



**Engineering Excellence**  
*Because Your Image Depends On It*



# Digital Focuser User's Guide

## **Welcome**

Thank you for purchasing an FLI Focuser. We know that your accessory will bring you years of enjoyment and excellent imaging results.

This User Guide is intended as a reference tool for you to use with all the available Focusers. Please read it and follow the procedures to ensure trouble-free installation of your hardware and software.

The information in this Guide pertains to the following Focusers:  
DF-2, and PDF.

When differences between these products exist, information is clearly specified.

If you have any questions about your purchase, please contact us.

## **Contact Information**

**Finger Lakes Instrumentation, LLC**  
**7287 West Main Street**  
**Lima, New York 14485**

**Web: [www.flicamera.com](http://www.flicamera.com)**

**Email: [support@flicamera.com](mailto:support@flicamera.com)**

**Fax: 585-624-9879**

**Phone: 585-624-3760**

If you are not aware of the FLI Yahoo Group you might want to look it up at [http://tech.groups.yahoo.com/group/FLI\\_Imaging\\_Systems](http://tech.groups.yahoo.com/group/FLI_Imaging_Systems). This forum is for members wishing to: discuss FLI imaging systems, share imaging experiences, techniques and results, and discuss imaging solutions and problem solving.

# Table of Contents

Digital Focuser .....	1
User's Guide .....	1
Welcome .....	2
Contact Information .....	2
Check your Shipment .....	4
Product Safety .....	4
Focuser Overview and Specifications .....	5
Focuser Connections .....	6
Installing the FLI Focus Software .....	7
Setting-up and Powering a Focuser .....	7
Connecting Adapters to the Focuser .....	8
Appendix A - Troubleshooting .....	9
Appendix B - Warranty for FLI Products .....	10
Appendix C - FLI Return Procedure .....	11
Return Addresses by Carrier .....	12
UPS and Fed Ex Returns—	12
USPS Returns—	12

## Check your Shipment

Please ensure that all the accessories and related components have arrived safely. In the unlikely event of a missing or damaged component, immediately notify FLI or your FLI dealer.

A Focuser order should include the following items:

- Focuser
- 12 volt power supply
- USB cable (15' for PDF or 6' for DF-2)
- 5/64" Hex wrench (for adapter pocket/camera coupling)
- 15' flat cable with RJ45 connectors (DF-2 only)
- Packing list

If you ordered other items, these items should be included. Please check that your order is complete.

## Product Safety

This Focuser is shipped with a 12-volt power supply. Do not use any other power supply with this System or use the power supply in a way other than described in this Guide as it may cause damage to the Focuser that will not be covered under the warranty.

If you are concerned about lightning strikes in the area in which you use your Focuser, you may want to take safety precautions as electrical surges can damage electrical equipment. We recommend that when your Focuser is not in use that you unplug the Focuser from power and unplug the USB cable from the Focuser.

## Focuser Overview and Specifications

FLI's digital focusers are specifically designed for modern CCD astronomy where the digital imaging system is mounted very close to correct focus. The thin designs allow focusing with short-travel optical designs. All of our focusers are ASCOM compliant and are compatible with most software. The table below provides specifications for the FLI Focusers.

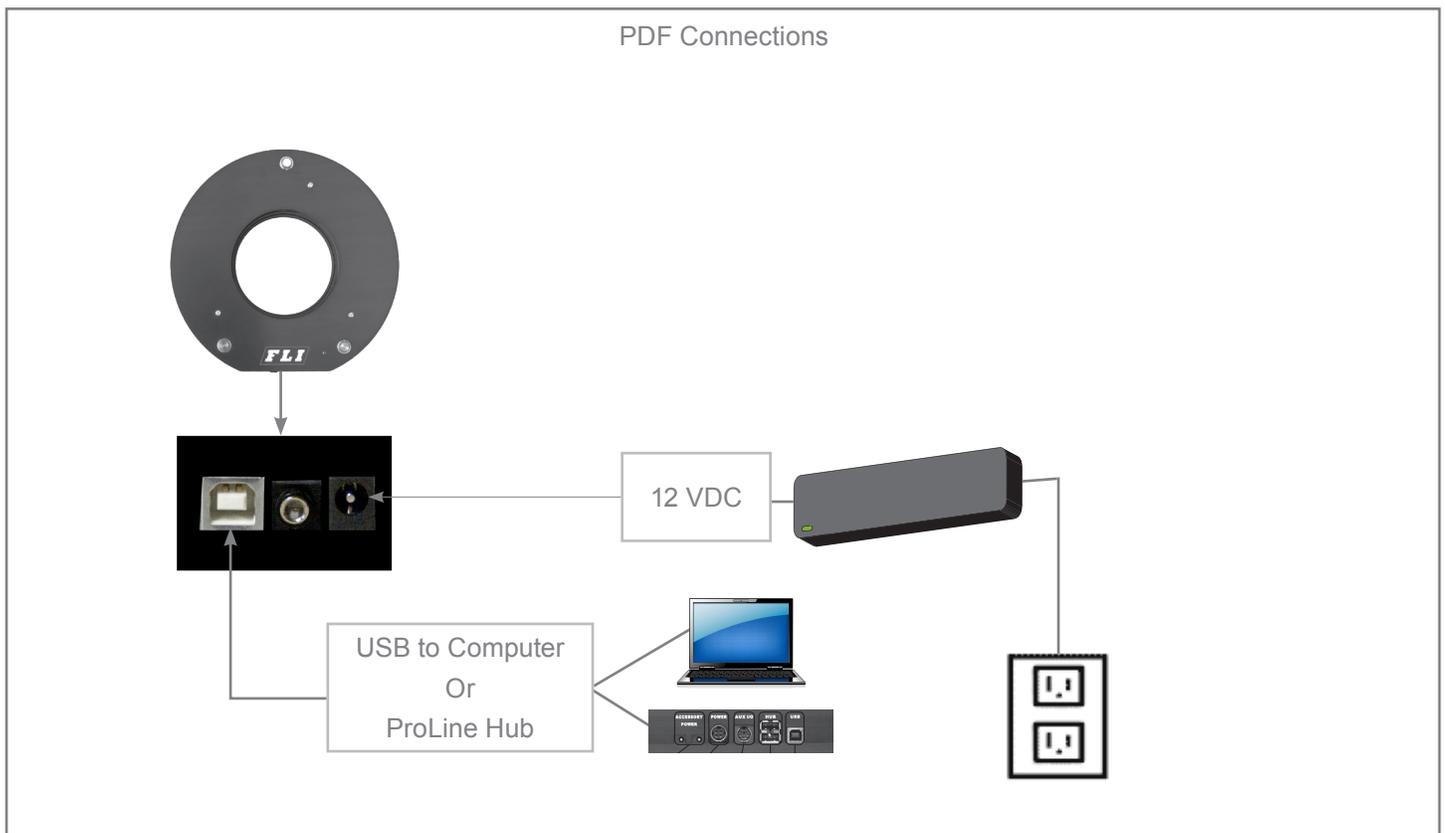
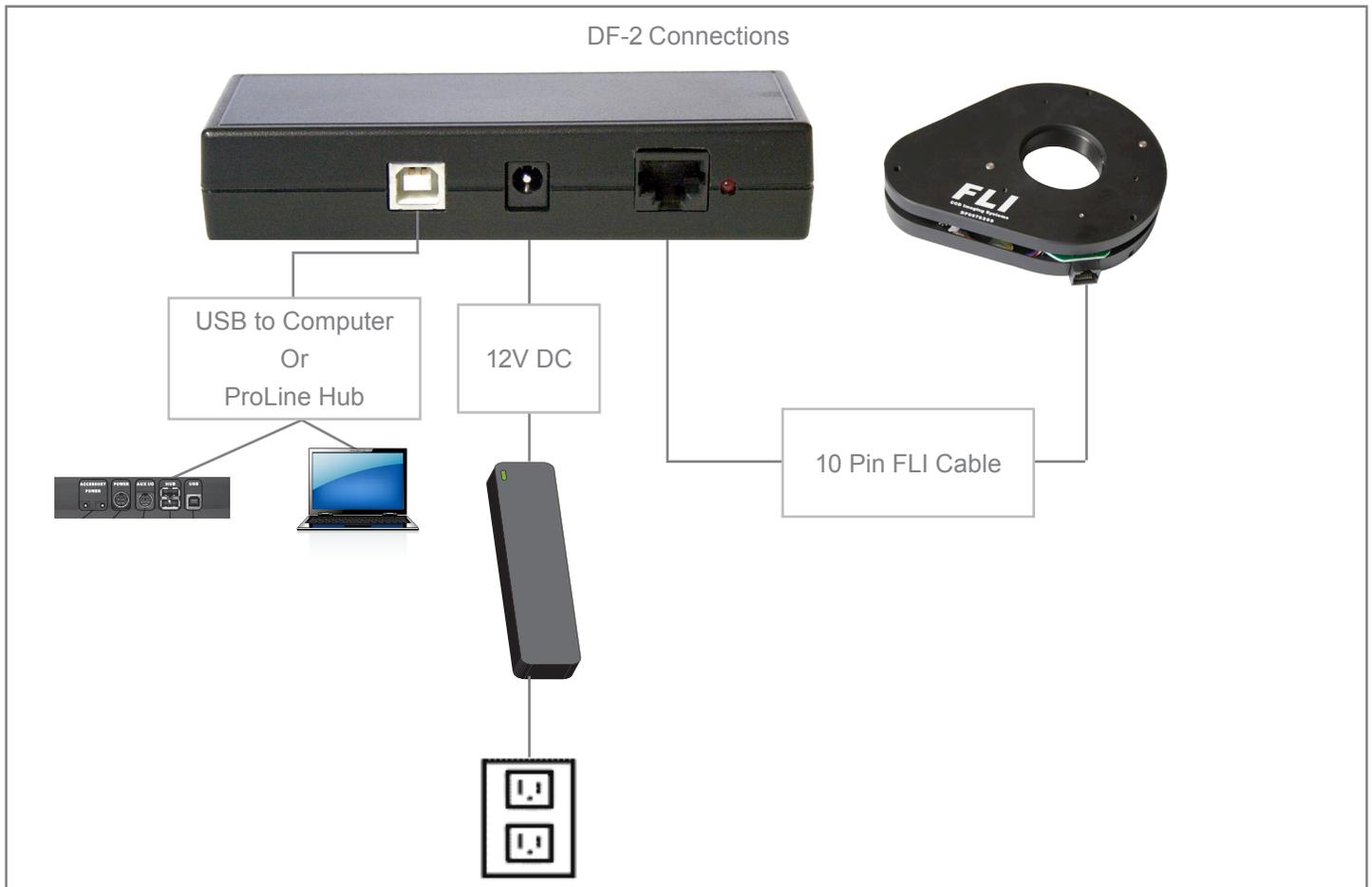
FLI offers three digital focusers described in the table below.

- The PDF (Precision Digital Focuser) is a large aperture format with very high resolution.
- The DF-2 (Digital Focuser) is smaller than the PDF.
- The Atlas is designed to achieve critical focus with heavy loads.

Focuser Specifications	DF-2	PDF	Atlas
Minimum Travel	0.20"	0.35"	0.35"
Dimensions	5.0" x 6.5"	8.0" diameter	7.0" x 7.0"
Thickness in Closed Position (Factory Set)	1.05"	1.05"	1.26"
Weight	1.6lbs	2.4lbs	3.0lbs
PC Interface	USB	USB	USB
Telescope Side Threads	2.005"-24 UNS-2B	3.750"-24 UNS-2B	*
Number of Steps	2,000	7,000	105,000
Resolution per Step	2.5 micron	1.25 micron	0.083 micron
Clear Aperture	50 mm	89 mm	89 mm

\*The Atlas is not threaded. use a Zero Tilt Adapter™ to interface with a telescope.

# Focuser Connections



## Installing the FLI Focus Software

Obtain the most up to date software to install and test your Focuser by downloading the software from our web site. Go to <http://www.flicamera.com/software/index.html> and select the FLI Software Installation Kit. Follow the on-screen prompts for the installation instructions. On-screen prompts will indicate subsequent steps, and its completion.

Note: Run the FLI Software Installation Kit before you set up and power the Focuser to ensure the system recognizes and correctly initializes the Focuser when you connect it.

## Setting-up and Powering a Focuser

Assemble all components in one area before beginning this set up procedure.

Warning: The three slotted screws on the upper plate of the PDF Focuser are for repair purposes only. Adjusting these screws can void the PDF Focuser warranty.

1. Plug the power supply cable into the Focuser.
2. For the PDF Focuser, attach the USB cable between the Focuser and your computer.

**Or**

3. For the DF-2, attach the USB cable between the Focuser and the USB Interface Box and attach the flat cable between the USB Interface Box and your computer.
4. Plug the power supply into a wall socket or switched AC power strip.
5. Run FLI Focuser to initialize the Focuser and make control selections.

The following items are provided to assist you with the FLI Focuser Software:

- When installing the application, software should automatically recognize the type of Focuser that is attached to your computer. If the computer does not correctly identify the Focuser, refer to the Troubleshooting topic later in this Guide for instructions.
- The home position of the focuser could be 0 (completely closed) or the middle of its range, depending on the software in use. The PDF has 7000 steps, the DF-2 has 2000 steps.
- Use the Zero button to override the focuser without homing. See the Troubleshooting topic later in this Guide for additional information.
- The Speed settings of Slow, Medium and Fast are user-enterable values.

The following items are specific for homing/initializing the PDF Focuser:

- Home the PDF Focuser prior to each use. The software must know the starting position of the Focuser. Failure to Home may cause the software to attempt to drive the Focuser beyond its mechanical limit causing it to jam. Do not Home the Focuser with one software program and then switch to another software program without performing another homing procedure.
- If the PDF Focuser jams, do not attempt to fix it. Contact FLI for service.

## Connecting Adapters to the Focuser

The FLI Focusers accept FLI cameras directly. Use of various adapters allows for mating with other types of cameras. See our web site at <http://www.flicamera.com/adapters> for a list of available adapters.

- The following items are specific for use of adapters with the PDF Focuser:
- Check that the threaded portion of the adapter that you want to attach to the PDF Focuser does not exceed 0.18" (4.5 mm) in total length. Adapters with longer threads will interfere with the PDF's Inner Light Shield when it is completely closed and will cause the PDF to jam.
- If the PDF Focuser jams, do not attempt to fix it. Contact FLI for service.

## Appendix A - Troubleshooting

Issue	Remedy
The computer does not correctly identify the attached Focuser.	<p>Check that the Focuser's power supply and USB cable are properly connected. If so, follow the steps below.</p> <p>On the FLI Focus dialogue box right click on the top of the dialogue box and select "Communications Settings".</p> <p>On the new dialogue box, if "Scan USB" is not displayed select it from the drop down list, then click Scan. The system should display "flifoc0" or "flifoc1".</p> <p>If a problem persists, unplug the Focuser power and USB cable, then reinstall FLI Focus.</p>
There is some binding and a jam is suspected.	Click Zero to move in either direction without homing the Focuser. This operation essentially overrides the homing procedure.
The motor is running but there is no movement.	Look through the side of the Focuser to determine if the chain is moving. If not, the motor drive sprocket may be loose. Contact FLI for assistance.
There is non-parallelism in the images.	The Focuser could be jammed or one of the Focusing screws could be dislodged. Contact FLI for assistance.

## Appendix B - Warranty for FLI Products

Unless otherwise noted, the standard statement of warranty described below applies to customers who purchase this product. This warranty may not apply in special circumstances in which prior arrangements have been made and separate documentation has been supplied prior to, or with, the product.

This warranty applies to all FLI Products.

All products and services are FOB Lima, N.Y. The customer is responsible for shipping and insurance to and from FLI.

The product is warranted against defects in materials and workmanship for a period of one (1) year after delivery to the original purchaser.

A CCD array is warranted by the CCD manufacturer for one (1) year.

In the event of a CCD array failure or malfunction, FLI will assist in testing, replacement, shipping and required communications with the CCD manufacturer in order to facilitate a resolution of the problem. The internal environment of a camera is warranted to remain moisture free for a period of one (1) year when used under normal conditions.

Damage arising from ESD (electrostatic discharge) events, exposure to the elements, mechanical shock, over-voltage, reverse polarity connections, or other environmental hazards is not covered under warranty.

FLI will be the sole judge of what constitutes defects vs. normal performance.

FLI application software is supplied for demonstration purposes only. The software carries no warranty of fitness for any purpose. FLI supplies the necessary information, drivers, and libraries, for users and 3rd party vendors to develop software for their specific purposes.

FLI works to maintain compatibility with many 3rd party software vendors, however FLI cannot guarantee operation with non-FLI software. FLI is not responsible for changes, upgrades, or errors in 3rd party programs.

Incidental and consequential damages resulting from the use of FLI products, malfunction or failure to perform, or lack of fitness for a particular purpose, are not the responsibility of FLI and are hereby excluded both for property damage and to the extent permitted by law, for personal injury damage.

FLI products are not authorized for use as critical components in life support or medical diagnostic applications where failure to perform could result in injury, faulty diagnosis, or other risk to patients or personnel.

FLI products are not authorized for use in robotic control systems where malfunction or failure could cause system motions hazardous to personnel.

This warranty applies to the original purchaser.

## Appendix C - FLI Return Procedure

If you need to return a product, please follow the instructions outlined below.

- 1.** Obtain authorization to return the camera/product in advance by phone or email contact with FLI and:
  - a. If you are outside the United States, contact your Customs Authority to register the merchandise to be returned to the United States for warranty repair or refund. Use the Harmonized Code number 9801.00.1012 on your shipping documentation. The monetary value you place on the item should be stated for insurance purposes. Clearly state that the "Value is for Customs purposes ONLY." When FLI returns the repair item to you, we will use the same monetary value.
  - b. For all customers, prepare a Pro Forma invoice to accompany the shipment with the following statement:
    - For Equipment not covered under warranty: "American goods returned for repair only with NO Commercial Value. Temporary return only"
    - For Equipment covered under warranty: "American goods returned for Warranty Repair only with NO Commercial Value. Temporary return only"
  - c. For all customers, if you are requesting service under warranty or a return, a copy of your original receipt.
  - d. For you records, make a copy of these documents.
  - e. Prepare a large shipping label with the appropriate return address (FLI or distributor) and for shipments from outside the U.S., include the Harmonized Code number.
- 2.** Locate the original shipping boxes in which your item(s) was packaged. These boxes are designed to protect the products.

OR:

If you do not have the original shipping boxes, obtain a rigid box that is at least 3" (7.5 cm) larger in all dimensions than the items. A smaller box will not allow appropriate cushioning. Tape the side and bottom seams to secure the box.
- 3.** If you have the original packing materials, place the item(s) in the original plastic bag(s) and place the bagged item in the appropriate foam cutout in the proper orientation. Insert other items into their appropriate compartments.

OR:

If you do not have the original bag, place the item(s) in a plastic bag and seal it. Wrap the bagged item(s) with at least two layers of bubble wrap or two bubble wrap bags. Wrap other items in the same manner. Into the bottom of the box, place two inches of packing material (Styrofoam peanuts or additional bubble wrap). Place the item(s) on the bottom layer with space around each. Add additional packing material around the sides of each item(s) and on top of the item(s).
- 4.** Write a letter that includes the following: reason the item is being returned to FLI or distributor, your complete contact information (name, phone number(s), email address, return shipping address), and if appropriate, payment method and information. On top of the item(s) in the box, add the required paperwork described in step 1 and the letter described in step 4. Seal the box with packing tape. Tape the top flaps and label the box with the shipping label prepared in step 1.
- 5.** Contact a shipper for pickup or bring it to a reliable carrier. As noted in step 1, use the appropriate value on shipping forms. FLI is not responsible for damage to any item or items when they are in the possession of a carrier.

## **Return Addresses by Carrier**

### **UPS and Fed Ex Returns**

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Finger Lakes Instrumentation  
Att. Greg Terrance  
7287 West Main St.  
Lima, N.Y. 14485

### **USPS Returns**

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Finger Lakes Instrumentation  
Att. Greg Terrance  
P.O. Box 19A  
7298 West Main St.  
Lima, N.Y. 14485