



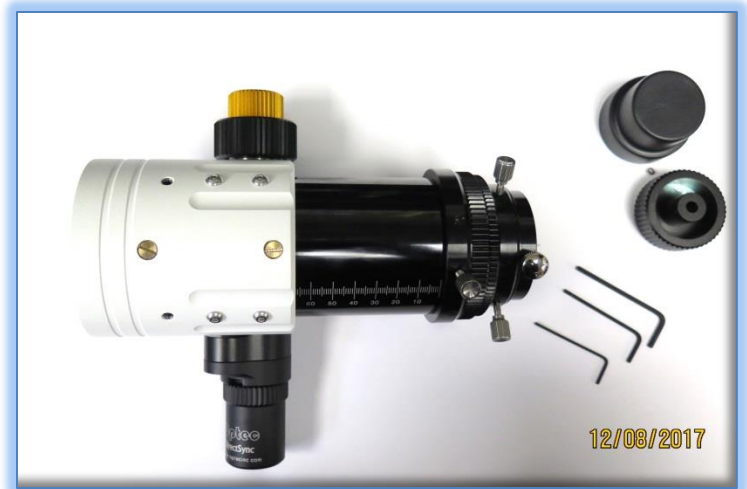
DirectSync APO Focus Motor Installation

Step-by-Step Instructions for Installing the DirectSync APO Motor Assembly to your Meade® or Stellarvue® APO dual-speed focuser.

Optec's #19776 DirectSync APO motor assembly works with the **FocusLynx** dual focuser control system to provide a complete digital focusing solution for Meade, Stellarvue, Astro-Tech, Teleskop Services and other apochromatic refractor telescopes. DirectSync APO motors can be ordered separately or in kit format. The motor assembly replaces the coarse focus knob of the focuser pinion block for Meade's new line of apochromatic refractors. Coincidentally, the same motor assembly works well with Stellarvue's new SV70T imaging refractor which includes the white body focuser shown below. Specifically, the DirectSync APO will fit the following telescope focusers plus several other brands:

- Meade Series 6000 ED Triplet APO 130mm
- Meade Series 6000 ED Triplet APO 115mm
- Meade Series 6000 ED Triplet APO 80mm
- Stellarvue SV70T f/6 APO Triplet
- Stellarvue SV80, SV102 and SV125
Access Series APO Refractors.

When properly mounted, the DirectSync APO motor provides approximately 1.4 micron per step resolution and superior repeatability and load carrying capacity. A precision digital temperature sensor and electronic noise suppression circuitry are integrated into the DirectSync motor assembly. Connection to the FocusLynx control hub can be made using the included flat 8P8C or any other Cat-5e or higher network cable.



For additional information regarding the FocusLynx dual-focuser control system, please visit:
<http://www.optecinc.com/astronomy/catalog/focuslynx/index.htm>.



199 Smith Street · Lowell, Michigan 49331 · U.S.A.
Telephone: 616-897-9351 · Fax: (616) 897-8229 · Toll Free: 888-488-0381
sales@optecinc.com · <http://www.optecinc.com> · www.optec.us

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DirectSync APO Package Contents

Confirm the contents of your DirectSync APO motor package. The package should contain the following:

- DirectSync APO motor assembly,
- Cat-5e or Cat-6 Ethernet cable,
- 60-tooth drive shaft gear with brass hub,
- 1/16" Allen hex key,
- 2mm and 2.5mm hex key tools,
- One M4 X 5mm length button head screw,
- One M4 X 6mm length button head screw.



FocusLynx DirectSync APO Package Contents

The DirectSync APO motor can be purchased as part of a complete kit including the FocusLynx controller hub. See <http://optecinc.com/astrometry/downloads/focuslynx.htm> for the latest FocusLynx Quick Start Guide available in pdf format.

If you purchased the full FocusLynx DirectSync APO package you will also have the following items:

- FocusLynx control hub
- 12VDC power supply with cord
- USB/Serial cable
- Cat-5e or Cat-6 Ethernet cable

The second Cat-5e Ethernet cable is for a network connection using the Network port on the bottom of the hub. This cable and the Ethernet cable included with the DirectSync APO are interchangeable with any Cat-5e or better cable.



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Installation Procedure: Step-by-Step

Step 1 - Remove Access Screw

To install the DirectSync APO motor, you will first remove the existing coarse focus knob on the left side of the focuser. The coarse knob is fixed to the shaft with two metric hex set screws (also known as grub screws) that can only be accessed through a small threaded port on the main pinion block. You will use the 2mm hex head L-key to loosen these two setscrews. Loosen only, do not remove.

To access the knob setscrews, first use the 2mm hex key to remove the single setscrew indicated by the RED arrow below. Set the metric hex setscrew aside.



You will use this threaded hole to secure one side of the DirectSync APO silver bracket to the pinion block.

Step 2 - Remove Knob

Rotate the focus knob until you can see one of the setscrews holding the coarse knob in place through the threaded access hole. Use the 2mm hex key to loosen the setscrew and then rotate the knob until the second setscrew is accessible. No need to remove these setscrews, just loosen them until the coarse knob can be easily slide off the pinion shaft.



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Step 3 - Install Gear

Slide the 60-tooth gear hub-end first onto the pinion shaft. Rotate the gear so that the setscrew falls upon the flat section of the pinion shaft. Rotate the pinion shaft so the gear-hub setscrew can be seen through the access hole.

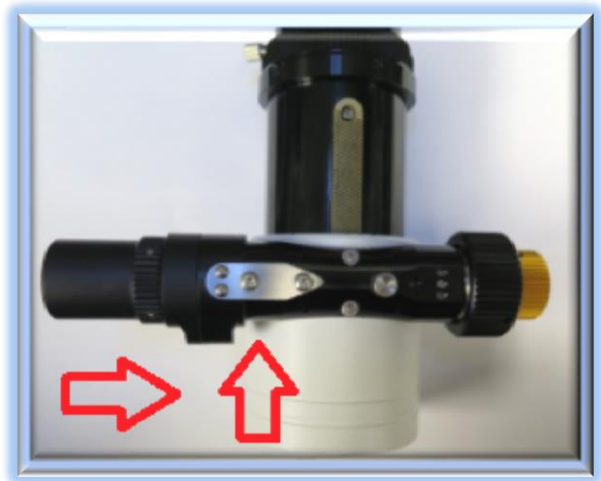


Adjust the gear position so the hub setscrew can be tightened. Insert the 1/16" hex key into the access port to tighten the gear to the pinion shaft. Be sure it is fully secured before continuing. Test the focuser function by moving the coarse and fine focus knobs on the right side of the focuser up and down ensuring smooth free movement.

Step 4 - Attach Focus Motor

Disengage the motor by rolling the motor cap counter clockwise (away from you in the orientation at right.)

Slide the DirectSync APO motor onto the focuser pinion with the stainless tab fitting over the two setscrew holes that are exposed. To improve the engagement of the gears, shift the DirectSync up keeping the stainless tab parallel with the pinion assembly. You should still be able to see the setscrew holes through the stainless tab. Use two M4 hex drive pan head screws to hold the motor in place, the longer 6mm in the left and shorter 5mm in the right hole.



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Tighten the two panhead screws when the fit is good. Now test the mesh of the gears by re-engaging the motor (turn the cap clockwise). Be sure the gears do not rub when the motor is disengaged.

Your DirectSync APO is now ready for FocusLynx Software Setup. Contact [Optec Support](#) if you have any questions or concerns when installing your DirectSync APO.

Download FocusLynx Commander Software

Your DirectSync APO motor is now installed. Visit Optec's download page to obtain the latest version of the FocusLynx Commander ASCOM driver and software package. FocusLynx Commander runs on any Windows 7 or higher operating system.

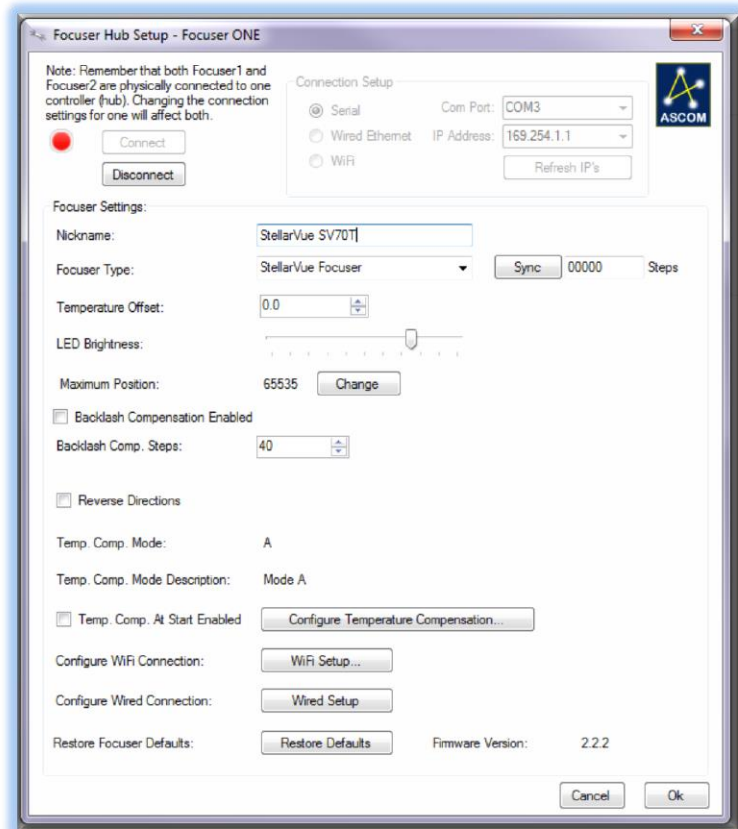
<http://www.optecinc.com/astronomy/downloads/focuslynx.htm>

FocusLynx Commander functions as an ASCOM local server so the full ASCOM platform is also required. Visit the ASCOM webpages for the latest version.

<https://ascom-standards.org/>

FocusLynx Software Setup

Consult the **FocusLynx Quick Start Guide** to install the FocusLynx Commander. Once installed, you will need to configure the FocusLynx Commander for your new DirectSync APO motor. Configuration within FocusLynx Commander will also configure the ASCOM driver so that the same settings will apply when using auto-focusing software such as Maxim D/L, FocusMax or Sequence Generator Pro.



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Control of the FocusLynx focusers within TheSky X can be accomplished through either the ASCOM chooser or with the native X2 drivers for FocusLynx.

Focuser Type Selection

Open the Focuser Hub Setup dialog for Focuser 1 or Focuser 2 and choose either the **Stellarvue Focuser** or the **DirectSync APO Focuser Type** option. Your FocusLynx Hub firmware should be v2.2.0 or higher for these options to be present. For the best repeatability, you may wish to turn on backlash compensation and set the number of steps somewhere around 40 to 60.

With stepper motors, speed and torque typically work inversely. That is, higher speeds will usually result in lower torque. The Stellarvue Focuser and Meade DirectSync APO Focuser Type option coupled with the **DirectSync APO** motor assembly can reliably handle payloads up to about 5 kg (11 lbs.).

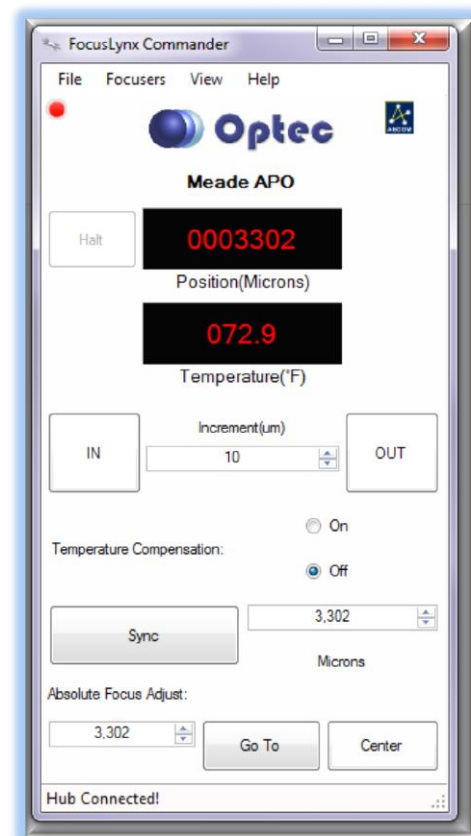
Contact Optec support (support@optecinc.com) if your focus motor cannot be adjusted without slippage or stalling.

Set the Position Units

In the main form of the FocusLynx Commander window, you may left-click directly on the Position digital read-out to toggle units between Steps, Microns, and Millimeters. Note that only the step count is passed through to the ASCOM driver. The iFocuserV2 standard for ASCOM absolute focusers relates all focuser movements to actual step counts with the higher level client responsible for making the conversions to real-world measurements. The FocusLynx Commander client extends the property to easily convert the units to mm and microns.

Step Size and Focuser Range

The Stellarvue SV70T focuser drawtube has a travel range of approximately 88 mm. The DirectSync APO stepper motor has a step-size of approximately 1.4 microns so the default maximum position of 65,535 steps should reach the end of travel for the drawtube. However, the Meade focuser may have a smaller step size and greater travel. To take advantage of the full focuser travel, you may wish to



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change the Maximum Position value in setup to allow more steps for full travel.

Recommended Sync Procedure

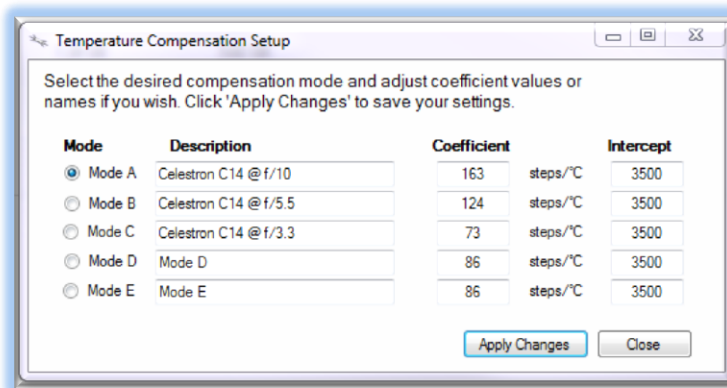
For most auto-focus routines, the required range of movement for the focuser is quite small compared to the total range of travel. The default 16-bit digital range of 65,535 steps is always more than adequate to allow successful auto-focusing. For best results, we recommend the focuser be manually moved to a rough focus and the position be synced to the center position of 32,767. The FocusLynx Hand Control offers an easy push-button method of accomplishing this “sync to center” operation. To “sync to center” with FocusLynx Commander, enter 32,767 (or simply round to 33,000) in the box immediately right of the Sync button. Press **Sync** and wait a few seconds. Test the IN and OUT button movements to ensure proper operation and function.

Alternatively, you can manually move the focuser drawtube all the way IN and Sync to 0. Then, use the hand control or FocusLynx Commander interface to move the drawtube outward to the end of travel. Note the step position and enter this value in the Maximum Position within setup. Subsequent connection to the focuser will automatically calculate the new center position (half of MaxPos) and display it as the new default Sync position on the main form and in the hand control “sync to center” feature.

Temperature Compensation

The DirectSync APO motor includes a built-in temperature sensor for temperature compensation. Within FocusLynx Commander click File – Temp Comp Wizard to let the software step you through the process and automatically calculate the “TC” or Temperature Coefficient for your particular telescope configuration. After completing the wizard, save the new TC value in any of the five available TC modes. Click the adjacent radio button next to Mode A through E to select that TempComp Mode for the current session.

Turn on temperature compensation by selecting “On” just above the Sync button on the main FocusLynx



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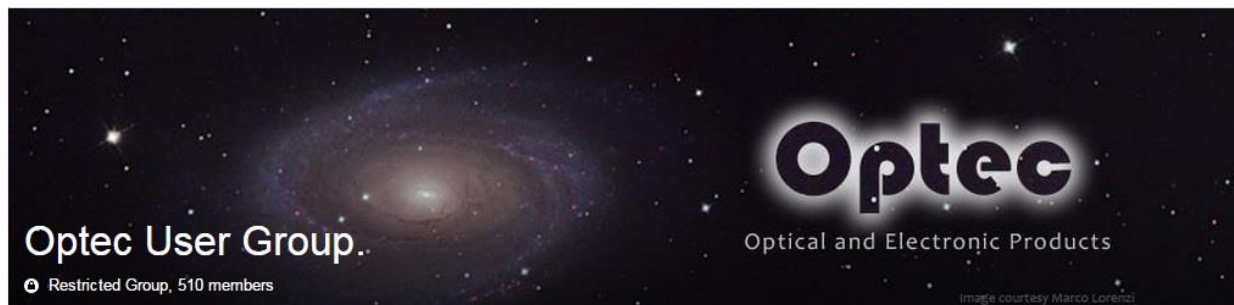
Commander form. The FocusLynx controller will automatically adjust the APO focus for changing temperatures.

Third-Party Software

Visit the Optec website for the additional information describing FocusLynx configurations for ASCOM clients such as **FocusMax** and **Maxim D/L**, as well as non-ASCOM software such as Software Bisque's **TheSky X** native X2 drivers for FocusLynx. Our FocusLynx Resource page is currently under development: <http://www.optecinc.com/astromy/catalog/focuslynx/resources.htm>.

Optec User Group

The Optec User Group on Yahoo! can also provide answers to specific configuration questions and provides a forum to communicate with other users. Click the banner below to subscribe.



Or visit the Yahoo! site here: <https://groups.yahoo.com/neo/groups/Optec/info>.



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