

ASSEMBLING YOUR STEREO 12 ELECTRONIC LENSBOARD

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Instructional Video

In addition to this comprehensive guide, we have created a video that demonstrates many (though not all) of these procedures, along with further thoughts and comparisons between different shutters and lensboards. The video can be accessed here: <https://youtu.be/P3YvPQqCXik>

Throughout this guide, corresponding timestamps of the video are provided in **green** for easy cross referencing.

Intro: Shutters

You need two functioning shutters. If they are not for the same lens, you'll need to apply a Mercury aperture scale on at least one of them for the lens you're using.

For example, if you have one shutter designed for the 80mm lens and one for the 65mm, and you wish to shoot with 65mm lenses, you should apply the Mercury aperture scale for the 65mm to the 80mm shutter. For visual consistency, you may wish to apply one to your 65mm shutter as well.

MAMIYA TLR, BLACK (From Mamiya TLR boards)

These shutters, originally for Mamiya Twin Lens Reflex cameras, work on the Stereo 12 "Mamiya TLR Lensboard." They do, however, require a bit of modification. You'll need to drill a small hole in each shutter's release lever. Depending on the shutter and lens you'll use in it, you may also need to modify its aperture ring. This is because Seiko by default limited the aperture range of the shutter to the

specific lens being used in it. Unless you are using only lenses with their original shutters, you'll need to perform a simple modification that enables the full aperture range on each shutter.

Finally, some of these shutters have clicks every half stop. Again, if you are using a different lens with the shutter than the one it came with, changes are those half stop clicks won't line up with your new aperture scale. If you have a shutter like this, you'll have to "de-click" it. Instructions below.

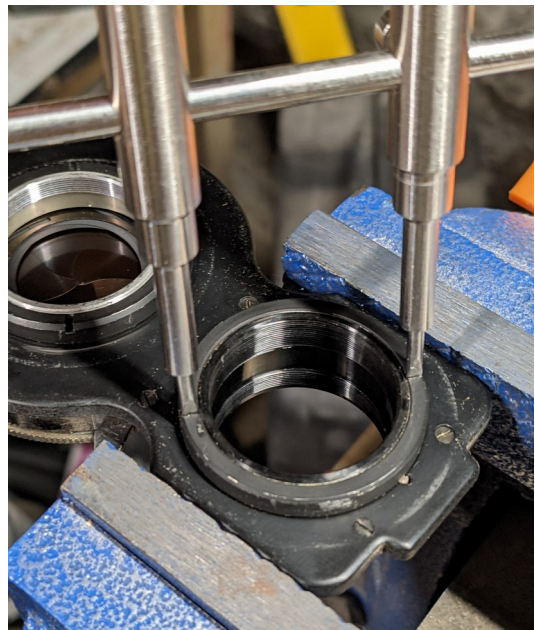
Removing from Mamiya Lensboard

45:57

1. Remove the front and rear lens elements from your Mamiya C lensboard by unscrewing them. You may be able to do this by hand, or may require rubber gloves or a kitchen jar gripper. In stubborn cases you may need to use a set of channel locks to grip and turn the lens elements (in this case, line the elements with blue painters tape before doing so if you wish to preserve the finish on the lens surface).

The 105mm f/3.5 DS viewing lens (and *only* this version of the 105mm) is different from all other Mamiya TLR lenses in that its front element doesn't just unscrew from the housing. You will need to use a spanner wrench on the front of the lens element. Remove the notched ring on the front of the lens. The lens barrel (which spins freely) will actually come off with the front element. Keep them both together and later reverse this process to reassemble on the Mercury lensboard when it is ready. Note that while this odd housing has no impact optically, it does create an aesthetic mismatch, a more difficult lens swap (on the same shutter), and a problem for lens filters. You may wish to obtain two copies of the 105mm lens sets and use only one or the other type of housing (perhaps selling the other pair).

2. Remove the two retaining rings on the back of your Mamiya C lensboard. You'll need a spanner wrench and a sturdy grip. A bench vice to hold the lensboard tightly is recommended. Clamp the board in the vice on the two different ends (one narrower and one wider) for the two different retaining rings. Place steady downward pressure with the spanner as you turn the ring to prevent slippage.



In very stubborn cases you can use channel locks on the retaining ring and/or use penetrating oil on the area.



3. Remove the four tiny silver screws that hold the flash PC connector together: first the ones on the face of the disc, then pull the disc forward slightly and to the side to clear vertical space to loosen the vertical screws holding the apparatus into the Mamiya lensboard.



4. Looking at the back side of the Mamiya lensboard, remove the four black screws and pry loose the metal pieces. One will contain the flash cord.



5. Using a Dremel cutoff wheel or a metal file, cut away the metal until you have liberated the black wire connecting the flash connector parts to the shutter. Or alternately just break the solder connection on the port and remove the wire. Either way, unscrew the two screws holding the port to the board to remove it.



65mm TLR lensboard:

1:11:38

This particular Mamiya TLR lensboard includes a plastic piece that connects the taking and viewing lenses. In order to fully separate them for Stereo 12 use, you'll need to remove this piece. To do so, use a very small flathead screwdriver (such as for eyeglass repair) to remove the four set screws in the connecting piece (two around each lens). Now, to remove the ring from the viewing lens, simply slip it down off the back of the lens. To remove the ring from the taking lens you must unscrew the top element of the lens, then unscrew the next small ring that is just above the connecting piece. The connecting piece can now be lifted upward and off the lens. Replace the two two threaded parts of the lens.

The 65mm lenses also usually include silver filter thread adapters. In most cases these should also be removed.

Flash:

41:44

If you do not wish to use flash with your Mercury Stereo lensboard using this shutter, you can simply cut the black wire and ignore the flash mechanism.

If you do wish to use flash with this shutter, you need to first remount the PC sync port on your new Stereo 12 lensboard. You can do this by using hot glue (black recommended) or a rubber cement or similar. There's a small cutout in the leatherette near the left shutter for this purpose. If you want to mount the flash ports on *both* shutters, choose a similar location for the right shutter. It is recommended that you use an X-Acto knife or similar to remove a small amount of the leatherette for better adhesion.

Next, in order to have a functional flash (which you can do later if you are unsure), add a ground wire to the PC connector (on the Mamiya TLR lensboard, the metal board itself was used to carry the ground signal). Use a length of AWG 22 solid wire (included with your Mercury lensboard) equal to the length of the current flash sync wire.

Remove the screw on the side of the shutter that holds the flash sync scale to the body of the shutter. Be careful as this screw is easily lost when removed, as the scale it holds in place will likely be “spring loaded.” Hold the scale down when removing the screw to prevent it from launching the screw as it comes loose. Pull this scale slightly out of your way.

Bend one stripped end of the wire into a short loop. Insert the screw you just removed into the wire loop and then reconnect the screw to the side of the shutter. Your wire should now be connected to the shutter body. You can now either trim the two ends of the flash sync scale (so it won’t interfere with your new wire connection) and glue it back in place, or simply remove it entirely and manually mark the “X” flash sync setting (the only element of this scale that is important).

Of the four tiny silver screws you removed when disassembling the PC connector, you want to use the longer two for this next step: Begin to reattach the silver disc to the upright connect stand, but only barely screw the screws in. Insert the stripped but unconnected end of the new ground wire in between the disc and the upright stand, and tighten these two screws as tight as you can reasonably get them (without endangering their heads with too much torque).

Connect an external flash to this connector and fire your shutter (ensure that it is set to “X” and not “M”). If the flash fires, you’ve succeeded! If not, examine to find where one or the other wire is not connected, or where the two wires may be shorting each other.

Aperture Ring Modification

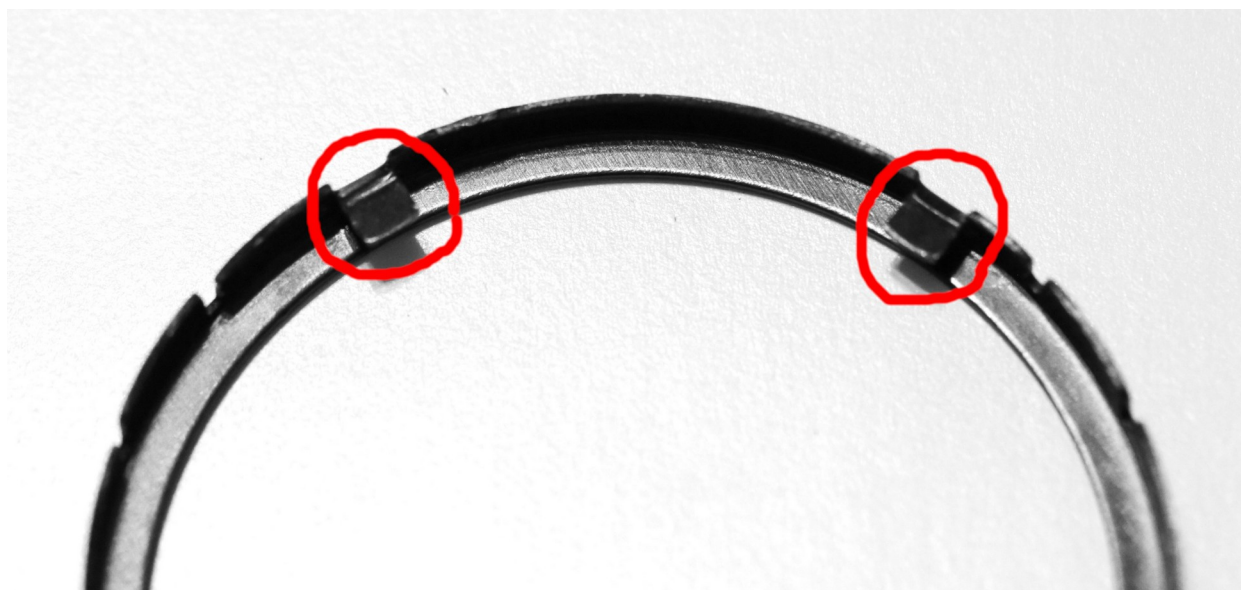
45:57

You will now need to slightly modify each shutter so that it can achieve its full aperture range. This will allow it to be used with other lenses, and provide you with the reference points you need to align Mercury aperture scales. *This step is unnecessary if you are only using the lens that original came in the shutter.*

Lift or gently pry the internal ring out of the external ring. Mark the proper orientation of the ring with a pencil before you remove it. Note that nothing holds this ring in but friction; it should be easy to pry free.



The bent-down tabs on this ring are the aperture limits. You have two choices, now: You can remove those tabs and replace the ring, or you can simply remove the entire ring permanently. It serves an aesthetic function, and slightly protects the shutter from airborne debris, but everything will function just fine without it. We recommend modifying the ring and replacing it if you feel up to it.



If you choose to remove the tabs from the ring: With a small needlenose pliers, bend them up. Then grind them away with a Dremel, using a cut-off wheel. The goal is to be sure that the tab doesn't extend higher than the general ring, and doesn't block the internal curve:



Replace the internal (now modified) ring in the same position at which you removed it. Reconnect the adjustment lever and the two tiny black screws. Test.

De-Clicking Your Shutters

50:17

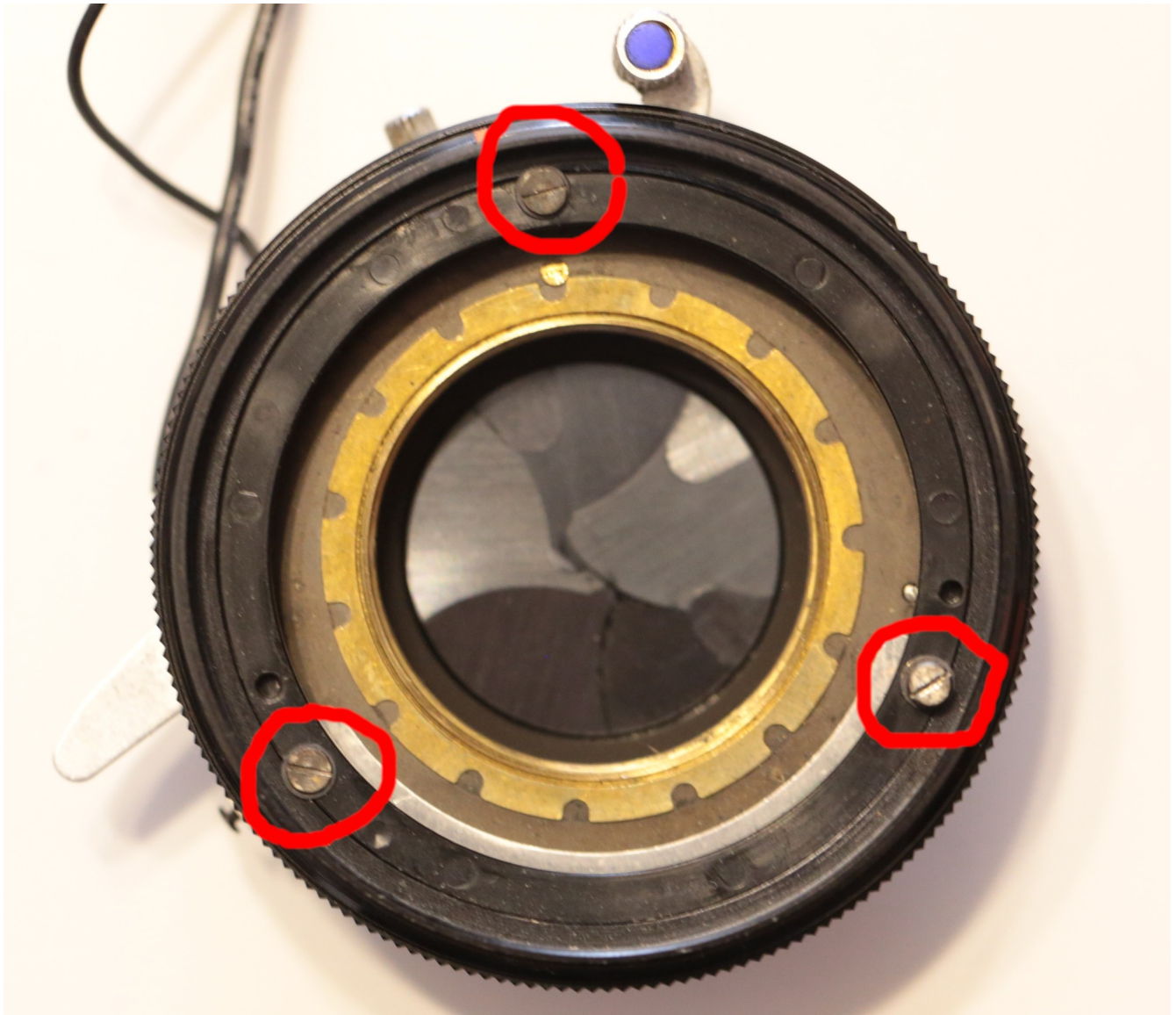
Many Mamiya TLR shutters have click stops for particular f-stops. Since these won't align with other lenses with different aperture scales, you will probably want to de-click your shutter if it has this "feature." To accomplish this, do the following before replacing your internal aperture stop ring:

1. Remove the two tiny black screws that connect the aperture adjustment lever to the top, internal ring of the shutter.



You will be faced with three screws. Remove all 3, taking care to keep the metal washer under each. These washers are essential to the operation of the shutter and need to be replaced properly when you are finished.

Also, mark with a pencil or pen which of these screws are tall posts (you will have either one or two tall posts).



Carefully lift out the ring that was held in place with the three screws.

You should now see a tiny ball bearing in the shutter, resting on top of a tiny spring. Remove the bearing and the spring.

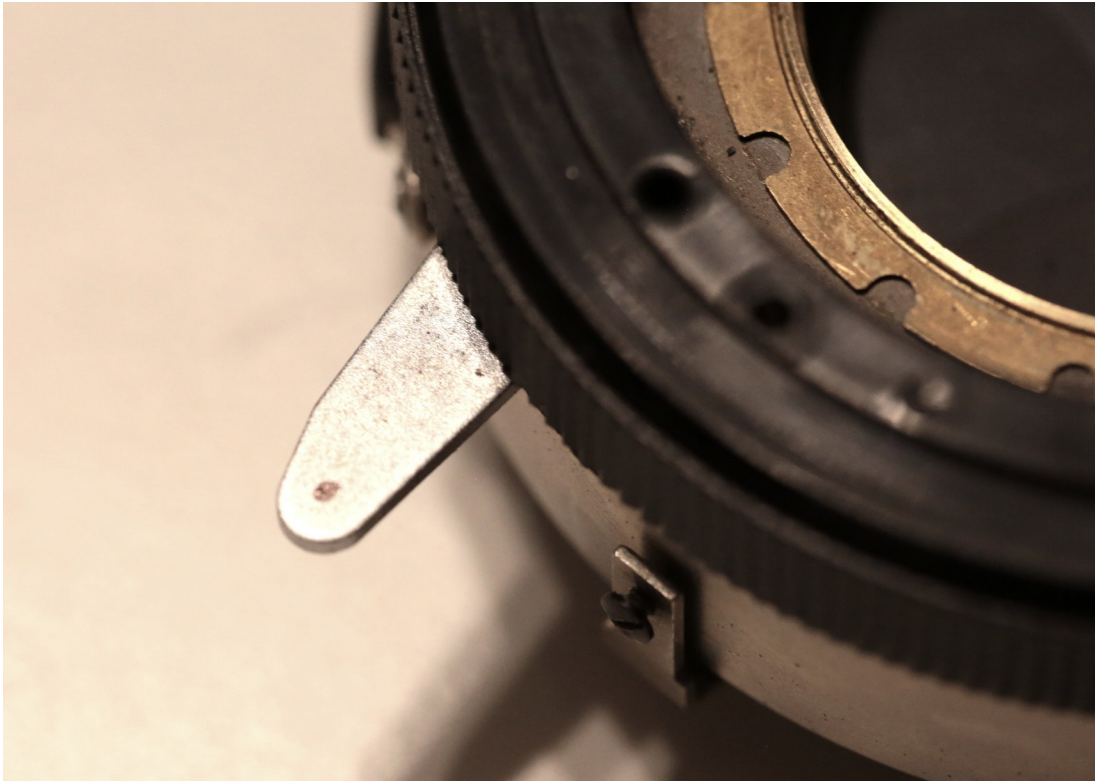


Now carefully replace the ring in the proper orientation, place the screws, with their washers back, then re-attach the aperture stop scale. Your shutter now has its full aperture range and is de-clicked!

Drilling the Shutter Release Lever

11:17

Use a fine tip Sharpie marker or similar to mark your shutter's release lever in the following position:



Support this lever on a flat, hard surface, such as the Mercury Shutter Drill Tool pictured here with a Copal shutter, but it works the same with Mamiya TLR shutters):

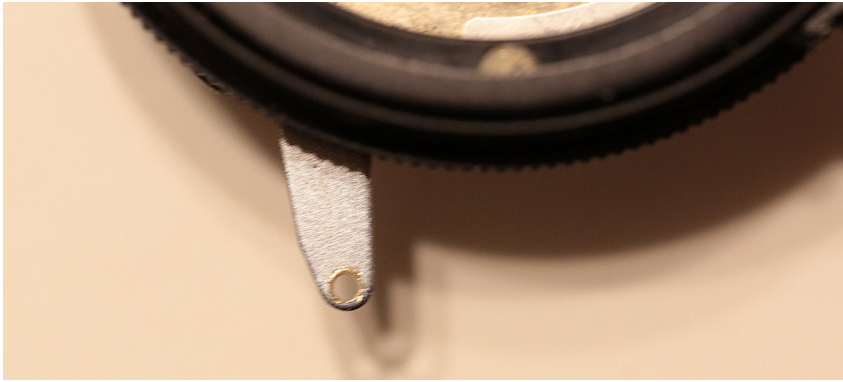


Use a sharp punch (a sharp nail or screw will work in a pinch) to create an indent on the spot you marked. Place the sharp tip right over the dot and hit the punch with a hammer.

Once you have a small indent in the release lever, you can use a drill to drill the final hole. The indent prevents the drill bit from wandering.

You can use a hand drill or (better, but certainly not necessary) a drill press. Either way, use a 1/16 inch drill bit. Make sure that your aperture lever and shutter body are fully supported.



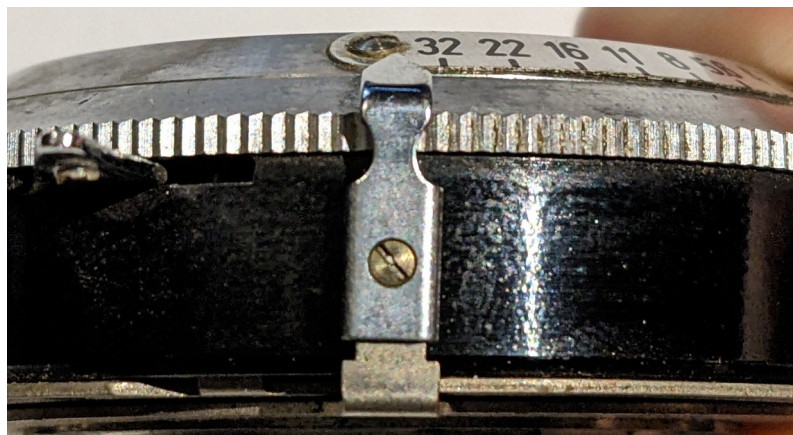


MAMIYA TLR, CHROME

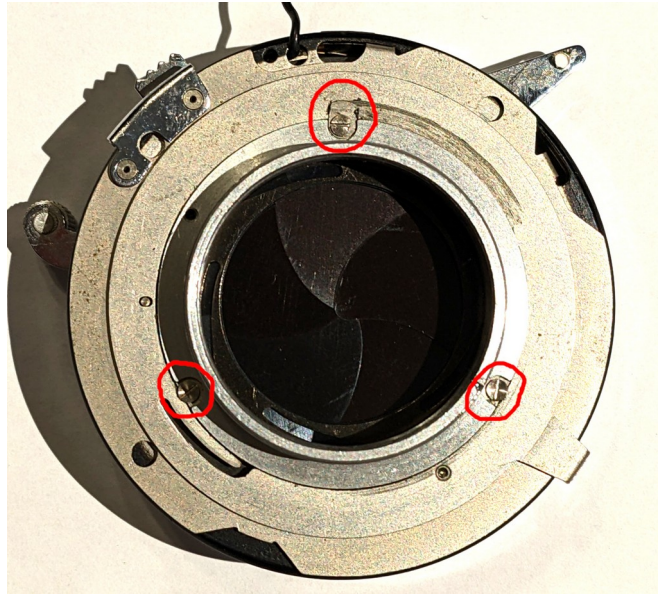
This older version of the Seiko shutter used on Mamiya TLR cameras, in order to be rendered compatible with the Mercury Stereo 12, must not only have its release lever drilled, but also its aperture adjustment ring altered.

Altering the aperture adjustment ring:

Remove the single screw holding the aperture indicator, then remove the indicator.

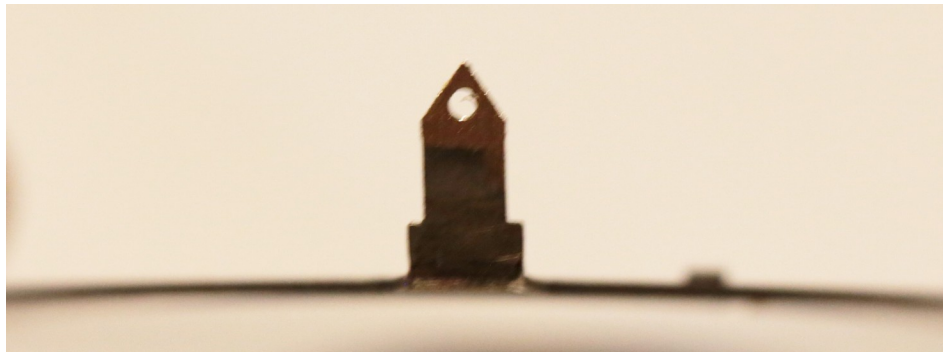


Remove the three screws on the back of the shutter that hold the aperture ring in place. Be careful not to loose the small compression tab under one of the screws. Mark which hole corresponds to this.



With the ring removed:

(a) File or grind the remaining square stub of the aperture lever so that it terminates in a point.



(b) Download the PDF of the template image shown below and print it. When printing, it's preferable to use official Adobe Reader software and make sure you select "Actual Size" or "100%" as you scale.

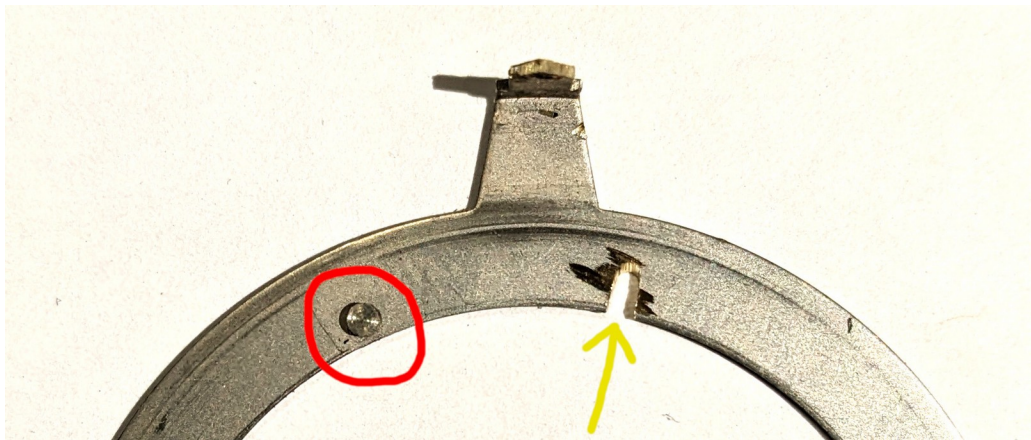


Cut out the template (including the red notch) and place it on your ring. Mark the notch to cut.



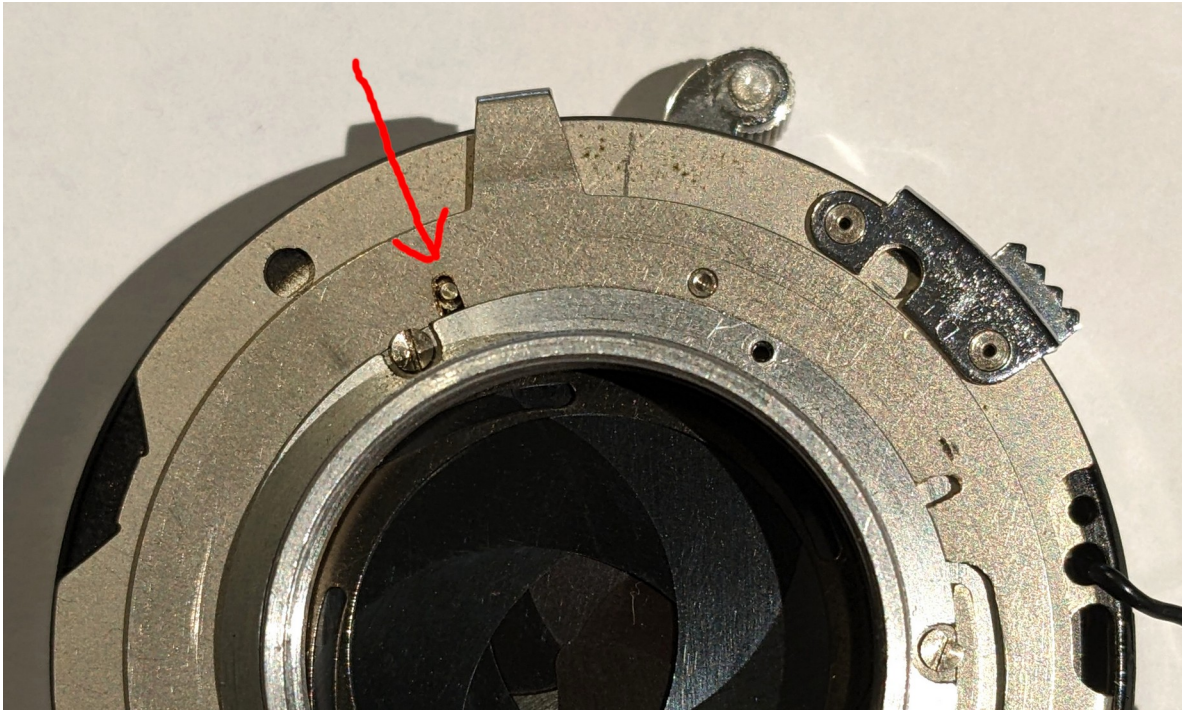
Marked, ready to cut

(c) Using a Dremel or similar, cut a notch in the inside of the aperture ring in the location you marked (yellow arrow below). Also, on the back side of the ring, file, grind, or cut down the protruding nub (red circle) so that it is level with the rest of the ring. Clean up around your work so there are no metal burrs protruding.



Back side of aperture ring. Notch has been cut (yellow arrow), nub (red circle) needs to be ground down.

Now replace the aperture ring, but in a new orientation: place the notch you cut over the aperture adjust nub in the shutter (red arrow below). Turning the ring once seated in this position should fully open and fully close the aperture blades on the shutter. Replace the three retaining screws for the aperture lever.

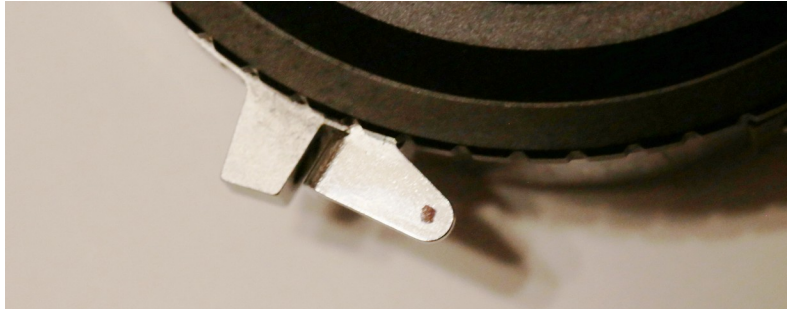


Drill a 1/16 in hole in the end of the release lever, utilizing the Mercury Shutter Drill Tool for support, as described in the Mamiya TLR Black Shutter section above.

COPAL 0

08:44

The only prep that Copal 0 shutters require is to mark and drill the hole in each release lever.



Support this lever on a flat, hard surface, such as the Mercury Shutter Drill Tool pictured here.



Use a sharp punch (a sharp nail or screw will work in a pinch) to create an indent on the spot you marked. Place the sharp tip right over the dot and hit the punch with a hammer.

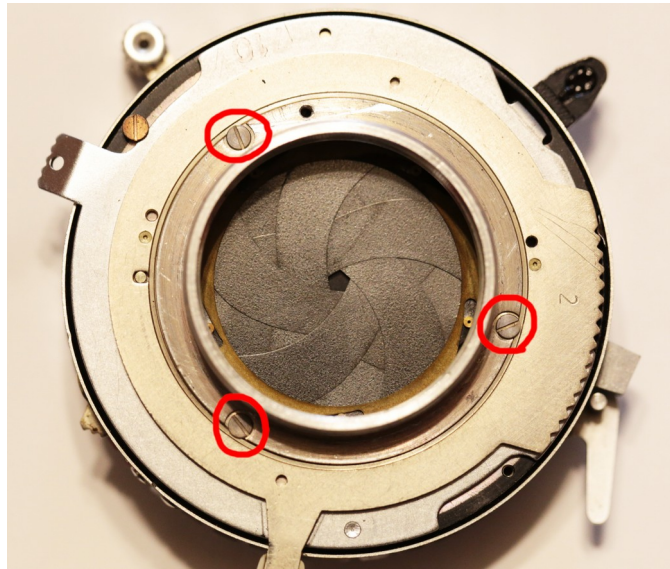
Once you have a small indent in the release lever, you can use a drill to drill the final hole. The indent prevents the drill bit from wandering. Use of a drill press is recommended if available.

COMPUR 0

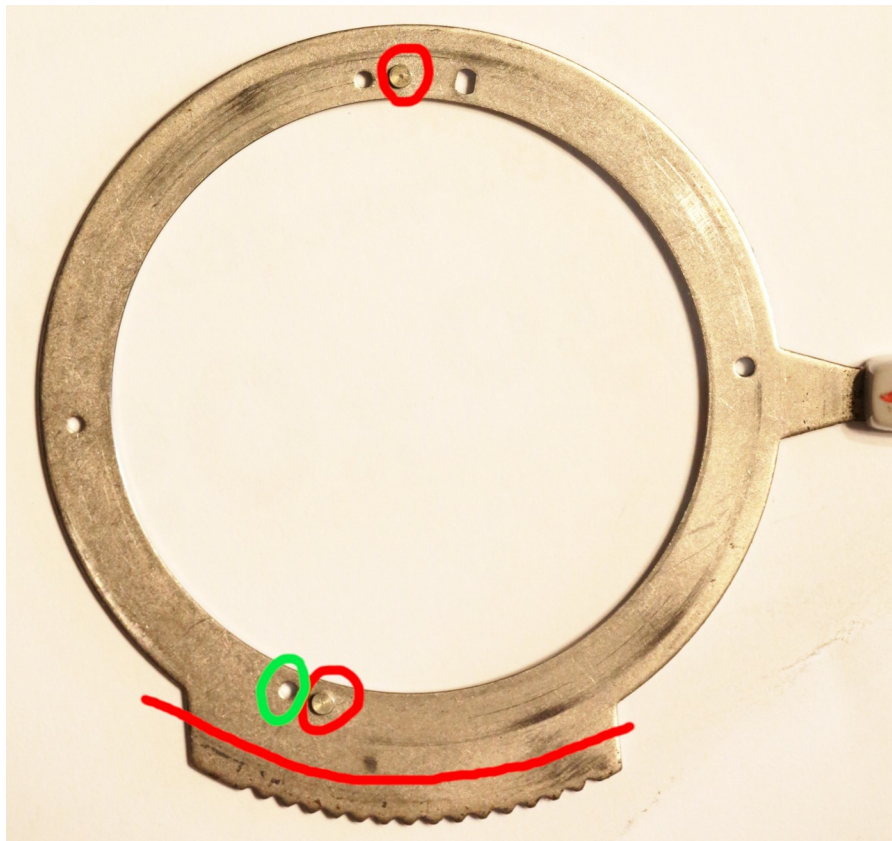
26:28

Compur 0 shutters need to have their release levers drilled. “Graflex” models also require modification of your aperture ring. In that case, do the following:

1. Remove the three retaining screws on the bottom of the shutter:



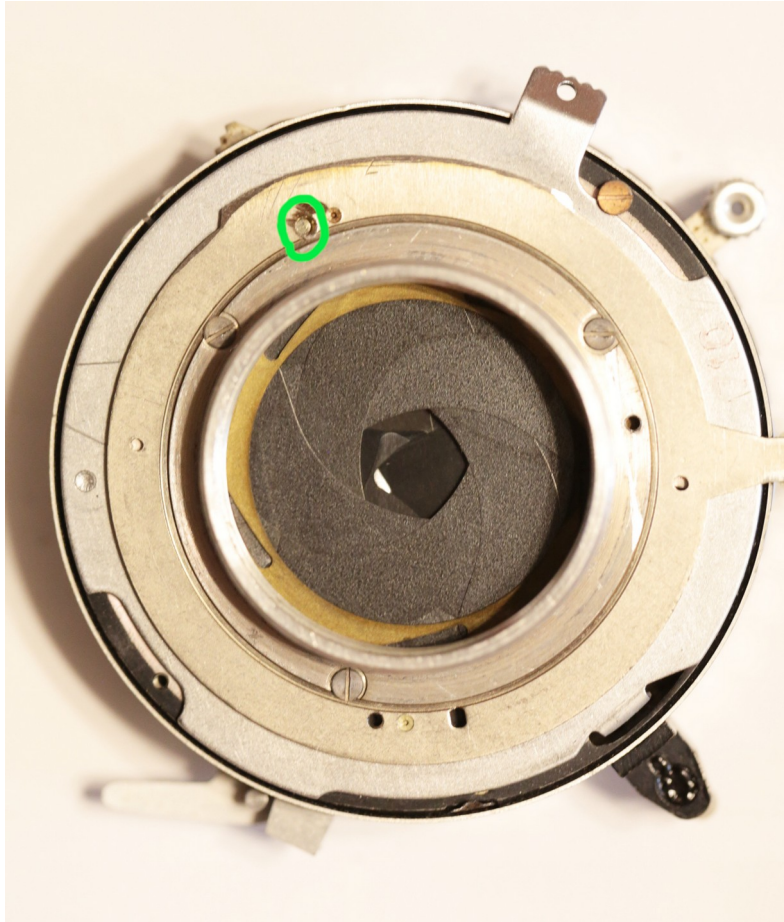
2. Grind down the two raised knubs circled in red below, so that they are flush with the rest of the ring.



3. Using a Dremel or similar, cut a small notch in the ring at the location of the hole circled in green above. The idea is to turn that hole into a notch on the inside of the ring.

4. Using a Dremel or file, cut or grind the rough protrusion approximately at the red line shown above. This will “de-click” your shutter, allowing it to be used with multiple lenses.

5. Replace the ring, but in a new orientation: line up the new notch you cut with the protrusion from the shutter that controls the aperture (circled in green below).



6. Replace the three retaining screws. Your shutter is ready to mount!

7. Drill a 1/16 in hole in the end of the release lever, utilizing the Mercury Shutter Drill Tool for support, as described in the Mamiya TLR Black Shutter section above.

COMPUR 00

There are two versions of the Stereo 12 Compur 00 lensboard: the standard one, with a regular stereo base of 62.5mm, and a “57mm Base” version that moves the two lenses 5mm closer together. Both boards work with compatible Compur 00 lenses. The 57mm base version, however, will result in wider stereo images, which allows for wider slide mounts when mounting transparencies, even when using film backs with only 113mm or 114mm widths. In addition, the 57mm base will allow you to shoot slightly closer subjects. Finally, the 57mm version is compatible with the Instax 3D format. The tradeoff is that your photos will exhibit less stereo depth at longer distances. There is no practical difference in assembly procedure for the two different versions.

1:17:03

No prep is required for these shutters except to remove their anti-rotation screws if present.

Instead of attaching their release levers to you solenoids by inserting the black wire through a drilled hole, strip the sheath off the end of the wire and wrap it several times around the Compur 00 lever, just inside the knurled knob:

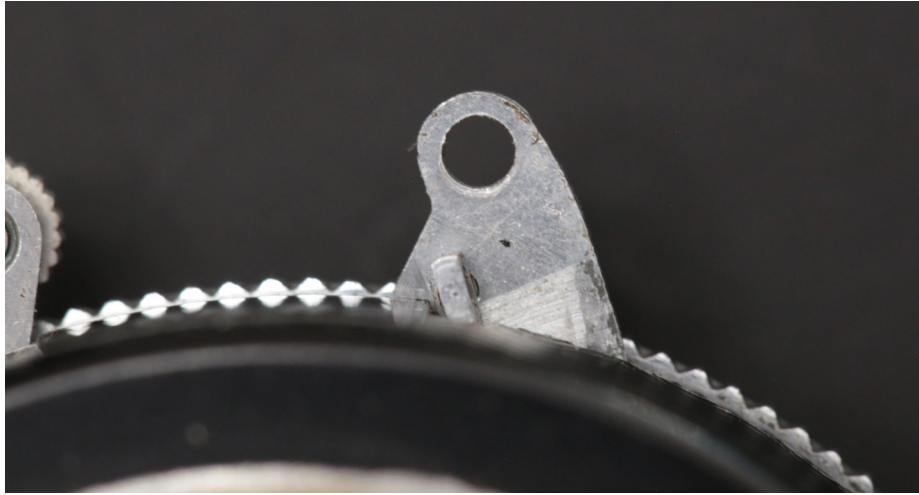


Nonetheless, if you have the capability and willingness to remove the nub on the release lever and drill a hole, we do recommend that as a more secure and reliable connection.

To do so, flip the shutter upside down (after removing the lens elements). You'll notice a rivet "hump" on the back of the release lever. You'll need to either file this down flush with the lever surface, or use a Dremel or similar to grind it off.



Once you've removed the nub, use the 1/16" drill bit included in your camera kit to find the center and begin drilling. It usually doesn't take much before the thumb catch on the other (front) side simply pops out. You'll now have the factory hole to work with.



Bend the end of your connection wire through the hole and fold back to make a secure connection.



SEIKO 0 LARGE FORMAT (Fujinon)

1:18:28

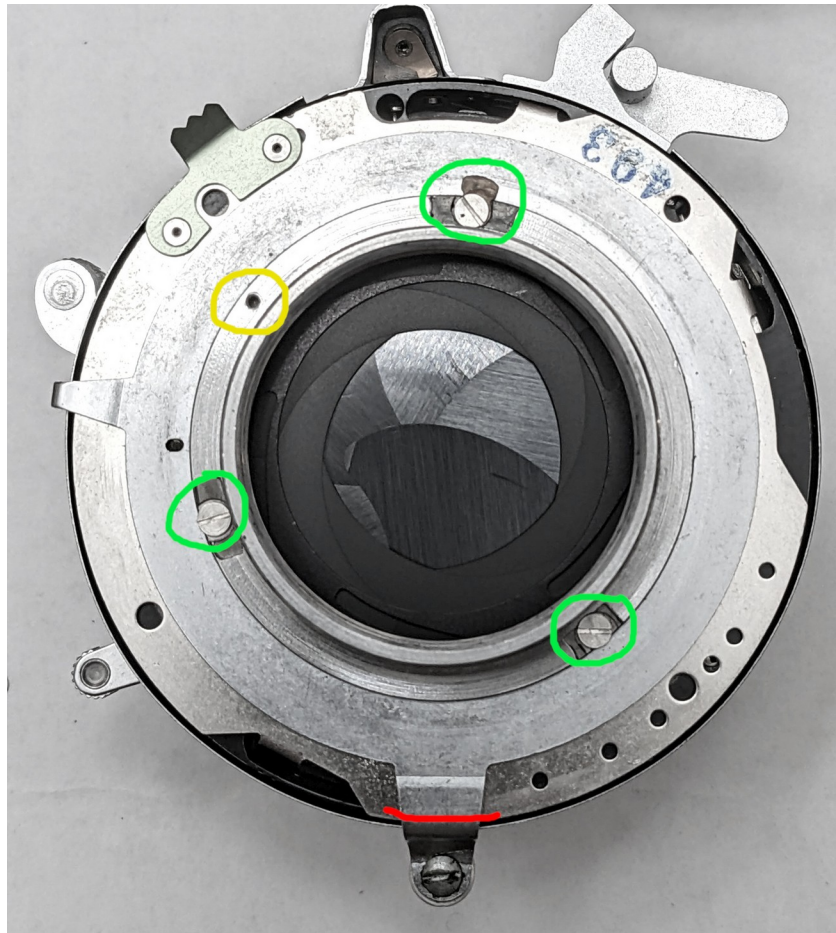
These shutters, like the Seiko 0 TLR shutters, work nicely with the Mercury Stereo 12. They mount on the Mercury Compur 0 lensboard. However, they require some minor, but permanent, modifications. Besides drilling their release levers, you must modify the aperture ring on the *left* side shutter (when viewing the lensboard frontally) and file/grind down parts of the remote release and shutter sync ports on the *right* side shutter (see image below). While Seiko LF shutters are the only ones that require destructive modification, it is not difficult to do, does not impact the functionality of the shutters, and is well worth it to enable the use of a couple of extremely excellent Fujinon lenses with the Stereo 12.

Note that before conducting these modifications, you should determine which of your shutters you'll be using for flash sync (if any). See the next section of this Guide for details. Your flash sync shutter will go on the left of your lensboard when facing it as below.



Modify Aperture Ring:

Remove the 3 screws circled in green (be careful not to lose the pressure tab under one of them). Then cut the lever off where the red line indicates.



Replace the aperture ring, including its three retaining screws and single pressure tab.

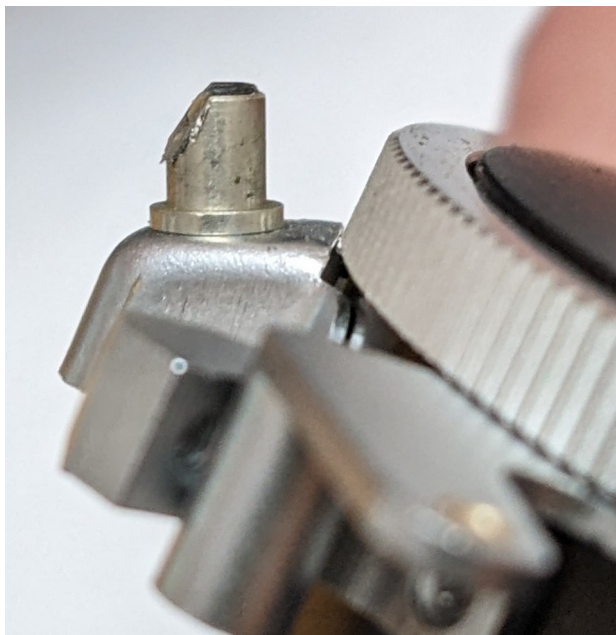
Remove the small lensboard position screw if it has one (in position circled in yellow above).

Modify Remote Release and flash sync ports:

Use a file, grinder, or Dremel with grinding bit to shave a bit off the top side of the flash sync port. You don't want to take enough to compromise the center hole; the idea is to retain flash capability if needed in the future.

When filing/grinding, note the angle, as shown in the above and right photographs: it is the angle at which the flash sync port contacts the leftmost lens on the lensboard that needs to be removed only.

Do the same to the corner of the remote release port. Try to take off material at exactly the angle depicted.



Drill a 1/16 in hole in the end of the release lever, utilizing the Mercury Shutter Drill Tool for support, as described in the Mamiya TLR Black Shutter section above.

When mounting the shutters on the lensboard, take care that they are positioned exactly as shown below. It's okay if the remote release port just barely touches the leftmost shutter body, as long as it doesn't prevent the shutters' retaining rings to fully seat inside the lensboard holes and fully tighten. However, the flash sync port should not make contact with the leftmost shutter at all.



SEIKO SLV (Topcor/Horseman)

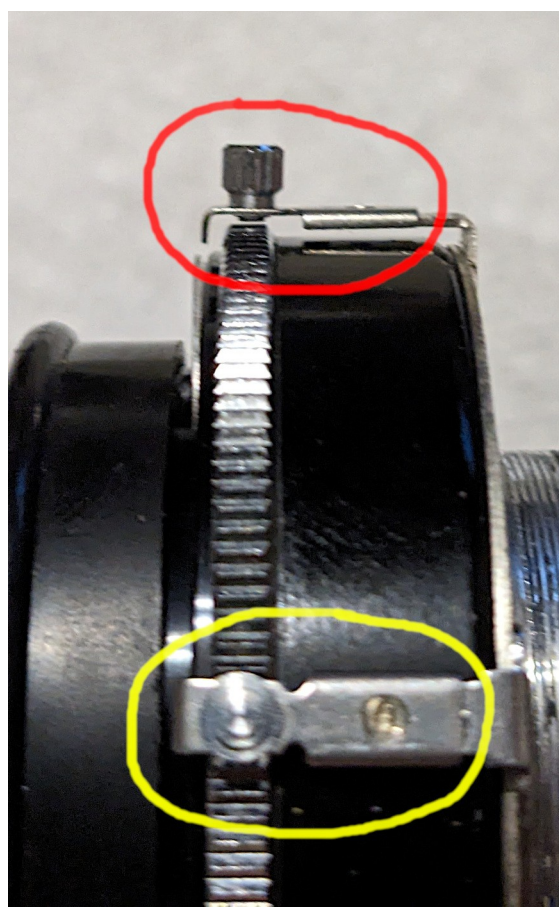
These shutters were made for Horseman/Topcor lenses mounted on Horseman lensboards. They are excellent shutters and excellent lenses!

These mount on the “Generic 0” Stereo 12 lensboard.

You do not need to drill the release levers of these shutters; just wrap the black wire around the knurled knob of each lever.

However, you do need to modify the aperture lever of your leftmost lens (when looking at the lensboard), or it will hit your right shutter. There are two ways to do this.

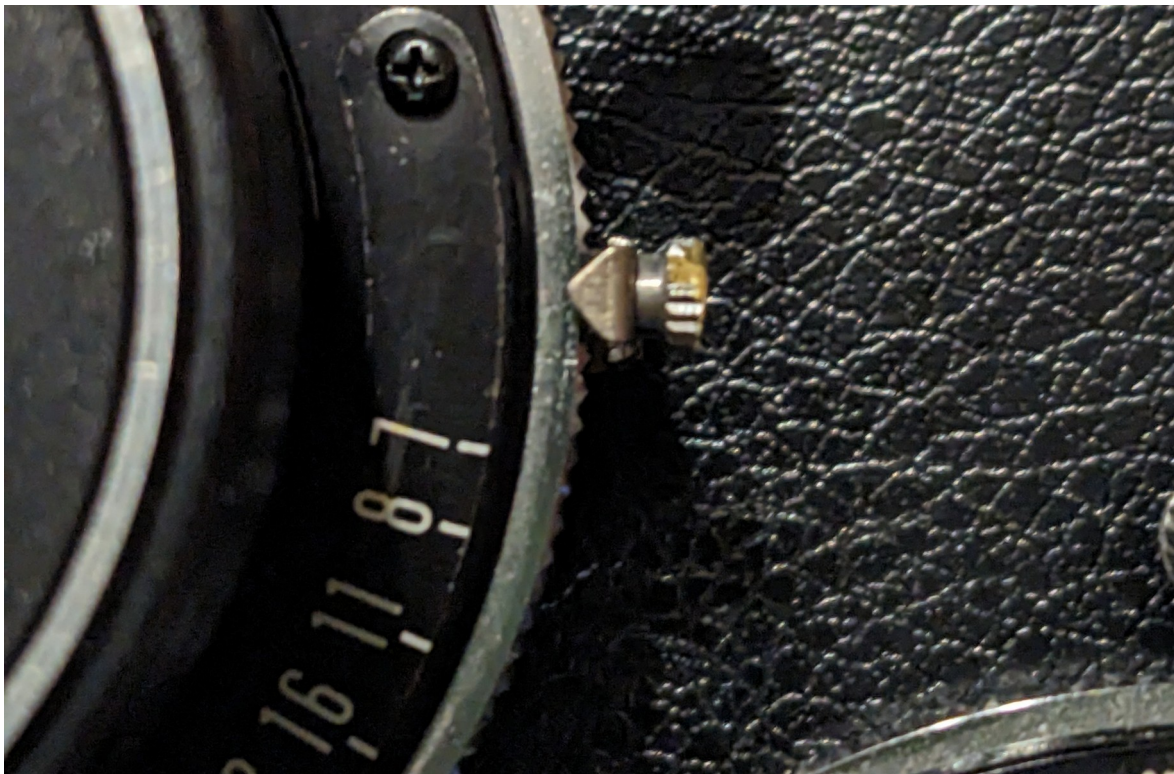
Option 1: With a tiny (eyeglasses) flathead screwdriver, remove the screw that holds the aperture



lever's indicator on its arm. Remove the indicator. Do the same for your flash type ("VXM") indicator. Then swap the two indicators and re-attach them to their levers. Because the flash type indicator is thinner, it won't interfere with the second shutter.

Note, however, that it is extremely difficult to remove these screws without stripping them. If you have no luck, move on to the next option.

Option 2: File or cut off half of the thickness of the knurled knob on your aperture indicator.



Finishing UP

Once you've fixed the aperture knob on one of your shutters, mount them on the board in the standard orientation and attach wires to the solenoid pistons by wrapping the included black wire around the shutter release levers and the holes in the sides of the pistons.

Flash

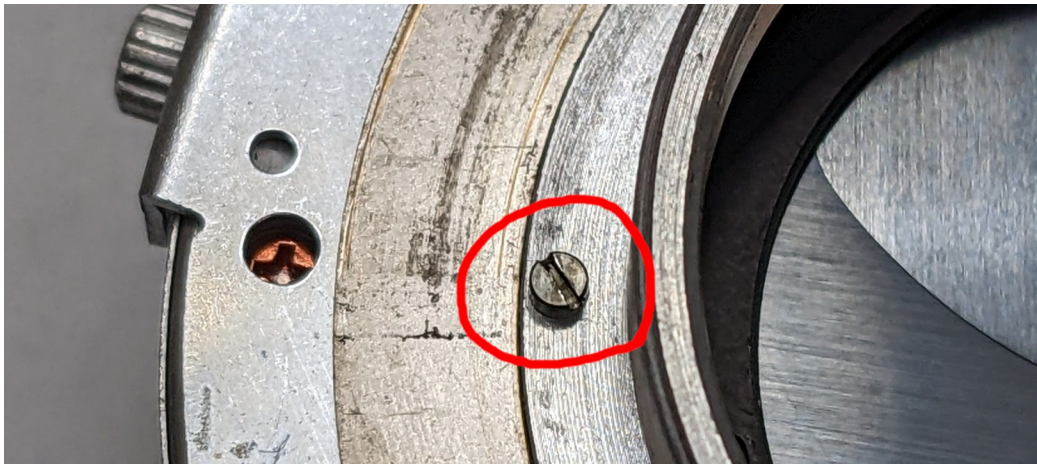
Note that these shutters do not contain on-board flash. Like the Mamiya TLR shutters, if you want to use flash you need to maintain the integrity of the wire coming out of the shutter, mount the flash port on your lensboard, and run a ground wire to a screw on your aperture scale. See the Mamiya TLR section at the beginning of this guide for instructions.

Mounting Shutters on Lensboard

16:15

Unscrew the retaining ring from the back of the lens. If it won't fit over the rear glass element of the lens, unscrew that first.

Mamiya TLR shutters have small anti-rotation screws on them when you remove them from their Mamiya C lensboards. Keep these screws in place. The Mercury Mamiya TLR lensboard is designed to accept these screws, which will help orient the shutters and prevent rotation. This is true for both black and chrome versions of the Mamiya TLR shutter.



All other Mercury lensboards are designed to have such screws removed, if they exist. That's because our lensboards are designed to take a wide range of shutter variations. Most lenses with leaf shutters, when purchased without their original lensboards, have had their anti-rotation screws removed, if they ever had them. However, you should check to make sure before mounting, and remove them if present!

If you plan to use electronic flash: It is a good idea to test your shutter speeds with an electronic tester if possible. This will tell you which of your two matched pair shutters is slightly slower or faster than the other. *The slower shutter should be used as the "flash" shutter.* However, the comparable speeds of the two shutters need to be pretty close at any f-stop at which you plan to use flash. If they diverge too much, flash won't work properly.

If you have no way of testing, just choose one to be the flash (usually the better/newer of the two shutters).

When looking at the front of the lensboard, the flash shutter (if there is one) goes in the leftmost hole. Secure this shutter first, then the one to the right.

To secure a shutter, simply screw the retaining screw in from the back side of the lensboard. At first it will likely bind when it reaches the back of the lensboard, but as you tighten and wiggle, it will then find its way into the very center of the lensboard hole. This will briefly "loosen up" the retaining

ring again, until you once again make contact with the back of the lensboard, this time with the ring firmly set into the hole.

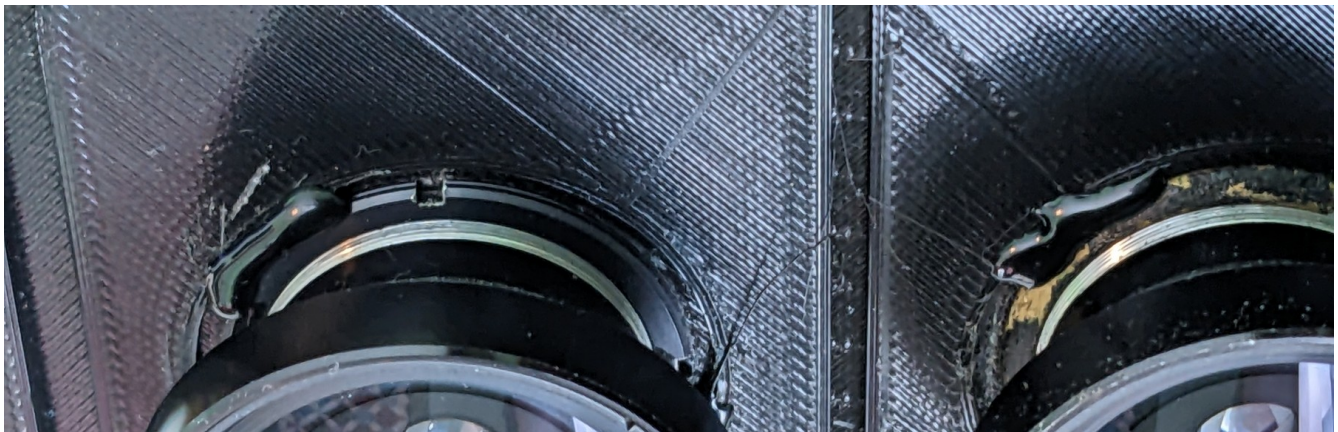
Before tightening completely, orient the shutter according to the appropriate image below.

Using a spanner wrench, tighten the retaining as much as you can safely accomplish.

Do the same for the right side shutter. Before final tightening, orient it according to the correct image below. Then fully tighten.

1:22:10

Though not required, many shutters (other than the Mamiya TLR) can benefit in actual use from being additionally secured with a couple points of black hot glue to prevent rotation. Always use *low-temp* hot glue and gun.



Connecting to Actuators

20:01

30:24

1:00:26

Connect each shutter to its corresponding actuator. Use a small piece of provided black-clad wire to accomplish this. Sharply bend down the end of each wire before threading it through (a) the hole you drilled in the shutter's lever and (b) the hole at the end of the actuator post:



When attaching wires, leave enough length that no pressure is being exerted on either the shutter lever or the solenoids, but also try to remove extra slack.

Copal 0

20:01

Copal 0 Lensboards require you to run one wire between your two lenses, and one through the elevated channel on the board:



Testing

24:47

Hook your lensboard up to your camera with its 3.5mm cable and, with batteries installed and the camera “On,” cock both shutters and trigger them with the camera. If all is well, they will trigger instantly and simultaneously. If they don’t, you may need more or less of a length of wire between the shutter lever and the end of the actuator. Adjust the wires until both shutters trigger without trouble and perfectly simultaneously.

For Mamiya TLR shutters only (black and chrome): Test to make sure that the actuator arm, where it protrudes out the back of each actuator after firing, can advance enough for the Aperture Preview Screw to be able to hold it open when the screw is screwed down. If the back acorn nut on the actuator doesn’t fully clear the preview screw, you may need to lengthen the wire segment between that actuator and its shutter.

Aperture Scale Alignment

53:38

When your lensboard includes two shutter/lens combos that are original (matched) and you do not plan to use any other lenses with these particular shutters, you don’t need to change any aperture scales.

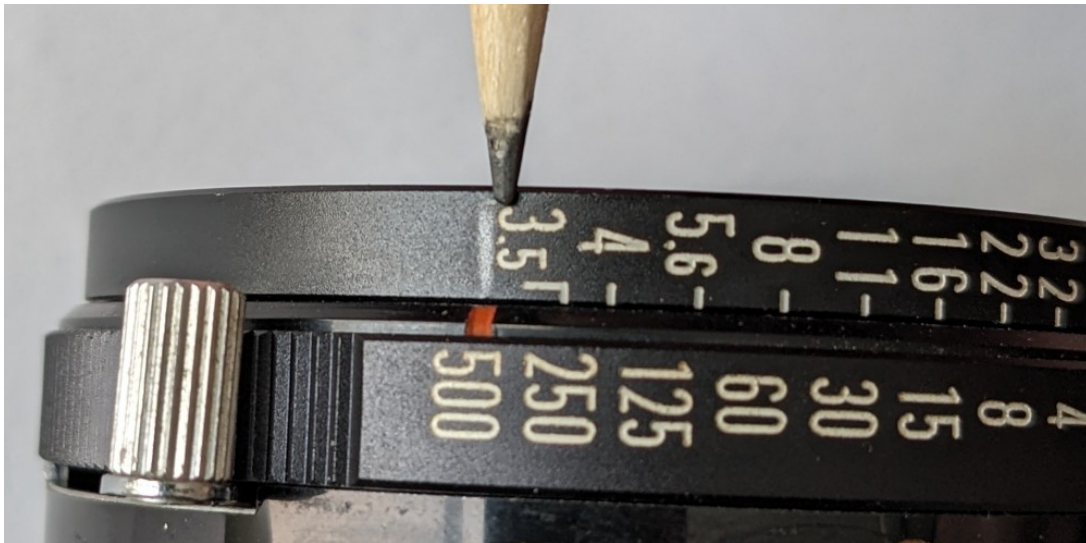
If, however, you wish to use these shutters with other lenses, or one or both of your shutters was originally intended for a different lens, you’ll need to add the proper aperture scales to the shutters, to match your lens(es). Mercury Works provides downloadable PDFs for many of the lenses compatible with the Mercury Stereo 12. Print these out at “Actual Size” (do not allow your PDF software to scale or “fit” the file when you print) on adhesive sheets. We recommend adhesive vinyl sheets, but even basic (paper) adhesive sheets can work.

If you wish to modify these aperture scales (to, for instance, combine two different lenses into a single shutter scale), you can import the PDF into Adobe Illustrator, Inkscape, or other vector editing software and edit the scales yourself.

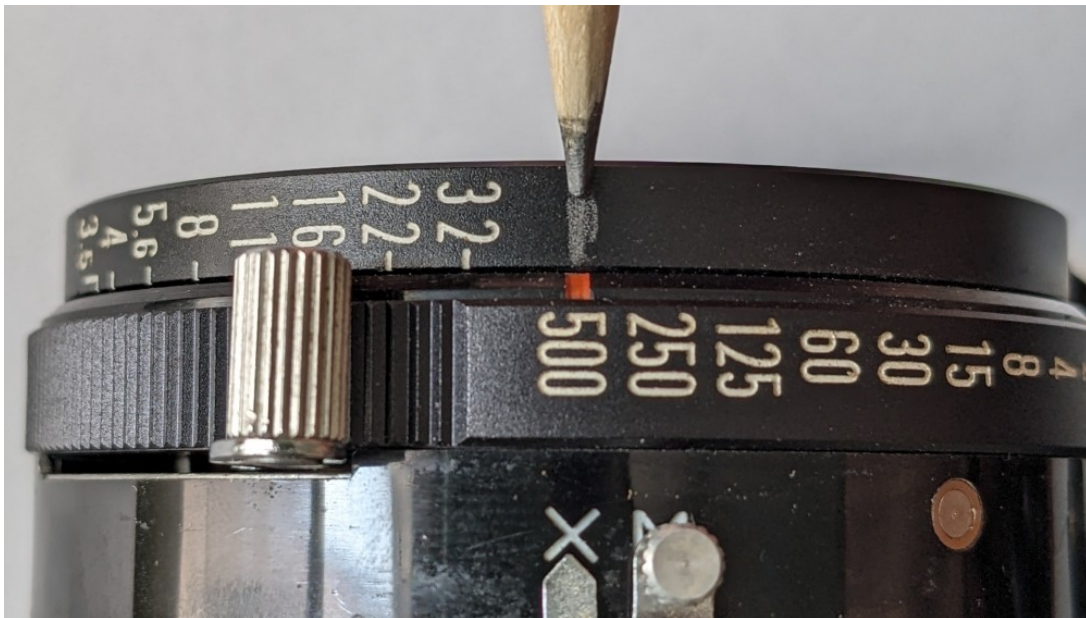
Once you’ve printed your scales, carefully cut them out.

Next, mark your shutters:

1. Move the aperture lever/indicator on the shutter to the far left—as far as it will go, even if that’s well past the current scale. Mark that point on the side of the shutter with a pencil.



2. Do the same for the right side: move the lever/indicator as far as it will go and mark the position.



3. Move the lever/indicator somewhere in the middle of its range to get it out of the way.
4. You can now peel your new shutter scale off of its backing paper and stick it on your shutter, covering up the original (factory) scale. If you printed on vinyl, be sure not to stretch the scale as you peel and apply it.

The gray lines on the left and right of the scale are designed to match your pencil marks on your shutter.

Each scale has been designed to align with the type of shutter that the lens was originally designed for and factory shipped with. If you wish to transplant lenses into different shutter models, you'll have to create new scales.

Mamiya TLR Black shutters: There are two models of these: plain levers and blue dot levers. Strangely, though they are nearly identical, the two models have slightly different max and min lever positions. Thus for Mamiya TLR lenses, our scales include two gray lines. The outer gray lines are for aligning with blue dot shutters; the inner gray lines are for aligning with the plain lever shutter. Note, however, that the scales themselves are the same, and it is quite possible to mix a plain and blue dot shutter on your lensboard and have no issues in use. The different only matters when aligning the scales, not when subsequently using them.



The photo above demonstrates not only the double gray alignment marks for different shutters, but also an extreme case of *all* recommended Mamiya TLR lenses on the same scale! This scale is usable, but confusing. In practice, we recommend using no more than two different lenses per lensboard. Some users prefer only one.

Note on Mamiya TLR 55mm lens:

The 55mm lens uses a scale virtually identical to the 65mm, except that the 55mm lens isn't designed to use the f/32 stop, and can't make use of the f/3.5 stop. The f/4 stop on the 65mm scale is equal to the f/4.5 stop on the 55. One of the Mercury scales is a combined version that shows the stop usable by the 65mm but not the 55mm in yellow.

Of course, if you are using only one lens per board and have purchased two of the exact same lens, each with its original shutter and proper aperture scale, you don't need to apply new aperture scales.

Your camera is now ready to shoot!

