DirectSync ACFX Installation

Step-by-Step Instructions for Installing the DirectSync ACFX Motor Assembly to your Meade ACF native dual-speed focuser.

Optec's DirectSync ACFX motor assembly for Meade® ACF telescopes includes an integrated ThirdLynx control circuit. Thus, unlike the original DirectSync ACF, an external FocusLynx hub is not required.

However, ThirdLynx works directly with all FocusLynx drivers and software including all ASCOM and Alpaca software. The DirectSync motor assembly replaces the coarse focus knob of the Meade f/8 Dual-Speed native focuser. Note that this system was designed exclusively for use with the dual-speed "reverse Crayford" focuser systems currently offered with the Meade ACF f/8 optical tube assembly.

When properly mounted, the Meade DirectSync ACFX provides a 1.1 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 with connection to a control computer via a standard USB cable. Included in the package is a 12-volt DC power supply with local wall cord, USB cables, and all required installation tools.

Meade f/8 ACF Focuser

Meade LX850 optical tube assemblies (OTA) with f/8 Advanced Coma-Free (ACF) optics include a unique focusing mechanism described as an *internal Crayford-style, zero image-shift, dual speed 5:1 focuser.*

See www.meade.com for additional details on the full Meade ACF product line. Optec engineers sought to provide a motorized add-on for the internal dual-speed focusers that is easily installed, quick to

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engage and disengage, and left the 5:1 reduction knob in place. Our solution is called the DirectSync ACFX with ThirdLynx for a complete motor package.

Shown at left is the Meade internal Crayford dual speed manual focuser. Optec's DirectSync ACFX motor was designed exclusively for this focuser and will NOT work on any other native focusers. The DirectSync ACFX motor works with the 5:1 reduction system to allow motorized control of the primary ACF mirror.

The DirectSync SV uses a geared clutch mechanism with bevel gears to engage and dis-engage the motor. A simple twist of the motor housing cap disengages and re-engages the motor.

Please review these instructions carefully for proper installation procedures. Contact Optec Support if you have any questions or difficulty when installing the DirectSync ACF motor.

DirectSync ACFX Package Contents

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

- DirectSync ACFX motor assembly,
- Replacement geared coarse focus knob,
- Replacement flat-head screws (four M2 x 8mm, black alloy),
- USB short and long cables,
- 12VDC power supply with wall cord,
- Tool kit including .0.50" and 1/16" Allen hex keys,
- 9/64" ball driver hex tool.

An optional USB to 12VDC converter is available for users wishing to eliminate the external power supply. Optec's USB to 12VDC Power Conversion Cable (stock item #17070) should only be used with USB charging ports capable of providing at least 1A or more current.

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Installation Procedure: Step-by-Step

Step 1

To install the DirectSync ACFX motor, you will first remove the existing focus knobs. Start by using the 1/16" Allen hex key to remove the smaller fine focus knob.   Save for Step 5 below.

Notice the flat machined into the shaft. A setscrew holding the knob in place should make contact against this flat.

Step 2

Next remove the coarse focus knob. There are four flat-head hex screws holding the coarse focus knob in place. Use the 0.050" hex key to remove each screw. Store the coarse knob and screws in a safe location in case you expect to replace them onto your Meade ACF telescope at some point in the future. They will not be used with the DirectSync

ACFX motor in place.

Step 3

Slide the DirectSync ACFX motor assembly onto the large focuser cylinder. Attach with the clamp closest to the primary mirror as shown. No need to tighten the clamp at this time.

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Step 4

Slide the new geared coarse focus knob into the DirectSync ACFX motor assembly. Rotate the coarse focus knob to line up the four holes. Use the 0.050" hex key to install and tighten four alloy screws included with the package. Tighten each screw securely.

Step 5

Now replace the original fine focus knob by lining up the flat with the setscrew. Use the 1/16" hex key to tighten securely.

Step 6

Finally, orient the DirectSynx ACF motor position to allow the USB cable and 12VDC power plug to be easily inserted. Use the 9/64" ball driver to tighten the clamp socket cap screw to fasten the motor assembly snugly to the focuser cylinder. Do not overtighten.

With the motor still disengaged move the coarse and fine focuser knobs to test the feel. The focuser may feel slightly less smooth but should function perfectly. Engage the motor by rotating the cap on the DirectSync ACFX motor housing where the USB cable connects.

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## FocusLynx Software Setup

Your DirectSync ACFX motor is now installed. Consult the **FocusLynx Quick Start Guide** to install the FocusLynx Commander software and ASCOM Alpaca drivers. Once installed, you may need to configure FocusLynx Commander for your new DirectSync ACFX motor. In most cases the ThirdLynx controller will automatically identify itself to FocusLynx Commander. 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, SGP, or Nina.

FocusLynx Commander Focuser Type selection
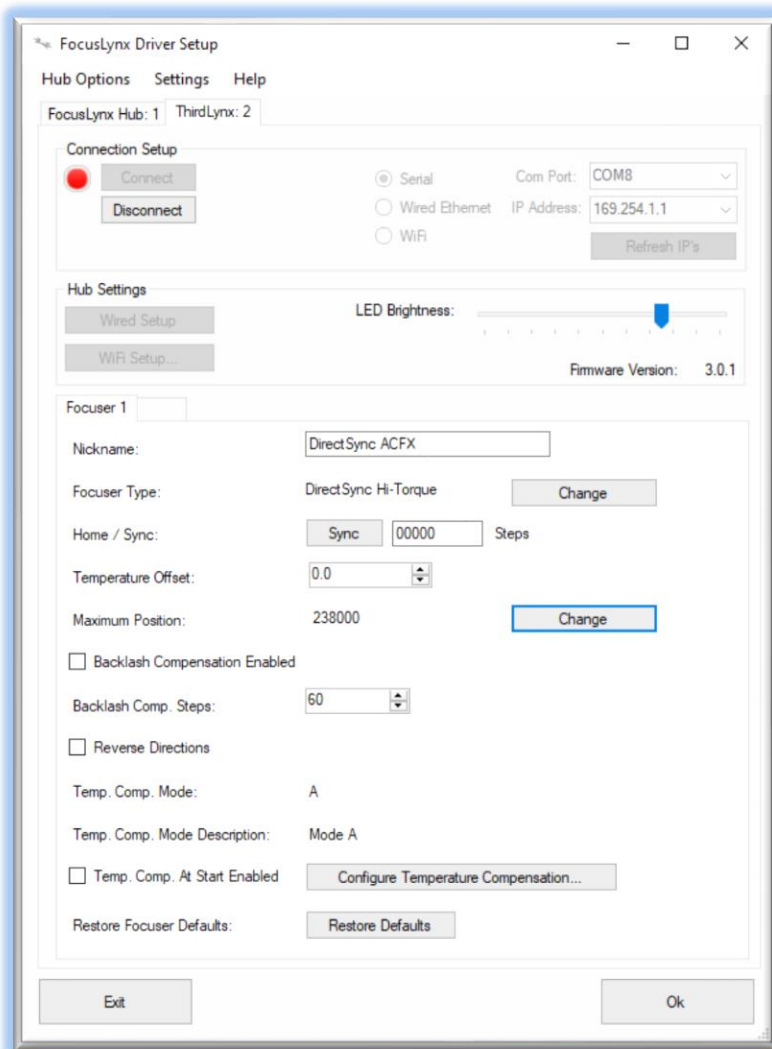
Open the Focuser Hub Setup dialog for Focuser 1 and choose the **DirectSync Hi-Torque** Focuser Type option. If you prefer, you can adjust the slider to the High Speed option instead. With stepper motors, speed and torque typically work inversely. That is, higher speeds will usually result in lower torque.

We recommend you turn on backlash compensation and set the number of steps to 60.
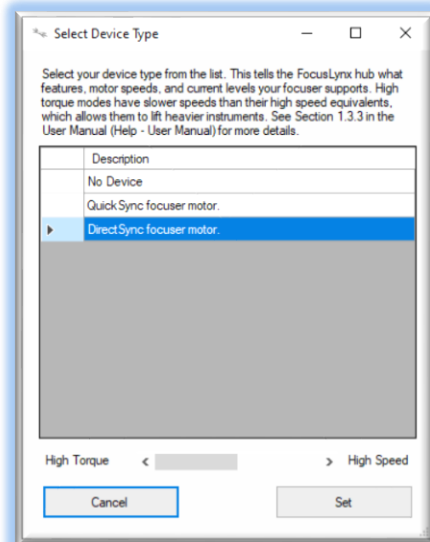
Optec

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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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 and V3 standards for ASCOM absolute focusers relate 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 Meade ACF focuser has a very large travel range with the primary mirror capable of moving about 23.3mm. A 28tpi leadscrew and 5:1 reduction assembly work together to yield a total step travel of about 238,000 steps for the DirectSync ACF stepper motor. The step size works out to only about 0.1 micron of actual focal travel for each step of the motor. To take advantage of the full range of the Meade ACF focuser travel you should set the Maximum Position in setup to 238,000 in the Focusers-Focuser 1: Setup dialog. If desired, enter 0.1 micron per step under File- Step Size Wizard or work through the wizard to measure the actual step size for your telescope focuser setup.
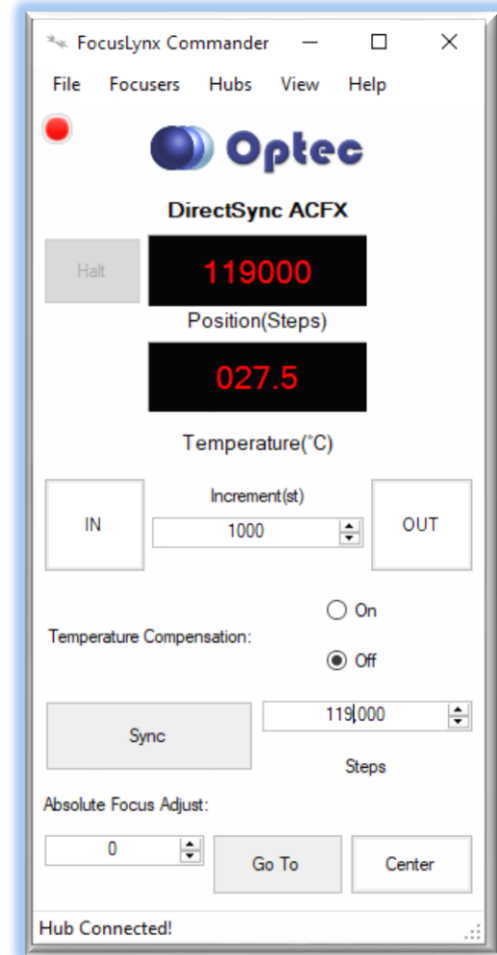
Recommended Sync Procedure

For most auto-focus routines, the required range of movement for the focuser is quite small compared to the total range of travel. For best results, we recommend the focuser be manually moved to a rough focus and the position be synced to the center position (default is 32,767). To "sync to center" with FocusLynx Commander, click **Sync** and wait a few seconds. Test the IN and OUT button movements to ensure proper operation and function.

Temperature Compensation

The DirectSync ACFX 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 Commander form. The FocusLynx controller will automatically adjust the ACF focus for changing temperatures.

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ASCOM Alpaca Configurations

Additional details for using the cross-platform ASCOM Alpaca driver are described here: https://download.ascom-standards.org/beta/platform65help/html/e3870a2f-582a-4ab4-b37f-e9b1c37a2030.htm. Check the Optec website for the latest developments and configuration advice.

Linux and Mac Software Setup

Optec is involved with the ASCOM Alpaca project for cross-platform drivers to meet the needs of Linux and Mac users. Our Linux based Commander program provides much of the same functionality and features available with Windows FocusLynx Commander. Check the Optec website for the latest developments.

INDI Support

A group of dedicated volunteer programmers has developed the INDI Library which is a collection of programs designed to control astronomical equipment.   Full details are available at the INDI Library website: https://www.indilib.org/

ThirdLynx uses the same low-level commands as FocusLynx and will function with the INDI FocusLynx driver developed by Mr. Philippe Besson and Jasem Mutlaq.   Complete instructions and the INDI Linux driver are available for download here: https://www.indilib.org/devices/focusers/focuslynx.html

A special thanks to both developers.

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.

TheSky X Pro

Many users have asked for specific instructions to configure the DirectSync ThirdLynx controllers with TheSky X native X2 drivers. Currently, you should configure ThirdLynx as FocusLynx Focuser 1.
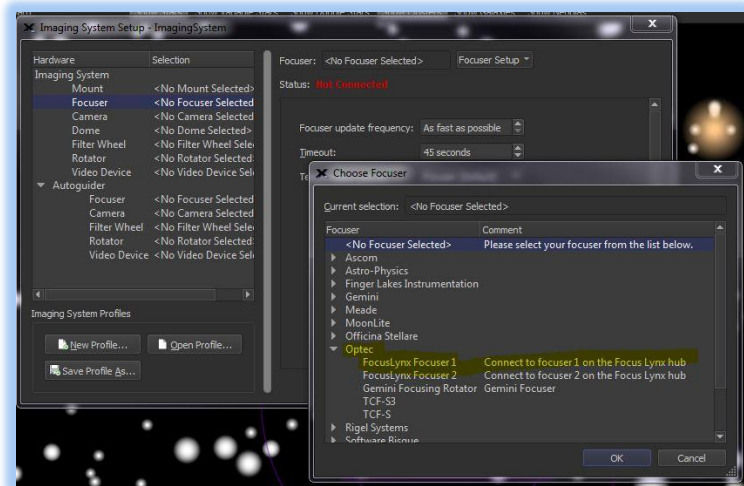
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We expect a future daily build to offer the ThirdLynx as a separate option. Under settings, look for the COM port labeled **Optec ThirdLynx USB CDC**.

YouTube Channel

Optec is developing videos for installation and configuration of our many products for various software packages. Visit our YouTube channel by searching "Optec Inc" or clicking the link below.

https://www.youtube.com/channel/UCLOJ43G-q2SQfZfqeoaLiLA

Optec User Group

The Optec User Group is now located at Groups.io which provides a forum to communicate with other users of Optec instruments.   Other end-users can often provide answers to specific configuration questions and Optec staff routinely follow and answer many questions as well. Click the banner below to subscribe.

Or visit the Groups.io Optec User Group here: https://groups.io/g/Optec.

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