

Library Telescope Program

Replacement Focuser Tube and Collar

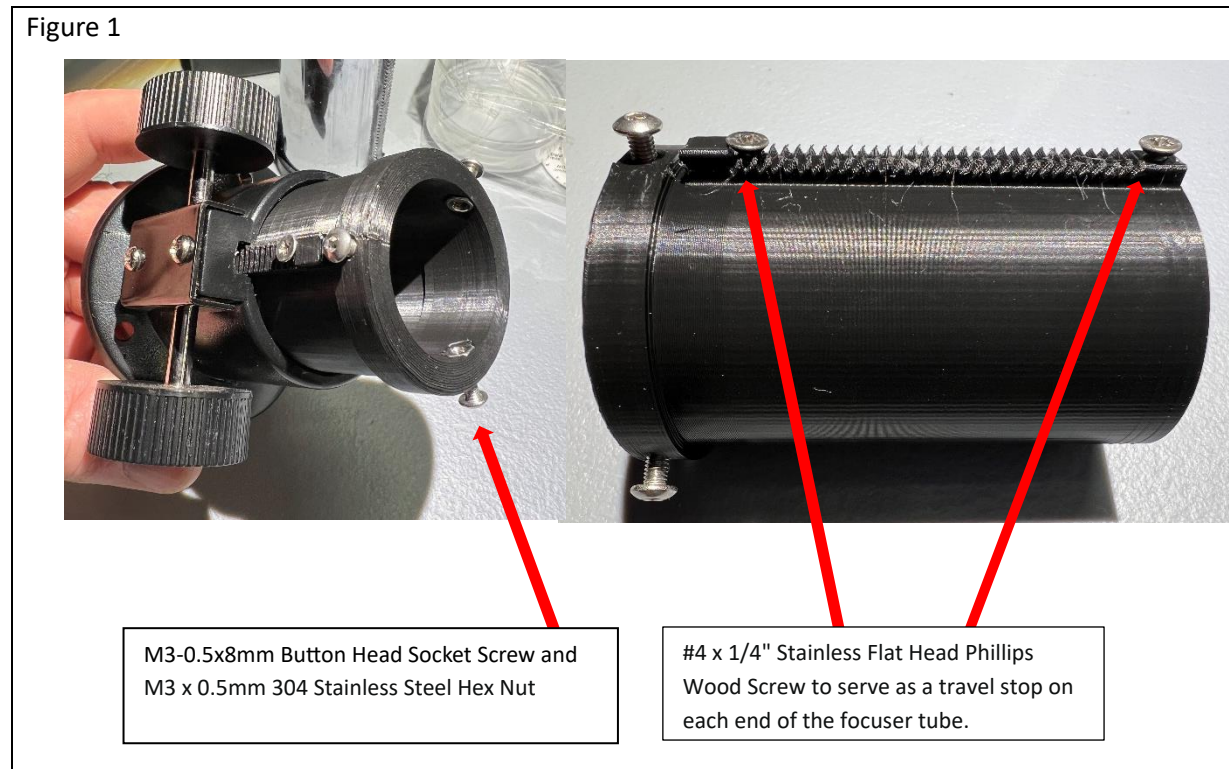
Last updated on 7/11/2023

Introduction:

The Focuser Tube and eyepiece Collar for the Orion Starblast (pre-2023 style) and the Zhumell Z114 reflector telescopes are made of plastic. The threaded holes on the Focuser Collar used to lock the eyepiece in place can be easily stripped. Likewise, the plastic teeth on the Focuser Tube are easily stripped by the metal teeth of the focuser gears. Replacement Focuser Tubes and Collars are difficult to find.

A 3D replacement has been designed that prints the Focuser Tube and Collar as one unit. To address the issue of soft materials used in 3D printing, the replacement Focuser Tube/Collar is designed to use metal screws/nuts to prevent damage. Additionally, this Focuser Tube is slightly larger than previous designs to allow the Focuser Tube to more snugly fit into the Focuser.

Figure 1 shows the 3D printed Focuser Tube with the metal screws/nuts in place.



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Printing and Assembly (refer to “Parts Needed” for items referenced):

1. Print the 3D focuser using this STL file: <https://librarytelescope.org/images/hacks/FocTubeCollar.stl>
2. Prepare the focuser collar:
 - a. Insert the Hex Nut (item 2) into the premade holes located on the interior of the Focus Tube. They will fit tight, which is intentional to lock the nuts in place, but they will insert.
 - b. Insert a Button Head Screw (item 1) into the collar and secure with the Hex Nut (item 2). Make sure the Button Head Screw (item 1) is screwed into the Hex Nut (item 2) to hold the nut in place, but not far enough to prevent the ZOOM lens from being inserted into the Focuser Tube.
3. Prepare the travel stop:
 - a. The Flat Head Screw (item 3) is a little long for our purpose, so trim just the tip of the screw with wire snips.
 - b. Insert the Flat Head Screw (item 3) into the pre-made holes on each end of the teeth of the Focuser Tube. Screw the Flat Head Screw (item 3) into the Focuser Tube such that the flat head will not block the operation of the focuser but will still be high enough to serve as a travel stop as shown below.



4. Swap out the focusers:
 - a. Remove the ZOOM lens from the existing Focuser Tube.
 - b. Insert the new Focuser Tube/Collar. Test to make sure the new focuser travels the full distance needed and the focuser gear correctly stops when hitting the flat head screws. If installed properly, the metal of the Flat Head Screw (item 3) should prevent the knobs on the focuser from turning when reached (this will keep the teeth from being stripped by the gears)
 - c. Insert the ZOOM lens. Tighten the Button Head screws (item 1) so the ZOOM lens does not turn. Make it snug but don't overtighten.

Parts Needed:

Item 1: Button Head Socket Cap Screw to secure ZOOM lens (same size as Orion's legacy focuser).

M3-0.5 x 8mm Button Head Socket Cap Screws 304 Stainless Steel 18-8 Hex Socket Cap Screws, Allen Hex Drive

Link to Amazon: <https://www.amazon.com/M3-0-5X-Available-Stainless-Machine-Fastener/dp/B081JQL9GF>

Item 2: Hex Nut for item 1.

M3- 0.5mm 304 Stainless Steel Hex Nut, Coarse Thread, 3mm Small Stainless Steel Female Thread Hex Nut

Link to Amazon: https://www.amazon.com/dp/B079YBNQ7Q?psc=1&ref=ppx_yo2ov_dt_b_product_details

Item 3: Flat head screw to serve as travel stop.

#4 x 1/4" Stainless Flat Head Phillips Wood Screw, 18-8 (304) Stainless Steel Screws

Link to Amazon: https://www.amazon.com/dp/B082D6M295?psc=1&ref=ppx_yo2ov_dt_b_product_details