



Finger Lakes Instrumentation

Engineering Excellence

Because Your Image Depends On It

Signa 550

Filter Wheel

User's Guide



WELCOME

Thank you for purchasing an FLI Signa Filter Wheel. We know that this accessory will bring you years of excellent imaging results.

This User's Guide is intended as a reference tool for you to use with FLI Signa Filter Wheels. Please read it and follow the procedures to ensure trouble-free installation of your hardware. For information on other FLI Products or to discuss your Signa filter wheel, please contact:

sales@flicamera.com

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

CONTACT INFORMATION

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PRODUCT SAFETY



This FLI Signa Series Filter Wheel is shipped with a 24V DC power supply. Do not use any other power supply with this FLI Signa Series Filter Wheel, or use the power supply in a way other than described in this guide. Doing so may cause damage to the Signa Series Filter Wheel that will not be covered under the warranty.



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

SIGNA FILTER WHEEL OVERVIEW

Signa Filter Wheels use high quality stepper motors to provide precision movement and optimal speed. Filter exchange rates as low as 66 milliseconds are possible.

All of the drive and control electronics facilitating the functionality of the Signa models are contained within the filter wheel housing. This convenient solution eliminates the need for an external controller and the associated wiring hassles.

The Signa 550 provides a solution to those looking for a larger field of view compared to other Signa series filter wheels while maintaining the performance consistent throughout the series. The Signa 550 accommodates 50mm or 2in filters.

SIGNA FILTER WHEEL SPECIFICATIONS

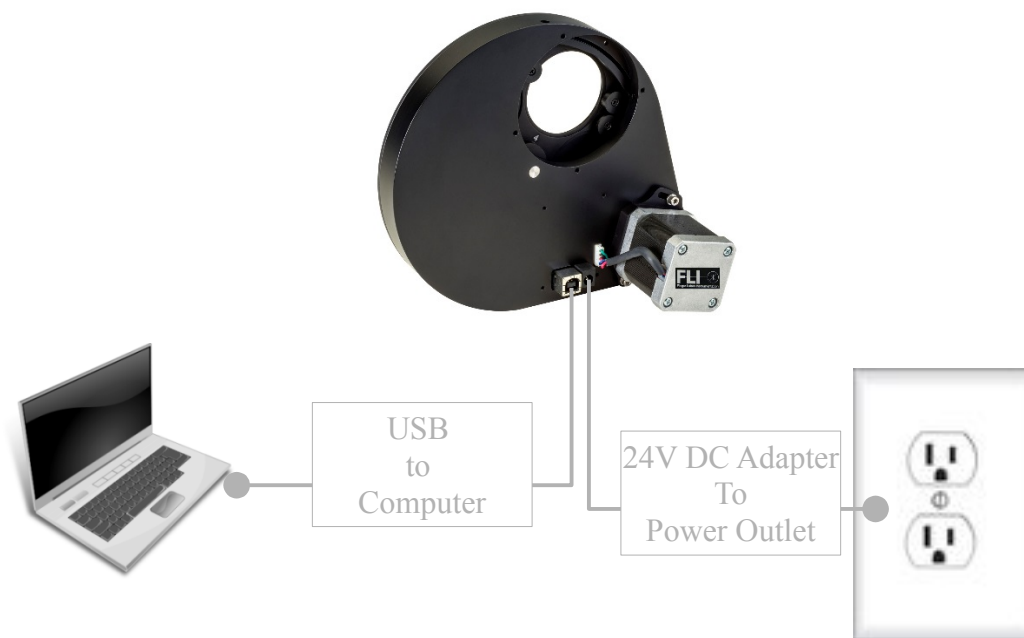
Voltage	24V DC
Power	36 W
PC Connection	USB2
Filter Diameter	50±0.4 mm
Adjacent Filter Transition	92 ms
Number of filters	5
Filter Thickness	1 mm to 5 mm

USB SETTINGS

Baud	115200
Data Bits	8
Stop Bits	1
Parity	None
Flow Control	None

FILTER WHEEL CONNECTIONS

Signa 550

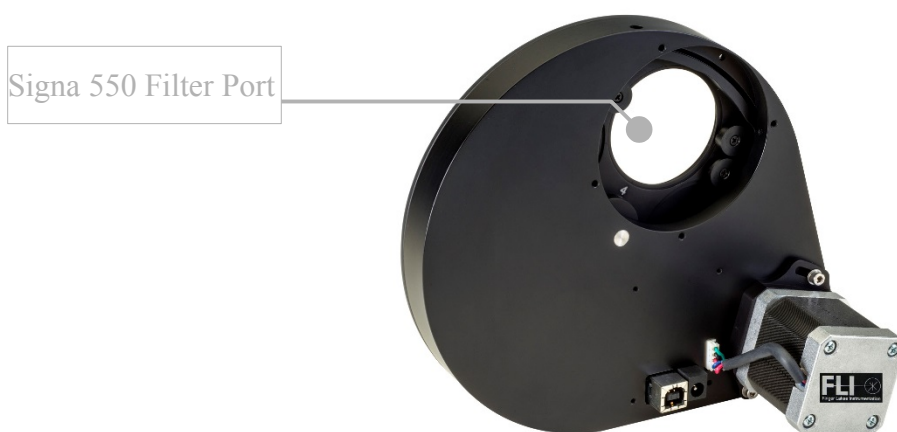


INSTALLING FILTERS FOR SIGNA 550

The Signa internal wheel has “Multi-Step” filter retainers that can be adjusted to accommodate filters from 1mm to 5mm thick.

Note: The thinnest filter retainer ledge accommodates 2” diameter filters and the thickest filter retainer ledge accommodates the 50mm diameter filters.

1. Remove power from the Signa Filter Wheel and remove the Signa Filter Wheel’s USB cable from the computer
2. Select one of the filter pockets to install a filter, and remove both filter retainers using a Philips head screw driver.
3. Carefully place the filter into the filter pocket.
4. Install the filter retainers by aligning the appropriate filter retainer ledge to secure the filter.
5. Do not over tighten the retainer screws.
6. Repeat Steps 2 through 5 for the remaining filters.



CUSTOM OPTIONS (NRE MAY APPLY)

1. Number of filter pockets
2. Size of filters
3. Shape and size of housing
4. Communication interface
5. Filter exchange rate
6. Firmware
7. Mounting Features
8. Tell us what you would like your filter wheel to do. Our engineers can modify an existing filter wheel design a completely new product to meet your requirements.

COMMANDS

Set Filter Position

Byte 0								
Bit	7	6	5	4	3	2	1	0
Value	0	SPD2	SPD1	SPD0	POS3	POS2	POS1	POS0
	Switcher Speed				Filter Position (0-4)			
	000 (0) Speed = 0				0000 (0) Position = 0			
	001 (1) Speed = 1				0001 (1) Position = 1			
	010 (2) Speed = 2				0010 (2) Position = 2			
	011 (3) Speed = 3				0011 (3) Position = 3			
	100 (4) Speed = 4				0100 (4) Position = 4			
	101 (5) Speed = 5							
	110 (6) Speed = 6							
	111 (7) Speed = 7							

Response: Byte 0: Command byte as received, returned immediately. Byte 1: 0x0D after task completion.

Reset

Byte 1: 0xFB								
Bit	7	6	5	4	3	2	1	0
Value	1	1	1	1	1	0	1	1

Response: 0x0D

Get Device Status

Byte 0-10											
Byte	0	1	2	3	4	5	6	7	8	9	10
Value	0xCC	SSP	Internal Use							0x0D	

Response: When requesting the slider status, the device responds with the received command (CC hexadecimal) immediately and requests configuration information.

Byte 0: 0xCC								
Bit	7	6	5	4	3	2	1	0
Value	1	1	0	0	1	1	0	0

Byte 1: SSP (Slider Speed and Position)								
Bit	7	6	5	4	3	2	1	0
Value	0	SPD2	SPD1	SPD0	POS3	POS2	POS1	POS0
	Switcher Speed				Filter Position (0-4)			
	000 (0) Speed = 0				0000 (0) Position = 0			
	001 (1) Speed = 1				0001 (1) Position = 1			
	010 (2) Speed = 2				0010 (2) Position = 2			
	011 (3) Speed = 3				0011 (3) Position = 3			
	100 (4) Speed = 4				0100 (4) Position = 4			
	101 (5) Speed = 5							
	110 (6) Speed = 6							
	111 (7) Speed = 7							

Bytes 2 - 9								
Internal Use								

Get Device Configuration

Byte 0: 0xFD								
Bit	7	6	5	4	3	2	1	0
Value	1	1	1	1	1	1	0	1

Response: When requesting the Incite configuration, the device responds with the received command (FD hexadecimal) immediately and requests configuration information.

Bytes 0-4					
Byte	0	1	2	3	4
Value	0xFD	'1'	'0'	'-'	'3'

Bytes 5-9					
Byte	5	6	7	8	9
Value	'W'	'A'	':'	'2'	'5'

Bytes 10-29					
Internal Use					

Examples

Binary	Hexadecimal	Decimal	Functionality
00000000	00	0	Incite sliders move to position '0' at maximum speed
00110110	34	52	Incite sliders move to position '4' at speed 3

APPENDIX A – WARRANTY FOR FLI PRODUCTS

Limited Warranty Coverage

If your Product does not properly function because of a defect in its materials or workmanship, Finger Lakes Instrumentation, LLC (“FLI”) will, at its sole option and for the length of the period indicated on the chart below, which period begins with the date of original purchase (the “Warranty Period”), either:

- (a) repair your Product with new or refurbished parts;
- or
- (b) replace your Product with a new or refurbished product.

The decision to repair or replace, the parts used to repair, or the new or refurbished product used to replace your Product, as applicable, shall be made by FLI in its sole discretion. Without limiting its discretion, where FLI determines that your Product shall be replaced with a new or refurbished product that is different from your Product, FLI will use its commercially reasonable efforts to replace your Product with a new or refurbished product that is as close to equivalent to your Product as practicable.

This Limited Warranty is offered to the original purchaser of a new product from FLI, which was not sold on an “as-is” basis. A legible purchase receipt or other verifiable proof of purchase for your Product is required to receive Limited Warranty parts or service.

This Limited Warranty does not apply in special circumstances in which prior arrangements have been made and separate documentation has been supplied prior to, or with, your Product; in such cases, the warranty (if any) provided in such documentation shall supersede and replace this Limited Warranty for your Product.

Item or Part Name	Warranty Period
Your Product, except those items listed in this table below	One (1) Year
Your Product’s Application Software (if included) and Batteries	None

Parts and Service

You must carry-in or mail-in your Product during the Warranty Period to receive the Limited Warranty parts or service. Prior to mailing or carrying-in your Product to FLI, you are required to contact FLI at the e-mail address or telephone number provided in the “Directory Information” Section of this Limited Warranty to receive a warranty service identifier code (and any other reasonably required identifiers, as directed by FLI) that you must provide in legible writing included within the package in which you mail FLI your Product.

The Limited Warranty does not include costs of shipping your Product, installation or re-installation of your Product, insurance relating to shipping your Product, or travel to carry your Product to FLI, except that FLI shall bear the costs of shipping your Product to and from FLI’s service center (but not insurance or travel) for Product Internal Environment Limited Warranty service claims made within one (1) year from the date of original purchase when shipped within the continental United States.

All products and services are F.O.B. Lima, NY.

Directory Information

Finger Lakes Instrumentation, LLC
15 Charles St, Suite 1E
Binghamton, New York 13905
Phone: 585-624-3760
Fax: 585-624-9879

This directory information is provided as a courtesy, and is subject to change without notice. Please verify this directory information by consulting FLI’s website located at:

<http://www.flicamera.com>

Product Software

As noted in the chart in the section of this Limited Warranty titled “Limited Warranty Coverage,” the Limited Warranty does not apply to your Product software. Software supplied with your Product is for demonstration purposes only. FLI supplies the necessary information, drivers, and libraries, for users and third party vendors to develop software for their specific purposes. FLI seeks to maintain compatibility with many third party software vendors, but does not, and cannot, warrant or guarantee operation with non-FLI software. FLI is not responsible for changes, upgrades, or errors in third party programs.

Important Limited Warranty Information

This limited warranty ONLY COVERS failures due to defects in materials and workmanship, and DOES NOT COVER normal wear and tear or cosmetic damage. This limited warranty ALSO DOES NOT COVER damages which occurred in shipment, or failures which are caused by or to products not supplied by FLI, or failures which result from accidents, misuse, abuse, neglect, mishandling, misapplication, alteration, improper maintenance, power supplied to your Product (including, without limitation, over-voltage, mechanical shock, reverse polarity, or power surges), electrostatic discharge, modification, or commercial use, rental use of your Product, service to your Product by anyone other than FLI at an authorized service center, damage due to environmental conditions (including, without limitation, extreme temperatures, exposure to excessive moisture or humidity, radiation, or electromagnetic fields), damage occurring after condensation or moisture has appeared in the Product inner (sealed) chamber, or damage attributable to acts of God (including, without limitation, lightning).

➤ THERE ARE NO EXPRESS WARRANTIES EXCEPT AS LIMITED UNDER “LIMITED WARRANTY COVERAGE.” FLI IS NOT LIABLE FOR INCIDENTAL OR CONSEQUENTIAL DAMAGES RESULTING FROM THE USE OF THIS PRODUCT, OR ARISING UNDER ANY BREACH OF THIS WARRANTY.

➤ ALL EXPRESS WARRANTIES MADE IN THIS LIMITED WARRANTY ARE LIMITED TO THE WARRANTY PERIOD OF THE LIMITED WARRANTY, AND ARE OTHERWISE HEREBY DISCLAIMED TO THE FULLEST EXTENT PROVIDED BY LAW.

➤ ALL IMPLIED WARRANTIES, INCLUDING THE WARRANTY OF MERCHANTABILITY, ARE HEREBY DISCLAIMED TO THE FULLEST EXTENT PROVIDED BY LAW.

➤ PARTS AND SERVICE WHICH ARE NOT COVERED BY THIS LIMITED WARRANTY ARE YOUR RESPONSIBILITY.

If your locality does not permit all or a portion of this Limited Warranty, this Limited Warranty may not apply to you. Please consult your local laws, rules, and regulations for any differences that may be present in your jurisdiction and apply to you. If you do not meet all of the criteria for this Limited Warranty or are outside of the Warranty Period, please be advised that you are not covered by this Limited Warranty and there may be a charge for any servicing and parts for your Product – please contact FLI using the directory information in this Limited Warranty for more information.

The Product is 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.

The Product is not authorized for use in robotic control systems where malfunction or failure could cause system motions hazardous to personnel.

APPENDIX B – FLI RETURN PROCEDURE

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

1. Contact FLI by phone or email to obtain a Return Material Authorization (RMA) number to return the camera/product 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. If you are outside the United States, prepare a ProForma 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 your 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.

Notice: 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.
Notice: 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. At 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. Surround each item completely with additional packing material.

4. Write a letter that includes the following:
 - a. Reason the item is being returned to FLI or distributor
 - b. Your complete contact information (name, phone number(s), email address, return shipping address)
 - c. 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.

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.