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PAGE 5 TO SERVICE NOTES
SUPER CHROMATIC "R" 55 MM. LENS

Recorda service notes

Servicing the Mamiya Sekor 500TL Camera

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Servicing the Mamiya Sekor 500TL Camera

by Leland R. Bartel

The Mamiya Sekor 500TL camera is a single lens reflex camera with interchangeable lenses incorporating the Pentax-Pracktica screw mount. The stop down spot meter system is based on a CdS photocell located below the mirror. To use the meter, you simply pull the wind lever away from the camera body and then push it back against the body to turn on the meter and stop down the diaphragm in the lens. The meter will read the reflected light from the area of the subject which is visible in the yellow square in the lower center of the viewfinder. Correct exposure is indicated by centering the exposure meter needle in the small "C" visible in the viewfinder by changing the diaphragm, shutter speed or ASA settings. The 500TL has a shutter speed range of 1 second to 1/500th plus bulb with FP and X sync. The ASA range is from 25 to 800.

The following servicing procedure, containing disassembly information, theory of operation and reassembly pointers, is applicable to all of the 500 and 1000-TL and DTL models. A 500TL body was used for the photos in this article. A recent tabulation indicated that approximately 12% of the SLR repairs in the shop where I work were completed on Mamiya Sekor cameras. These cameras are also selling at a very low price here in the Denver area. The popularity and the somewhat unique problems of the Mamiya camera line prompted this article.

Begin disassembly of the Mamiya Sekor 500TL camera by unscrewing the left-hand thread rewind button on the bottom of the camera. Next, take out the four bottom cover retaining screws and lift off the bottom cover. The S-76 battery will probably stick to the battery saver disc in the battery compartment cover and stay with the bottom cover. If not, remove it from the bottom of the camera.

Figure 1 shows the bottom of the camera body. Note the wind lever axis and the wind lever return spring which hooks to the left side of the lug on the wind lever shaft and to the right side of the diaphragm-meter switch link. The meter shut-off button shaft and lever pass through the middle of the wind lever shaft. One end of the meter shut-off button shaft lever rests against the diaphragm-meter switch link and the other end hooks to a tension type spring which hooks to a stud screw in the camera body. Pull the wind lever

away from the camera body and watch the shut-off button lever fall between the wind lever shaft lug and the diaphragm-meter switch link. Push the wind lever back against the camera body and note that the diaphragm-meter switch link is pushed across the camera body closing the contact on the battery holder for the exposure meter. At the same time the diaphragm striker plate is pushed forward inside of the mirror cage to stop down the diaphragm in the lens. Under normal operation the meter switch will close before the diaphragm can stop down to f/11 or f/16. In bright situations this may cause the meter to peg temporarily.

A common problem with this camera is the exposure meter switch. Always check the battery and then check the switch in the bottom of the camera when you have a meter problem. Once in a while you will find a no. 675 battery in the camera which will give incorrect meter readings. Many times the tab on the battery holder will break off, preventing the switch link from making contact. Some of the newer models have a spring tab on the end of the switch link to ease the pressure on the battery holder. The latest models have a switch near the wind shaft which hopefully will eliminate the present meter switch problems.

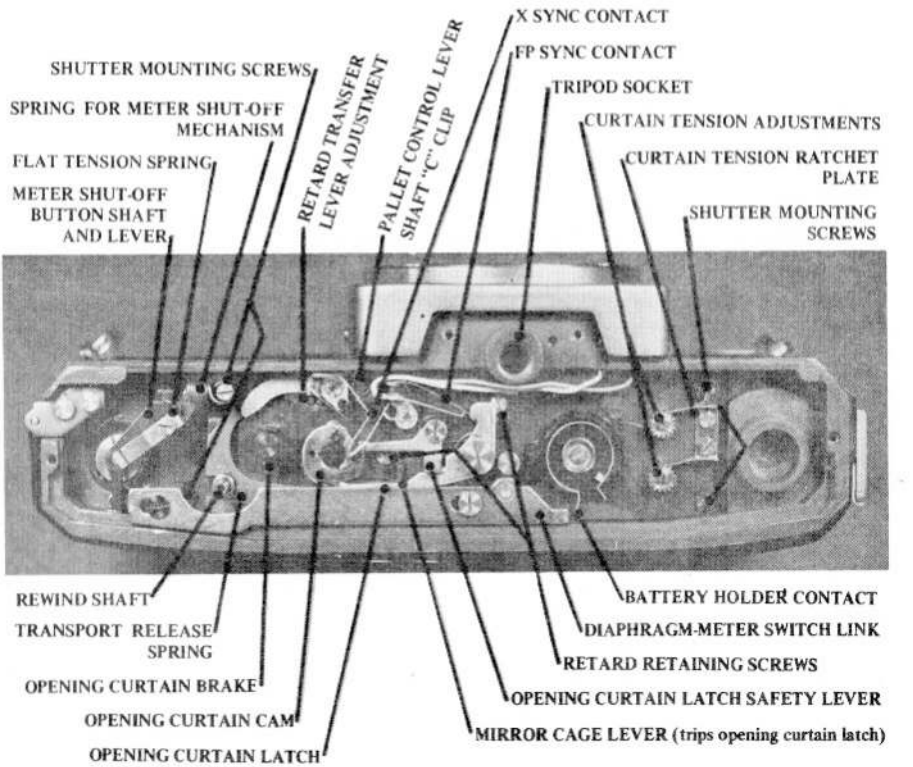


FIGURE 1 – BOTTOM OF CAMERA BODY

The Mamiya Sekor 500TL provides both X and FP sync via twin contacts. The FP contact is closed via the opening curtain latch which is tripped via linkage on the mirror cage approximately 7 to 15 milliseconds before the opening curtain clears the opening side of the film format. The X contact is closed via a cam and insulated stud on the bottom of the opening curtain drum. The contact is closed as soon as the opening curtain completes its travel across the film format. The red wire connects to the X sync contact and the yellow wire to the FP contact.

Note that the FP contact is closed only as long as the mirror is in the up position. The X contact is closed when the shutter is tripped. Thus the FP contact acts as a safety switch allowing continuity in the sync circuit only while the shutter and mirror are in operation during an exposure. Failure of the FP contact will also render the X sync circuit inoperative. From now on handle the camera with care, as the sync contacts bend easily.

Remove the flat tension spring (figure 1) from the bottom of the meter shut-off button shaft and lever. This spring provides the upward pressure on the shut-off button shaft and allows the shut-off button lever to drop between the wind lever lug and the diaphragm-meter switch link when the wind lever is pulled away from the camera body. Carefully pull the meter shut-off button shaft and lever out of the camera body approximately ¼ inch. This will allow the meter shut-off button to drop free from the top of the wind lever. Push the meter shut-off button shaft back into the camera body and reconnect its spring (if it becomes disconnected during this procedure).

On the under side of the meter shut-off button you will find an access hole. Some technicians suggest heating the meter shut-off button to soften the cement to remove the insert. This will then allow access to the setscrew in the wind lever cap. Other technicians suggest forming a loop of spring wire and working it under the meter shut-off button and then pulling up to remove the button. This process has never proved successful for me. Besides, what repair can you do to this camera that wouldn't require removing the bottom cover? I always remove the bottom cover and follow the procedure outlined in the previous paragraph.

Loosen the setscrew in the wind lever cap and unscrew the left-hand threaded wind cap. Examine the top of the wind lever, and you may find several deep scratches caused by the setscrew in the wind lever cap. These scratches were probably caused by another group of technicians who advocate unscrewing the wind lever cap without loosening the setscrews or removing the meter shut-off button! You might be able to remove it in this way, but I don't go along with the procedure. If you have any pride in your work at all, I can't see scarring up the wind lever just because you are too lazy to remove the bottom cover and do the job right!

Set the shutter speed dial to ¼ second and ASA 80. Loosen the setscrews now visible on the rear of the shutter speed dial. Reset the ASA to the highest ASA setting and the speed dial to Bulb. Lift off the shutter speed dial. Removing the speed dial in this

position allows most of the tension to be released from the exposure meter spring and prevents meter backlash when the dial is removed. When installing the speed dial, simply set the shutter speed to Bulb and rotate the chain coupler all the way counter clockwise. Set the speed dial to ASA 800 (or the highest ASA) and set it on the camera body with the Bulb position to the rear of the body. Rotate the speed dial counter clockwise and pick up the chain coupler and finally seat the speed dial in the Bulb position. Make sure that the setscrew is real tight! If not, the speed dial will come off as soon as the customer tries to reset the ASA. This procedure also applies to other 500 and 1000 model Mamiya cameras.

Wedge the rewind fork with a screwdriver and unscrew the rewind knob. Remove the three screws from the top cover – one at each end and one under the speed dial. Lift off the top cover, the washers from atop the counter and the shutter release button. Using a pair of pliers, carefully unhook the prism hold-down spring. Lift off the plastic cover, prism and prism seat shim. This shim or mask is not found on all Mamiya Sekor cameras. Remove the two screws in the lens mount apron and lift it off.

Figure 2 shows the top of the camera body. Note the chain (which hooks to a spring) that runs around the rewind shaft housing, once around the meter housing, around pulleys at the rear cor-

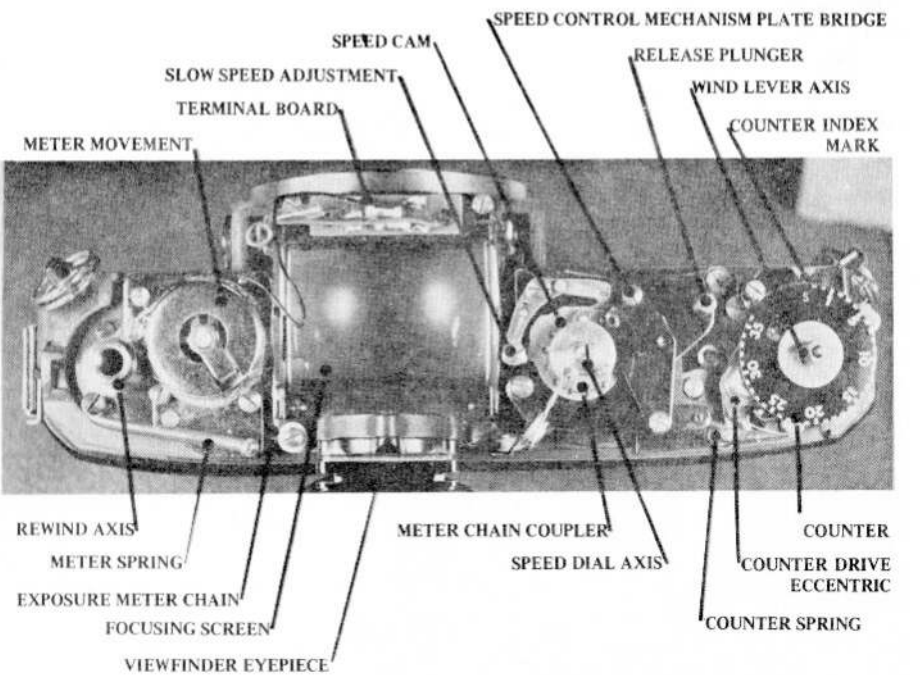


FIGURE 2 – TOP OF CAMERA BODY

ners of the mirror cage and finally to the speed dial axis. This chain is the mechanical link which programs the exposure meter in relation to the shutter speed and ASA settings. At first glance it would appear that replacing chains would be big business in Mamiya cameras. In over two years of experience in servicing Mamiya cameras I have never encountered a broken chain. I've seen them come off of the pulleys and loose from the meter itself. Recently I replaced a jewelry chain which another technician had substituted for an original equipment chain. Other chains aren't strong enough, so don't try a substitute. That little chain is stronger than you think!

There is a special procedure to be followed when setting up the meter when the chain has come loose from the meter or if the chain has torn. Install the meter complete with spring, pulleys and shutter speed dial. Set the ASA to 100 and the speed dial to one second. Figure 3 shows a cutout on the cam surface of the outer circumference of the meter housing and the tab of the meter needle blocking lever which rides on the cam surface. The blocking lever tab should be in the counter clockwise end of the cutout when the ASA is set to 100 and the speed dial is on one second. If it is not in this position, rotate the meter movement in relation to the chain until it is properly positioned. Then recement the chain to the meter housing with Pliobond cement at the two points where the old cement is visible on the meter housing. When the speed dial is set to ½ second, the blocking lever should ride up and out of the cutout and free the meter needle. Always check this timing before attempting to adjust the exposure meter calibration on any Mamiya Sekor camera.

The Mamiya Sekor DTL models have another chain which runs from the spot-average switch on the front of the camera body to the S-A indicator in the viewfinder. They also have a large cir-

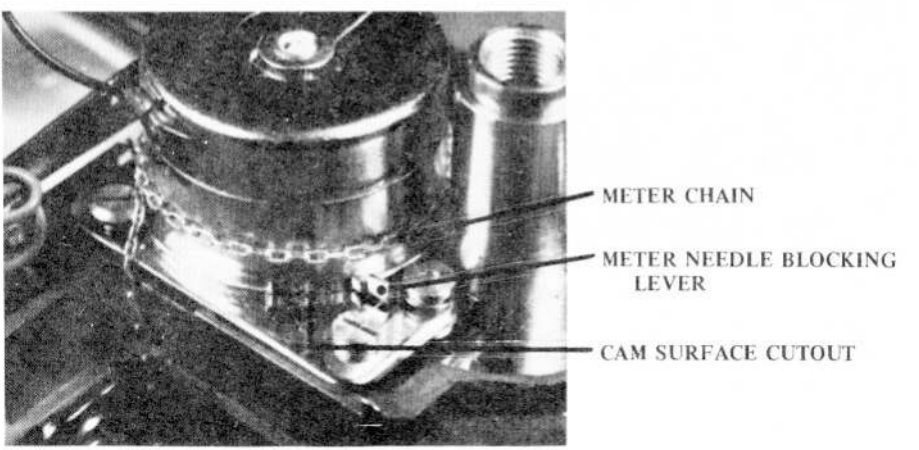


FIGURE 3 – EXPOSURE METER

cuit board which surrounds the meter movement and two additional average photocells near the viewfinder eyepiece.

The spot-average meter system, a delayed action, and higher shutter speeds and ASA settings are the major difference between the TL and DTL models. Other internal differences should present no problems for any technician who is familiar with any one of the Mamiya cameras. There are numerous internal changes between models and within model runs which have affected the operation and reliability of the camera line, but they don't require any special change in servicing techniques. The delayed action on the DTL models is accessible through the front of the camera body after removing the leatherette and several screws.

The exposure meter (figure 2) in the TL model is a basic CdS exposure meter system. The terminal board at the front of the mirror cage provides connection points for the blue battery wire, the black meter movement wire and the three wires from the spot photocell below the mirror. Minor adjustments are accomplished via the hairspring adjustment in the meter movement. Normally you can go up to one f-stop via the hairspring adjustment. If a meter is off more than one f-stop, you better look further and replace the defective component instead of attempting to cover it up by adjusting the meter. Normally it is a defective photocell.

It is no longer necessary to purchase a complete meter assembly from Osawa Camera Service in order to get a replacement photocell. A supplier in Denver now offers photocells for most cameras. This is a big saving, since most manufacturers sell only complete meter assemblies. It really is a shame when you have to buy a $20 meter assembly in order to get a pair of photocells. You can now buy a pair separately for $5.00 from Denver. I have replaced complete meter assemblies, including circuit boards and resistors, and had all kinds of trouble calibrating the meter system. More than once I have had to use parts from the old meter assembly in order to get the "new" assembly to work properly. I have installed dozens of photocells in exposure meter circuits in all types of cameras and had excellent results with calibration and reliability of the installation!

Don't be afraid of the meter circuit in the DTL camera. Basically it is a twin meter system. You have one meter movement and two sets of photocells. A switch selects either the spot cell in the mirror or the average cells near the eyepiece. Trouble shoot the system like any other CdS meter. The only catch here is that one of the two systems may go bad, and you will not get the same reading with the spot and average systems. I usually replace the photocell(s) in the circuit which is not reading properly. Then I adjust the average circuit via the hairspring and use the adjustable resistor (figure 4, R7) to balance the two systems. In some cases it may be necessary to replace all of the photocells in order to be able to balance the two systems. Usually you will find resistor R7 turned all of the way clockwise or counter clockwise. Changing the position of the wiper (without replacing

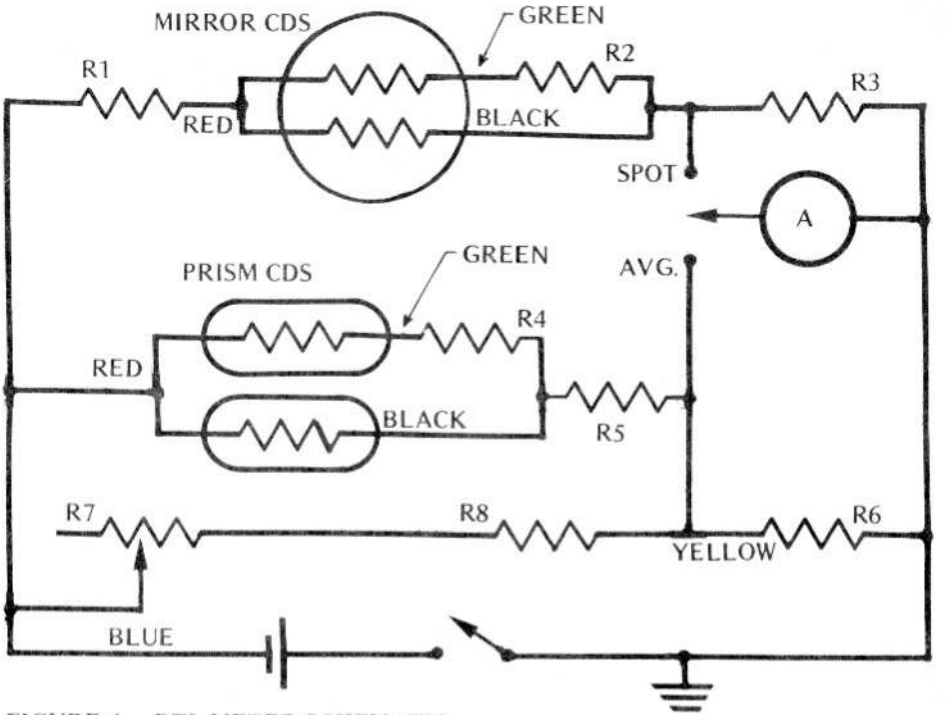


FIGURE 4 – DTL METER SCHEMATIC

the cells) will only increase the difference between the two systems. So, replace the photocells. So far I have not encountered a DTL model in which one system was dead and the other operational.

Remove the three screws in the viewfinder eyepiece (figure 2) and take off the eyepiece. The accessory shoe clips to the eyepiece and places a lot of stress on the three mounting screws. It is very important that the screws be very tight, as they have a tendency to work loose and fall down into the camera, jamming the mechanism. Note the position of the eyepiece for proper reassembly. Usually the outside of the lens is scratched from careless cleaning. If you install it backward the viewfinder image will be blurred.

Unsolder the meter and battery wires from the terminal board at the front of the mirror cage. Unhook the meter tension spring and remove it as well as its stud screw. Lift the chain coupler from the speed dial axis and remove the two screws and pulleys from the rear corners of the mirror cage. Remove the three screws which hold the meter movement to the meter mechanism plate. Lift the meter movement from the mechanism plate, being careful not to bend the needle. Then remove the two screws which hold the meter mechanism plate to the camera body and lift it off. In the DTL models you will need to remove the

needle blocking lever and spring before removing the meter mechanism plate. Note the two ceramic bumpers on the left side of the mirror cage. In most cameras they are free to fall out once the meter is removed. Carefully bend the top of their mounting studs or apply a small drop of Pliobond cement to each stud to keep them where they belong.

Remove the two screws from the speed control mechanism plate bridge and lift it off along with its two spacers. Unhook the torsion spring (figure 5) from the upper portion of the closing curtain latch. Note the position of the dimpled brass bushing in the high speed adjusting arm. The position of this bushing plays an important part in the adjustment of the high speeds during reassembly.

Install the wind lever and watch the action of the retard transfer lever (figure 10) and the closing curtain cam assembly lug. The closing curtain cam rotates counter clockwise and slips under the retard transfer lever just before the shutter is fully cocked. When the shutter is released at the slow speed settings, the closing curtain cam lug strikes the retard transfer lever providing the slow speed "delay" for the closing curtain. Once in a while you will find a camera in which the lug on the closing curtain cam assembly will come around during the cocking cycle and run into the retard transfer lever, jamming the wind action or causing a slight hangup during the wind cycle. The position of the retard transfer shaft is adjustable in relation to the position of the lug on the closing curtain cam

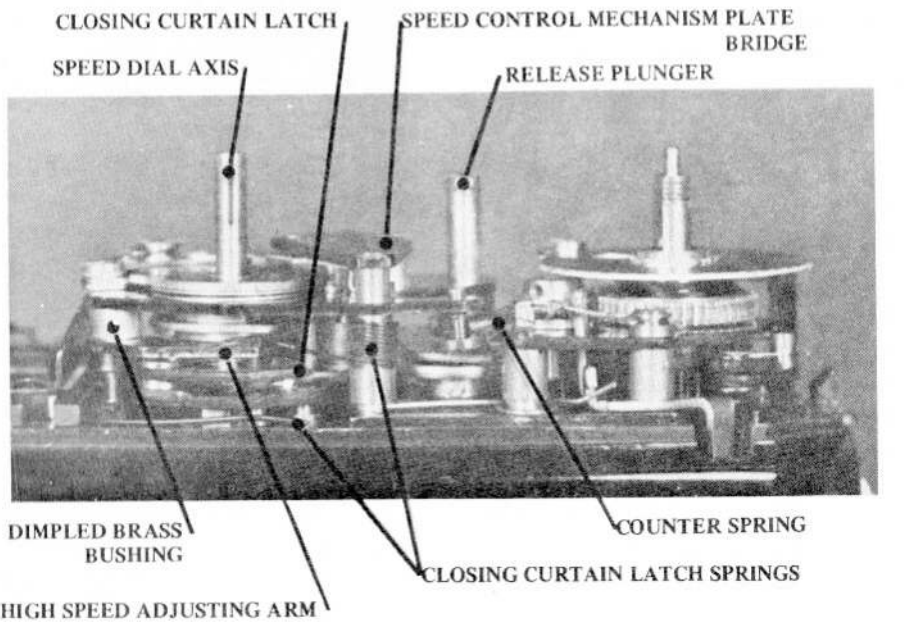


FIGURE 5 – REAR RIGHT-HAND SIDE OF CAMERA BODY

assembly. Figure 2 shows an adjustable bushing in which the retard transfer lever shaft rides. This bushing can be adjusted to change the position of the retard lever and shaft so they will slip up and over the closing curtain lug on the wind cycle and still make proper contact during the release cycle.

Unhook the tension-type spring (figure 5) from the counter drive pawl. Remove the countersunk screw in the lower left-hand corner of the speed control mechanism plate. Pull the pallet control lever counter clockwise to free it from the speed control cam and lift off the speed control mechanism plate. Also remove the shutter release plunger, the spring for the upper portion of the closing curtain latch and the high speed adjusting arm.

Scribe the position of the mirror cage on the top of the camera body casting. This is important so that you can install the mirror cage in exactly the same position as it was mounted originally. If incorrectly positioned, you may have a problem with the mirror cage not cocking and latching properly, plus the viewfinder focus may be out of adjustment.

By now you have probably noticed that the Mamiya Sekor camera has a solid body casting on which the front plate is part of the main body. You cannot remove the front plate/lens mount as on a Pentax or Minolta. This pretty well eliminates the problem of lens flange - film plane focus adjustments. The correct distance between the front edge of the lens mount ring and film guide rails should be 45.5mm plus or minus 0.03mm. This measurement can be checked using guage blocks and a dial indicator. Normally you will find several shims of varying thickness behind the lens mount ring. Additional shims may be added or existing shims may be taken away to provide correct body focus.

The viewfinder focus may be adjusted via four screws located at each corner of the viewing screen carrier. Install the mirror cage during reassembly and position it according to the scribe marks on the top of the body casting. Check the viewfinder focus and make any necessary adjustment. A drop of Pliobond cement on each of the four screws will help insure that they do not work loose and change the viewfinder focus.

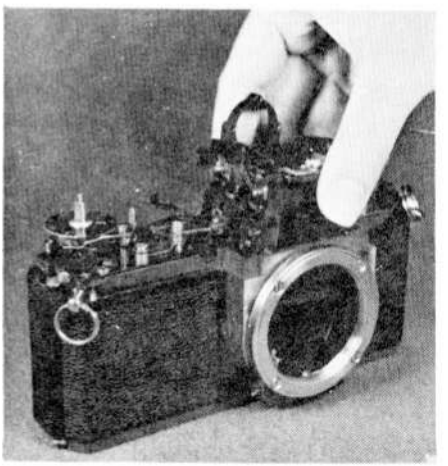


FIGURE 6 – MIRROR CAGE REMOVAL

Remove the two screws from the front of the mirror cage and carefully work the mirror cage up and out of the camera body (figure 6). This will require careful manipulation, as the mirror cocking lever has a tendency to get

in the way. In some Mamiya cameras it will be necessary to remove a screw and light baffle from the bottom of the mirror cage before attempting to lift it out of the camera body. During reassembly it will be necessary to pull the diaphragm striker plate forward while seating the mirror cage.

Figure 7 shows the mirror cage in the cocked position. Note that all three of the tension-type drive springs are fully tensioned. When the shutter release is activated, the linkage inside of the camera body moves downward releasing the shutter assembly from the transport. The shutter is then held by the opening curtain latch on the bottom of the camera body. The internal shutter release linkage trips the diaphragm kick lever latch, releasing the diaphragm kick lever which swings forward striking the diaphragm striker plate closing down the diaphragm in the lens. As the diaphragm kick lever moves forward (figure 8), it trips the mirror latch which frees the mirror assembly allowing the mirror to travel upward. As the mirror reaches the full up position, it trips the first intermediate and second intermediate opening curtain release levers which in turn trip the opening curtain latch on the bottom of the camera body. The opening curtain begins its travel and is soon followed by the closing curtain. As soon as the closing curtain completes its travel, a lug on the closing curtain cam strikes the mirror cage main lever latch and allows the main lever to return to its at rest position. At the same time the mirror comes down and the diaphragm kick lever returns to its at

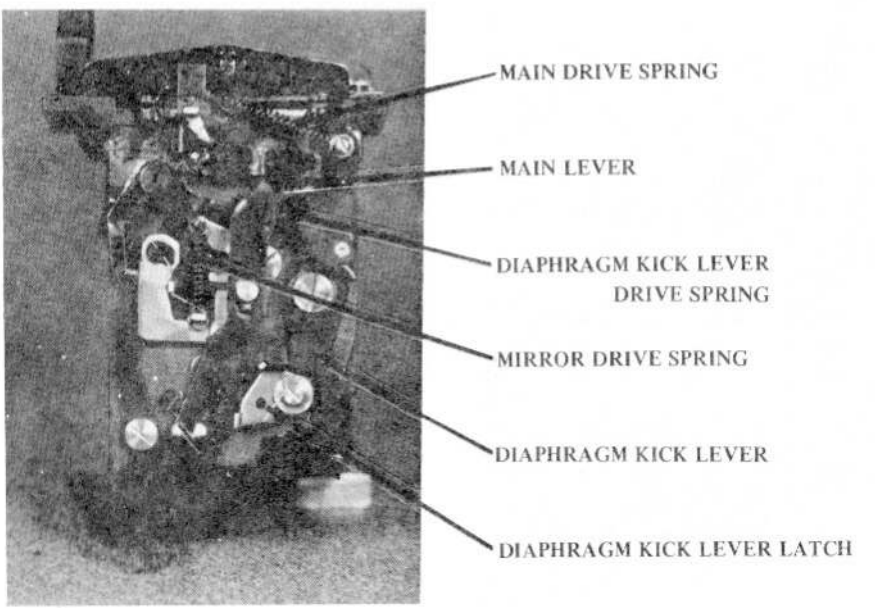


FIGURE 7 – MIRROR CAGE IN COCKED POSITION

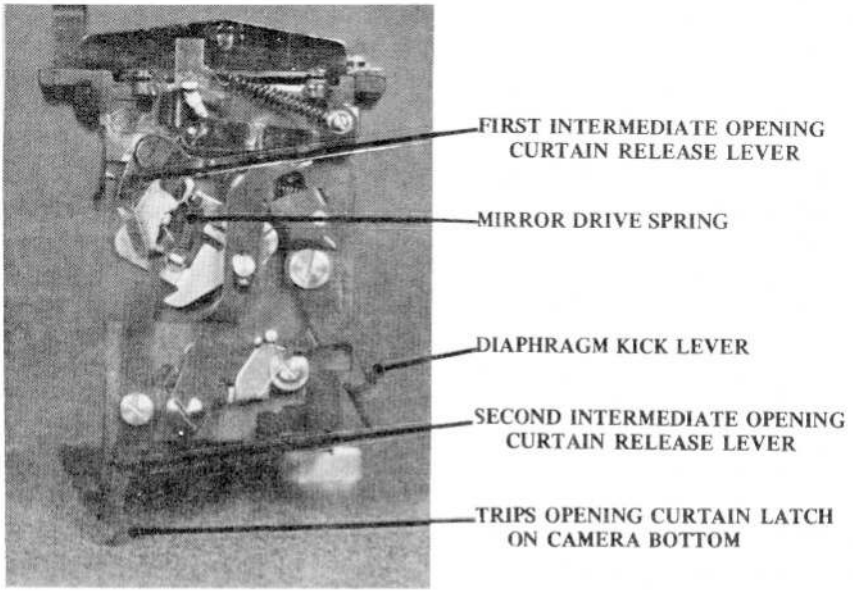


FIGURE 8 – MIRROR CAGE IN TRIPPED POSITION

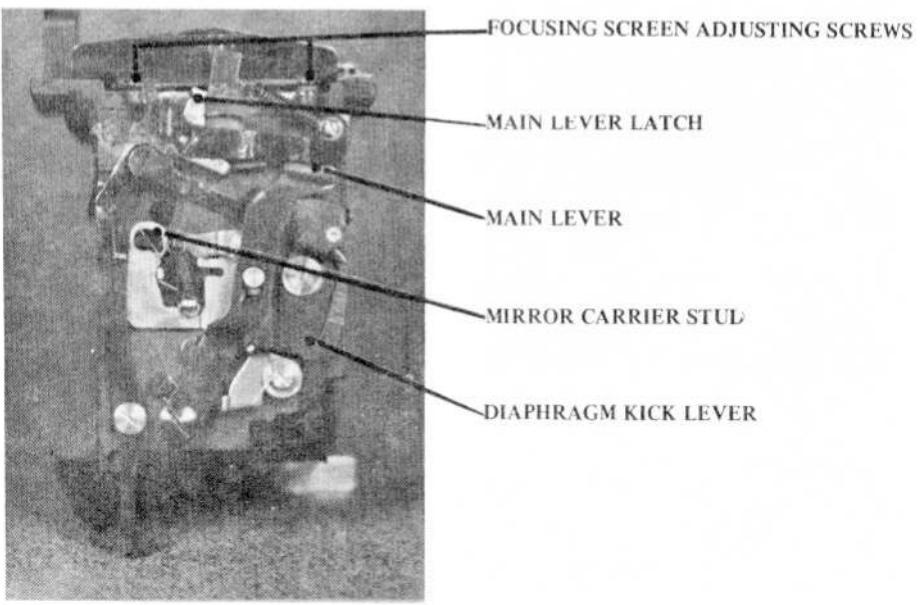


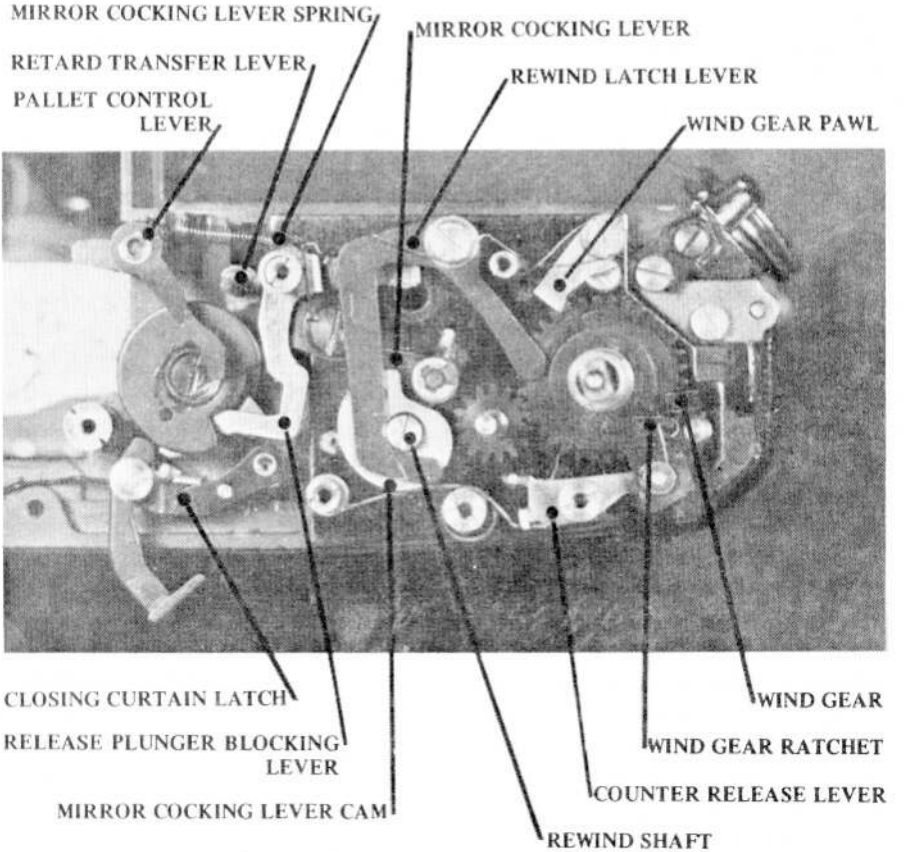
FIGURE 9 – MIRROR CAGE IN RELEASED POSITION

rest position, allowing the diaphragm to open fully for viewing the next shot.

The mirror cage in the Mamiya camera is the root of quite a few problems. The most common is the failure of the main lever to cock and latch. This can be caused by incorrect mirror cage position, fatigued mirror cocking lever, or failure of the main lever latch. Another common problem lies in the springs on the mirror cage. They have a tendency to break, which of course jams the whole camera.

Replacing the photocell in the mirror is easily accomplished once the mirror cage is removed from the camera body. Carefully slip a flat object under the center of the mirror in the cutout provided. Then pull the mirror down and out of the mirror carrier. The photocell is cemented in place, but the mirror is held by a spring clip which surrounds the mirror on three sides.

Some technicians like to flush clean the Mamiya camera without further disassembly. Install the wind lever and cap



and the release plunger. The camera can now be operated if you release the opening curtain via the opening curtain latch on the bottom of the camera. On a few cameras the opening curtain cam lug may nick the mirror cocking lever during the wind cycle when the mirror cage is not in the camera body. I find it difficult to properly clean the drum and tension rollers at this stage of disassembly. However, many technicians do not disassemble the camera further in order to do a clean, lube and adjust on the shutter-transport.

Remove the counter index mark (figure 2), unhook the counter dial spring and remove the counter dial. Unhook the spring between the two counter drive pawls. Loosen the set-screw in the eccentric bushing which drives the pawls and remove the eccentric, the upper pawl, the washer and the lower pawl. Remove the two screws in the rear of the counter mechanism plate and lift it off. Usually you will find the counter pawl springs cemented to their respective connecting points.

Figure 10 shows the right top of the camera body with the speed control mechanism plate and the counter assembly removed. Remove the rewind latch lever, screw and spring. This lever holds the rewind shaft in the up position during the rewind operation so that the sprocket is disengaged from the shutter. Unhook the pallet control lever spring from the mirror cocking lever spring. Swing the mirror cocking lever spring up and over the mounting stud for the release plunger blocking lever. Lift the bushing off of the blocking lever pivot stud. Unhook the spring from the blocking lever and remove both the lever and the spring. The release plunger blocking lever prevents the operator from releasing the camera until the shutter has been fully wound. The closing curtain cam stud contacts the long end of the release blocking lever and moves it out of the way of the release plunger when the closing curtain is fully wound.

Figure 11 shows the closing curtain latch and the lug on the closing curtain cam assembly. Note that there is approximately 1mm of clearance between the two parts. This is very important. When the shutter release is activated, the closing curtain latch moves downward and is positioned exactly opposite the lug on the closing curtain cam assembly before the mirror is tripped and the opening curtain is released. When the opening curtain is released, it begins its travel and the closing curtain is held by the closing curtain latch. If there is less than 1mm of clearance between the latch and the lug, the closing curtain may not be held by the closing curtain latch, and both curtains will travel across the film plane at the same time. The only exception is when the shutter speed dial is set to a retard speed. Quite often a customer will bring in a camera in which there are slow speeds but no Bulb action or high speeds. This will probably be the root of the problem. To adjust the closing curtain position, wind the shutter 2/3 of the way. Loosen the screw in the closing curtain cam assembly and rotate the cam assembly slightly counter clockwise and tighten the screw. Fig. 1 shows the location and technique to use in loosening the screw. It may require more than one try to get the cam assembly properly positioned.

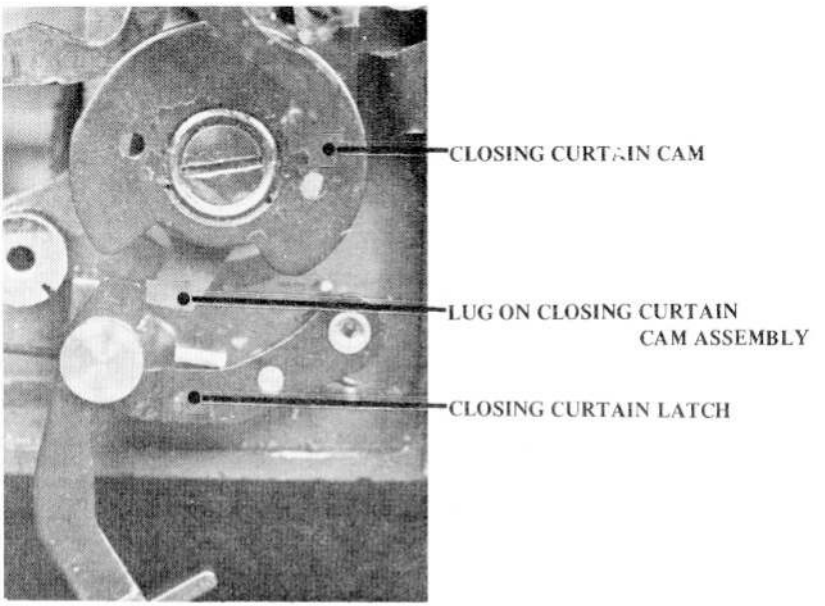


FIGURE 11 – CLOSING CURTAIN LATCH AND CLOSING CURTAIN LUG

Note the wind gear pawl on the front of the transport mechanism plate in figure 10. This pawl prevents the wind mechanism and sprocket from backing up under tension of the film. You will find this pawl in any one of several positions in Mamiya cameras. On some models the pawl has an eccentric bushing around its mounting screw for adjustment. Occasionally you will find a Mamiya in which the transport will require two strokes of the wind lever (and two frames of film) in order to cock the shutter mechanism. The problem is that the back pressure of the sprocket via the film will cause the sprocket to back up slightly. When the transport gear is allowed to move back into the camera (after the shutter is tripped) and into engagement with the sprocket, it misses the stud on the bottom of the sprocket. Thus you have to wind the film twice in order to wind the shutter once. On cameras with adjustable pawls, adjust the pawl for maximum back-up prevention to solve this problem. On a camera such as the one illustrated, it may be necessary to swage or replace the pawl to prevent any back-up of the wind and sprocket. This problem can really make you tear your hair out until you figure out what is going on!

Remove the screw and spring from the mirror cocking lever and work it free of the camera body (figure 10). Unhook the spring (figure 5) from the closing curtain latch and pull it up and out of the camera body. Watch for the bushing under the latch. Remove the cam from the top of the closing curtain cam and lug assembly.

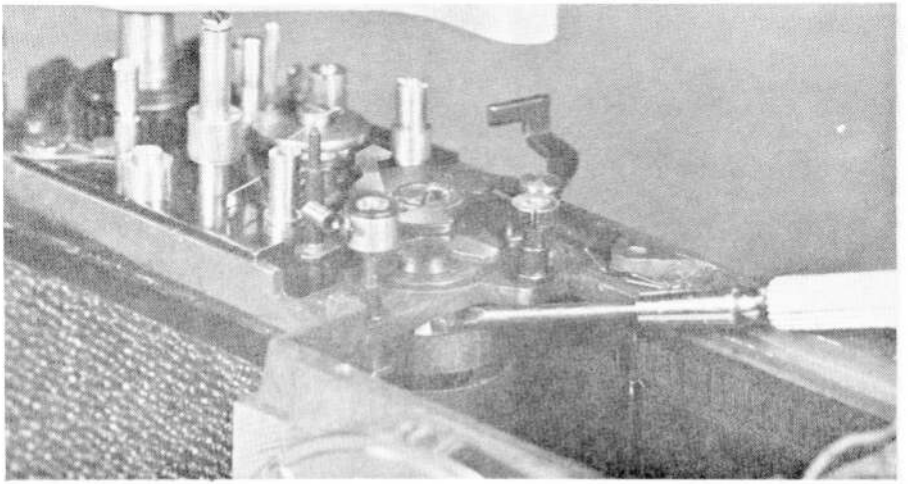


FIGURE 12 – CLOSING CURTAIN LUG ADJUSTMENT

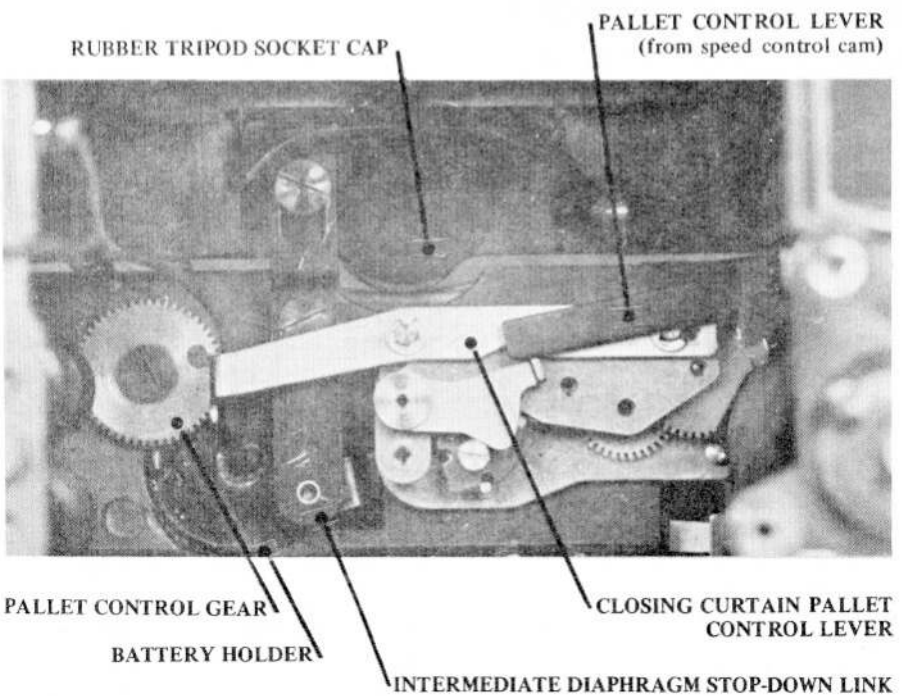


FIGURE 13 – RETARD MECHANISM

Figure 13 shows the retard assembly down inside of the camera body. Note the double pallet control mechanism. The pallet control lever transfers the pallet control from the cam stack on the speed control mechanism plate. The closing curtain pallet control cuts out the pallet when the closing curtain completes its travel. Note the correct position of the stud on the pallet cutout gear that meshes with the closing curtain gear. If not timed correctly, the stud will pass the pallet control lever and prevent the shutter from being wound. Also shown in figure 13 is the intermediate diaphragm stop-down link which transfers the diaphragm stop-down action to the striker plate when the exposure meter is switched on. Once in a while you will see a camera in which someone has used a tripod with a mounting screw which is too long. The mounting screw will penetrate the bottom of the tripod socket and push up through the rubber cap which seals the tripod socket. This may not cause a problem unless the rubber cap is pulled loose and jams the retard or shutter curtains. On some Mamiya cameras there is a metal plate with two screws that is used to close off the tripod socket. I have seen cameras on which this metal plate was forced up into the intermediate diaphragm stop-down link causing quite a lot of damage. The big problem here is that you have to pull the mirror cage in order to make repairs. That makes a minor repair quite a bit of work! Remove the retard screws (figure 1) and take out the retard. Also remove the two screws, two bushings, and the intermediate diaphragm stop-down link.

Remove the meter shut-off shaft and spring (figure 1) from the bottom of the camera body. Also take out the diaphragm-meter switch link with its two screws and spacer bushings. Unsolder the flash sync wires from the flash contacts. Release the tension from

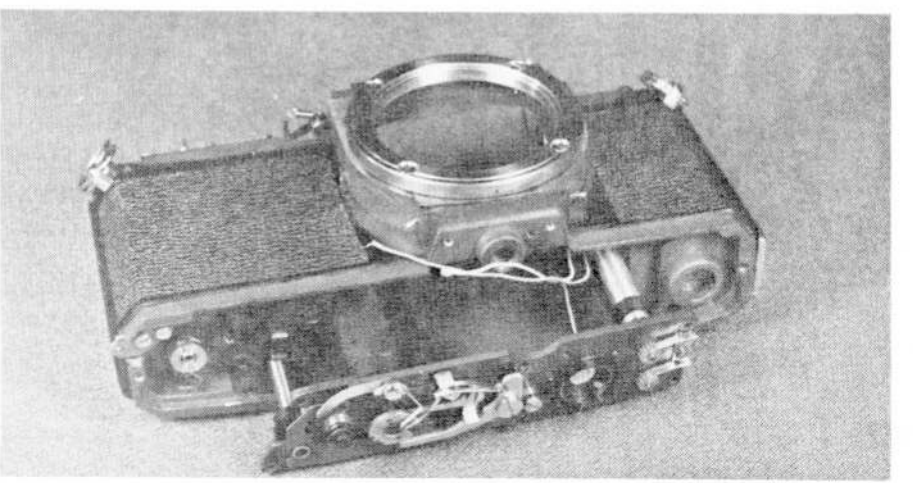


FIGURE 14 – SHUTTER REMOVAL

the curtain rollers. Take off the "C" ring from the base of the release linkage shaft located between the sync contacts. Remove the four screws in the shutter mechanism plate and carefully pull the shutter assembly from the camera body. Watch for washers under these four screws, as they maintain the proper clearance between the lower mechanism plate and the top of the camera body. Without them the drum and tension rollers may not have enough room to turn freely.

Take out the retard transfer lever (figure 10) which is now loose inside of the camera body. Figure 15 shows the shutter assembly and figure 16 shows the shutter disassembled. Remove the curtain tension ratchet plate and its two screws. Hold the center of the curtain tension shaft with a small screwdriver and unscrew the tension setting ratcher gear. Remove the screw from the opening curtain cam and lift off the cam. Pull the drum assembly and tension rollers from the shutter mechanism plate. Watch for washers that may fall out. Remove the transport release spring and transport release gear from the shutter mechanism plate. Normally it is not necessary to remove any of the remaining parts from the shutter mechanism plate in order to clean and lube the shutter or replace the curtains. Remember that the curtain overlap is determined by the position of the opening curtain tapes and the closing curtain on the drum assembly. If you replace the curtains, make sure that the overlap is the width of one curtain bar before reassembling the shutter and camera. It's a long way back down to the curtains if the overlap isn't right when you try to set the shutter speeds!

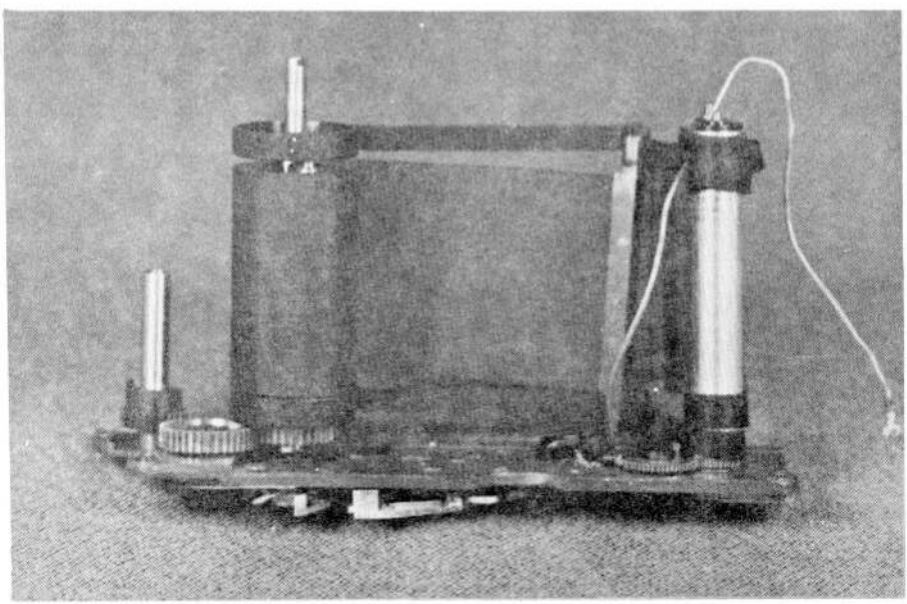


FIGURE 15 – SHUTTER ASSEMBLY

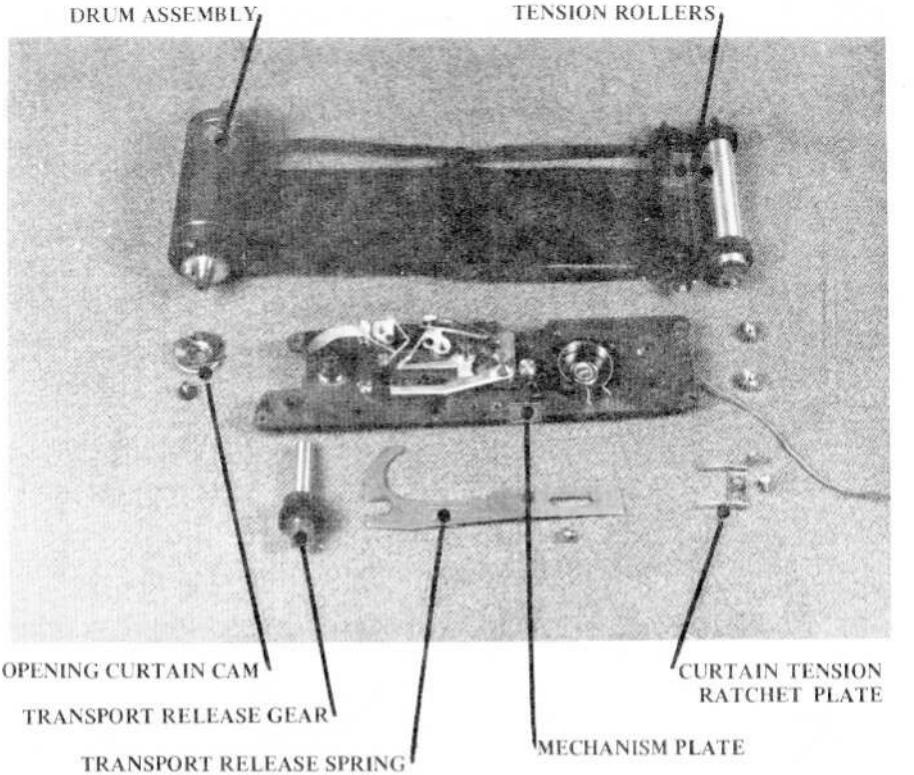


FIGURE 16 – DISASSEMBLED SHUTTER ASSEMBLY

Figure 17 shows the transport mechanism plate. Take off the wind ratchet gear and "C" ring from the wind shaft. Pull the wind shaft out of the bottom of the camera body. Check it and make sure that it is not twisted. Unhook the counter release lever spring. Remove the four stud screws and one countersunk screw in the transport mechanism plate. Take off the counter release lever and spring and lift the transport mechanism up and off of the camera body. The film drive sprocket is now free and will fall out of the camera body as soon as the back door is opened.

The film take-up spool can be removed from the camera body by unscrewing the lower spool bearing in the bottom of the camera body. This bearing is usually very tight and may require dimpling with a drill press in order to unscrew it. Then remove the notched collar from the bottom of the spool shaft and pull the shaft up and out of the camera body. Watch for washers. The spring on the top of the spool provides the clutching action for the take-up. Excessive lubrication on the spring as well as a weak spring may cause spool take-up problems.

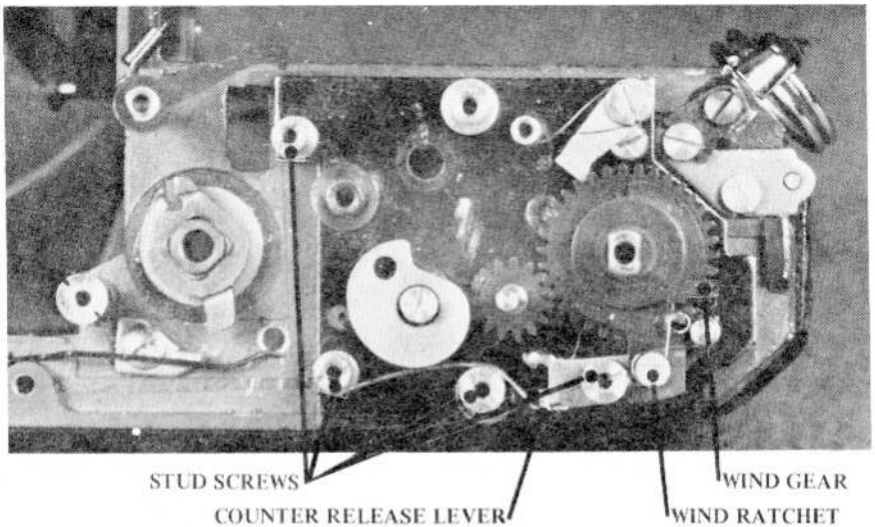


FIGURE 17 – TRANSPORT MECHANISM PLATE

Examine the keyway in the top of the sprocket and the mating pin on the rewind shaft shown in figure 18. When the rewind shaft is pushed up into the camera body and latched via the rewind latch lever (figure 10), the sprocket is disengaged from the transport mechanism allowing the film to be rewound. It is possible for the keyway to become badly worn and allow the pin on the rewind shaft to slip out, resulting in the camera failing to transport film or wind the shutter.

Figure 19 shows the other end of the sprocket and the transport release gear attached to the shutter mechanism plate. Note that the peak of the cam surface on the transport release gear is positioned at about 11 o'clock. This is the position for this gear when the curtain drum is in the fully released position, i.e., all of the way clockwise when viewed in the same manner. Earlier we talked about the transport requiring two strokes of the wind lever in order to wind the shutter one time. The sprocket and transport release gear are at the heart of this problem. In severe cases of sprocket back-up it may be necessary to replace the back-up pawl, the sprocket, and the transport release gear. The cam surface on the transport release gear and the engaging pin on the sprocket both appear to be quite hard. However, a burr on either one or excessive cement on the sprocket pin could prevent engagement in borderline cases. My experience has been that adjusting the back-up pawl won't always solve the problem.

Begin reassembly of the shutter assembly by installing the curtain drum assembly. Rotate the drum assembly all of the way clockwise (drum and tension rollers sitting on top of the base plate) until the stop pin on the lower gear

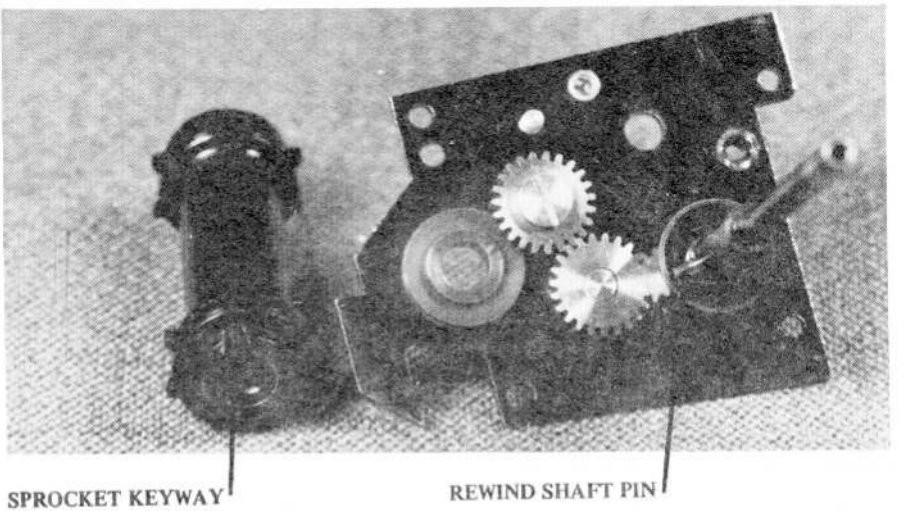


FIGURE 18 – BOTTOM OF TRANSPORT MECHANISM PLATE

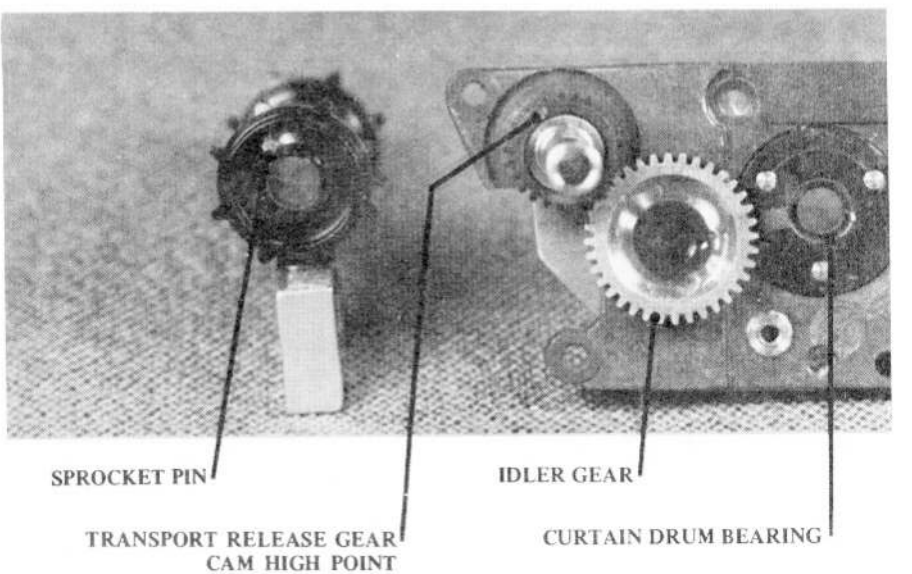


FIGURE 19 – SHUTTER MECHANISM PLATE

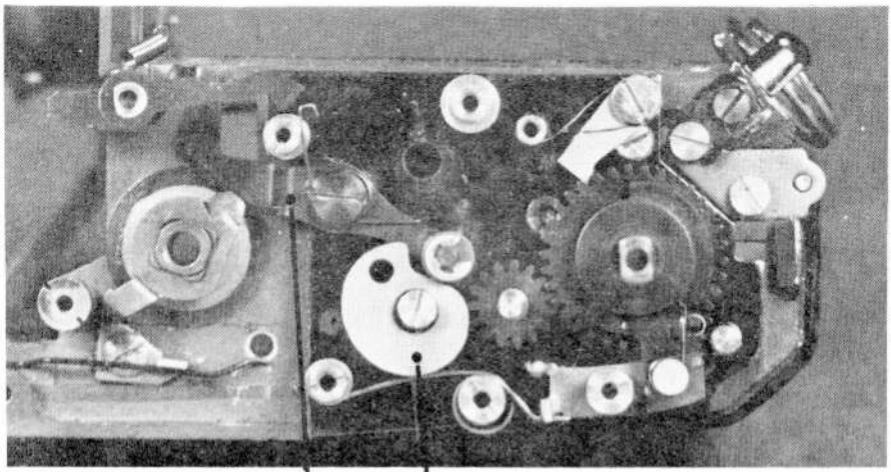


FIGURE 20 – TRANSPORT MECHANISM PLATE

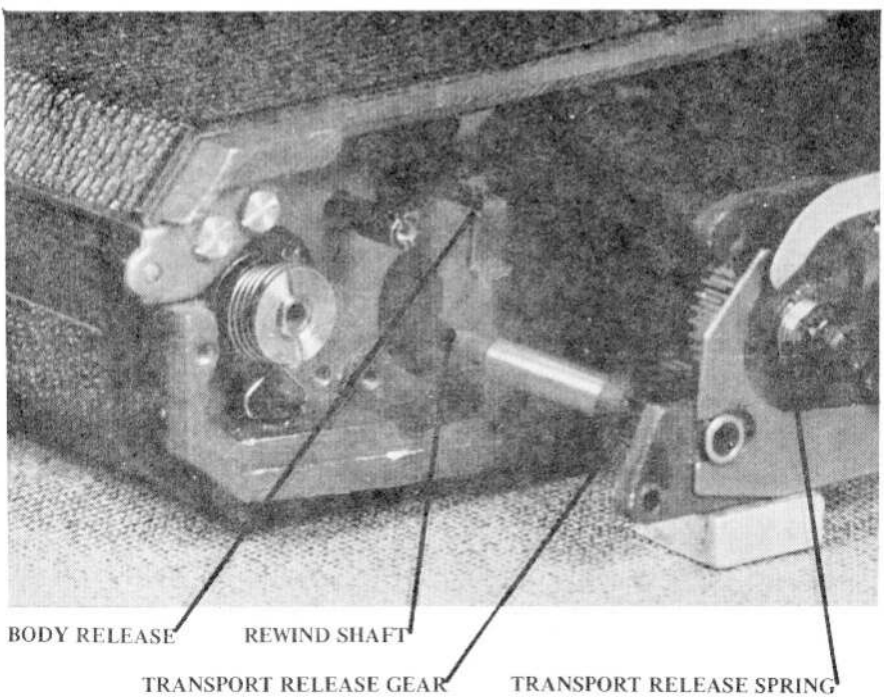


FIGURE 21 – SHUTTER INSTALLATION

strikes the stop pin on the base plate. Install the opening curtain cam so that the X sync contact is closed. I usually don't remove the sync contacts as the plastic mounting screws are easily broken. With a little care you can work the opening curtain cam under the X contacts. Install the two tension rollers and secure them with the two tension setting ratchet gears. Install the tension ratchet plate and apply about one turn of tension to each roller. Wind the drum assembly fully until it is latched by the second notch on the opening curtain cam. Release the shutter assembly via the opening curtain latch and rotate the drum fully clockwise against the opening curtain brake. Install the transport release gear and its flat spring on the bottom of the base plate. The peak of the cam surface should point to 11 o'clock as indicated in figure 19. Set the shutter assembly aside for a few minutes and install the take-up spool, sprocket, transport mechanism plate, wind lever shaft, wind gear and ratchet in the camera body. The lug on the bottom of the wind lever should point toward the rear of the camera body. The wind ratchet on the top of the camera body should also point toward the rear of the body. Temporarily install the mirror cocking lever in order to check the timing of the mirror cocking cam. Note its position in relation to the mirror cocking lever in figure 10.

Insert the shutter assembly into the camera body (figure 21), lining up the transport release gear with the rewind shaft. Thread the blue battery wire up through the mirror cage cavity and loop it over the upper edge of the camera body. The next alignment point is the curtain drum shaft, which fits through the closing curtain cam assembly. Before seating it fully (figure 22), make sure that the stud on the closing curtain assembly meshes with the fork on the

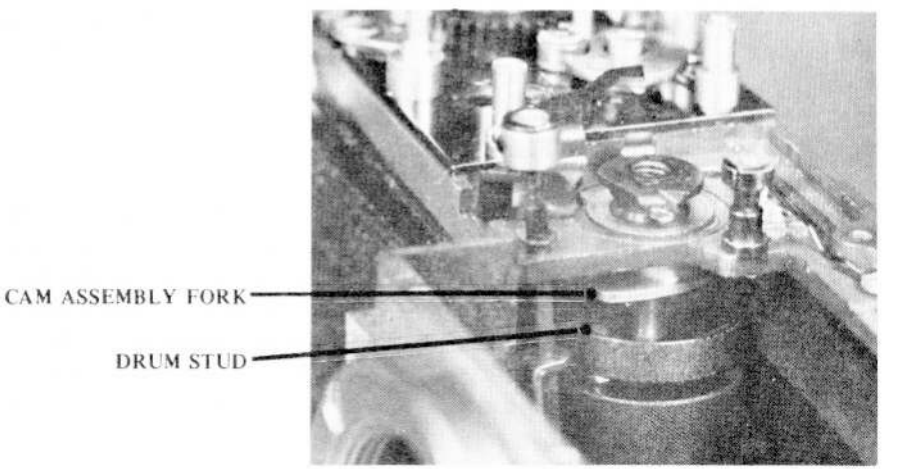


FIGURE 22 – DRUM ALIGNMENT WITH CLOSING CURTAIN CAM ASSEMBLY

lower portion of the closing curtain cam assembly. Once this is seated, turn the camera over and start one or two of the screws in the wind lever end of the shutter base plate. Then align the tension rollers (figure 23) with their respective pivot points and install the remaining screws and washers in the shutter base plate.

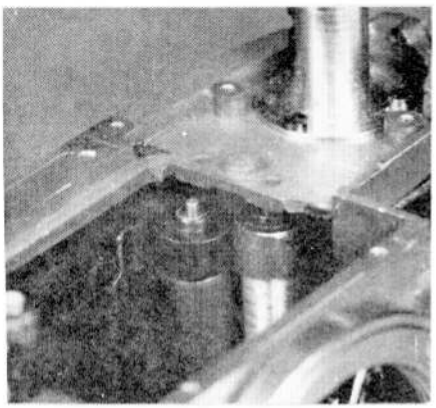


FIGURE 23 – SEATING CURTAIN TENSION ROLLERS

Install the release plunger, and the wind shaft spacer, and the wind lever. Carefully cock the shutter. Watch carefully for smooth action and note if the opening curtain is latched in the second notch in the opening curtain cam. Trip the shutter via the opening curtain latch. Make sure that it takes only one full motion of the advance lever to fully cock the shutter. Note the position of the mirror cage cocking lever. The roller on the cocking lever should be in the lowest portion of the cam when the shutter is fully wound. If it is off, you can loosen the setscrews under the cocking cam and rotate the cam till the timing is correct. Note the timing of the cam in figure 20. Make sure the setscrews are tight, as the cam takes a lot of stress and the screws have a tendency to work loose.

After you are satisfied that everything is working properly and assembled correctly, release all of the tension from the tension rollers with the shutter in the released position. Then add 4½ turns of tension to each roller. Operate the shutter and check for proper operation. Reassemble the camera working back through our disassembly procedure, checking each part or assembly as you install it. Install all of the internal parts except the prism and exposure meter.

The 4½ turns of tension should be approximately correct in order to produce a curtain travel time of 11 to 12.5 milliseconds. If not, adjust the tension to obtain the correct travel speed. With the speed control set to 1/500 second, adjust the dimpled brass bushing to obtain a correct 1/500 second. Then draw out the high speed adjusting arm and adjust the inner screw (the second one in from the end, figure 24) for proper tolerance at 1/60 and 1/125. Then recheck 1/500. If it is not within tolerance, work back and forth between the two adjustments until proper speeds are obtained.

Set the speed control to ¼ second and adjust the retard transfer lever arm screw (figure 25) for proper tolerance at ¼ second. If the camera has been properly cleaned and lubricated and is not worn too badly, all of the shutter speeds should be within tolerance.

Complete the reassembly by installing the exposure meter, prism, eyepiece, etc. Install the top and bottom covers and check all functions and features of the camera. And last of all, install the meter shut-off button!

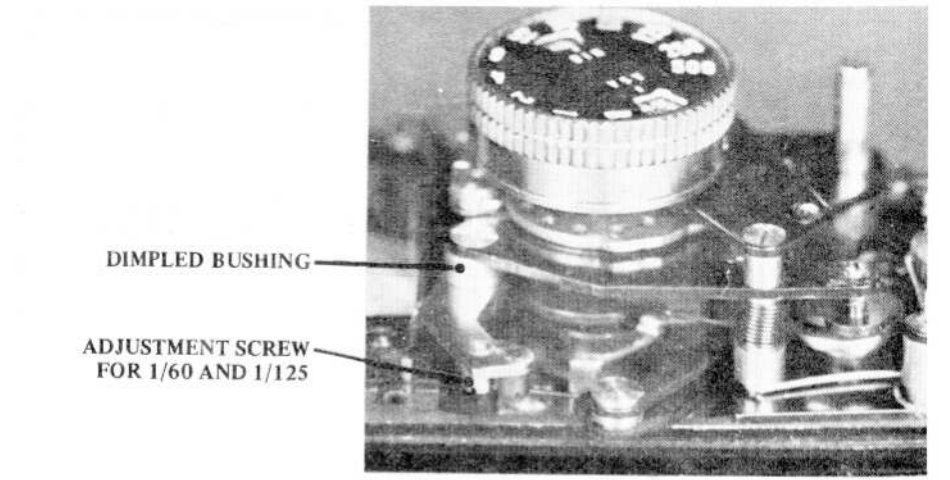


FIGURE 24 – HIGH SPEED ADJUSTMENT

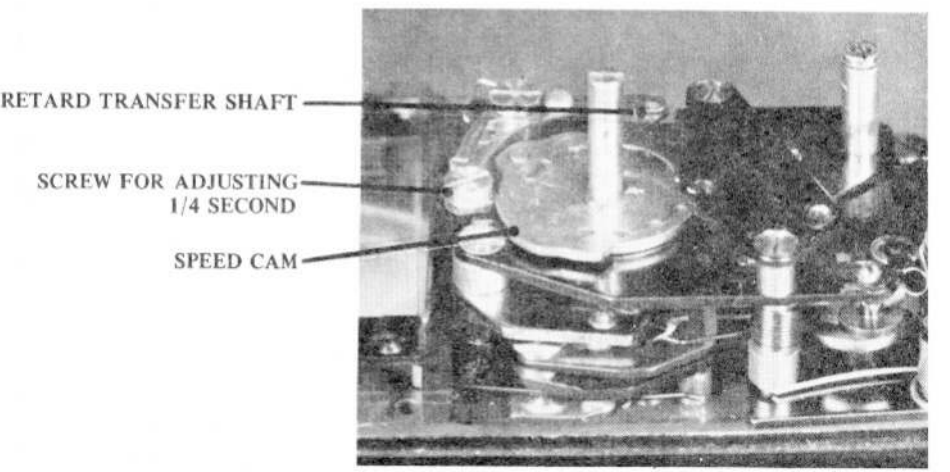


FIGURE 25 – ¼-SECOND ADJUSTMENT

80-Slide Mamiya 500 & 1000

Self-Teaching Repair Program

FOR RENT

(After January 1, 1974)

If you think this Mamiya Manual is good, you should see the 80 color-slide program which you can rent to accompany it! Leland Bartel presented this slide program to the Mile-Hi Chapter of SPT. It was so good that the Society persuaded Leland to let us distribute it for him, on a rental basis, to all SPT members.

This program rents for one week (not counting shipping time) for $25 (paid in advance). It contains:

1) 80 slides in a Kodak Carousel tray.
2) Accompanying script, both printed and on cassette tape.

In addition, a refundable deposit of $10 is necessary before shipment.

The Society will pay to ship the program to you. You pay the return shipping charges.

We will rent this program after January 1, 1974. Two copies of the slides and scripts are available to facilitate scheduling. First come, first served.

The Mamiya 500 and 1000 program can be used on either an individual or a group basis. An apprentice may wish to obtain a Mamiya 500 or 1000 for practice disassembly, viewing the program alone to learn the servicing of this camera. A group of technicians familiar with SLR's will find the program helpful, as it points out common servicing problems and their solutions.

Letters...

Gentlemen:

With reference to the article concluded on p. 52 of the July/Aug. '73 **Journal** – who is this paragon of virtue the author refers to? ". . . A refreshing change to the above policies is the case of one company that is U.S. based . . ."

I am anxious to learn if I have been missing out on something or not!

Eugene S. Summers
New Orleans, LA.

[Ed. Note: We forwarded this question to the author of the article. Here is his reply, below.]

Dear Mr. Summers:

The company to which I referred is Kalart-Victor Corporation in Plainville, Ct., and there is a lot that wasn't covered in my article. I service a group of their 16mm sound projectors that are used an average of seven hours a day, seven days a week, by untrained personnel. So you know what the problems are. And this company does an excellent job of handling all requirements. All parts are sealed in plastic with labels with the part number on them, VPI paper enclosed if they are metal, and the shipping document has the prices on it too.

John K. Perrin
Spring Lake, NC.

Gentlemen:

I came across the following book which might be of help to other repairmen in business for themselves. The title is: A FINANCIAL GUIDE FOR THE SELF-EMPLOYED, by John Ellis, published by Henry Regnery Co., Chicago.

Table of Contents:

1) Self-Employers Are Different
2) Some Common Concerns of the Self-Employed
3) What Specialists Can Do for You
4) You Must Protect Yourself with Insurance
5) Where To Borrow Money When You Need It
6) Time Management: The Key to Getting Things Done
7) The Art of Collecting Overdue Bills

8) Tax Specifics for Self-Employers
9) Handling Your Paper Work
10) Planning Your Retirement

There is a wealth of useful information between the covers of this 228-page book.

Chester M. Bruszewski
Delano, CA.

U.S. DEPARTMENT OF LABOR
MANPOWER ADMINISTRATION
WASHINGTON, D.C. 20210

October 10, 1973

Mrs. Peggy Jones
Executive Secretary
Society of Photo-Technologists
P. O. Box 19308
Denver, Colorado 80219

Dear Mrs. Jones:

It is with pleasure that I inform you that the National Apprenticeship Standards for the Society of Photo-Technologists has been approved and registered under registry number N-90071 as of October 3, 1973.

I am enclosing one copy of the registered standards as well as a photocopy of the Certificate of Registration.

As per our telephone conversation we will immediately start the process of preparing 2,000 copies of the standards as they now appear. At the same time we are developing the necessary paper work in order that these standards be printed in booklet form.

As you well know, the persons in the Bureau of Apprenticeship and Training who were basically responsible for the development of these standards were Michael J. McDonough and Charles M. Carlson of the Denver BAT office. Without their initial efforts in developing the draft standards, our final development would have taken a much greater time.

Congratulations on establishing these National Standards. As soon as the standards have been reproduced in quantity I will advise you.

Sincerely,

DeForrest E. Cline

DeFORREST E. CLINE
National Apprenticeship Representative
Office of National Industry Promotion
Bureau of Apprenticeship and Training

CHAPTER NEWS

DENVER: The September Mile-Hi Chapter meeting was a tour of the Lowry AFB ground camera repair school. Thanks go to Sgt. Thornton who was an excellent guide. The October meeting featured a talk on Zoom Lenses by Larry Tuttle.

UNITED KINGDOM: The U.K. Chapter issued Newsletter No. 2 in September and gathered nominations for offices. Results of election, held in October, will be announced in the next **Journal**. The Chapter distributed a questionnaire to gather data for the U.K. edition of the **Parts Directory** and also for a "1974 Trade Listings" to be distributed to U.K. photographic magazines.

SOUTHERN CALIFORNIA: In September Mr. John Cannon from the Verselector Co. demonstrated to the Chapter his Verselector Meter, used for checking shutter speeds. It was designed for a photographer to carry in his gadget bag to direct him to open up or stop down according to the degree of shutter accuracy, but it is also of use to repairmen. There will be a 25% discount to SPT members on quantities of three or more. **[Ed. Note: This unit has not yet been perfected and is not quite ready to be marketed. We'll write more about it as soon as possible.]**

WEST VALLEY, CALIFORNIA: Students at the West Valley Occupational Center have just formed an SPT Chapter. Mr. Hal Goldman is the Chapter Representative. The students plan to try to keep in touch with each other, and with new students, after graduation. The school's repair course has expanded to a day class in photographic equipment repair, held five mornings a week for 20 weeks, and a camera repair course held two evenings a week for 20 weeks.

CANADA: The following committee has been appointed to form the Canadian Chapter and put together the Canadian edition of the '74 **Parts Directory**:

Lou Ann Barsotti – **Parts Directory** Editorial Director
Barry Winch – **Parts Directory** Technical Director
Len Abramoff – Eastern Coordinator
Allen Groom – Western Coordinator

Volunteers to join the committee are welcome. Contact the Canadian SPT Editorial Office, 876 Tulane St., Sudbury, Ontario. Or phone: (705) 566-2117.

The Committee hopes to have the Canadian Parts Directory ready to go in time to accompany the U.S. **Directory**, which will be printed in the Jan./Feb. '74 **Journal**.

In January, after this project is completed, the Committee plans to hold nominations and elections.

NEW YORK: The organizational meeting of the N.Y. Chapter was held on Sunday, October 14, at the Steak & Brew in New York City. For $6.50 the 23 members and guests enjoyed steak and trimmings, all the salad they could eat, all the beer they could drink, and the tip was included.

Officers elected were: President, Al Drucker; Vice-president, Jerry Gross; Secretary-treasurer, Roy Rothstein. A program committee was formed: Steve Gordon, Al Spector, Susan Linder.

The Chapter decided to adopt the SPT By-laws with slight modifications.

The group will meet quarterly during the coming year. The next meeting will be on the second Sunday in January, 1974.

J. C. I. A. Bulletin

NEWS OF THE JAPAN CAMERA INDUSTRY ASSOCIATION

OCTOBER MEETING

The JCIA Service Committee had tentatively scheduled a tour of Minolta for their October meeting, but as Minolta will not move into the company's new plant until later this year, the tour was postponed. The Service Committee did discuss their individual memberships in SPT. The chairman, Mr. Shinozaki of Mamiya Camera Service, clarified the difference between a Regular Membership and a Sustaining Membership. The group also reviewed a letter from SPT explaining the Apprenticeship Standards recently written for the U.S. Department of Labor.

MINOLTA MOVE

While most Americans are busy eating leftover turkey, Minolta will be busy moving. In case repair shops are wondering where (or whether) to send Minolta parts orders during December, here's the schedule:

December 21, 1973 — Minolta stops doing business at the old New York address.

December 26, 1973 — Moving day.

January 2, 1974 — Minolta opens for business at:
101 Williams Drive
Ramsey, NJ 07446

FUJI MOVE

Another moving day will occur around mid-May of 1974. May 15 is the day on which Fuji Photo Film USA takes over parts orders and servicing for Fujica cameras from EPOI. This will probably not cause any drastic delays in Fujica servicing, because Fuji already has its own parts and service people working inside EPOI facilities. And authorized independent service stations across the U.S. will continue repairing as usual. The only new servicing function Fuji will need to set up is quality control, which EPOI has been handling for them.

NAME CHANGE

For years people have been calling Osawa Camera Service "Mamiya Camera Service" and now this company has officially changed its name. Also, as of November 1, 1973, Mamiya Camera Service officially services the Mamiya Sekor cameras previously serviced, officially, by Ponder & Best. P&B continues to distribute these cameras in the U.S.

Announcements

AS WE GO TO PRESS.....

AVAILABLE ON MICROFILM FROM SPT

US Army Technical Manual TM 11–6720–244–35; KS–15(4); (FSN 6720–935–7701). [This is really a manual on the Leica M3, including: exposure meter; flash unit; 35mm, 50mm, 135mm lenses.] 250 pages on 3 microfilm sheets. $8.00.

KODAK'S SERVICE PUBLICATION PLAN IS MICROFILMED, now, costing less than it did when printed on paper. Kodak announced that it is phasing out its paper-printed service publications within the year. Present subscribers can convert to microfilm, receiving all the back issues, at no cost other than their $78. renewal (formerly $108.). For new subscribers, the back issues on microfilm cost $156. (formerly $216.).

Kodak has chosen the same type of 24x reduction on 4" x 6" mylar-bonded fiche that SPT found practical for the Society's microfilm. The same kind of reader can be used for both.

SPT has asked Win Moses, our ANSI representative, to propose this microfilm format for use by all members of the photo industry when microfilming service information.

A DESK-SIZE MICROFILM VIEWER is available at a discount to SPT members from: Micro-Design, 857 W. State St., Hartford, Wisc. 53027, Attn: Phil Gustafson, Marketing. This viewer, with an 8 1/2" x 11" screen, was originally made for a manufacturer's service departments.

REPAIR ACADEMY PREPARATIONS are underway, finally.

During the latter half of March, 1974, there will be a business meeting of the SPT Board of Directors in Chicago with staff of Southern Illinois University plus as many members of SPT's Committee on Apprenticeship, Education and Certification as can attend.

There will also be a general business meeting (see article "SPT/NAPET Merger Proposed"). Details of the Chicago get-together will be announced in the next issue. We hope that as many members as possible can attend.

To review the general concept of a Repair Academy--you may remember that Norman Goldberg proposed such an institution to members of the photo industry a couple of years ago. This would be located centrally at an institution which could provide electronics training, machine shop practice and other courses related to camera repair. Repair courses would be financed by the whole industry, which would donate guest instructors, practice equipment, service manuals, test equipment -- and a certain amount of cash.

Southern Illinois University at Carbondale is enthusiastic about the project. This seems to be the flexible type of institution necessary to house the Repair Academy. This university has already helped develop versatile training programs for fields such as: aviation electronics, law enforcement, mortuary science & funeral service, and construction technology.

SPT is in the process of sending to manufacturers and distributors a questionnaire asking for their personnel needs which the Academy could fulfill and also how much in the way of staff, materials and cash they could donate.

A HOME-BUILT TEST INSTRUMENT, copied from the schematics of a commercial brand, was built by Mr. J.B. Roberts of Utah. We were going to write a feature article on the building of such an instrument, but since Mr. Roberts is leaving the repair industry and selling it, we'll describe it briefly, right now. If you wish more details, write to Mr. Roberts. (See Classified Ads.)

This instrument includes a Movie Tester, a Light Meter, a Light Box and a Still Camera Tester (General Power Supply & Readout). Mr. Roberts and his partner, Mr. Baughman, claim their machine will do anything the commercial one can do except test movie camera frames per second.

The instrument was used in a small, two-technician shop repairing cameras, projectors and meters. The partners also had an outside technician handling electronic flash units. Mr. Roberts' background is basically mechanical and limited, in electronics, to the basic knowledge needed by a camera repairman. He believes to build a test unit like this you would need a fair knowledge of elec-

tronics or help from an expert. He found it necessary to hand part of the photo-multiplier to his flash unit repairman to build.

Although Mr. Roberts had access to the commercial tester, he used it only for checking out his completed system.

Figuring hours of labor is difficult when a unit is built in bits and pieces over a period of time, but Mr. Roberts makes the following estimates on the time and cost for each component:

HOURS	COMPONENT	COST
5	Movie Tester	$ 15.
5	Light Meter	$ 10.
10	Light Box	$ 30.
12-20	Gen. Power Supply & Readout	$180.

Mr. Roberts explains that the figure for the General Power Supply & Readout do not include about $120. paid to his electronics expert for the building, calibration and checkout of this part.

SHUTTER SPEED TEST CERTIFICATES are being issued with Regula Reflex 2000 CTL cameras manufactured by the Kamerawerk King KG. These certificates show the results of out inspection for each shutter speed between 1 second and 1/2000 second as prescribed by DIN 19016. The results are, in each case, compared with the nominal value and their permissible plus/minus tolerances.

The certificate can assure the customer that every camera has, indeed, been inspected. But will the shutter speeds be relevant by the time the certificate reaches the customer? It is recognized that shipping and handling can cause shutter speeds to vary slightly or even have a marked detrimental effect on the camera.

Will the certificate lead to unrealistic expectations? Will the customer become overly picky -- especially if he doesn't understand tolerances? Will he start pawing through the dealer's stock to find the "most accurate" camera? Will he expect a camera repair shop to be able to adjust every single shutter speed right on with no error whatsoever?

We'll be interested to see the results of King KG's new certificate program.

SUPER 8 CARTRIDGE SYSTEMS have been standardized by the U.S. Department of Defense. When the military adopts a standard, education and industry often follow. So far, Fairchild has the only system on the market that meets all the DOD's standards. If other manufacturers start making products which conform to these standards, it may mean fewer test cartridges to be stored in a shop for checking out equipment.

These DPD standards are: MIL STD.1354 (film format of Super 8 Magnetic sound with 18 frame advance) and MIL STD.1497 (endless loop cartridges). They are available from: Commanding Officer, Naval Publications & Forms Center, 5801 Tabor Ave., Philadelphia, Pa. 19120.

Classified Ads...

Classified Ads are available at the rate of $3.50 per column inch.

EXPERIENCED CAMERA REPAIRMAN WANTED for quality retail store with established repair dept. Nonsmoker. Send resume of repair qualifications to: Mike's Camera, 1637 Pearl, Boulder, CO. 80302.

COMPLETE REPAIR SHOP FOR SALE: Incl. all hand tools, many parts, digital shutter timer, flashcheck strobe tester, AC power supply, cap. tester, Unimat lathe w. many acces., Kodak, B&H, Honeywell, Mamiya, Compur, GAF & many more manuals. NCRS repair course updated. All **SPT Notes**. All that's needed for full-time repair shop. Will sell complete only. Best offer over $3,500. $5,000 value. Robert E. Decker, Bob's Camera Clinic, 50 Engleberg Plaza, Mt. Angel, Ore. 97362. Phone: 845-6728.

WANTED: Service manual, tools & spare parts for HASSELBLAD. Contact Pacific Camera Service, 730 W. 19th St., Costa Mesa, CA. 92627.

TEST UNIT FOR SALE. Home-built. Movie tester, light box, light meter, still camera EE tester. Approx. parts cost $230. Complete w. instruction books and schematics, $500. J. B. Roberts, 4689 West Point Dr., Granger, UT. 84120. Ph: (800) 299-7426.

Faces at the

James T. Amos
President of SPT

Leo Bulgarelli
Honeywell Corp.

Joseph C. Hayden
Lexington, KY

Norman Goldberg delivers
the Keynote Address.

Martin Forscher
Professional Camera Repair
NY

Pat Rowley
Dixserve Ltd., U.K.

Sgt. Charles Ackerman
AF repairman
in the Panama Canal Zone

Convention

Technicians play with Yashica's EV tester.

When you're trying to get Nikon parts in a hurry, call Blanche at EPOI (516) CH8-5200.

Finally – some cheerful faces: Anna Marie Benlian (right) and Marilyn Baker (left) with Bob Snatchko in the background.

Here's the picture in the bathtub, requested last issue.
Well, what did you expect?

SPT'S CAMERA REPAIR MARKING SYSTEM –

Here's YOUR Marking Number

"What System? What Number?" our newer SPT members may ask.

Briefly, in 1970 SPT adopted a uniform system of camera repair markings such as has been used for years in the watch industry. When a repairman completes his work, he scribes, inside the camera, his number. He may also add the date and a number or letter coded to show the kind of repair. This number is placed where it will be readily accessible to another repairman, but where the general public will never see it. Then, if the camera is stolen, this number helps in its eventual identification. Or, if a shop has an agreement with others whereby they will honor each others' repairs, the number can establish who did the repair and when.

In the Jan./Feb. '70 **Journal**, SPT announced that the Society would assign a number to any member wishing one and keep a record of numbers assigned. It soon became evident that we were spending an awful lot of time writing individual letters to all the people requesting numbers. This was good because the more people who use the marking system, the more effective it becomes. However, we did not promote the system among the newer members who hadn't seen the '70 **Journal** because we were in the process of finding a better, less costly method of sending out numbers than writing 1,000 individual letters.

The solution, of course, was to send everybody their number at the same time. And we have.

If you look at your white computer label on the back of this magazine, you will see a group of numbers and letters printed out across the top. (If you are a new or recently moved member, you will have a typewritten colored label and will have to wait until the next issue to get your number.) Starting from the left, the first ten letters and numbers stand for zip code, name, etc. These may change from time to time. The 11th, 12th, 13th and 14th digits are your marking number. There may be some letters and numbers after your marking number, or there may not. And this, too, may change. But the marking number is the computer's member-identification number and will remain the same.

Example:

02115DOE J0733AD7

Please note that a space is counted like a number or letter. The first ten digits are: 02115DOE J. The repair marking number is 0733.

If you were issued a repair marking number already, it **should** be the same as the number on your label. But you might double-check to make sure that we fed it into the computer correctly.

Now that you have a number it is up to you to use it or not, as you choose. SPT keeps a computer print-out from every year, so the number will always be on record with us if a camera needs to be traced. For example, if you (or the police) are trying to determine the owner of a stolen camera, you can look inside to see if it has been repaired. If there is a marking number, you can ask SPT whose number this is. Then the police can contact the repairman, who can dig out his invoice on the job (that's why it's a good idea to put the date in the camera, too!) and tell who the owner is.

An Auto Collimator with Interchangeable Lenses!

by James Todd Amos

To those of us who eagerly await new test equipment in the camera repair field, the Honeywell-Richter auto collimator was worth waiting for. While the Richter auto collimator has been around for a long time, the credit must go to Honeywell for having made the test instrument now being offered a worthy candidate for addition to any camera repair shop's test bench.

Our purpose here is to give you our impressions of the instrument based on actual use in an independent camera repair shop. We won't take time here to describe in detail the capabilities of auto collimators or the exact operating instructions. That information is capably handled by Honeywell in their TIPS Catalog (pages 17-23 through 17-33). You should have this catalog in your shop. The catalog, as well as this collimator, is available from Honeywell Corp., 5200 E. Evans Ave., Denver, CO. 80222.

Our first impression of this test instrument is its professional finish and appearance. The quality of workmanship is good. On closer look, one is a little surprised to find that the actual auto collimator head is so small, compared to instruments most of us grew up using. It may take you a while to realize that a collimator head need not be large, bulky and heavy to do its job. This Honeywell instrument is small and light enough to be easily removed from its column and base for special, one of a kind jobs.

But the most impressive feature, and the one truly unique, is the interchangeability of objective lenses. It is hard to believe how great a feature this is until you have used it. In my freshly revised opinion, we repairmen for too long have been trying to make one single focal length auto collimator do too many jobs! Our shop handles cameras with a great range of lens

focal lengths, literally from 6mm to 600mm. What works well with 6mm won't be even close at 600mm.

The 60mm objective is just the lens for Super 8 cameras. How many of you know how much a zoom lens shifts focus – and where does it shift to? With this lens you can easily find out. Some of you are going to be in for a surprise when you do find out. This lens is also very handy for the new Pocket Instamatic cameras.

The 60mm objective is permanently focused at infinity, as is the 130mm lens, which is a useful lens for checking wide angle lenses for 35mm cameras. Because our shop requires all incoming cameras to have the focus quickly checked for any substantial focus errors, we found the 130mm lens to be ideal for these quick checks.

The 254mm lens is adjustable and it can be focused on both sides of infinity. This is a feature that we appreciate when working on lenses that are way off. This lens is the normal lens for use with 35mm camera lenses.

There is a 508mm lens also available for this collimator. Although it is not shown in the Honeywell catalog, it is listed in the price list on AD222005. We had the opportunity to use this lens several times, and for telephoto lenses it can't be beat. However, the 508mm lens is too long to be used on the stand provided and I wouldn't recommend using this lens in the horizontal position unless it were supported. Thus, this lens requires that the collimator head be removed from the stand and the head and lens separately supported. Also, the length of the lens makes it difficult to operate the camera at the same time one is looking into the collimator eyepiece. Therefore, while this lens is a useful optic, it does require some thinking on your part to use it.

It will warm your heart to see that you can have this auto collimator, the stool and all the lenses for something less than a thousand dollars. And all these items are availably separately, of course.

Auto Collimator 110v AD222001	$515.70
Adjustable 254mm lens AD222004	172.00
Fixed Focus 130mm lens AD222003	76.65
Fixed Focus 60mm lens AD222002	46.00
Fixed Focus 508mm lens AD222005	153.35
TOTAL	$923.70

Now, as with any product, there is a change I would like to see made. The one area of improvement would be the eyepiece focusing. I would suggest something on the order of a binocular eyepiece. The present eyepiece is indeed adjustable, but the thread is exceedingly fine, which means that refocusing the eyepiece takes a bit longer than I think it should. Also, the procedure requires two hands, the procedure being first to back off the locking ring, then turn the eyepiece in or out to focus, then tighten the locking ring. Now there would be no problem for just one person using the collimator. However, where a number of technicians use the equipment, and when their eyesight is varied, one either constantly readjusts the eyepiece, or ignores it with the resultant error introduced.

In conclusion, I will state that this auto collimator will meet the needs of any independent repair shop that I am familiar with. Thanks to the interchangeable lens feature, it does many tasks better than any other single auto collimator.

Honeywell has presented to you, in effect, an auto collimator "system," for which they can offer additional accessories in the future to meet any needs which might develop. Thus, you can invest in their auto collimator without fear that it will become obsolete.

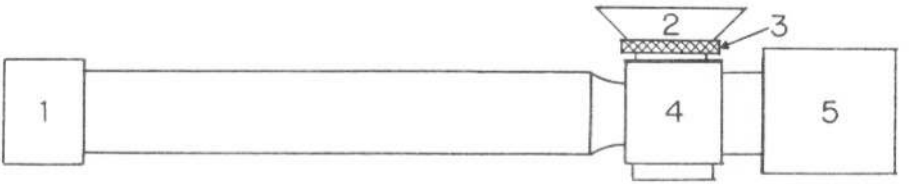


FIG. 1

The parts of the Reflex Auto Collimator (as shown in Figure 1) are:

1. Interchangeable Collimator objective
2. Interchangeable eyepiece
3. Focusing collar
4. Beamsplitter block
5. Interchangeable light source

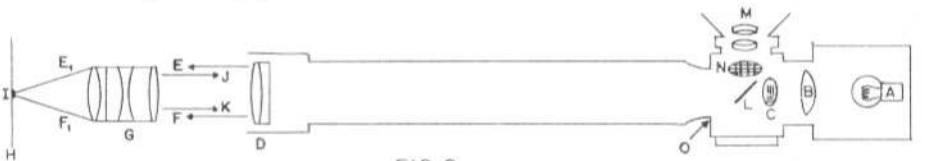


FIG. 2

Figure 2 is a schematic diagram of the function of the Reflex Auto Collimator. Light from lamp A passes through condenser B to test pattern C. The test pattern, similar to Figure 3, is at the infinity focus of the highly corrected Collimator objective D. Collimator objective D acts as a projection lens, projecting the image of test pattern C to focus on infinity; the projected rays, E and F, are therefore parallel – or collimated.

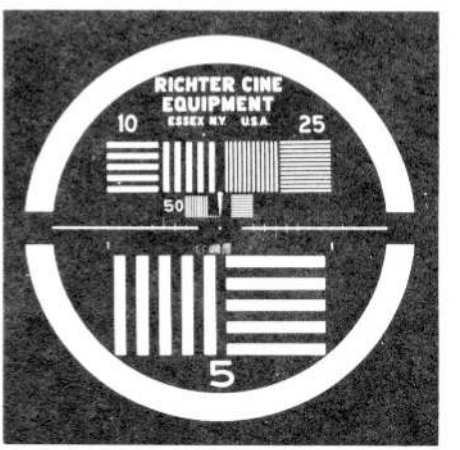
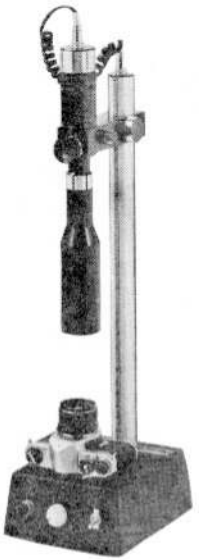


FIG. 3

Honeywell

REFLEX AUTO COLLIMATOR



The Reflex Auto Collimator is a precision instrument designed for the checking and testing of photographic optus.

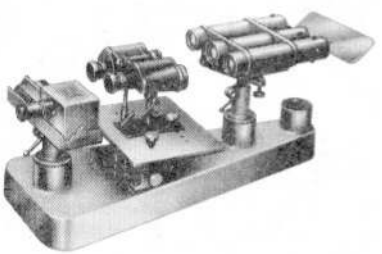
With accessory interchangeable lenses of 60mm, 130mm, 254mm, and 500mm and a wide range of focal lengths can be accurately tested.

Reflex Auto Collimator with adjustable 254mm lens.

Price $688.60

Accessory lens	60mm	$46.00
	130mm	$76.67
	500mm	$153.35

BINOCULAR COLLIMATOR



A precision instrument for accurate checking and adjustment of all types of binoculars. Fully adjustable, this instrument is designed for binocular technicans to be used without strain for efficient and accurate results.

Binocular Collimator complete: $850.00

Shipping weight 80lbs.

For more information or a free copy of operation manuals, write to

Honeywell Photo Products Division
5200 E. Evans Ave.
Denver, Co. 80222
ATTN: TIPS Catalog Dept.
M.S. E250

SPT/NAPET Merger Proposed

At the '73 SPT Convention, Martin Strauss, president of the National Association of Photographic Equipment Technicians (NAPET), proposed merging NAPET and SPT. Mr. Strauss said, "It will be detrimental to all parties concerned if the limited amount of qualified camera repair technicians cannot be joined into one association. Our industry is too small to afford separate groups and it will be far more rational and productive for all interested parties to gain strength by association."

Several repair technicians are already members of both NAPET and SPT, including the presidents of both groups. However, for those members of SPT who are not acquainted with NAPET, here is a short history of the association.

Foundea in 1957, NAPET at first tried to improve the standards of camera repair in the U.S. by certifying that all members had reached an acceptable level of competency in repairs. This is more easily said than done, however, and NAPET no longer screens prospective members by visiting their shops. For a while, the group worked to encourage Japanese manufacturers' facilities in the U.S. to bring fewer technicians, from Japan and hire more Americans. But they felt that their efforts were not effective. Martin Strauss explained, in an article on lobbying which appeared in the **Association and Society Manager**, "I don't think that we can count on the federal government or anyone else coming to our aid. We are even thinking seriously of dissolving the association and joining instead the Manufacturers and Photo Dealers Federation of America, even though our voice will be infinitesimal. We feel utterly powerless and exhausted from trying to be heard on our own."

Soon thereafter, NAPET did become the repairman's division of the MPDFA. About that time, James Todd Amos (SPT President) wrote the August '72 "Open Letter to the Photo Industry" dealing with the problem of obtaining parts and service information for imported electronic shutters. Then SPT invited manufacturers to come to the '73 SPT Convention. At the Convention, SPT was named the official channel through which members of the Japan Camera Industry Association (JCIA) would communicate with American repairmen. EPOI recently opened a Nikon repair school to build up an American repair staff, and service facilities for other Japanese cameras have been publicizing their wish to hire American trainees. NAPET's efforts, in conjunction with SPT's activities, may have been more effective than they realized.

Meanwhile, when NAPET began a test instrument survey, they asked for, and received, SPT's cooperation in this

project. Many repairmen have responded to the initial survey of test instrument requirements sent to NAPET and SPT shops.

If you look at NAPET's "Aims and Purposes," printed at the end of this article, you will see that they are very much the same as the ideals expressed by SPT members. The methods of carrying out projects to further these ideals have been somewhat different in the two organizations, however.

SPT's vehicle for completing projects has, generally, been the SPT magazine. The **SPT Journal and Service Notes** is not only a technical data exchange but reflects members' ideas and wishes. When a project entails work, a committee is appointed to do the thinking. SPT's paid staff does the paperwork, and the general membership is kept up to date on progress through the magazine.

NAPET has carried out its activities mainly through its annual business meeting, which most of the 40 members attend. Although there are only 40 shops in the organization, most are the larger, well-established shops which have been able to afford the expense of travelling to the meeting and personally funding the group's projects. Upon becoming part of the MPDFA about a year ago, of course, NAPET handed over to that association its general administration. A new NAPET member simply joins the MPDFA and receives the same benefits available to dealers and photofinishers. MPDFA dues are assessed on the basis of a member's gross sales, the lowest dues being $50. Mr. Strauss, however, agreed that a $25 Regular Membership rate could be maintained in a merged organization. The MPDFA does not depend on dues money to fund its annual Convention and Trade Show, but uses the earnings of the previous year's show. This show makes enough of a profit to also help fund the group's **Photo Marketing** magazine and other benefits.

NAPET President Strauss and SPT President Amos have suggested some practical ideas for possible merger. Mr. Strauss suggested that, since the MPDFA has its own printing equipment, if SPT mailed to their office a photo-ready copy of the **Journal and Notes**, the MPDFA could print and mail the magazine more cheaply. Mr. Amos suggested creating an enlarged, merged, Board of Directors containing all the present officers of both organizations, and appointing a committee to restructure the offices before the next election of both groups came due. Or, if NAPET wishes to maintain a separate identity, it could become a part of SPT, functioning as a Chapter. The SPT Executive Secretary asked the MPDFA for a detailed copy of its budget, expressing the thought that, although repairmen of both SPT and NAPET might rather easily reach an agreement, SPT repairmen might be hesitant about joining the dealers and photofinishers (and vice versa!) unless they could be assured that a fair share of the budget would go to projects benefitting their group.

The MPDFA, however, responded that they were grateful for our candor. However, they considered our proposals unacceptable and closed their files on the subject.

This simplifies matters, greatly. It is now up to only the NAPET and SPT members to get together to discuss their common goals, projects and interests. Since both NAPET and SPT will be in Chicago during the MPDFA Convention this March (See "Announcements – Repair Academy Preparations"), at that time there will be a joint NAPET/SPT meeting to discuss possible merger details. It should be possible for the entire SPT Board of Directors or proxies to attend. Before that time, Chapter Representatives on the Board will discuss possibilities with their groups. We hope that the general SPT membership, also, will let us know what they think so that the Board can discuss and vote intelligently at the March meeting. We also hope that as many general members as possible will attend this meeting. Time and place will be announced in the Jan./Feb. '74 Journal.

In the Jan./Feb. '74 issue, we'll publish a "Forum" on the merger, with ideas contributed from Chapters, from SPT members, and from SPT/NAPET members.

AIMS AND PURPOSES
of
NAPET
Division of
Master Photo Dealers' & Finishers' Association

1. To promote and encourage a wider understanding and appreciation of photography by use of advanced methods of repairs and service.
2. To collect, disseminate information of value to service shops and manufacturers of photographic equipment and to take such other action as may be calculated to further the servicing of photographic equipment.
3. To promote better understanding and cooperation between service shops and between service shops and manufacturers in order to devise methods of information for repairing and testing and also to interchange information regarding defects of equipment and possible changes and corrections to correct these defects.
4. To collect and publish information periodically which may be helpful to service shops and to manufacturers' service departments.
5. To promote or help in promoting training courses in approved and recognized places of learning such as technical schools or colleges to train technicians as possible future employees of service shops or manufacturers.
6. To further friendly and cordial relationships among service shops of photographic equipment and between such shops and the sellers and consumers of photographic equipment.
7. To further friendly and cordial relations with all organizations and societies pertaining to their interests in any phase of the photographic field.

Honeywell

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5200 E. EVANS AVENUE
DENVER, COLORADO 80222
ATTN: DEANNA THOMPSON MS E250.

THE NORTH BENNET STREET
INDUSTRIAL SCHOOL

CAMERA REPAIR COURSE

by Peggy Jones

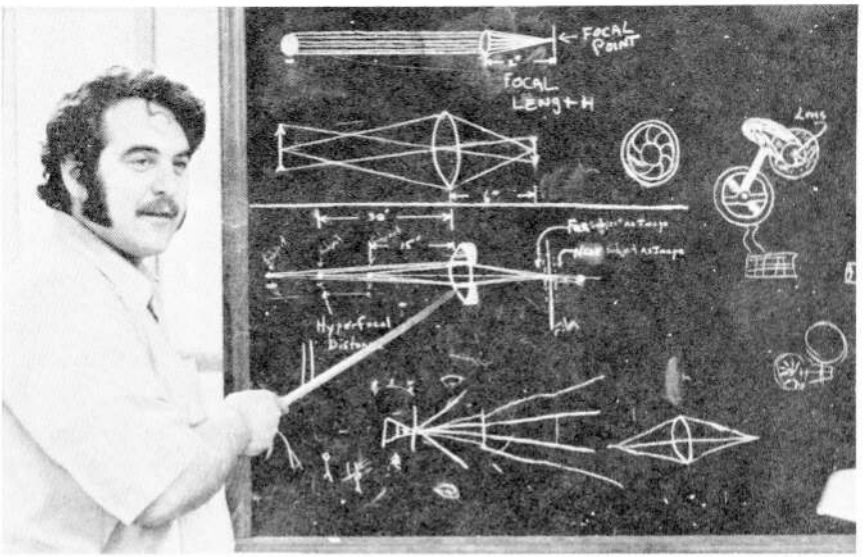
With thanks to the following "Reporters": Lloyd Mahoney, Cleon Babcock, Joseph Goode, Granville Kirkup, Polaroid Corporation

In 1881 the North Bennet Street Industrial School was founded by a small group of sponsors who wanted to see if it were possible to teach vocational skills in a classroom rather than depending exclusively on the apprenticeship system. Today, the school is a small, non-profit corporation with about 150 students in courses such as carpentry, drafting, jewelry making, offset printing, camera repair and others.

Students, who range in age from 16 through 54, are admitted on the basis of ability rather than previous academic record, according to the Trade School Coordinator, Mr. Joseph Goode. A student spends from one to eight weeks in a Basic Vocational Class. The school's catalog explains that in this class the student receives "general training to promote good work habits, self-expression and social adjustment" and academic training in arithmetic, trade math and measurements. He is also tested to determine his basic abilities. Then he is placed in a trade course where, according to Mr. Goode, "A student must show by his performance in class that he will be employable in his trade, or else he will be terminated."

Mr. Goode adds, "There does not seem to be any problem in securing employment for all of our [camera repair] students in the local area at this time. However, . . . we plan to have this class on a national level taking applicants from out of state and limiting those locally so as not to 'glut' the market in any one area."

The instructor, Kenneth Mahoney, comes from a family of camera repairmen. He began repairing cameras part-time in his father's shop as a teenager. After graduation from high school he entered the Air Force where he completed the course in Basic Electronics at Lowry AFB (Denver) in 1959, and subsequently became a Bomb Navigational Specialist. After leaving the service, Mr. Mahoney worked for a couple of years in his father's shop, then was employed by an engineering firm to repair, trouble-shoot and modify high-speed photographic equipment in co-operation with design engineering. He stayed in this field until 1967, when he became head camera repairman for



Instructor Kenneth Mahoney gives a lesson in optical theory.

Jed Instrument Laboratories, responsible for the repair of both amateur and professional types of cameras. In 1971 he joined the North Bennet Street faculty to set up and teach the camera repair course.

Classes are limited to 15 students and instruction, which emphasizes shop work, is on an individual basis.

Classes meet Monday through Friday from 8 a.m. to 2 p.m. and the cost of training is:

Registration Fee	$ 50
Tuition (2 semesters @ $805)	1,610
Shop Fee (2 semesters @ $23)	46
Insurance (for one year)	6
Tools	150
TOTAL	$1,862

The camera repair course is 46 weeks long. At present, students may enroll on any Monday during the year, provided there is a vacancy, and stay until the time specified for the course has elapsed. However, by the fall of 1974 the school hopes to start all camera repair students on the day after Labor Day.

Although the school is quite old, the camera repair course was begun only about two years ago. The first student from the course graduated on June 28, 1973, after 68 weeks of instruction. Since the beginning of the course, it has been shortened from 68 weeks to 46 and photography and basic electronics added. In October 1973, the school filed the necessary papers for VA approval, having completed the two-year waiting period required before these papers can be submitted for a new course.

The catalog describes the revised camera repair course as follows:

"An individual interested in this course must have good finger dexterity, ability and desire to work in fine instrumentation. The course offers the opportunity to acquire the best working knowledge of camera repair in this area.

"As one proceeds through the course, he will learn: to use hand tools, testing equipment; become knowledgeable in the fundamentals of photography, basic electronics as related to the camera, how to order parts, workshop and bench techniques, estimate repairs and procedures of setting up one's own business.

"A variety of cameras will be covered such as Bell & Howell, Canon, Graflex, Keystone, Kodak, Leica, Mamiya, Nikon, Pentax, Rollei, Yashica, Zeiss, Minolta and Polaroid.

"Shutters will include Compur Focal Plane, Prontor and Syncro Compur."

A student learns lens collimation.

The (condensed) course outline appears at the end of this article.

So far, the school has only very basic test equipment, including a flash sync tester, an auto collimator, a VOM and an inexpensive meter-type shutter tester. To obtain practice equipment for the students, who spend most of their time on the bench, the school has asked dealers to donate old cameras and students are encouraged to obtain work during their training which can be undertaken during school hours. Each student has his own bench, and the school even provided facilities for one student after graduation until he found a shop of his own.

Although there have not yet been enough graduates to properly evaluate the success of the course, it should be noted that, so far, all students have been interested only in opening their own shops upon graduation, and none have sought employment with an established firm. Describing the camera repair course, the revised catalog says, "Upon satisfactory completion of the course, an individual would be able to go to work in industry and, for some, their own business." Although the need for camera repairmen is so great in some parts of the country that a recent graduate might, indeed, make a go of it on his own, most will probably find the going rough without a few more years of training in a shop with an experienced technician. They will find that some manufacturers are not enthusiastic about supplying parts and information to any repairman with only one year of experience, no matter how good that one year might have been.

There have already been changes in the course outline and, as with any developing course, there will probably be more. Our guess is that in a few years, after the school has had a chance to gather feedback from graduates, there will be more of an emphasis on seeking employment with an established shop or with a manufacturer's repair center.

For more information, contact:

North Bennet Street Industrial School
39 North Bennet Street
Boston, Massachusetts 02113

CAMERA REPAIR COURSE
OUTLINE – CONDENSED

	Hours
The Basic Camera	125
Lens Systems	180
Iris Assemblies	110
Shutters	250
Transport and Cocking Linkages	170
Range Finders	170
Meters	165
Movie Cameras	210
Approximate hours:	1380

What Is a 'PHOTO-TECHNOLOGIST'?

There is no such thing as a "typical" member of SPT.

A questionnaire went to all members in an effort to better identify photo-technologists' wants and needs. Almost 500 members responded. Here are the statistics:

The overwhelming majority of SPT members believe the technical information published is the most valuable activity of the Society. They want as much of it as possible.

Second on most people's lists of needs is help in solving some of the industry's problems, such as the lack of certain parts for repair. Conventions usually took lowest priority, and many members felt them a waste of time because they could not attend. However, at the '73 Convention SPT made much progress in discussing industry problems and gathered a lot of information for publication. So several members may change their minds about the value of such meetings. Convention programs can result in benefits to all members.

The mean average age of SPT members is 46. The eldest is 72 and the youngest is 20.

Seventy-nine people said they did specialize, 195 said they did not, and the rest did not comment.

Three hundred thirty-nine members said they were the sole technician reading the SPT magazine. Eighty-four said they shared with someone else. Those 84 must pass their magazines around a lot, because they were read by about

240 non-members, in all. This means that for every three members reading our magazine, two other non-members also are reading it. Let's get these people to join!

Although camera repair is a relatively new field, there are a few old-timers around:

2%	began repairing	before	1940.
8%	"	"	in the '40's.
9%	"	"	in the '50's.
61%	"	"	in the '60's.
20%	"	"	in the '70's.

How did all these people learn camera repair? About half learned in two or more of the following categories:

% of Members Responding	Type of Training
4%	formal (registered) apprenticeship
13%	on-the-job training (under an experienced technician)
5%	on-campus repair school (non-military)
9%	armed services
69%	correspondence course

We inquired if a member was a full-time or part-time repairman, and also asked how much of his income came from repair. We discovered it was not unusual for a person to classify himself as full-time, yet only from 0% to 30% of his income came from camera repair! There were also dealers, employing several repairmen, whose income derived at least 50% from retail sales, though the repair shop was surely full-time. And there were experienced, full-time technicians with a working wife plus military retirement who made only about 25% of their income from camera repair. On the other hand, an apprentice whose income derives 100% from camera repair can be producing only about 40% of the repairs made by the experienced technician. For a clearer picture of how many full-time and part-time technicians we have, see the chart at the end of this article. The main generalization that we can make, here, is that the **vast majority** of camera repairmen surveyed also have a second income.

Here are the responses to the question, "How much of your income is from camera repair?"

0 - 4%	195 repairmen
5 - 19%	70 repairmen
20 - 49%	46 repairmen
50 - 74%	21 repairmen
75 - 100%	106 repairmen

We were curious about that portion of the SPT membership who do not depend on camera repair for income but who are serious enough to pay $25 dues each year. As you would expect, a lot of part-time correspondence course students, part-time repairers and hobbyists are engineers, electricians, photographers, machinists – people interested in related fields. But we were surprised to find also a high school principal, a clergyman, policemen, chemists, firemen, librarians, truck drivers, computer analysts, laborers, professors, teachers, printers, doctors, and people in several other fields.

In addition to our questionnaire, we found that recent application forms, letters, service notes, and other correspondence helped to classify members. Obviously, to really survey our membership, we needed to go through every

single correspondence file. That's just what we did. Based on 519 identifiable people, we found members fell into nine basic categories. Here's a chart showing these categories and the percentage of members in each.

We should note that we excluded all technicians in the U.K. from this chart. We found that the U.K. Chapter has a character all its own, being made up almost completely of experienced repairmen in full-time repair shops.

1) STUDENT OR HOBBYIST. Repairs very few cameras. Does not try to make a profit.

2) PART-TIME REPAIRMAN, SELF-EMPLOYED. Part-time defined as less than about 30 hours per week, or productivity less than about 50% of an experienced, full-time repairman.

3) FULL TIME SHOP OWNER. Sometimes a photodealer, also, but the shop itself is full time, independent of the dealership.

4) FULL TIME SHOP TECHNICIAN. Shop may be connected with a dealership, but the technician has no duties other thar repair.

5) FULL TIME DEALER OR DEALER'S EMPLOYEE. Interested in repairs, but repair end of business not a full time shop.

6) PHOTOGRAPHER OR PHOTOGRAPHIC STUDIO.

7) INSTITUTIONAL TECHNICIAN. Repairing for armed services, schools, library or large company. Sometimes repairing full-time, sometimes has other duties as well.

8) MANUFACTURER OR DISTRIBUTOR. Technician or manager.

NOTE: The repairmen surveyed were listed in the above statistics ONCE, in the photo-technology field in which they were MOST involved. It might interest you to know that in addition to the 111 part-time shops listed in category (2), there were also 31 other photographers, shop technicians, etc. who moonlighted with their own part-time repair shops.

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___March/April'73 (Yashica Electro 35, Part III), $3.00 _____
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*Out of print articles: 1 copy of the _____ article in the out of print _____ Journal, (15¢ per Xeroxed page.) _____

Microfilm:
1 set of Bauer Manuals, $6.00 _____

US Army Tech. Manual KS-15(4) [Leica M3], $8.00

TOTAL: _____

SUMMARY OF PUBLICATIONS: Index - The Jan/Feb issue of the Service Notes is the Index of both Notes and Journal. The Notes have appeared bi-monthly from Jan./Feb.'61 to the present (except for May/June'67, July/Aug.'65, Sept./Oct.'65 & July/Aug.'66). The Jan./Feb.'72 issue is the outdated Index. Please don't order.

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