

Cleaning the Optics in a Schmidt-Cassegrain Telescope

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08/15/2022

Eventually, the day will come when you say Enough is enough. I can't stand looking through this filthy telescope any longer. Well, for the second time in 30+ years I've owned my LX200, that time has arrived.

When that time comes knocking on your door, you have three options. You can:

- 1) Ignore the problem and hope it goes away (it won't).
- 2) Bite the bullet, box up your pride and joy, ship it to God knows where and hope it doesn't get destroyed somewhere along the way, and on top of that, pay big bucks to have it done.
- 3) Screw up your courage, roll up your shirtsleeve and do it yourself.

Not believing in magic and being somewhat frugal with my funds, and not very trusting of others to give my scope the same level of care as I do. I opted for number three – Again.

First, let me say that I have been an amateur astronomer for most of my 70 years of life. Having started with 60mm "K Mart-special" way back at the tender age of eight or nine. In all those years, I have owned, used, and cared for one or more telescopes.

For some reason, most folks are afraid of the meniscus (corrector plate) found at the front end of a Schmidt-Cassegrain telescope. Perhaps it is because of the somewhat complicated curve that they are ground to (It is that). Or perhaps it is because it is a relatively thin piece of optical glass (about .25" at the edge). Or perhaps because each one is custom matched to the mirror it is mated with. Or maybe it's because there is a big ole secondary mirror attached to it. Whatever the reason, people are afraid of them.

That fear is unfounded. It's just a piece of glass, folks. That's all it is, and with a bit of care and attention to detail, it can be dismantled



The patient: My 10" Meade LX200

from the front end of your “cat” and be cleaned. At the same time, you can gain access to both the primary and secondary mirrors and clean them as well.

The following is a list of supplies you will need, and tools you will need, and the procedure to safely remove and clean your meniscus and mirrors.

You will need:

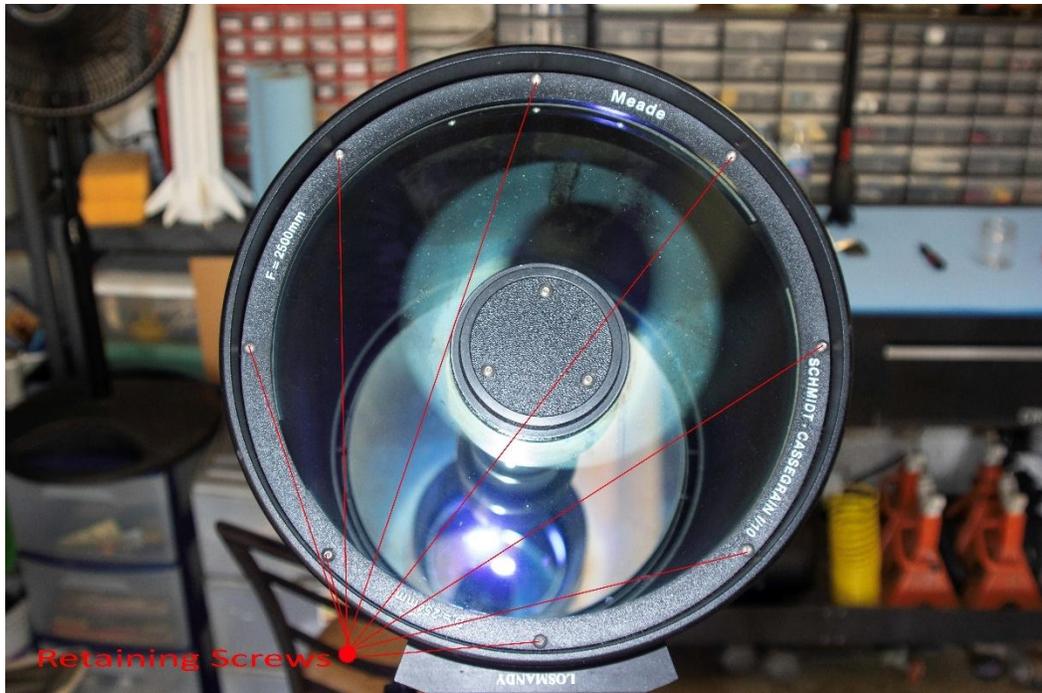
- Some Isopropyl Alcohol at least 90%
- Some Distilled or bottled water (Tap water as a last resort)
- A Dust blower
- A set of Hex keys
- Some ¼” wide masking tape (you can cut what you have to size)
- A hobby knife or razor blade
- A pack of “Pec Pads or some other kind of non-abrasive pad
- Optional a bottle of “Eclipse” optical cleaner (Methanol)
- Rubber Gloves
- A container to hold the water



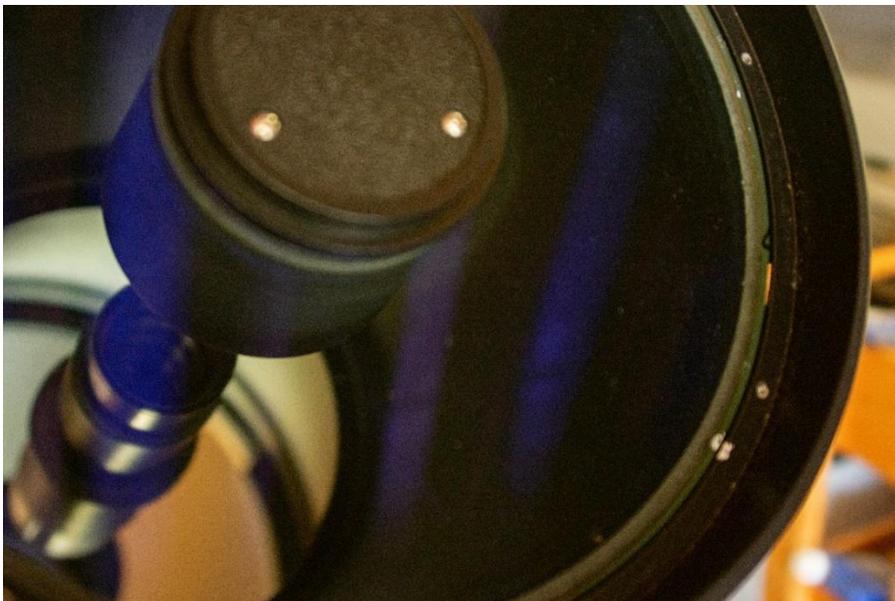
Begin by orientating your telescope as shown. That is with the tube pointing upwards at about 45 degrees or so. This will keep the meniscus safely in place while you remove the retaining ring.

Next identify the eight retaining screws on the front of the tube.

Then using a proper size hex key remove the retaining screws and set them safely aside.

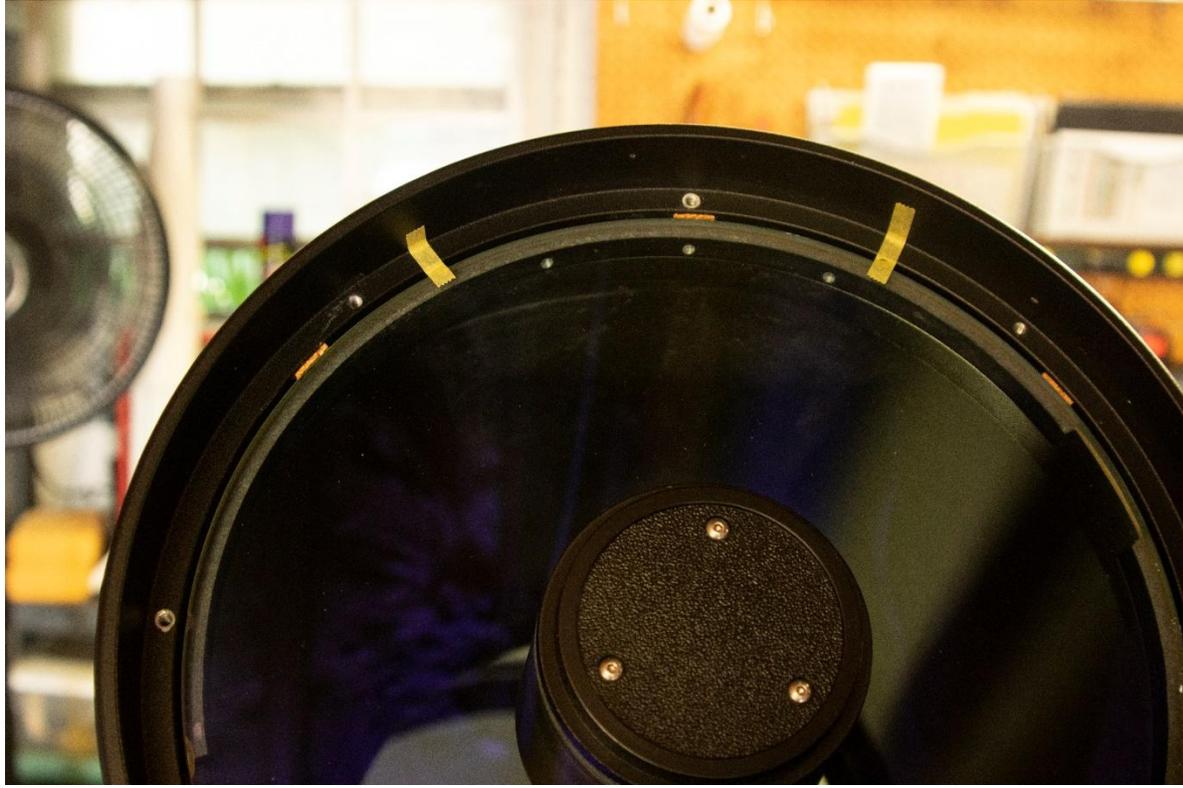


Then gently lift the retaining ring from the front of the tube and set aside. Look for a registration mark (the white paint on the meniscus and cell shown in the photo. There may not be one on yours, in that



case we will make some registration marks with tape as shown in the next photo. *THIS IS IMPORTANT* as the meniscus *MUST GO* back in its original orientation.

Take the $\frac{1}{4}$ " masking tape and cut two 1" lengths. Place them about 30 to 50 degrees apart with half of the 1" length on the cell and the other half on the meniscus as shown here. Then with the hobby knife cut the tape between the cell and the corrector. Note the cork spacers around the perimeter of the meniscus and its mounting cell.



Now is the moment of truth. Screw up your courage and grab the secondary mirror housing. And gently rotate the top of the meniscus towards you. As soon as you can, grasp the top of the meniscus and with both hands (one on the secondary mirror housing, and the other at the top of the glass), lift it free of the telescope. Take it to your bench and lay it face down on a padded surface.



Now that the corrector is safely removed and resting securely on the bench, we can begin the cleaning process. Start by mixing a few drops of liquid detergent with your water in a container big enough for



the meniscus to fit in. Do not put it in just yet.

Instead, wet a soft cloth with the soap and water solution you just made and wipe down the tube's interior as shown here.

After cleaning the inside of the tube let's turn our attention to the primary mirror. Begin by rotating the telescope so that the tube is pointing up as shown here.

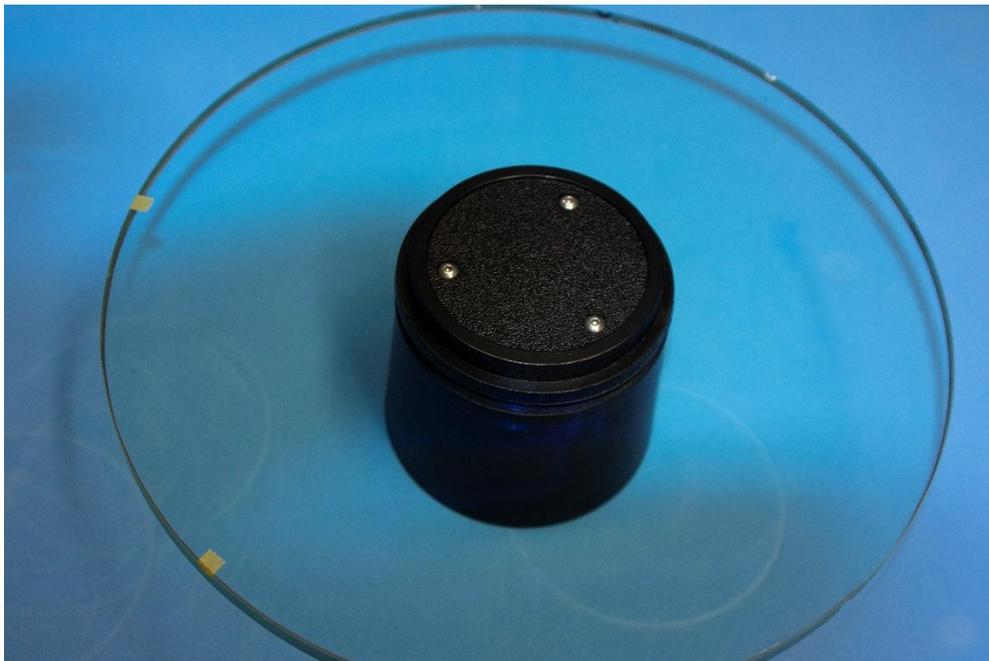


Begin by blowing any dust off the mirror's surface with the dust blower. Then, take and drop some of the soap/water solution onto the surface of the mirror. Then with rubber gloves on, take a fresh Pec Pad and fold it in half and gently – ever so gently – wipe the mirror from top to bottom across its diameter. Throw the pad away and repeat as necessary to remove dirt, pollen, etc.



Finish with the same procedure as outlined above but substitute a 50-50 mix of the Isopropyl Alcohol and water or straight Eclipse Optical Cleaner (I prefer Eclipse). Repeat, as necessary.

We can now turn to the meniscus and the secondary mirror. Blow any dust off the corrector with the



blower. Then, stand the meniscus on edge in the container with the soap and water Solution and support it with one hand (still gloved). Again, using a fresh Pec Pad, gently wash the front and rear surface of the corrector. Do not wash the secondary at this time. Repeat, as

necessary. When done, place the meniscus back on the padded surface, front side up. Now, using the 50/50 mix of the Isopropyl Alcohol and water or straight Eclipse Optical Cleaner, finish cleaning the front of the Corrector.

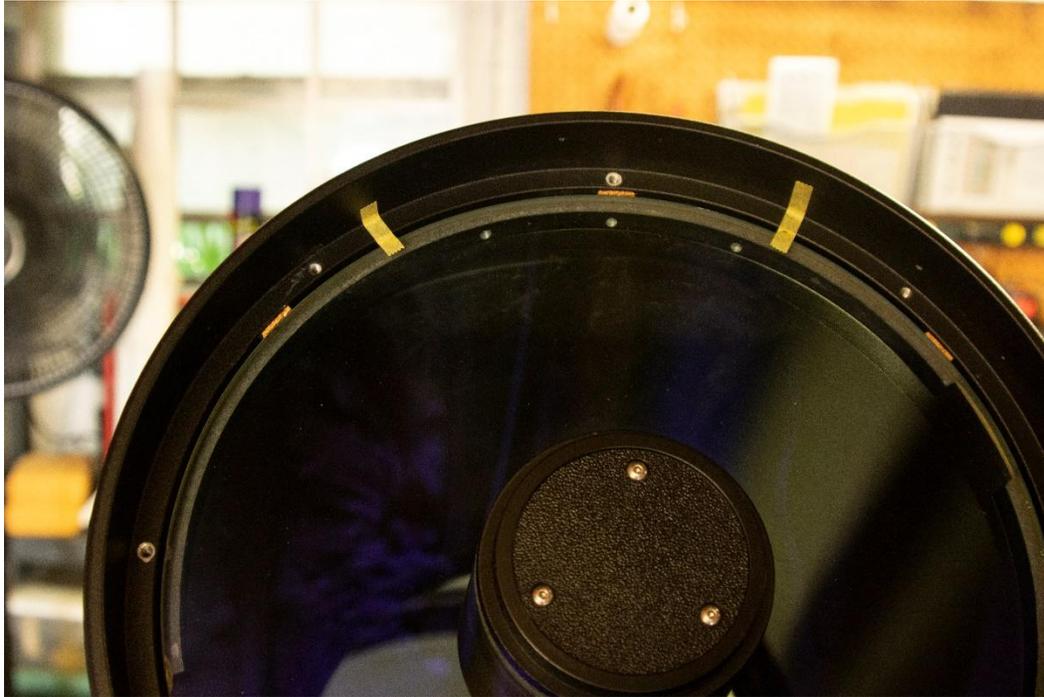
Next, using gloved hands, turn the corrector over and finish cleaning the inside surface as you did for the front side. Once the inside surface of the corrector has been cleaned, you can turn your attention to the secondary. Using the same steps outlined for the primary clean the secondary mirror.



Now that's a freshly cleaned corrector and secondary mirror. Congratulations, your optics are clean, you haven't broken anything, you saved some money, and you're feeling good. So, let's wrap this project up and reassemble the telescope.



Don't take those gloves off yet, and if you did, put them back on. Remember, you just cleaned the optics; you don't want dirty fingerprints on that shiny glass - not yet anyway.



Rotate the telescope so that it's back to about 45 degrees up angle and reinstall the meniscus, aligning the registration marks made earlier.

Once everything is aligned correctly again, remove the

tape from the corrector and the cell. Then place the retaining ring back to the front of the telescope and reinstall the retaining screws you set aside earlier. Finger-tighten all the retaining screws. Then using the hex key and starting at the top snug all the screws down, working in a star pattern around the circumference of the retaining ring. DO NOT OVERTIGHTEN the retaining screws, just snug them down.

And that's all there is to it, folks. Overall, the total time spent doing this procedure was about 1 hour.

There is a small but not very likely chance that we will need to collimate the optical train the next time out. But for now, we are finished.

If there is an interest, I will pull together a "How To" on collimating your Schmidt-Cassegrain telescope.