGH** or **LOW** flash. Then set Repronar for **HIGH** or **LOW** flash depending upon your selection.



4. Set lens to f/stop circled on calibration label on bellows support for selected **HIGH** or **LOW** light.



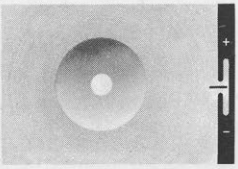
5. Turn on FOCUS light.



6. With no slide in place, turn on your camera light meter and adjust ASA control until meter indicates correct exposure point, usually centered or at index mark for stopped-down metering.

   NOTE: If your camera light meter has both averaging and spot metering capability, use the averaging system. If you're using a

(Continued on page 14.)



6. (Continued)
Pentax ES, adjust ASA control for indication of 1/500 in viewfinder. (See your camera Owner's Manual.)

7. Record ASA setting of your camera dial.

8. Find the ASA number you recorded in step 7 in top row of Table 1. Find the ASA number of the film you're using in vertical column of table 1 for either **HIGH** or **LOW** flash per your selection in step 3. Now find the number that intersects the two ASA numbers in the chart and **set this ASA number on the ASA dial of your camera.**

NOTE: Don't change this ASA setting without recalibrating.

FOR EXAMPLE: You're using a film with an ASA number of 25, the calibration setting for HIGH flash is f/4.0, your camera meter indicated correct exposure at ASA 80, then the proper ASA number to set on your camera is ASA 320, where 80 down and 25 across intersect in Table 1.

You have now calibrated your camera light meter for either **HIGH** or **LOW** flash depending on your selection in step 3. You'll have to recalibrate if you switch from either **HIGH** or **LOW** flash. You just can't arbitrarily switch between **HIGH** and **LOW** flash without recalibrating.

Because of variations in line voltage and age of focusing lamp, you'll obtain best results if you perform this calibrating procedure for each different shooting session.

Table 1. Calibration

FLASH SETTING	ASA NO. OF FILM YOU'RE USING	ASA READINGS WITH CAMERA SET AT 1/500 SHUTTER SPEED													
		25	32	40	50	64	80	100	125	160	200	260	320	400	500
		Meter slide you're copying at 1/60 shutter speed.													
HIGH LIGHT	1.3	20	25	32	40	50	64	80	100	125	160	200	260	320	400
	1.6	25	32	40	50	64	80	100	125	160	200	260	320	400	500
	2	32	40	50	64	80	100	125	160	200	260	320	400	500	640
	2.5	40	50	64	80	100	125	160	200	260	320	400	500	640	800
	3.2	50	60	80	100	125	160	200	260	320	400	500	640	800	1000
		Meter slide you're copying at 1/15 shutter speed.													
	4	16	20	25	32	40	50	64	80	100	125	160	200	260	320
	5	20	25	32	40	50	64	80	100	125	160	200	260	320	400
	6.4	25	32	40	50	64	80	100	125	160	200	260	320	400	500
	8	32	40	50	64	80	100	125	160	200	260	320	400	500	640
	10	40	50	64	80	100	125	160	200	260	320	400	500	640	800
	13	50	64	80	100	125	160	200	260	320	400	500	640	800	1000
	16	64	80	100	125	160	200	260	320	400	500	640	800	1000	1250
	20	80	100	125	160	200	260	320	400	500	640	800	1000	1250	1600
	25	100	125	160	200	260	320	400	500	640	800	1000	1250	1600	2000
		Meter slide you're copying at 1/60 shutter speed.													
LOW LIGHT	16	13	16	20	25	32	40	50	64	80	100	125	160	200	260
	20	16	20	25	32	40	50	64	80	100	125	160	200	260	320
	25	20	25	32	40	50	64	80	100	125	160	200	260	320	400
	32	25	32	40	50	64	80	100	125	160	200	260	320	400	500
	40	32	40	50	64	80	100	125	160	200	260	320	400	500	640
	50	40	50	64	80	100	125	160	200	260	320	400	500	640	800
	64	50	64	80	100	125	160	200	260	320	400	500	640	800	1000
	80	64	80	100	125	160	200	260	320	400	500	640	800	1000	1250
	100	80	100	125	160	200	260	320	400	500	640	800	1000	1250	1600

Because of variations in film, processing and camera meters, Table 1 must be considered as only a starting point. If you find variations, make a series of test exposures and select the one that suits your conditions. You may have to do this with each different film and processing technique you plan to use.

Metering slides

You must use the shutter speed listed inside the proper black bar in Table 1 for exposure determination of your slides, even if your camera will x-sync at higher speeds. Notice that shutter speed (1/15 or 1/60) varies with film speed and calibrated flash setting. In the preceding example, you'd set your shutter speed at 1/15 second for exposure determination of your slides.

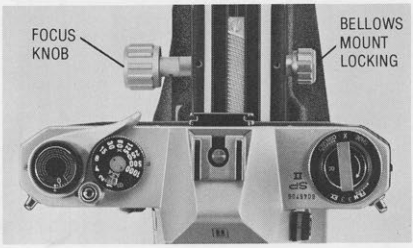
With proper shutter speed set, turn on your meter and adjust lens f/stop until proper exposure is indicated in the viewfinder. This is the f/stop to take your flash picture at. **Note:** If you're using a Pentax ES, the shutter speed dial will be set on AUTO. Adjust the lens f/stop until the proper shutter speed from Table 1 is indicated in the viewfinder.

Composing and focusing

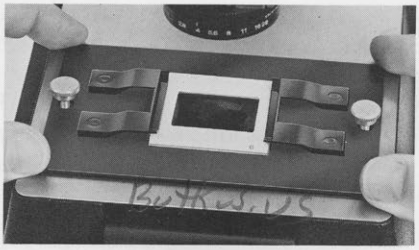
Always focus your camera by positioning entire bellows assembly. Focus by loosening bellows mount locking screw and turning focus knob.

If you're using a lens with focusing adjustment, set to infinity.

Set lens f/stop to wide open position while focusing and composing.



Place your transparency in slide holder with emulsion or dull side down. That's so you'll view your slide just like you took your picture. On most slides, the emulsion side is the one with the manufacturers name printed on the mount.



Compose your slide by moving the slide holder on the easel and checking in your viewfinder.

To make a 1:1 duplicate from a color slide, frame the image of the slide in the viewer of your camera. To get rid of the border of the slide you're copying, you may have to crop the slide slightly. To crop, loosen the camera mount locking screw and extend your bellows slightly by moving your camera away from the lens. Don't move the lens mount. When your picture is properly composed, tighten camera mount and slide holder thumb screws. Then focus slide.

In most SLR cameras, the viewfinder doesn't show 100 per cent of the picture that will be recorded on the film. The amount of cutoff can exceed 10 per cent of the total image area of the slide you're copying. You'll usually get better results if you frame your copy well inside the borders of the slide you're copying.

A good check is to compare a slide in the viewfinder with what appears on a piece of matte acetate or ground glass at the film plane. Here's how: With no film in your camera, open camera back and place a piece of matte acetate or ground glass on the film tracks at the film plane. What you see there is what the film is going to record.

Shooting a test roll of film will also help you determine your camera's viewfinder cutoff limits, if any.

Once you have the image you want, just measure and record the distance between camera mount and bellows mount and make this setting next time you want to copy slides.

Cropping and enlarging

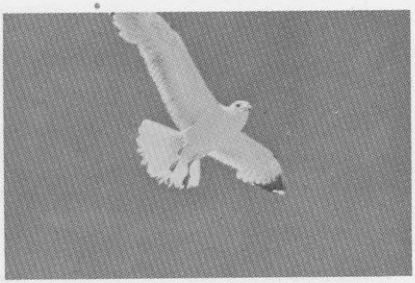
With your Repronar, you can enlarge a portion of your transparency up to about 3½ times the original size. Cropping and enlarging may strengthen and greatly improve the composition of your picture. This technique lets you eliminate distracting or undesirable areas from your picture.

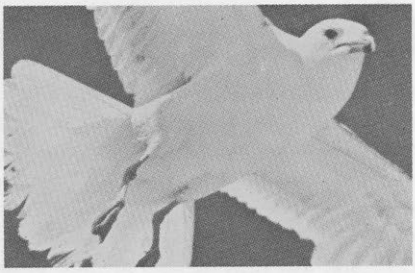
Try some portraits or enlargements like the one on this page which was made from the original (top picture).

The quality of the enlargement in general depends upon the sharpness, film grain, color balance, and other qualities of the original. **For best results make enlargements from originals that are of good quality.** An enlargement of 3X magnification requires an original transparency of excellent quality.

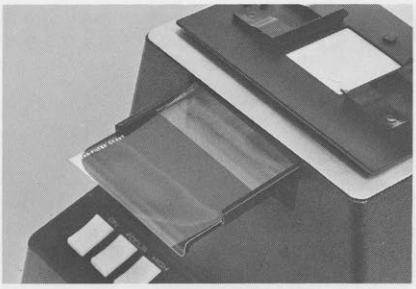
Here's how to crop and enlarge: Leave the lens mount locked at base of bellows. Loosen the camera locking screw and position camera while observing your transparency. Compose by moving slide holder on easel. Focus by positioning entire bellows. It's easy if you'll move camera a little and lock it. Then focus and compose.

Keep repeating the sequence until you get what you want. When you get there, be sure to lock both camera mount and bellows focusing mount.





Inserting filters



The proper use of filters is important when using your Repronar. Suggested starting points for color filtration are listed in Table 2. Color printing (CP) or gelatin filters, generally available in 3-inch squares (75mm), can be inserted into the filter holder. Use the filters of your choice together with the clear glass in the filter holder.

For best results, keep the number of filters in your filter pack to a minimum. For example, there's more light loss with two CC20Y filters than in one CC40Y filter.

Film will vary in color balance and speed from one emulsion batch to another. Slight color shifts are also experienced because of processing differences between processing labs. Day-to-day variations also can be experienced within the same lab. Since there are so many variables, the films and filter pack listed in Table 2 should be regarded as suggested starting points only.

TABLE 2. Suggested filter starting points

Film you're using to copy with	Film of slide you're copying	Suggested Filter Pack starting point
Ektachrome slide duplicating film 5038*	Kodachrome	Wratten Filter No. 2E + CC60Y + CC40R
	Ektachrome	Wratten Filter No. 2E + CC50Y + CC55R
	Agfachrome	Wratten Filter No. 2E + CC50Y + CC55R
Kodachrome 25	——	20Y
Kodachrome 64	——	5R + 5Y
Ektachrome X	——	2A + 10M + 5Y
Agfachrome 64	——	15R
Kodacolor	——	None

*Process E-4 short first developer times. See Kodak data sheet packed with film.

Determining your filter pack

Everyone sees color differently. Each of us have preferences to tonal values. Your choice of filters for each film and scene is at best subjective. That's why the suggested filter packs in Table 2 are only starting points.

The filter combination that you prefer is best determined by a series of tests. Here's how to do it:

1. Select a test slide that, in your opinion, is pleasing and includes known colors and the gray scale. Always view this slide and all others you compare it with under identical lighting conditions. Standard transparency illuminators are commercially available.
2. Copy your master slide on an entire roll of film of your choice, use a different filter combination for each exposure. Record all filter data.
3. After processing, evaluate and use the filter combination that most closely matches your master slide. If you change films or processing techniques, make a new test for best results.

Correcting Color

If the slide you want to copy does not have the color quality you desire, a slight variation in your filter pack is necessary.

Here's how:

1. Place a slide on your transparency illuminator or viewing box.
2. Select filter colors according to the table below.
3. View the slide through the different densities of this color and choose the filter that makes the correction you want. Add this filter to your standard filter pack. When judging, look at the middle tones instead of highlights or shadows. Your adjustment of the filter pack involves either removing a filter of the color of the overall hue or adding its complement. Whenever possible, subtract color from your standard filter pack, because you want as few filters in the filter pack as possible.

If Overall Slide is too:	Add these Filters:	Or Subtract these Filters:
Yellow	Magenta + Cyan	Yellow
Magenta	Yellow + Cyan	Magenta
Cyan	Yellow + Magenta	Cyan
Blue	Yellow	Magenta + Cyan
Green	Magenta	Yellow + Cyan
Red	Cyan	Yellow + Magenta

Correcting exposure

Since you're metering your slide with the through-the-lens metering system of your camera, under and overexposed transparencies will be automatically corrected by the metering system. If you're enlarging a portion of your slide, the bellows extension factor is also corrected for by the metering system.

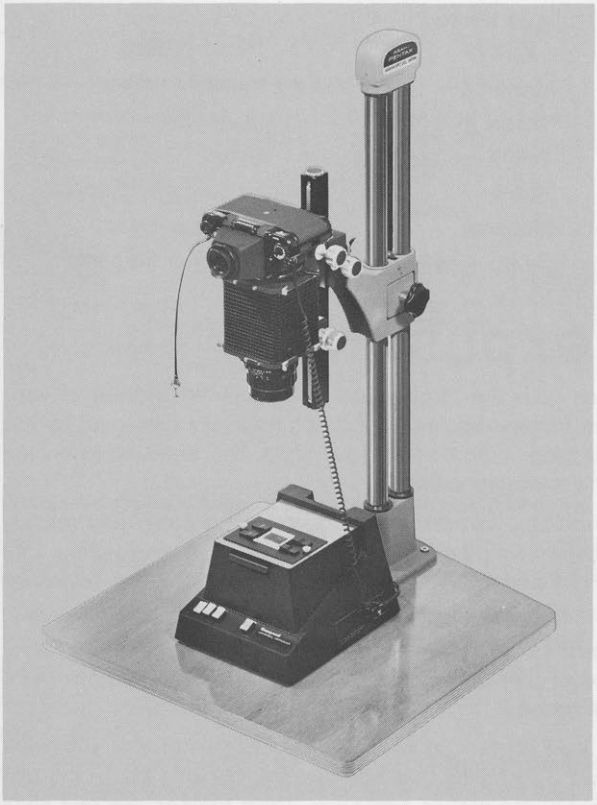
If your original is more than one f/stop overexposed, the resulting copy may appear muddy. There's too little color in the original to make a satisfactory copy. You also may have to add color filters to compensate for the color shift caused by the exposure correction.

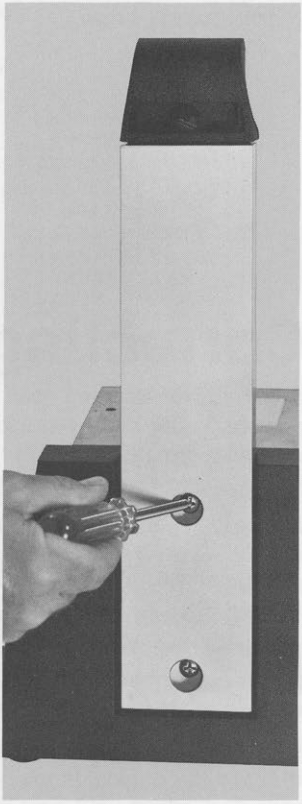
Every system has limits. You can't get a picture out of something that's just not there. Some experimenting may be necessary to arrive at a solution for slides that are more than one f/stop over or under exposed.

If your original has dominantly light or dark tones (like a snow scene) and you want to retain the original tones, select a test slide that has average density. Meter the test slide and adjust your camera f/stop for proper exposure. Then replace the test slide with your original and take the picture. That's all there is to it.

Some experimenting may be necessary to get to just the right degree of tonal value you want. You may want to stop down or open up the lens to get what you're looking for.

Using your Repronar with large format cameras





You can use your Repronar with most format cameras. But, with cameras larger than 35mm SLR's, you'll need a copy stand or some other firm way to hold your camera.

The bellows mount can be removed by unscrewing the two Phillips screws in the back as shown in the picture. These screws have a special taper that self-aligns the bellows column when tightened.

Specifications

Power Source ..... 104 to 129 VAC, 50 or 60 Hz

Recycle Time

- **High Light** ..... About 8 seconds
- **Low Light** ..... About 2 seconds

Flash Duration ..... About 1/500 second

Color Temperature ..... About noon, daylight on bright day (5600°K)

Flash Output ..... Regulated to within ¼ f/stop

Magnification ..... From 1:1 to 3½:1 with Honeywell 50 mm Lumetar enlarging lens

Ready Light ..... Indicates full light output

Shutter Sync Circuit ..... Low voltage to protect camera shutter contacts

Shutter Synchronization ..... X-Sync

- **Between-the-lens shutters** . All speeds
- **Focal Plane Shutters** ..... Usually 1/60 second

Shutter Cord ..... 3-foot Honeywell 100 jack-to-removable-pc (supplied)

Size

- **Height** ..... 17 Inches (43cm)
- **Width** ..... 9.25 Inches (23.4cm)
- **Depth** ..... 11.25 Inches (28.6cm)

Weight ..... About 11 pounds (5 kilograms)

Maintaining your Repronar

Form the Capacitor

Like all electronic flash units, your Repronar has an energy storage capacitor that stores the electrical energy required by the flashtube. When your Repronar is new or if you haven't used it for 30 days or more, it's normal for the capacitor to lose some of its ability to store electrical energy, or deform. A deformed capacitor causes longer recycle time for the first few flashes.

Reforming the capacitor is easy. Just turn on your Repronar and set to HIGH flash for about 30 minutes before you use it. If you can afford a few seconds more between flashes, let your capacitor reform while you're using your Repronar.

Shutter Cord

Your Repronar uses a Honeywell shutter cord Cat. No. 477. This cord has a 100 jack on one end and a removable tip on the other. It's supplied with a removable PC tip. Tips that fit most cameras are available from your Honeywell dealer.

For best results, make sure the removable tip is screwed on tightly, otherwise your Repronar may fail to flash due to poor contact.

Replacing the Focus Lamp

The focus lamp supplied with your Repronar is a special, clear glass, 115 to 125 volt incandescent lamp. You can purchase replacement lamps from Honeywell (Part No. 73004039-001) or General Electric (Lamp ordering code 2556)

CAUTION: Before attempting to replace your focus lamp, turn it off by depressing ON switch, unplug power cord, and wait about 10 minutes for lamp to cool.

1. Remove opal glass.
2. Pull out filter drawer.
3. Unscrew lamp and replace.

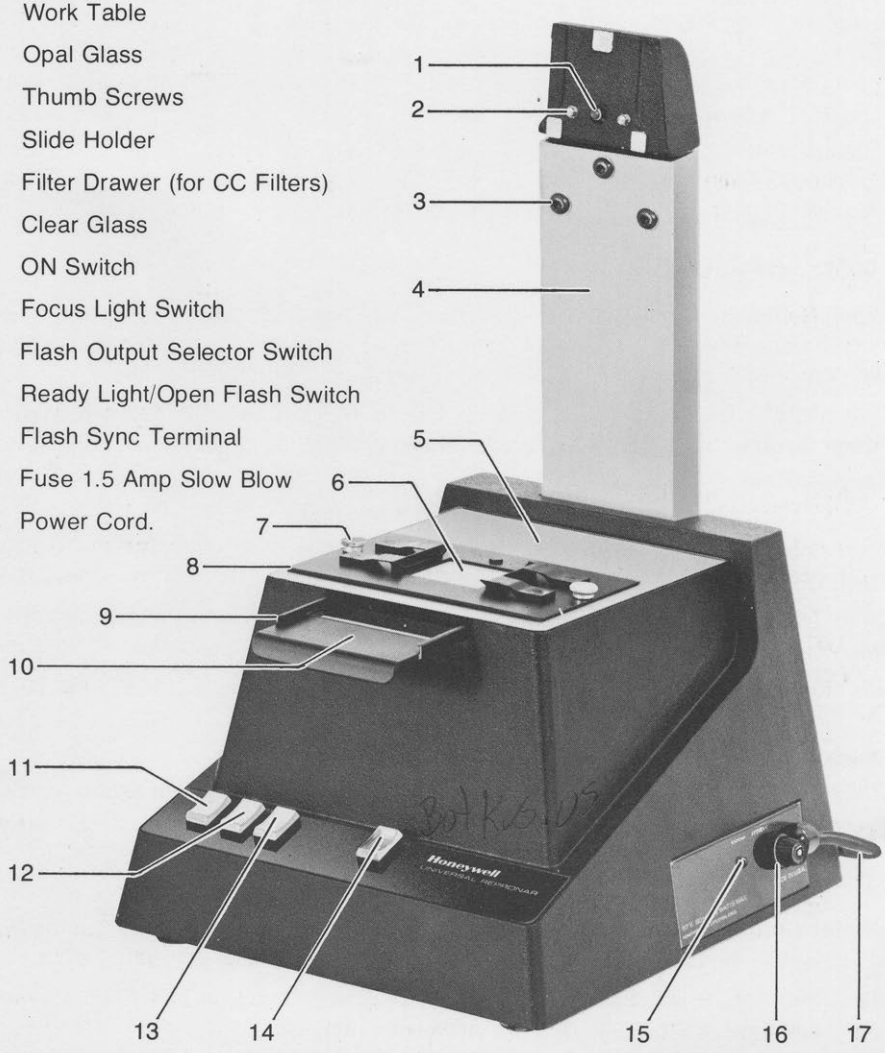
Replacing the Fuse

1. Unplug Repronar power cord.
2. To remove fuse, press fuse cap inward and turn as indicated by the arrow. The fuse is held in the cap by a spring clip and will be withdrawn with the cap.
3. Remove the old fuse. Insert a 1.5 amp, 125-volt slow-blow fuse in cap. Observing cap key, insert cap and turn clockwise to lock.

WARNING: Do not remove bottom cover. It'll expose you to dangerous HIGH VOLTAGE. The bottom cover must be removed only by a qualified technician.

Know the major parts of your Repronar

1. Bellows Mounting Screw
2. Bellows Mounting Pins
3. Factory Alignment Screws
4. Bellows Mount
5. Work Table
6. Opal Glass
7. Thumb Screws
8. Slide Holder
9. Filter Drawer (for CC Filters)
10. Clear Glass
11. ON Switch
12. Focus Light Switch
13. Flash Output Selector Switch
14. Ready Light/Open Flash Switch
15. Flash Sync Terminal
16. Fuse 1.5 Amp Slow Blow
17. Power Cord.



CAUTION: Do not adjust the three factory alignment screws (item 3). They're set at the factory and should not need further adjustment.