

WILLIAM OPTICS CRAYFORD FOCUSER

Even though I had gotten the stock XT10 rack and pinion focuser to function well, once I added the binoviewers, it was not up to the task of focusing the heavy train at high powers. The play inherent in the rack and pinion design combined with a very slight amount of image shift at high powers made focusing extremely irritating. This did not meet my number one criteria for every subsystem: it must be transparent in use.

So I started looking for alternative focusers. I managed to try the 3 big name focusers, [JMI](#), [Feathertouch](#) and [Moonlight](#) at the Mason Dixon Star Party in Pennsylvania. The Feathertouch and Moonlight had superior motion to the JMI DX-1. I sent a few emails and made some phone calls to the Feathertouch and Moonlight folks to try and determine how I could install one of these masterpieces on my XT10. Both would require base adaptors and long draw tubes and would run upwards of \$350 after all these extras were included.

The problem was that these focusers are low profile focusers. This is nice for dobs that are designed for low profile focusers, but not for the XT10. The XT10 focuser stands proudly tall at 3" above the OTA fully retracted. These fancy focusers were a paltry 1.5" tall fully retracted. There are many technical reasons why a low profile focuser is desirable, but none of these apply when trying to replace the stock XT10 focuser. You need to match the same travel requirements as the stock focuser.

I could solve this problem by adding riser plates under the low profile focusers to bring them up to 3". But adding 1.5" of plates under a \$300 focuser seemed a bit silly and would probably have looked dumb. I could have purchased either the Feathertouch or Moonlight with a really long draw tube, but that would look stupid as well. In either case, baffling the focuser to keep out any stray light would have been a difficult task.

So, I had given up on the new focuser idea for a while until a nice gentleman on the Skyquest Yahoo group mentioned a Crayford focuser that he had purchased from William Optics. I had not seen this focuser in my earlier quest and took a keen look at its specifications. The price was right @ \$139. The specs looked good. Hmmm... So, I ordered one right away from [Anacortes](#).



Here is my report that I filed on the Skyquest group:

Mechanically, it is solid. Not as over engineered as a moonlight or feathertouch, but well made. Smooth as any moonlight or feathertouch I have played with, and better than the JMI crayfords I have tried. No slop at all when changing focus direction.

I do have an issue with tension when the big, heavy binoviewer train is installed. The crayford design is susceptible to this phenomenon, and the William Optics is no exception. With all that weight, the focuser wants to slide all the way in. Luckily, William Optics has been kind enough to include a tension adjust knob to take care of this. It works very well.

Dave had an issue with his not allowing his ep's to focus in his XT8 after it was installed. We have communicated a lot in the past week and I think I will be ok with my configuration. I need $3\frac{5}{8}$ " - $4\frac{11}{16}$ " travel as measured from the top of the OTA to the bottom shoulder of the ep. I measured about 50 configurations of ep's, binoviewers, correctors, barlows and powermates. That took a while. That's $1\frac{1}{16}$ " of required travel. I was worried when Dave reported that his focuser only had $\frac{7}{8}$ " travel. I was relieved when I measured mine and got $1\frac{1}{8}$ " travel. With my TV high hat 2"-1.25" adaptor, I can just slap the focuser on the tube and be good to go.

The 2"-1.25" adaptor that is included with the focuser gives you the option of dialing in a height, to a degree, and I could use that one instead of the TV to get my required travel. But the TV has a nice compression ring in the 1.25" part where the William Optics adaptor just has a set screw.

Upon first glance, the baffling inside the draw tube looked to be less than sufficient. But when you look closer, you can see that it is a nice design incorporating hundreds of little ring baffles. I compared it to flocking paper on the inside and the stock baffling is very good.

Installation was not difficult and careful measuring and drilling resulted in no shims required. I was concerned about baffling between the draw tube and OTA when the focuser was racked all the way out. The hole in the OTA is bigger than the outside of the base plate on the crayford focuser. Simple weather stripping would work for keeping light out, but I was looking for a tighter solution. I used a mouse pad. I cut two squares that matched the bottom of the base plate plus a $\frac{1}{4}$ " on each side to cover the bigger hole in the OTA. Then I stacked them and cut holes that matched the outside diameter of the draw tube. I then cut a piece of flexible cutting board (thanks Gene) for the inside of the OTA. This was larger than the current hole in the OTA and also had a hole in the middle that matched the diameter of the draw tube. It is held in place by the bolts that hold the focuser. The result was a nice tube that surrounds the draw tube and makes a great baffle.



This is a pic of the mounting plate with the focuser assembly removed. A nice touch that made it easier to mount. You can see the stacked mouse pad cutouts extending past either side of the baseplate. This is what covers up the part of the original hole that extends beyond the new focuser base. I made the mouse pads too wide on purpose. I can shave another 3/16" off each side to clean it up a bit.

One thing that always bugged me about the way the stock focuser was held on was that the nuts, when tightened, pulled a localized area around them up towards the bolt head. This caused an unsightly deformation in the area around the nuts. I had to use a c clamp to flatten these deformation out before installing the crayford. Just a characteristic of the stock focuser.

You can also see how the stacked mouse pads form a tunnel of sorts through the OTA. The hole looks off center because the picture is taken off center, but it is actually dead center. The mouse pads are a gasket of sorts that keeps all the light out of the draw tube. Some light is spilling in around the top and bottom of the base and can get inside the OTA through the old screw holes. So, I added this to the inside of the OTA:



This is the piece of flexible cutting board I bought at Wal Mart. Nice red color, huh? It will get flocked when I get some more flocking paper. I'll put some felt on it for now. This piece acts as a gasket to prevent light from getting inside the OTA. Works very well. Also note the focuser drawtube fully extended into the OTA. Nice fit through the mouse pad and cutting board gasket.



This is the draw tube racked all the way out. Still a nice sealed light pipe going to the bottom of the draw tube. No stray light here.



A pic of the new MEBLSPT. The old one is available, if someone wants to try the barlowed laser method on their stock XT 2" focuser.



A view from the side with the included adaptor at it's lowest position. Here's another stock shot from Anacortes:



This is the same adaptor pulled out a bit:



This extended configuration can help with focusing ep's that need a lot of back focus. It is rock solid even extended. The brass clamping ring on the 2" part helps keep it solid.

Here's a pic with my televue high hat adaptor:



Check out the size of those knobs. 1 7/8" in diameter.

Like I mentioned before, I'm using the TV adaptor because it has the brass clamping rings. The adaptor that's included could have given me the same height adjustment I needed as well.

Here's a pic with the bino train loaded up:



Probably about 3 lbs worth of glass hanging on an 8" moment arm. It keeps it right where it should be.

I tested the focuser for square using my method described in other posts. The focuser was square as installed. I put the secondary back on and it required no adjustment from the position it was in when I took it off. I purposely left the secondary tilt screws in the same spot to QA how the focuser install went. Surprisingly, the secondary required no adjustment at all.

Testing revealed very good results. There is ZERO focuser slop with the laser installed. None, notta, zip. Motion is very smooth even with the tension knob tightened all the way (this is required for the binoviewers). The big test was the binoviewer with 2x corrector on top of a powermate. No spot shift from the laser only test. This is very good news. Even with the heavy binos and powermate, the focuser holds the laser spot in place.

The actual installation took about 10 minutes (plus another 15 to make a new barlowed laser spot target thingy). I spent about 5 hours on it, though. I did a lot of measuring and just looking at the base plate and such. If I was off by 1/16", I may not be able to get my ep's and binoviewers to focus. I thought about shifting the focuser forward 1/8" or so to allow the secondary to move forward, but opted against this. I just wanted to get the focuser back in in the exact same spot as the old one.

The good news is the old focuser can be put back on and it will cover up the holes that I made for the crayford. This is a nice option if I ever want to get that Tscope I've been looking at.

"Let me `splain. No, is too much. Let me sum up."

Goods

1. Smooth
2. Zero focus shift
3. No mods needed to get to focus my ep's on XT10
4. Large knobs
5. Price (compared to starlight, feathertouch)

Others

1. Not a perfect fit
2. Collimation requires shims (I got lucky and didn't need to collimate it)

It's staying and I am no longer considering a much pricer replacement that would require significant modification.

Here's another report from the field:

Just got done testing all my whacky configurations with the new focuser. No troubles, mate. All of them came to focus.

So, how did it function?

Fanfriggintastic. This is just what I was looking for in a focuser. There is no doubt where in focus is (at least on the stars) The focus arm is not required for stars. Moon is coming up, so that is the next test. Mars at 400-500x this morning will be the real test. If the star test focus is any indication, this is a wonderful upgrade and well worth the \$139 and time to install.

I will caution anyone looking at trying this that you should take a lot of measurements first. The focus travel and height are critical to making this a simple mod vs an impossible mod. Also, you must be comfortable with how to properly square a focuser and center a secondary. If this describes you, then this is a peachy keen addition to an already great scope.

Another bene I noticed was laser wobble for laser only collimations. I could put the laser in, yank it around and the spot would move about 3/4" and always return to the center spot. I removed the laser and put it back in (being careful to orient the laser the same way) and the laser spot always returned to the middle of the center spot. No muss, no fuss. This would make laser only collimation (no barlowed laser) much more accurate.

Forgot to mention the compression ring style thingy on the 2" part of the focuser. Very nice. Makes it a lot easier to switch to a 2" ep. Also, you don't need any messy grease.

I have been using my XT10 a lot and the focuser has become transparent. That is about the highest compliment I can pay it. It has no impact whatsoever on my viewing. It is smooth,

solid and predictable. I still use a focus lever for critical focusing above 300x. It works well without the focus lever but it is very precise with it. It has handled the heavy weight of the binoviewers very well.

Was it worth \$139? You betcha. I would endlessly fiddle and fuss with the old focuser trying to get it smooth and predictable without any sign of wobble. Focusing at 400x was difficult, made worse by the heavy load of the binoviewers. Now, I don't even notice the focuser is there and that is wonderful.

Is it a good upgrade for everyone? Probably not. The stock focuser is very good and I should have been satisfied with it. But I am the fixer of things unbroken in my relentless quest to let better get in the way of good enough. I am looking for Obsession quality at an Orion price. So far, I think I'm doing alright.