



Len Controller (LC-1)

Operation Manual (Version 1.0)



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Revision Date: 2/15/2017

Features

- Control lenses with 9-12V motors
- Accurate control of 1x lens with Zoom, Focus, and Iris
- Interfaces for Ethernet (UDP)
- Allow multiple devices to be connected and simultaneously controlled over a network
- Easy to use software interface
- Unlimited programmable preset capability
- Hirose connection for lens communication



Figure 1: LC-1 Front Panel



Figure 2: LC-1 Back Panel

Description & Specifications

Interface	Ethernet
Input Power	85-264 VAC, 50-60 Hz, 0.3 A
Lens Voltage Range	9-12 V
Lens Inputs	1
Presets	Unlimited, programmable
Software	Windows GUI
ECCN	EAR99

The ISSI Ethernet Lens Controller (LC-1) is a control device for motorized lenses. The LC-1 can operate lenses with up to three-motors, with or without presets. The device is operated via a graphical user interface and allows for presets to be saved (if using a lens with preset ability) and then recalled at any time. The presets will save the position of the zoom, focus and iris. Since the LC-1 is an Ethernet device, it can be networked with other LC-1s or Ethernet devices. This makes communication and physical cable connections much simpler than traditional serial lens controllers and also allows them to be operated over a longer distance than serial devices. The IP address of the LC-1 can be configured to match the local network. Uses for this device include closed-circuit television systems (CCTV), event monitoring, and optical based measurements in wind tunnels or other large test facilities. The LC-1 comes with a Windows GUI for remote control and also has API command available for integration into existing user interfaces.

Connections Description

Front Panel

Power	Device is powered on
Lens	Hirose connection for motorized lens
Ethernet	Ethernet communication connection

Back Panel

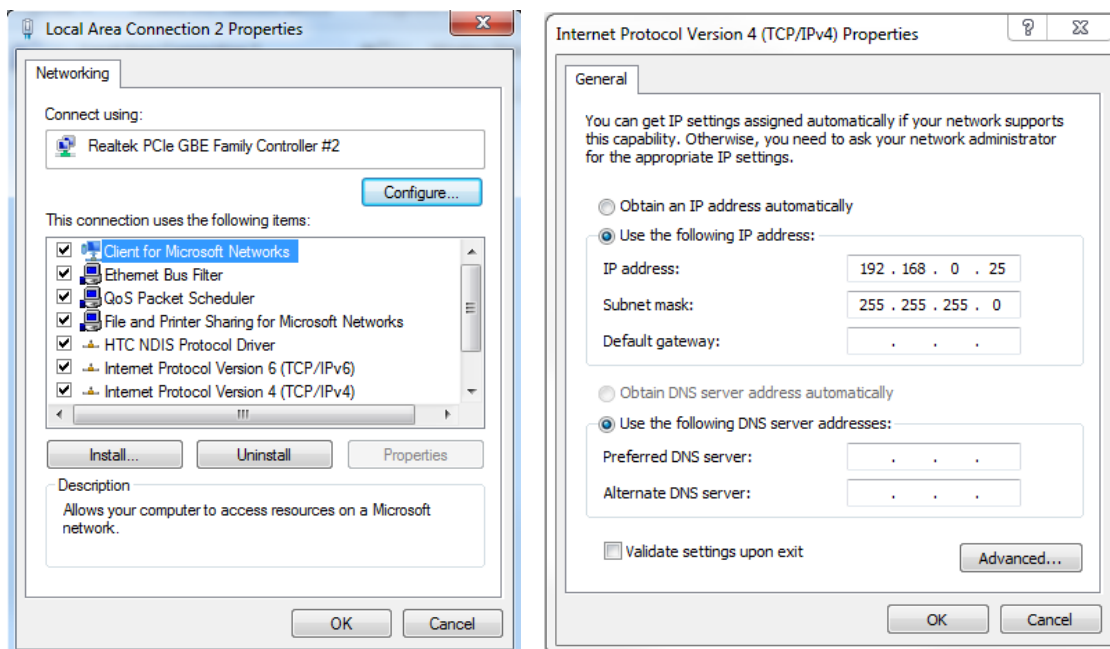
Reset	Resets to default IP address, resets entire box
2A/125 VAC, 1A/250 VAC	Device power connections

The LC-1 is shipped with:

1. Power cord
2. Ethernet cable
3. Hirose connector for wiring to lens
4. Software and manual on flash drive

NIC Network Setup

The network on the PC NIC (network interface card) needs to be properly configured for communication over the network. To do this, navigate to the 'Network Connections' page on the control panel where the local networks of the computer are displayed. Right-click on the network where the LC-1 is connected and select 'Properties.'



From the 'Local Area Connection X Properties' window (above, left), click on 'Internet Protocol Version 4 (TCP/IPv4)' and then press the 'Properties' button, now useable. This will open the 'Internet Protocol Version 4 (TCP/IPv4) Properties' window. This is where the IP addresses are entered so that LC-1 can be reached over the network. The settings needed for communication are **IP Address** and **Subnet mask**. The IP address of the NIC should use the following conventions

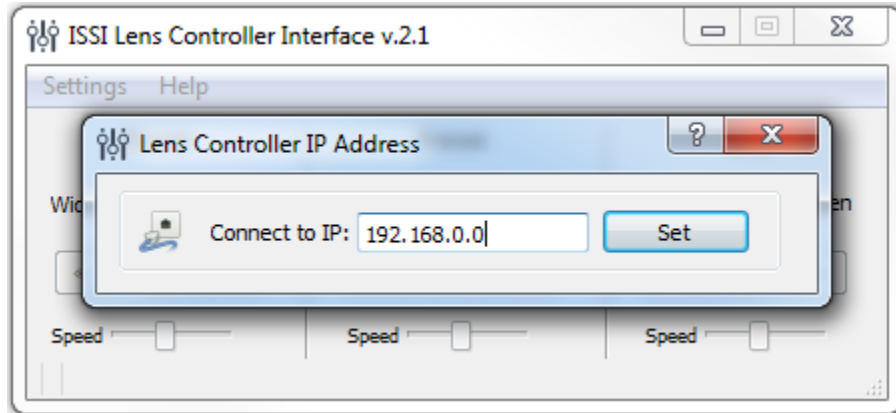
IP Format: Network.Network.Subnet.Host

- LC-1 IP: 192.168.2.251
- NIC IP: 192.168.2.XXX

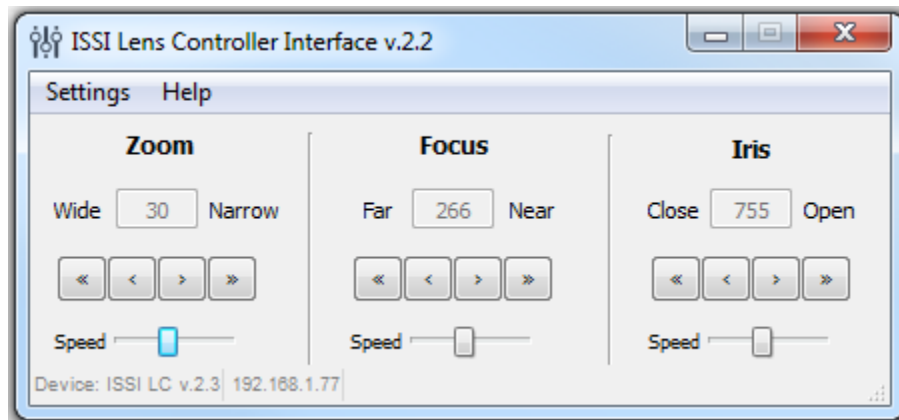
The NIC IP address should have the same network and subnet addresses but a unique host, the last line of the IP address. The host can be any value 1-254 but different from the host address of the LC-1. The subnet mask should be set to match that of the LC-1 which, by default is 255.255.255.0. The **Default Gateway** and all other fields can be left blank.

Software Operation

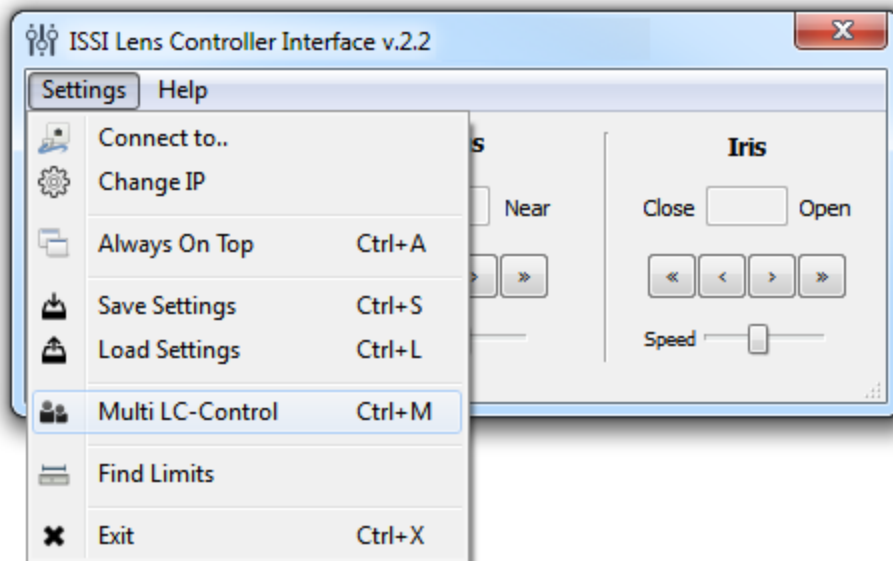
Open the software for the LC-1 from the desktop and it will ask for the IP of the connected LC-1.



Enter the IP address of the LC-1 connected to the network. To communicate with multiple LC-1s over this network (through a network switch), open up another instance of the program on the desktop. Once connected, the GUI will show the current position of each motor of the lens and the IP address which it is connected over in the bottom left corner.

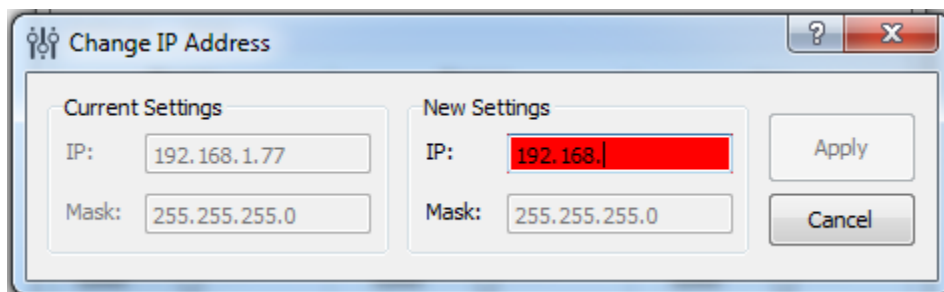


The lens controller is made to work with three motor lenses with or without preset capability. If the lens being used is not a three-motor lens as shown above the motor not present will not operate on the GUI. The GUI displays the current positions of the Zoom, Focus and Iris (Aperture). There are two sets of arrows below this which are used to move the position of the motor. The single-arrow is slower moving for fine adjustments and the double-arrow is faster for coarse adjustments. The overall speed of the movement of each motor can be controlled using the sliding adjustment labeled '*Speed*.' Moving to the right moves the motor faster while moving left slows it down.



Before using the lens controller with a lens, the limits of the motors can be found using the *Find Limits* tool. For lenses with preset capability, this determines the minimum and maximum motor positions. The motors of the lens will move through their minimum and maximum points to establish the limits.

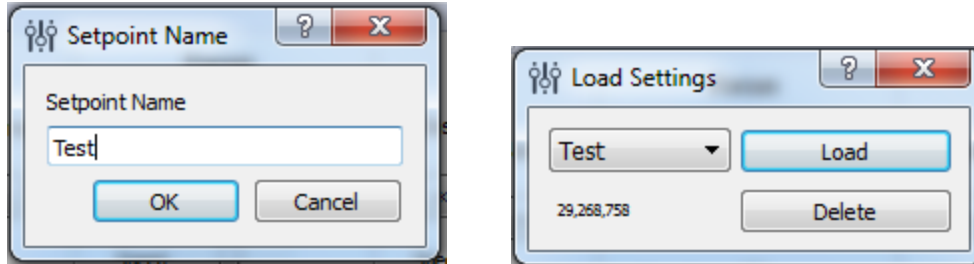
Once connected, the IP address of the lens controller can be changed if desired. Under the *Change IP* window, the IP address can be updated.



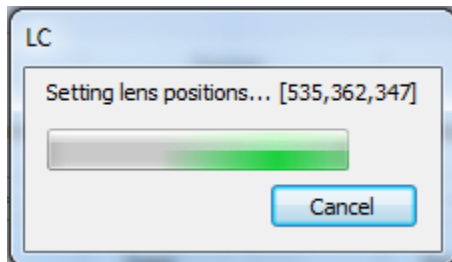
If the toolbar is red, that means it is not a valid IP address. Type in the desired IP address and click *Apply* to implement.

Always on Top makes the LC-1 software always appear as the front window for all windows open on the desktop.

For lenses with preset capability, the save and load settings are used to save positions and recall them on each motor of the lens. When the lens parameters are at their desired location, those positions on each motor can be saved and later recalled. To save new settings, select *Save Settings* and enter a name for those lens settings. Settings are saved to the computer in which the interface is open, not the lens controller itself.



To recall those lens settings, select **Load Settings** and the lens will return each motor to those positions. The lens positions will be displayed in the **Load Settings** window for each preset.



When the position of the lens is being set, the above status window will show the progress.

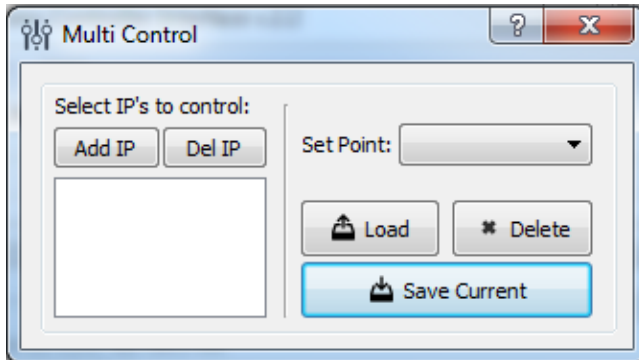
Keyboard Commands

For easier access to preset positions, keyboard commands can be used to recall saved positions. If a preset is saved with any single digit integer (0-9) it can be recalled by the command *Ctrl*+0, 2.....9. Individually recall these commands by holding down *Ctrl* then pressing the number of the preset. To recall these presets, they must have the name of the single digit integer being recalled.

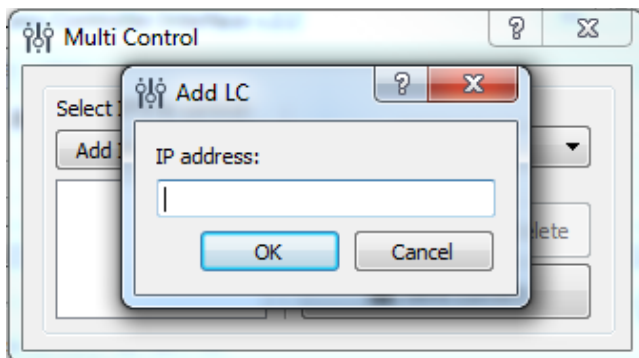
For example, if a preset is saved as 1, then pressing *Ctrl*+1 will recall that preset.

Multi Control

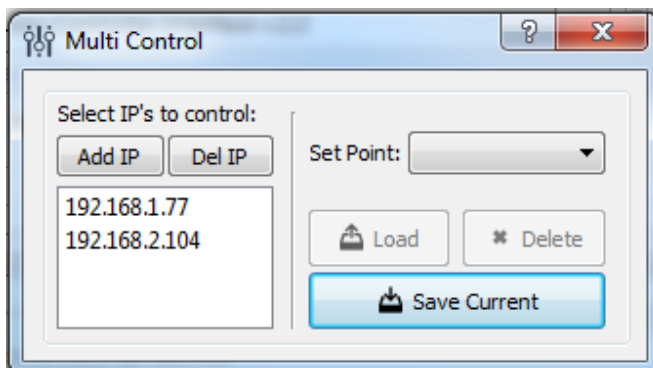
The *Lens Controller Interface* allows for master control of multiple LC-1s connected over a local network. From the Multi LC-Control bar on the settings tab, the Multi Control window can be opened.



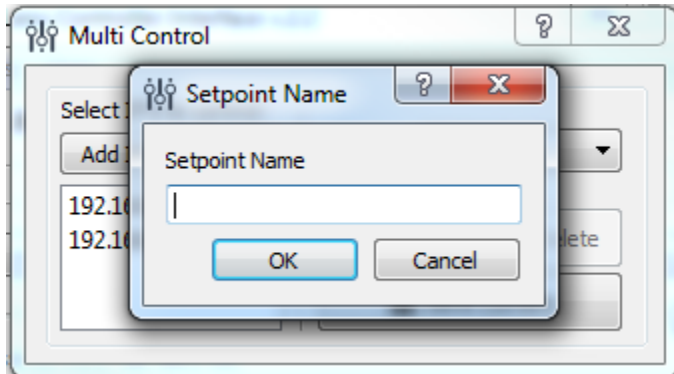
The multi-control allows multiple LC-1s to be added and settings to be saved and recalled from the master computer. To add LC-1s to the multi-control, click the **Add IP** button. This will open a window where the IP address of an LC-1 can be entered. As with the presets for single lens controllers, the settings saved in multi-mode are to the computer and not the lens controller itself.



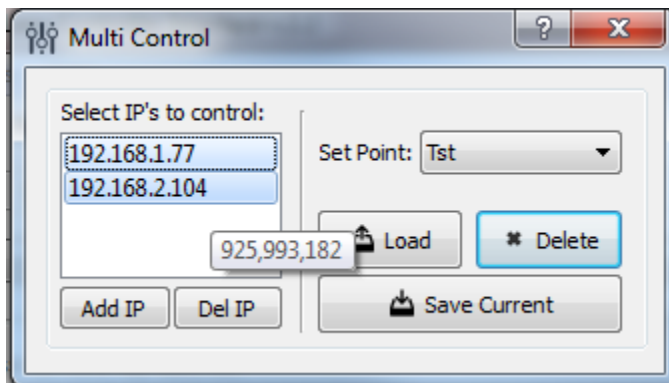
Once entered, the IP address will be added to the list in the window on the bottom left of the multi-control window.



To save the current settings for the LC-1s on the list in the multi-control window, click the **Save Current** button. This will prompt a name for that set point to be entered.



Enter the name of the current position of the lens. If a name is entered that already exists, it will ask if you would like to overwrite that file name.



Holding the cursor over an IP address on the list will display the current position of each motor of that lens as shown above. To recall a set point for all selected LC-1s in multi-mode, click the **Load** button. This will move each lens on each connected LC-1 to the positions saved from that set point (+/- 2 units). Set points are saved on each computer, not on each LC-1. If settings are saved on one computer, they cannot be recalled on another. If using multi-mode,

It should be noted that while all lenses will physically move to the set point from multi-mode, the lenses not connected to the master computer will not update their positions in the software on their computer until the software is disconnected and reconnected.

Connections



Use a Cat5 or Cat6 Ethernet cable (provided) to connect to a PC network interface card or network switch. The LC-1 is set up for universal power. The lens is supplied with a Hirose connection to connect to the LC-1. This is a keyed connection and will only attach one way. For users wishing to connect a specific lens other than that provided by ISSI, the connection pin-out is described on page 11.

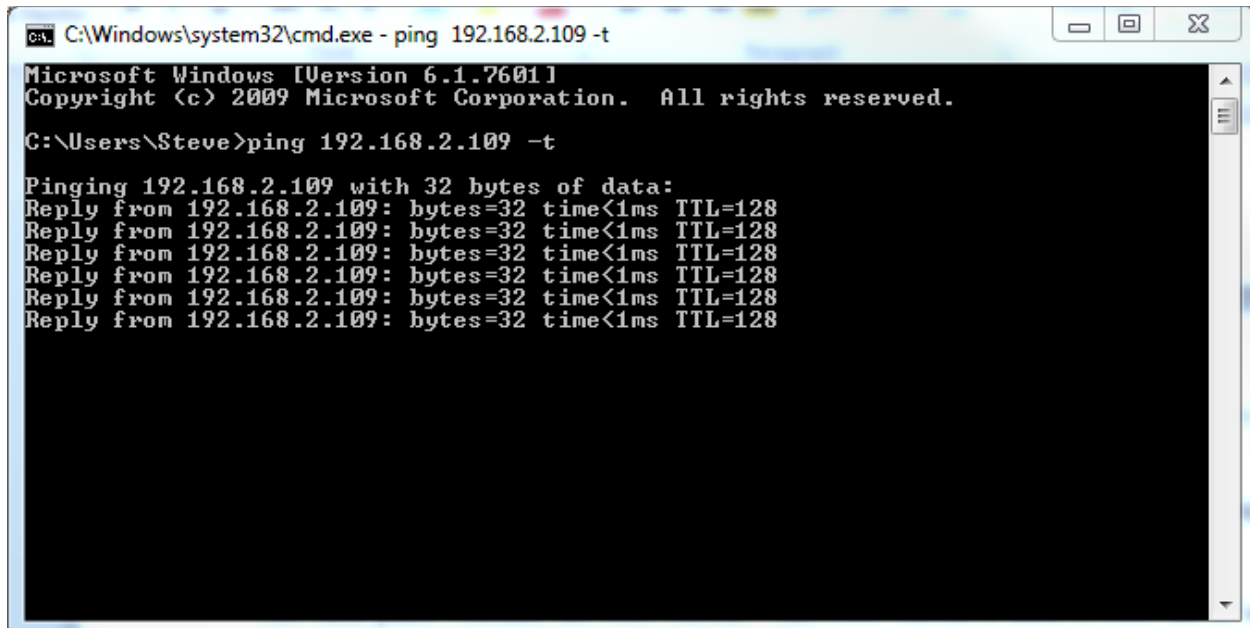
The back panel contains the reset button. This reset button is used to reset the IP address to the default IP address if the IP address was changed and is forgotten. To reset the LC-1 to the default IP address, hold for 2 seconds and the IP address will be reset IP to 192.168.2.251.



Once changed to the default, the device will lose connection and need to be re-opened in the GUI with the default IP address. From there, the IP address can be changed to the desired address by use of the **Change IP** tool previously explained.

If connection problems persist, check the connection of the Ethernet cable between the computer NIC and the LC-1. To check that there is a physical connection, ping the IP address of the LC-1 from the Command Prompt. To do this, open the command prompt window and enter:

Ping XXX.XXX.XXX.XXX -t



```
ca. C:\Windows\system32\cmd.exe - ping 192.168.2.109 -t
Microsoft Windows [Version 6.1.7601]
Copyright (c) 2009 Microsoft Corporation. All rights reserved.

C:\Users\Steve>ping 192.168.2.109 -t

Pinging 192.168.2.109 with 32 bytes of data:
Reply from 192.168.2.109: bytes=32 time<1ms TTL=128
Reply from 192.168.2.109: bytes=32 time<1ms TTL=128
Reply from 192.168.2.109: bytes=32 time<1ms TTL=128
Reply from 192.168.2.109: bytes=32 time<1ms TTL=128
Reply from 192.168.2.109: bytes=32 time<1ms TTL=128
Reply from 192.168.2.109: bytes=32 time<1ms TTL=128
```

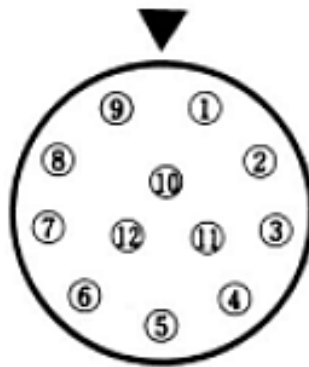
Wiring to Connector

****Disclaimer**:** This is provided to show the specifications of the connector on the LC-1 and the capabilities of the LC-1 itself. It is not a guarantee of performance with every CCTV or zoom lens. Damage to the LC-1 due to improper wiring or connection to a lens is not covered by the product warranty.

Specifications

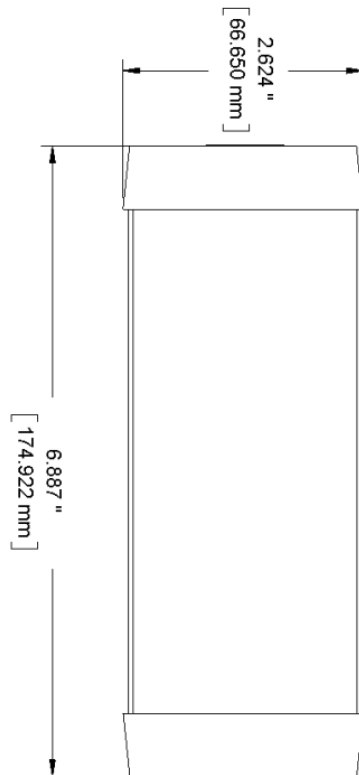
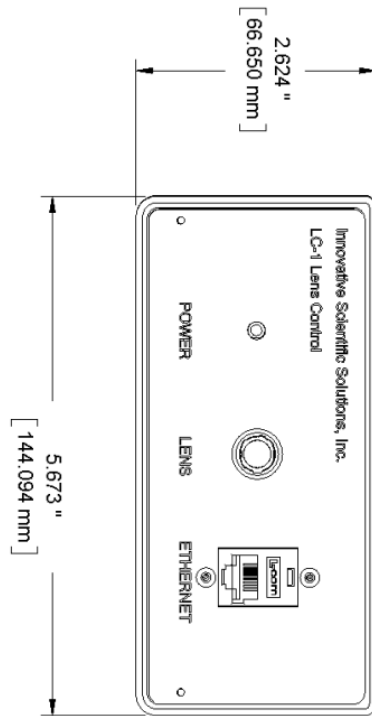
Input Voltage	85-264V, 50-60Hz, 0.3A
Interface	Ethernet
Protocol	UDP
Output Voltage	9 V (DC), 1.5A
Input Resolution	10 bits

Control Connector: Hirose HR10A-10R-12S(71)



Pin	Signal Type	Signal Name
1	9 VDC	Motor 2 (focus) Command Voltage +
2	9 VDC	Motor 2 (focus) Command Voltage -
3	9 VDC	Motor 1 (zoom) Command Voltage +
4	9 VDC	Motor 1 (zoom) Command Voltage -
5	GND	Ground
6	5 VDC	+5V
7	9 VDC	Motor 3 (iris) Command Voltage +
8	9 VDC	Motor 3 (iris) Command Voltage -
9	N/C	Future Use
10	0-5 VDC	Focus potentiometer input
11	0-5 VDC	Zoom potentiometer input
12	0-5 VDC	Iris potentiometer input

Dimensions



Export Disclaimer

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Appendix

ISSI Lens Controller API

Based on UDP protocol, 1337/UDP port is used for communication.

Action: Get controller f/w version

Command: “ver” (hex: 766572)

Answer: “ISSI LC=2.3”

Action: Change controller IP address to 192.168.1.2

Command: “ChangeIP=192.168.1.2”

(hex: 4368616e676549503d3139322e3136382e312e32)

Answer: no answer, controller will set IP and restart

Action: Get current motors values

Command: “Current” (hex: 43757272656e74)

Answer: “Current=XXX,YYY,ZZZ”

Where XXX – zoom position value, YYY- focus position value, ZZZ – iris position value.

Action: Move Zoom Narrow during X ms

Command: “ZoomN=X”

Answer: “Zoom=Y”, where Y – current value of Zoom motor

Action: Move Zoom Wide during X ms

Command: “ZoomW=X”

Answer: “Zoom=Y”, where Y – current value of Zoom motor

Action: Move Focus Far during X ms

Command: “FocusF=X”

Answer: “Focus=Y”, where Y – current value of Focus motor

Action: Move Focus Near during X ms

Command: “FocusN=X”

Answer: “Focus=Y”, where Y – current value of Focus motor

Action: Move Iris Open during X ms

Command: “IrisO=X”

Answer: “Iris=Y”, where Y – current value of Iris motor

Action: Move Iris Close during X ms

Command: “IrisC=X”

Answer: “Iris=Y”, where Y – current value of Iris motor

Action: Set zoom motor value to X

Command: “setZoom=X”

Answer: “zoomDone”, it may take for a while to position the motors.

Action: Set focus motor value to X

Command: “setFocus=X”

Answer: “focusDone”, it may take for a while to position the motors.

Action: Set iris motor value to X

Command: “setIris=X”

Answer: “irisDone”, it may take for a while to position the motors.

Action: Stop all motors

Command: “setStop”

Answer: no answer