Finger Lakes Instrumentation

Engineering Excellence

Because Your Image Depends On It

Incite High Speed Filter Cube Switcher

User's Guide

June 2018

WELCOME

Thank you for purchasing an FLI Incite High Speed Filter Cube Switcher. 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 the FLI Incite High Speed Filter Cube Switcher. 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 Incite High Speed Filter Cube Switcher, please contact:

sales@flicamera.com

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

CONTACT INFORMATION

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Tel USA 585-624-3760
https://www.flicamera.com

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PRODUCT SAFETY

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

If you are concerned about lightning strikes in the area you use your Incite High Speed Filter Cube Switcher, you may want to take safety precautions as electrical surges can damage electrical equipment. We recommend that when your Incite High Speed Filter Cube Switcher is not in use that you unplug the Incite High Speed Filter Cube Switcher from power and any RS-232 cables.

INCITE HIGH SPEED FILTER CUBE SWITCHER OVERVIEW

The Incite High Speed Filter Cube Switcher uses a high-performance servo motor, which feature rare earth magnets coupled with backlash-free power transfer. This provides ultimate torque which translates to unparalleled speed. Filter exchange rates under 30 milliseconds are possible.

In addition to the servo motor's use of encoder feedback, which yields reliable operation, the Incite High Speed Filter Cube Switcher also features state-of-the-art semiconductor components, a high-performance Digital Signal Processor (DSP), and a sophisticated control algorithm. The control system optimizes the trajectory, resulting in maximum speed with minimum vibration, as well as adapting to changes in load. When filters are added or removed, the controller parameters must be adjusted in order to maintain peak performance. A built-in adaptation mechanism takes care of these adjustments, to provide optimum performance under any operating conditions.

Incite High Speed Filter Cube Switcher Specifications

Voltage	24V DC
Power	120 W
PC Connection	RS-232
Number of Filter Positions	3 or 5
Longest Distance Travel Time	75 ms
Adjacent Filter Transition Time	30 ms
Weight	4.5 lb

Communication Settings

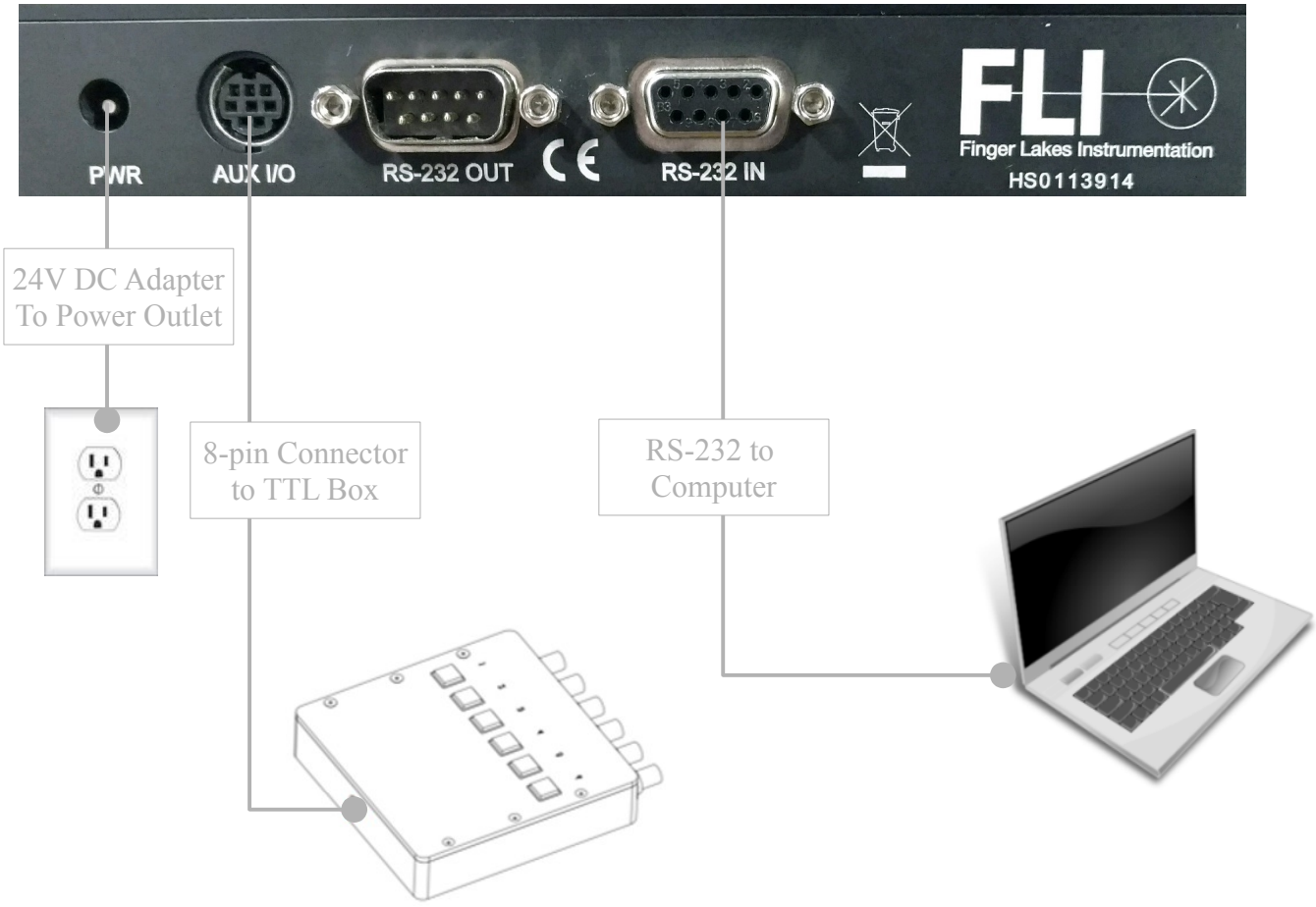
Baud	115200
Data Bits	8
Stop Bits	1
Parity	None
Flow Control	None

Filters

Filter	Filter Size	Filter Thickness
Emission	25±0.4 mm Diameter	3.5 mm or 5 mm
Dichroic	25.6±0.6mm x 37.5±1.5mm	1mm, 2mm, or 3mm

ELECTRICAL CONNECTIONS

Connecting the Incite High Speed Switcher to a Computer



EMISSION FILTER INSTALLATION

1. Remove the 24V DC power supply cable from the Incite High Speed Filter Cube Switcher.

2. Remove the emission access cover with the supplied #1 Phillips screw driver and set the four cover screws aside.

3. Manually move the emission slider to the filter pocket to be populated.

4. Carefully place an emission filter into the filter pockets.

5. Install two emission filter retainers by aligning the appropriate filter retainer ledge to secure the filter.

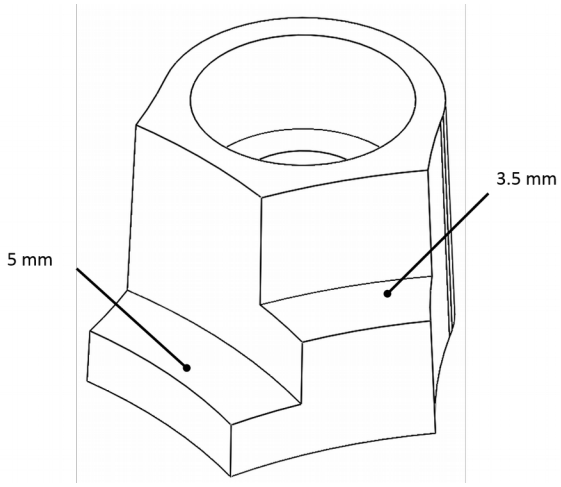


Fig. 1: Emission filter retainer (Not actual size)

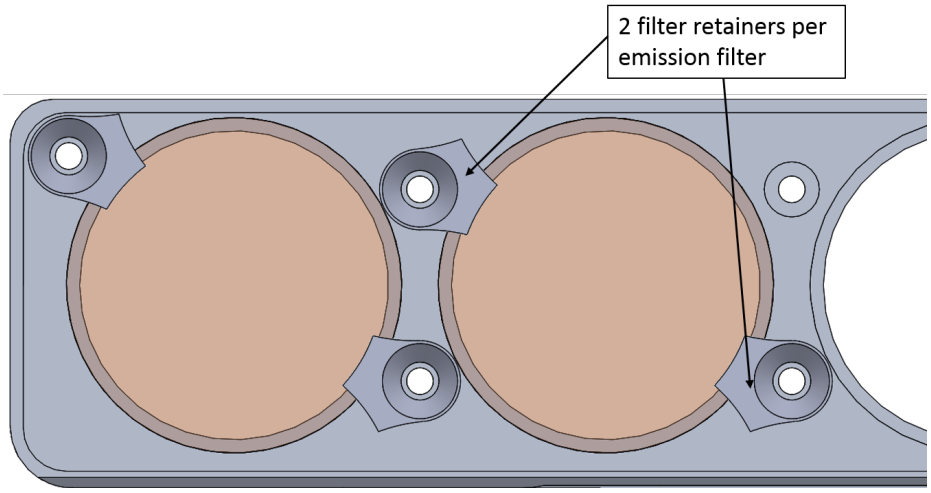


Fig. 2: Emission filter set-up (Not actual size)

6. Use the supplied #1 Phillips screw driver to tighten the emission retainer screw.

7. Repeat steps 3 through 6 for the remaining filters.

8. Carefully place the emission access cover back onto the Incite High Speed Filter Cube Switcher, ensuring it is in the appropriate position for the number of filter positions available.

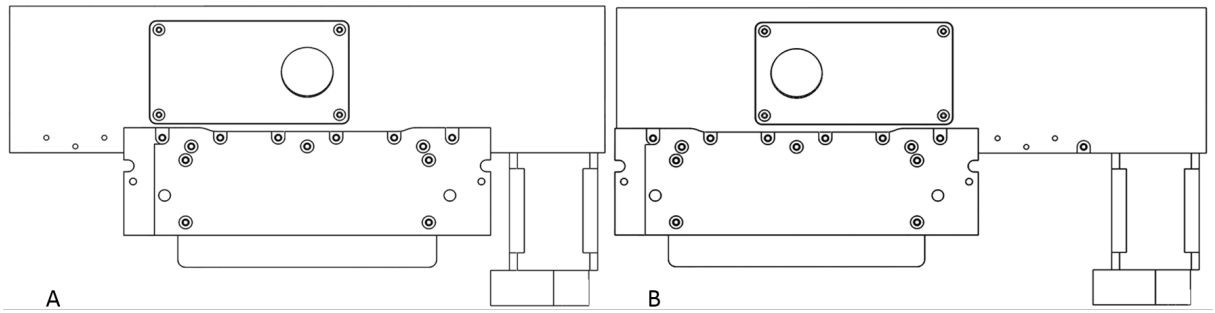


Fig. 3

Notice: In figure 3:

Figure 3A is the correct orientation for the emission access cover for the 5 position Incite High Speed Filter Cube Switcher.

Figure 3B is the correct orientation for the emission access cover for the 3 position Incite High Speed Filter Cube Switcher.

9. Once the emission access cover is placed in the appropriate position, reattach it using the four cover screws, making sure not to over tighten the screws.

DICHROIC FILTER INSTALLATION

1. Remove the 24V DC power supply cable from the Incite High Speed Filter Cube Switcher.

2. Remove the dichroic access cover with the supplied #1 Phillips screw driver and set the four cover screws aside.

3. Manually move the dichroic slider to the filter pad to be populated.

4. Carefully place a dichroic filter on to the filter pad.

5. Install three dichroic filter retainers using the supplied #1 Phillips screw driver to tighten the dichroic filter retainer screw.

   Note: Each dichroic filter is retained by a set of three dichroic filter retainers. When using the dichroic filters in two adjacent spaces, place both dichroic filters before installing the dichroic filter retainer(s) between the two dichroic filters.

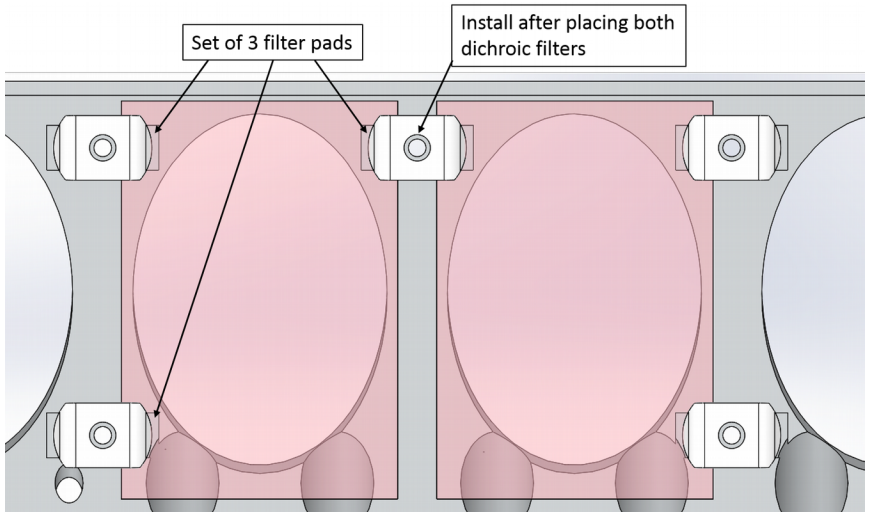


Fig. 4: Dichoric filter set-up (Not actual size)

6. Repeat steps 3 through 5 for the remaining dichroic filters.

7. Carefully place the dichoric access cover back onto the Incite High Speed Filter Cube Switcher, ensuring it is in the appropriate position for the number of filters in use.

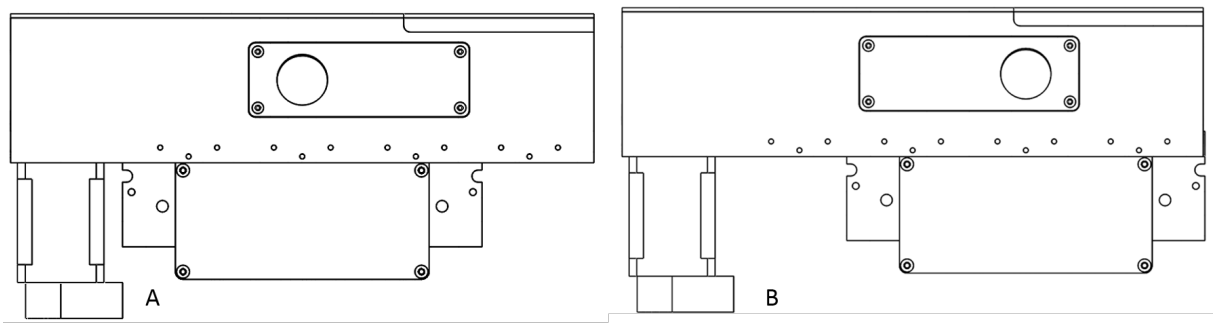


Fig. 5

Notice: In figure 5:

Figure 5A is the correct orientation for the dichoric access cover for the 5 position Incite High Speed Filter Cube Switcher.

Figure 5B is the correct orientation for the dichoric access cover for the 3 position Incite High Speed Filter Cube Switcher.

8. Using the four cover screws, reattach the dichroic access cover to the Incite High Speed Filter Cube Switcher

Set-up and Powering an Incite High Speed Filter Cube Switcher

1. Remove the mounting screws from the stock turret in the microscope.
2. Slide the stock turret out of or off the microscope.
3. Slide the Incite High Speed Filter Cube Switcher into the stock holder of the microscope.
4. Attach the Incite High Speed Filter Cube Switcher using the mounting screws supplied in the Incite High Speed Filter Cube Switcher sales package.
5. Connect the supplied 24V DC power supply unit to the power connector on the Incite High Speed Filter Cube Switcher
6. Plug the supplied 24 V DC power supply cord into an available 120V outlet.
7. Connect the 24V DC power supply cord and 24V DC power supply unit.
8. Connect the Incite High Speed Filter Cube Switcher to the TTL Breakout Box using the supplied 8 Pin M/M mini-DIN cable.
9. Connect the TTL Breakout Box to the data acquisition system (not included) with BNC Cables (not included).

The TTL Breakout Box

Connect the TTL Breakout Box to the Incite High Speed Filter Cube Switcher using the supplied 8 pin M/M mini-DIN cable. Use BNC cables to connect the data acquisition board(s) to the TTL Breakout Box.

Note: The TTL Breakout Box can be operated through either the BNC input cables, or manually with the buttons. If multiple commands are sent simultaneously, the commands will not be carried out.

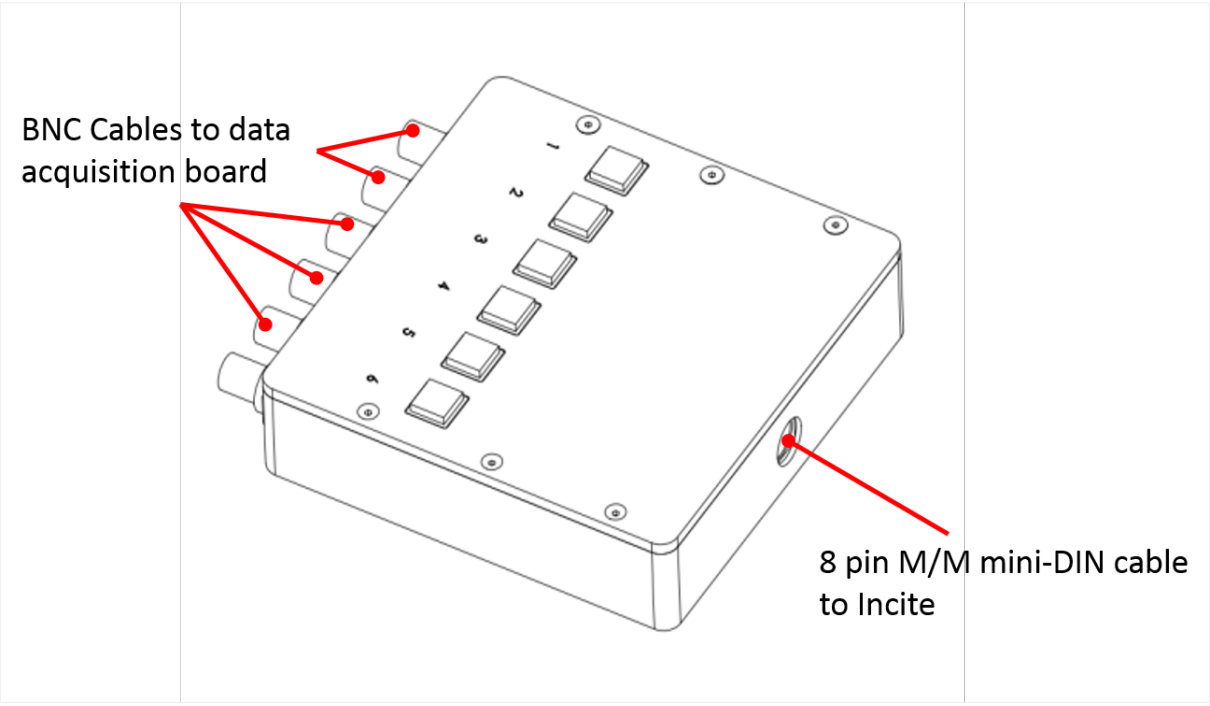


Fig. 6: TTL Breakout Box with leader lines

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 = 0 001 (1) Speed = 1 010 (2) Speed = 2 011 (3) Speed = 3 100 (4) Speed = 4 101 (5) Speed = 5 110 (6) Speed = 6 111 (7) Speed = 7	0000 (0) Position = 0 0001 (1) Position = 1 0010 (2) Position = 2 0011 (3) Position = 3 0100 (4) Position = 4

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 = 0 001 (1) Speed = 1 010 (2) Speed = 2 011 (3) Speed = 3 100 (4) Speed = 4 101 (5) Speed = 5 110 (6) Speed = 6 111 (7) Speed = 7	0000 (0) Position = 0 0001 (1) Position = 1 0010 (2) Position = 2 0011 (3) Position = 3 0100 (4) Position = 4

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 FCA FLI, Rochester NY USA.

Finger Lakes Instrumentation LLC
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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, lightening).

- 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 BYLAW.

- 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 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.

   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.