Integration Note

Manufacturer:	Converging Systems, Inc.
Model Number(s):	**ILC-x00 family of LED lighting controllers**
g! Core Module Version:	g! 7.2. later
Driver Developer:	Converging Systems Inc.
Download Location	http://www.convergingsystems.com/local_profiles.htm
Document Revision Date:	December 24, 2015

Integration Note Table of Contents

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OVERVIEW AND SUPPORTED FEATURES

The Converging Systems ILC-x00 family of LED lighting controllers are networkable devices which can provide support for Converging Systems' Flexible Linear Lighting Arrays (FLEX) RGB, RGBW, and monochrome LED devices. The devices are supported using either RS-232 serial connection (IBT-100) or Ethernet (e-Node). In addition, a separate e-Node/dmx controller can be used in conjunction with third-party DMX 3-color and 4-color lighting devices and can be controlled using the same device drivers specified within this Integration Note.

The ELAN g! system is capable of receiving bi-directional communication data (color status in RGB, RGBW, or HSB color space) and updating g! sliders (faders) to indicate real time feedback of color state changes.

Depending upon the specific LED lighting controller desired to be supported (i.e. ILC-100 RGB controller, ILC-400 RGBW controller or ILC-400 4-channel monochrome controller of the e-Node/DMX Ethernet/dmx color computer translator, one or more specific g! drivers can be utilized.

THE FOLLOWING OPTIONS ARE SUPPORTED BY THE CONVERGING SYSTEMS LED DRIVER:

- Discrete control of LED states (ON/OFF)
- One-way control of Correlated Color Temperature (CCT) (or sometimes referred to as "Dynamic White") settings with RGB, and RGBW devices using Converging Systems FLLA LED elements. Specific CCT settings can be selected as well as CCT UP/DOWN controls for CCT adjustments
- One-way control of Circadian Rhythm (Sunrise to midday sun to Sunset dynamic settings) using Converging Systems RGBW FLLA devices. Three
- Support of communication utilized Telnet with or without authentication (Port 23)
- Two-way control of color settings in the RGB, RGBW, or HSB color space.
- Ability to store and recall specific colors set by a user.
- Control via all thin client interfaces (PC, Elan Touchscreen, Android, iOS,TS2, and HR2

THE FOLLOWING OPTIONS are not supported by [this driver]**:**

- Ability to control specific lighting Effects resident within ILC-xxx controllers
- Ability to set Dissolve Rates and Sequence Rates from Elan (still can set these through Pilot sw)

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Tabular Summary of Supported Features

The following commands are supported by the current driver for the various lighting and motor control devices (except those that are grayed out).

LED Lighting Commands

Table 1

General CS-Bus Commands	Elan Naming Convention[1]	ILC-100	ILC-400	e-Node DMX
General LED Control Commands				
ON	eNode_On	✓	✓	✓
OFF	e-Node_Off	✓	✓	✓
EFFECT,n (>1)	Execute_Effect	*	*	*
STORE,#	Store Preset	g!	g!	g!
RECALL,#	Recall Preset	g!	g!	g!
DISSOLVE.1=XX	Set_Dissolve_Rate	*	*	*
DISSOLVE.2=XX	Set_Dissolve_Rate	*	*	*
DISSOLVE.3=XX	Set_Dissolve_Rate	*	*	*
DISSOLVE.5=XX	Set_Dissolve_Rate	*	*	*
SEQRATE=XX	Set_Sequence_Rate	*	*	*
SUN_UP	Sun_Up	✓	✓	✓
SUN_DOWN	Sun_Down	✓	✓	✓
SUN.S	Set_Circadian_Value	✓	✓	✓
HSB (HSL) Color Space Commands				
FADE_UP	Fade_Up	✓	✓	✓
FADE_DOWN	Fade_Down	✓	✓	✓
SET,L	Set_Brightness	✓	✓	✓
HUE_UP	Hue_Up	✓	✓	✓
HUE_DOWN	Hue_Down	✓	✓	✓
HUE,H	Set_Hue_Value	✓	✓	✓
SAT_UP	Sat_Up	✓	✓	✓
SAT_DOWN	Sat_Down	✓	✓	✓
SAT_S	Set_Saturation_Value	✓	✓	✓
STOP	STOP	✓	✓	✓
COLOR=H.S.L	Set_Preset_HLS Colorspace	✓	✓	N/A

PRESETH.X=XXX.XXX.XXX	Set LED Presets/HLS Color spacer for preset x	✓	✓	✓
RGB Color Space Commands				
RED,R	Set_RED_Value	✓	✓	✓
GREEN,G	Set_GREEN_Value	✓	✓	✓
BLUE,B	Set_BLUE_Value	✓	✓	✓
VALUE=R.G.B	???	✓	✓	N/A
WHITE,W		*	*	*
VALUE=R,G,B,W	Set RGB Value	g!	g!	g!
PRESET.X=XXX.XXX.XXX (3-color)	Set LED Presets/RGB Color spacer for preset x			
PRESET.X=XXX.XXX.XXX (4-color)				
STOP	Stop adjustment	✓	✓	✓
Correlated Color Temperature (CCT) Commands				
CCT,XXXX	SET_Correlated_Color_Temp	✓	✓	✓
CCT_UP	Color_Temp_Up	✓	✓	✓
CCT_DOWN	Color_Temp_Down	✓	✓	✓
Bi-Directional Commands				
COLOR=?	Automatic polling within Driver. **Note**: Driver achieves same function with Notify ON	See note	See note	See note
VALUE=?	Automatic polling within Driver **Note**: Driver achieves same function with Notify ON	See note	See note	See note
PRESETH.X=?		*	*	*
PRESET.X=?		*	*	*
Accessory Enode Command/Setup Parameters				
Verbose Mode				
UDP Port 4000/5000				
Telnet Login with		✓	✓	✓

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Authentication (with e-Node				
Telnet Login without Authentication				

Notes:

- With current LUA release, these can only be set within e-Node Pilot**.** Check back to see if any updates to the LUA driver have become available allowing these to be set directly.

g! Feature is implemented through internal function within g! rather than supporting this command.

Motor Commands (WIP currently)

Table 2

General Commands	Elan Naming Convention	IMC-100	BRIC ("Bric Mode ")	
General Motor Control Commands				
UP		✓	✓	
DOWN		✓	✓	
STOP		✓	✓	
RETRACT		✓	✓	
STORE,#		✓	✓	
RECALL,#		✓	✓	
PRESET.X=XX.XX				
Bi-Directional Commands				
STATUS=?				
POSITION=?				
Accessory Enode Command/Setup Parameters				
Verbose Mode		✓	x	✓
UDP Port 4000/5000				
Telnet Login with Authentication (with e-Node		✓	✓	✓
Telnet Login without Authentication		✓	✓	✓

Converging Systems Configuration

The system will need to be installed and configured according to the Converging Systems documentation, prior to integration with the g! system. The Converging Systems e-Node Pilot application (required for setup) is available for download for free from the Converging Systems website (http://www.convergingsystems.com/customerportal/1000/downloads.htm#anch4). IP configuration using the e-Node is possible using both dynamic or static addressing.

NOTE: It is recommended that the Converging Systems controllers (ILC-x00 controllers as well as the e-Node Ethernet gateway) are running the latest version of firmware available at the time of installation

WIRING DIAGRAM (for IP connection)

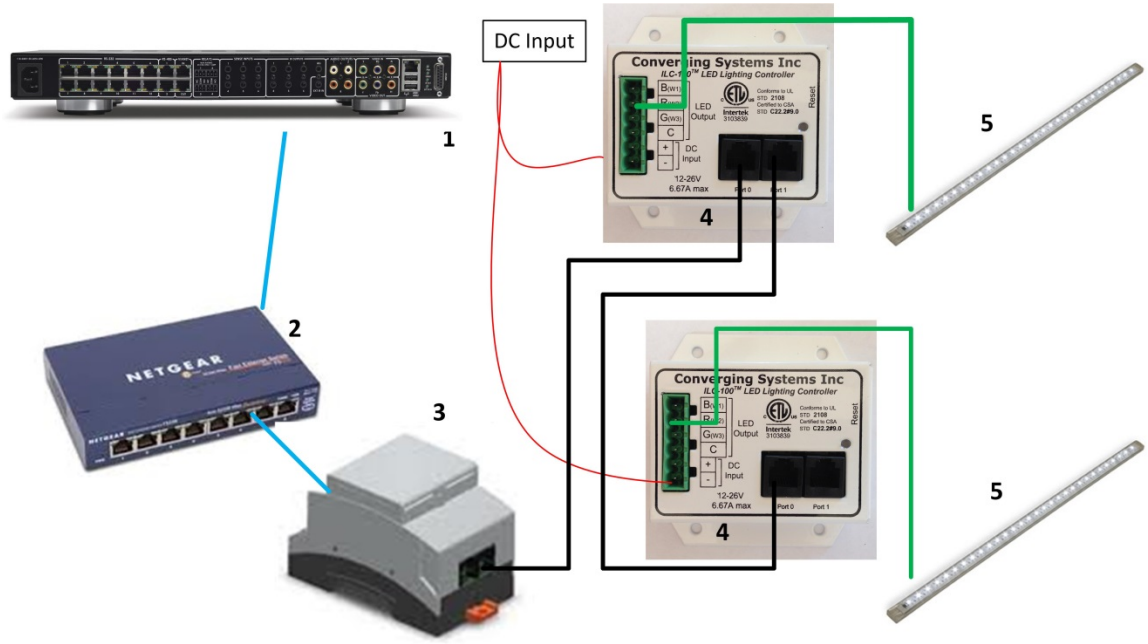

Figure 1

Wiring/Configuration Notes:

1. Maximum length of CS-Bus cabling from e-Node to the last ILC-100/ILC-400 using CAT5e or better cabling (and obeying the 1-1 pin-out requirements for the RJ-25-RJ25 cable) = 4000 feet

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2. Maximum number of ILC-100/ILC-400 controllers and Converging Systems' keypads (if provided) that can exist on a single network connected to a single e-Node device = 254
3. Maximum number of e-Nodes that can exist on a Elan system = 254

BILL OF MATERIALS (for IP control)

Table 3

#	Device	Manufacturer	Part Number	Protocol	Connector Type	Notes
1	Elan Host Processor (gSC-n or similar)	Elan Home Systems	gSC-n or similar	Ethernet/Serial/IR	various	
2	Network Switch	Various	Various	Ethernet	RJ-45	
3	e-Node	Converging Systems	e-Node	Ethernet	RJ-45 (for Ethernet) RJ-25 for local bus	
4	Lighting Controller (or Motor Controller)	Converging Systems	ILC-100 or IMC-100 or (Stewart BRIC)	CS-Bus protocol	RJ-25 for CS-Bus communication	Must terminate beginning and end of bus with 120 ohm resister on pins 3/4
5	Flexible Linear Lighting (FLLA) RGB or RGBW luminaries	Converging Systems	FLLA-RGB-xxx FLLA-RGBW-xxx		3-color 4 pin 4-color 5 pin 1-color 4 pin	

WIRING DIAGRAM (for RS-232 serial connection)

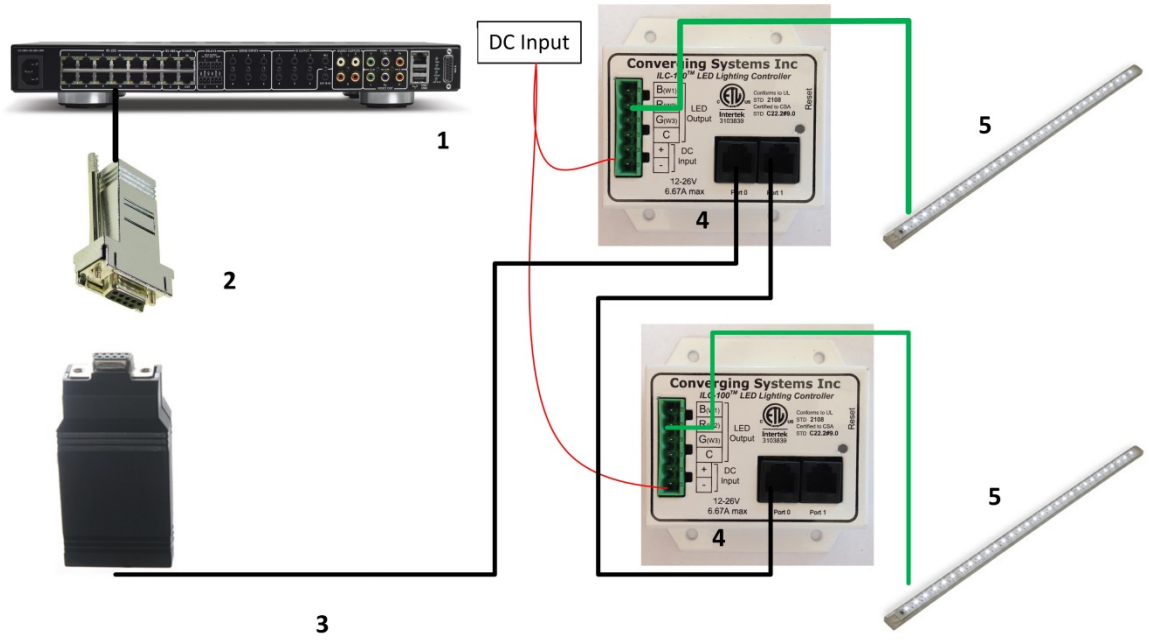

Figure 2

Wiring/Configuration Notes:

1. Maximum length of CS-Bus cabling from e-Node to the last ILC-100.ILC-400 using CAT5e or better cabling (and obeying the 1-1 pin-out requirements for the RJ-25-RJ25 cable) = 4000 feet
2. Maximum number of ILC-100/ILC-400 controllers and Converging Systems' keypads (if provided) that can exist on a single network connected to a single e-Node device = 254
3. Maximum number of e-Nodes that can exist on a Elan system = 254

BILL OF MATERIALS (for RS-232c connection)

Table 4

#	Device	Manufacturer	Part Number	Protocol	Connector Type	Notes

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1	Elan Host Processor (gSC-n or similar)	Elan Home Systems	gSC-n or similar	Ethernet/Serial/IR	various	
2	RJ-45 to DB-9 dongle	Elan	RJ-45 to DB-9 straight dongle (CB-307 Male)	RS-232c	Pinouts RJ45 / DB9 1 / 9 2 / 1 3 / 4 4 / 5 5 / 2 6 / 3 7 / 8 8 / 7	
3	IBT-100	Converging Systems	IBT-100	RS-232c	DB-9 (for Serial) RJ-25 for local bus	
4	Lighting Controller (or Motor Controller)	Converging Systems	ILC-100 or IMC-100 or (Stewart BRIC)	CS-Bus protocol	RJ-25 for CS-Bus communication	Must terminate beginning and end of bus with 120 ohm terminating resister on pins 3/4
5	Flexible Linear Lighting (FLLA) RGB or RGBW luminaries	Converging Systems	FLLA-RGB-xxx FLLA-RGBW-xxx		3-color 4 pin 4-color 5 pin 1-color 4 pin	

g! Configuration

The configuration process will involve loading a lighting communication device (for the e-Node or the IBT-100) and one or more load devices (LED loads). Please follow the below steps to load one or more compiled EDRVC within g! Tools.

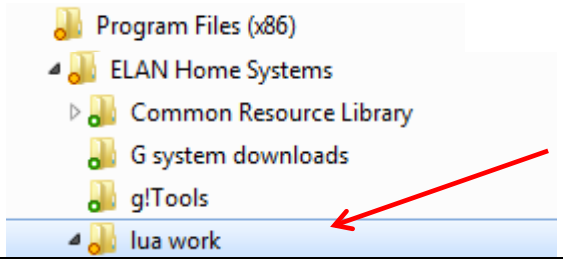
Installation Process

1. Import Converging Systems LUA driver into your project. (Ethernet or Serial as appropriate)

<table>
<tr><th>Step</th><th>Step</th><th>Detail</th></tr>
<tr><td>1a</td><td>Download the appropriate Converging Systems' LUA driver into convenient subdirectory below Elan Home Systems in your Program Files (x86) directory.</td><td>-Select the appropriate LUA driver depending upon if you will be driving your systems through Ethernet using the Converging Systems' e-Node, or through RS-232C communication using the Converging Systems' IBT-100 serial adapter.

Currently these files are located on the Converging Systems' website.
http://www.convergingsystems.com/local_profiles.htm

Select the appropriate file as below:
<table>
<tr><th>Type of Connectivity</th><th></th></tr>
<tr><td>Ethernet connectivity</td><td>CSIEXP_enode.EDRVC file</td></tr>
<tr><td>RS-232c Connectivity</td><td>CSI_IBT.EDRVC file</td></tr>
</table>
-Place file within the Elan directory on your computer.

 
</td></tr>
<tr><td>1b</td><td>Import the applicable LUA driver into your g! Project

Note: Make sure you download latest version from the Converging Systems' website or Elan's (if available) and</td><td>-Within your project, go to the Lighting Tab, and right click on the Lighting Interfaces category to expose the "Add New Lighting Inteface…" dialog box.</td></tr>
</table>

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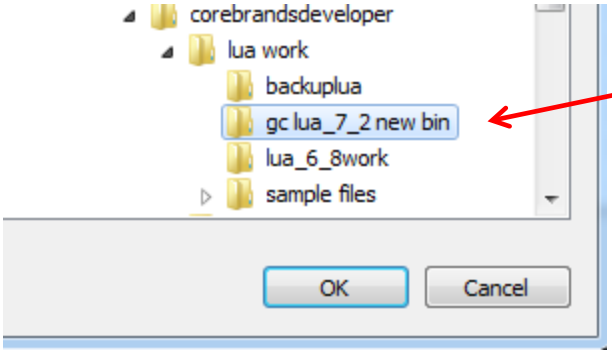
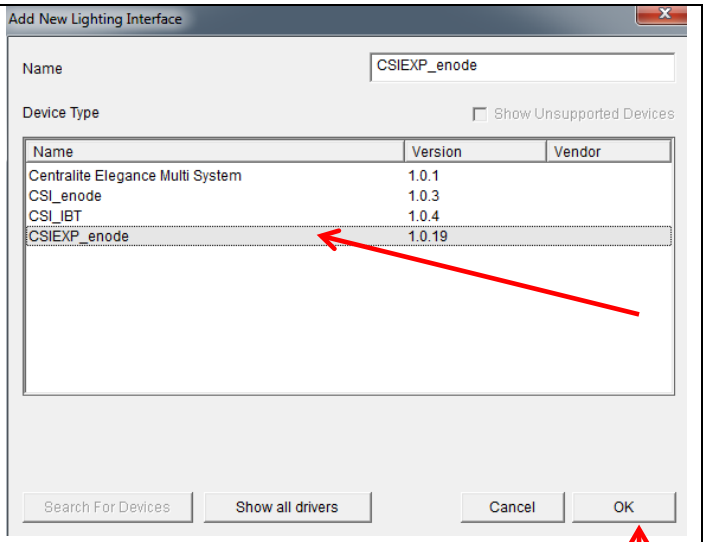
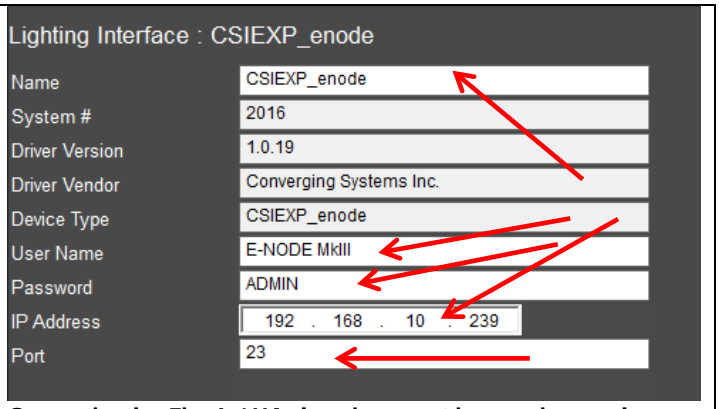
	ensure you know the location of the extracted EDRVC driver files on your computer's hard drive.	 -Next, select the **Search Folder**. button and navigate to the directory where you placed the .EDRVC file in **Step 1a** above and select that directory. (In this case, the file is located in the ***corebrandsdeveloper*** folder but on your computer this location will vary.)  Hit **OK** to continue. -You will now see a dialog box appear which will show the device driver found. Select the driver name (**CSIEXP_enode** in this case) to continue.

		 Hit **OK** to confirm --Your new **LUA** Driver has now been updated to your g! Controller.

2. Set-up communication device for the Converging Systems Communication Device (Ethernet or Serial)

Step	Step	Detail
2a	Set-up communication parameters for the Converging Systems interface (**e-Node IP device** or **IBT-100 serial device**) that will be used with one or more Intelligent Lighting Controllers (ILC-100/ILC-400).	Determine what will be the communication linkage that you will use to connect to the Converging Systems' device. -Refer to **Step 2b** if you will be using IP Communication and the **e-Node**. -Refer to **Step 2c** if you will be using RS-232c Communication and the **IBT-100**.
2b	Communication Setup for **Etherne**t connectivity (e-Node). This will set up both (i) a Communication Device as well as (ii) a single Lighting Interface (through which lighting controllers will be added in **Section 3** below).	**-**Select the applicable device (e-Node) for which you have loaded the driver in **Steps 1a** and **1b** above. The following data entry box will appear for our example of the **CSIEXP_enode** found.



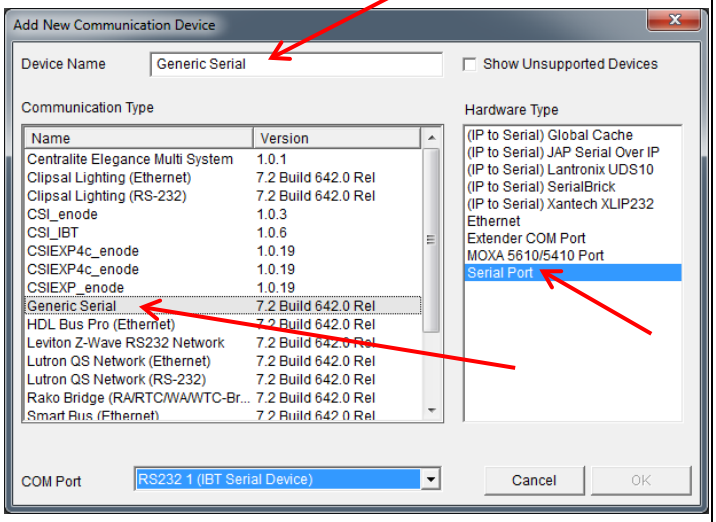
Currently, the Elan's LUA development is ongoing and therefore user interfaces and data fields are subject to change. Certain data fields that may be pictured above may not need to be programmed. See below documentation for current information.

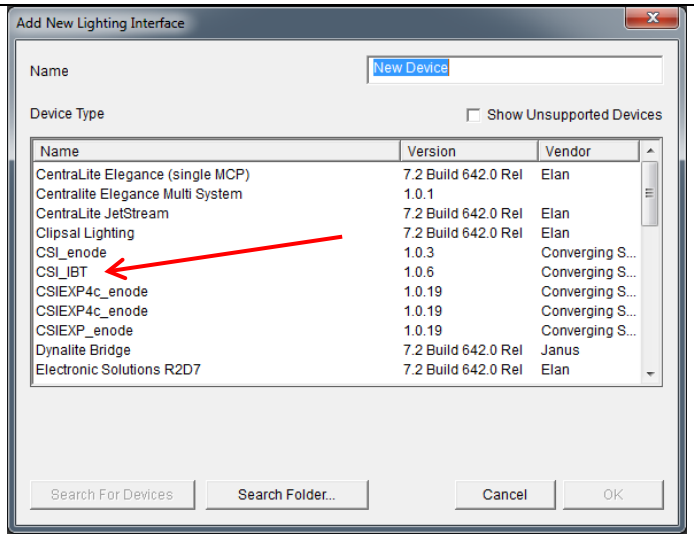
Name: This is name of the particular device loaded. Should you have multiple e-Nodes (for large systems for where you may have one standard e-Node and one e-Node/dmx or multiple standard e-Nodes), make sure you utilize different names for each e-Node to be supported. If you only have one e-Node in your system, just leave the default name unchanged.

User Name: This is e-Node's Telnet User Name for login authentication. The factory default is **E-NODE** for the Rev 2 e-Node and **E-NODE MkIII** for the Rev 3 e-Node (the MkIII has 2 RJ-25 and 1 RJ-45 in a row while the MkII has just two RJ-25 ports). Unless you have changed the **User Name** within the e-Node Pilot application, simple use the default name provided.

Password: This is e-Node's Telnet Password for login authentication. By default from the factory, the Password is **ADMIN** for all versions of the e-Node. Unless you have changed the Password within the e-Node Pilot application, simple use the default name provided.

IP Address. This is IP address for the particular e-Node being used as the communication device. The IP address can be determined by either using the e-Node Pilot application or by discovering the e-Node using Windows' UPnP discovery mechanism with Windows. Consult the e-Node manual for more information.

		Port. By default, Telnet communication utilizing Port **23** is supported by this driver. Therefore you do not need to change this field.
2c	Communication Setup for RS-232c connectivity (**IBT-100**). This will set up both (i) a Communication Device as well as (ii) a single Lighting Interface (through which lighting controllers will be added in **Section 3** below).	- Select the **Lighting** tab and right click on **Add New Communication Devices** and scroll down to pick a **Generic Serial Type.** Under **Hardware Type** pick **Serial Port** and under **Device Name** provide a unique name for the serial port that will be utilized for the IBT-100. In this example, it will be **called IBT Serial Interface. Select the COM port that will be used to connect to the IBT-100.**  Click **OK** to continue. -Next **right click on the Lighting Interfaces** tab to expose the following pop-up. Add New Lighting Interface... -Select this pop-up and the following screen will appear enabling you to establish communication parameters.

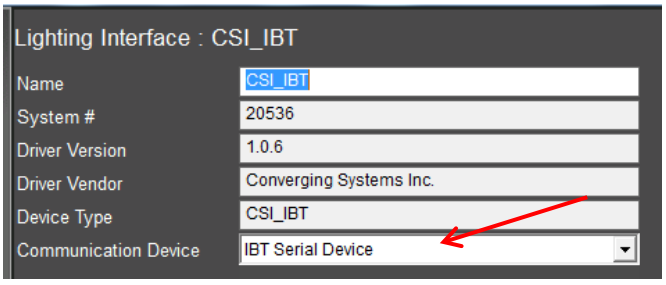


-You may have to select **Search Folder** button and navigate to the location where the Converging Systems applicable .EDRVC file is located. Select **the CSI_IBT** as the Device Type.

-Enter a name in **Name** field to help you identify which device will be controlled

-Select the **CSI_IBT** driver. Select **OK** to proceed.

-Left click on your new **Serial Lighting Interface**. This page will appear.



-Select the **Communication Device**, and select the **IBT-100 Serial Device**

-Select **Apply** to continue**.**

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3. Set-up Lighting Devices (i.e. ILC-x00 or other similar CSI controller) for the Converging Systems Communication Device (Ethernet or Serial) established within Section 2 above.

<table>
<tr><th>Step</th><th>Step</th><th>Detail</th></tr>
<tr><td>3a</td><td>Background on Lighting Devices</td><td>
Depending upon the type of lighting functionality desired with your project (i.e. Slider, On/Off buttons or Scene select buttons) you must select the appropriate Elan LUA Device Type available for each and every lighting Device that you wish to program within Section 4 following this section.

Before proceeding it is wise to understand your requirements before adding devices within this section.

Currently, the available functions supported by these Device Types relevant to Converging Systems LED products are as follows:

Table 5
<table>
<tr><th>Type</th><th>Elan Reference</th><th>Application</th></tr>
<tr><td>Slider</td><td>Lua Dimmer Device

Note: A separate device must be installed for each type of Slider required for each Z/G/N address</td><td>Sliders for
-Hue,
-Sat
- Brightness
-Red
-Green
-Blue,
-White
-Color Temperature
-Circadian Rhythm</td></tr>
<tr><td>On/Off button</td><td>Lua n/Off device

Note: A separate device must be installed for ON/Off button set for each Z/G/N address</td><td>Standard buttons
-On
-Off
-Power Toggle</td></tr>
<tr><td>Scene</td><td>LUA Scene</td><td>Customizable Scene</td></tr>
</table>
</td></tr>
</table>

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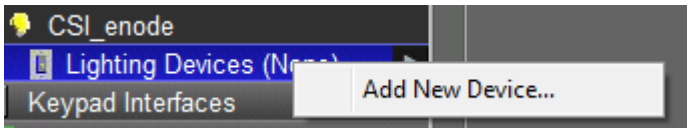
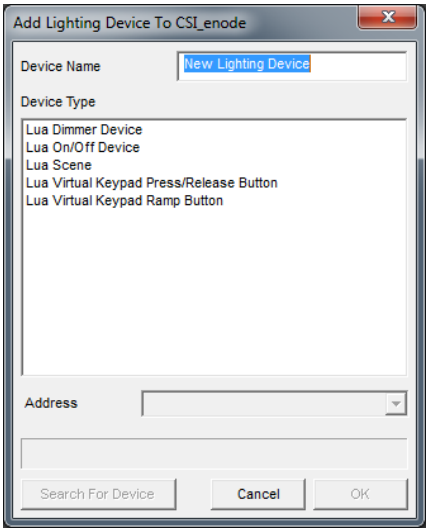
		button	**Note**: A single device must be installed for each Z/G/N address to be supported regardless of the numbe of scenes to be supported.	buttons -Scene 1 to n
		% Set button	Lua Dimmer Device **Note**: A single device must be installed for each Z/G/N address to be supported regardless of the numbet of % set buttons to be populated.	-Button to pick a particular level setting
		Color temperature setting button	Lua Dimmer Device **Note**: A single device must be installed for each Z/G/N address to be supported regardless of the numbet of	-Button to pick a particular level setting

		temperature settings buttons to be program-med.

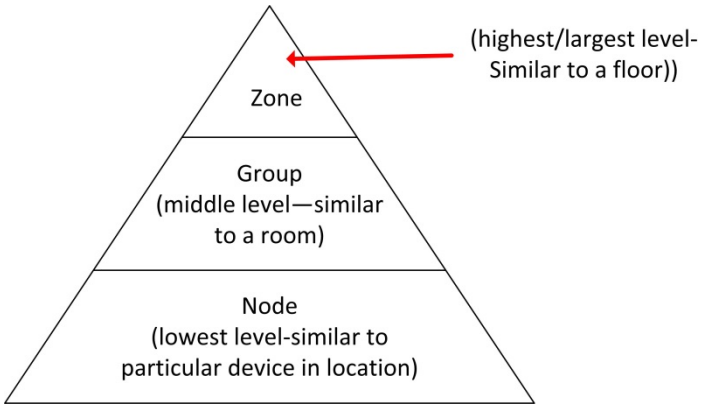
These choices are available by right clicking on the **Lighting Devices (None)** entry or any programmed entry under the **Lighting Interface** programmed within **Section 2** above and selecting **Add New Device**...





Note: With the currently available Elan Core release, only the above Lighting types are available. ***Over time additional type devices may become available which may increase the functionality of choices available to the installer. .***

3b	Background on Addressing	This information is only relevant for when you ***start*** adding buttons and sliders within the GUI section of your Elan g! Tools project. All Converging Systems' devices (loads or controllers as opposed to communication devices) that are connected to a communication device (e-Node or IBT-100) will be addressed using a unique **Z**one/**G**roup/**N**ode

		addressing scheme (**Z**/**G**/**N**). Those addresses are referred to within g! Tools as **Zone, Group and Node Addresses.** **Background on ZGN Addresses**: The largest group is referred to as the **Zone**, which might be associated with a floor of a building. The next smaller group is referred to as the **Group**, which might be associated with a room on that floor of a building. Finally, the smallest entity is referred to as the **Node**, or the particular unit in that Room or Group, and within that Floor of Zone. From the factory, all lighting devices have a default address of **Zone**=2, **Group**=1, **Node**=0 ("0" refers to an undefined unit). **Range of ZGN Addresses**: Enter a number between 1 and 254 for **Z**one numbers, **G**roup numbers, and **N**ode numbers. Please note -- no two controllers should be assigned the same Z/G/N address. **Background on Bi-Directional Feedback**: Once a load device (ILC-100 or ILC-400) is programmed using the e-Node Pilot application to a non-zero value, then **AND ONLY THEN** can those devices can be queried or monitored for color state data which is quite useful in auto-updating sliders and numerical readouts. The figure below describes this hierarchy.  **YOU MUST HAVE PRE-ASSIGNED Z/G/N ADDRESSES TO ALL LOADS BEFORE PROCEEDING WITH g! PROGRAMMING. See the Converging Systems' documentation on the e-Node Pilot application for more information here.**

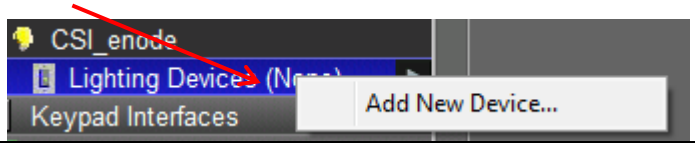
<table>
<tr>
<td></td>
<td></td>
<td>
At this point after you assigned Z/G/N address to all loads (ILC-100 or ILC-400 controllers) it would be useful to write down a “map” of all interconnected loads and their re-assigned Z/G/N Addresses for use when programming within g! Tools.

Example: If you have a device with a Z/G/N address of 2.1.1 , then the Elan system can monitor that device to determine its current lighting status. If you choose to enter a wildcard address of a 2.1.0 (that is a broadcast to all units with Z/G/N addresses between 2.1.1 and 2.1.254), only the unique color settings available from the device with an address of 2.1.1 or the first Z/G/N unit in the series will be queried. See Appendix 3 for more information.

Example: If you have a device with a Zone/Group/Node (“Z/G/N”) address of 2.1.1 , then the Elan system can poll that device to determine its current lighting status. If you choose to enter a wildcard address of a 2.1.0 (that is a broadcast to all units with Z/G/N addresses between 2.1.1. and 2.1.254), only the unique color settings available from the device with an address of 2.1.1 or the first Z/G/N unit in the series will be queried.

Specifically, if you had more than one ILC-100/ILC-400 controllers, you could give them (through the e-Node Pilot application) addresses as follows:

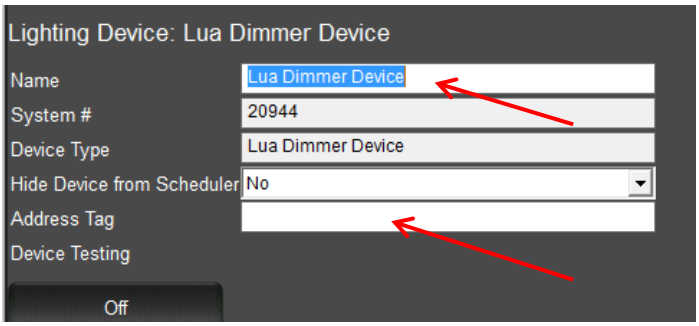
Table 6
<table>
<tr><th>ILC unit</th><th>Zone/Group/Node Address</th></tr>
<tr><td>First Unit</td><td>2.1.1</td></tr>
<tr><td>2nd unit</td><td>2.1.2</td></tr>
<tr><td>nth unit</td><td>2.1.3 or some other number up to 254</td></tr>
</table>
</td>
</tr>
<tr>
<td>3c</td>
<td>Now, let’s Add Lighting Devices</td>
<td>
- Right click on the auto-populated (generic entry) Lighting Devices (None) found below the Lighting Interface established in Step 2c above. A pop-up Add New Device… will appear



</td>
</tr>
</table>

-Left click on the **Add New Device**. button to begin adding the applicable Lighting device to be supported. Depending upon your control needs, you will need to select a specific Device Type specified in **Table 5** above to match your requirements.

-Select specific entry under **Device Type** for list and hit **OK** to add that device. You will next see this general type of table for each **Device Type** added.



-The following two fields should be filled out for each new Device programmed—**Name**, and **Address** Tag.

-**Name**. This is an alias name that should be entered to easily identify the Device. Typically, a **Z/G/N** (**Z**one.**G**roup.**N**ode) reference can be used to facilitate device especially when there are many devices to be programmed (see example below for more information).

-**Address Tag.** This is an addressing reference this is read by the Elan Core software and is bundled in all outgoing command strings sent to Converging Systems controllers. The address must be accurately entered or no control of a specific device will be possible. **It is critical that the Periods and Commas are entered exactly as shown below.** Refer to the following table for the **Address Tag** information that must be entered for each Device Type to enable the operation of these types of controls.

Table 7

System Family	Device Type	Address Tag
Red Slider	Lua Dimmer Device	**Z.G.N,RED**

Green Slider	Lua Dimmer Device	**Z.G.N,GREEN**
Blue Slider	Lua Dimmer Device	**Z.G.N,BLUE**
Hue Slider	Lua Dimmer Device	**Z.G.N,HUE**
Saturation Slider	Lua Dimmer Device	**Z.G.N,SAT**
Brightness (Fade) Slider	Lua Dimmer Device	**Z.G.N**
Standard On/Off buttons	Lua On/Off Device	**Z.G.N**
Recall (Scene)	Lua Scene	**Z.G.N,n** (where n is the scene or recall number)

Note: The **Z.G.N** entries refer to the **Zone** number, **Group** number and **Node** number previously programmed into each ILC-xxx controller (**see Appendix 1** for more information).

NOTE: YOU WILL NEED TO CREATE AS MANY DEVICES (of the three types available) FOR THE NUMBER OF SLIDERS OR BUTTONS REQUIRED RELATED TO A SPECFIC Z/G/N ADDRESS.

-Proceed to the next step to see several examples of **Address Tag** entries

3d	Sample Address Tag Data Entry	These sample projects show a combination of above available **Device Types**. These Device Types are also summarized in the table below for completeness. In general, for each unique Slider you will need to create a unique (new) Dimmer Device. For each instance of an ON/Off control for a particular address, you will also have to create a unique (new) On/Off device as well. And finally, for each instance of a unique Recall (Scene) command for a particular address, you will also have to create a unique (new) Lua Scene device as well. **Example 1**: If you have one ILC-100 LED controller with a **Z/G/N** address of 2.1.1 and you wanted a **Hue/Sat/Brightness** set of sliders, and an **ON/OFF** control, you would need to create the following:

Table 8

Deisred button or slider	Device Type	Z/G/ N Address	Address Tag Entry
Hue Slider	Dimmer Device	2.1.1	2.1.1,HUE
Sat Slider	Dimmer Device	2.1.1	2.1.1,SAT
Fade Slider	Dimmer Device	2.1.1	2.1.1
ON/Off toggle	On/Off device	2.1.1	2.1.1
Separate On/Off buttons	On/Off device	2.1.1	2.1.1

Example 2: If you have one ILC-100 LED controller with a **Z/G/N** address of **2.1.1** and you wanted a **Hue/Sat/Brightness** set of sliders along with a **Red/Green/Blue** set of sliders, and an **ON/OFF** control, you would need to create this following:

Deisred button or slider	Device Type	Z/G/ N Address	Address Tag Entry

Hue Slider	Dimmer Device	2.1.1	2.1.1,HUE	
Sat Slider	Dimmer Device	2.1.1	2.1.1,SAT	
Fade Slider	Dimmer Device	2.1.1	2.1.1	
Red Slider	Dimmer Device	2.1.1	2.1.1,RED	
Green Slider	Dimmer Device	2.1.1	2.1.1,GREEN	
Blue Slider	Dimmer Device	2.1.1	2.1.1,BLUE	
ON/Off toggle	On/Off device	2.1.1	2.1.1	
Separate On/Off buttons	On/Off device	2.1.1	2.1.1	

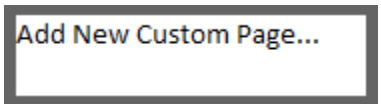
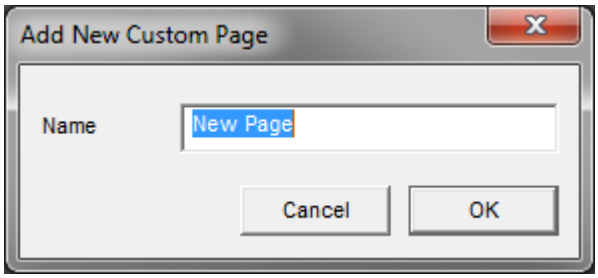
Example 3: If you have one ILC-100 LED controller with a **Z/G/N** address of **2.1.1** and a second ILC-100 LED controller with a **Z/G/N** address of **2.1.2 AND** you wanted a **Hue/Sat/Brightness** set of sliders, an **ON/OFF** control **AND** a **Recall** (Scene 1) button for each controller, you would need to create this following:

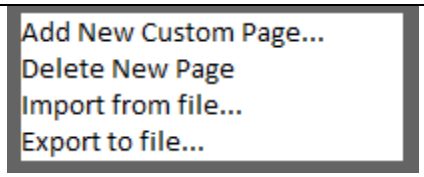
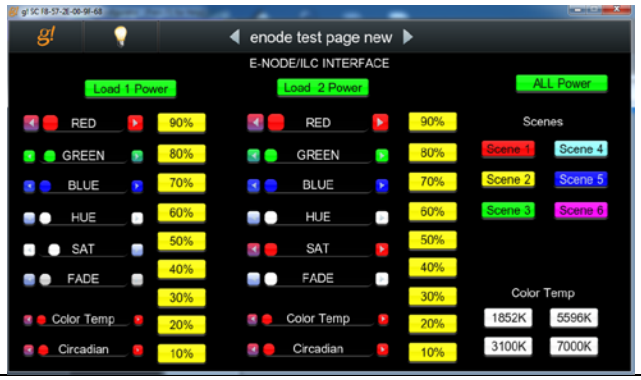
Table 9

Deisred button or slider	Device Type	Z/G/ N Address	Address Tag Entry
First controller with Z/G/N address of 2.1.1			
Hue Slider	Dimmer Device	2.1.1	2.1.1,HUE
Sat Slider	Dimmer Device	2.1.1	2.1.1,SAT
Fade Slider	Dimmer Device	2.1.1	2.1.1
Recall Scene 5	Lua Scene	2.1.1	2.1.1,5
ON/Off toggle	On/Off device	2.1.1	2.1.1
Separate On/Off buttons	On/Off device	2.1.1	2.1.1
Second controller with Z/G/N address of 2.1.2			
Hue Slider	Dimmer	2.1.2	2.1.1,HUE

			Device		
		Sat Slider	Dimmer Device	2.1.2	2.1.2,SAT
		Fade Slider	Dimmer Device	2.1.2	2.1.2
		Recall Scene 5	Lua Scene	2.1.2	2.1.2,5
		ON/Off toggle	On/Off device	2.1.2	2.1.2
		Separate On/Off buttons	On/Off device	2.1.2	2.1.2

4. Create (or Modify) Various Controls for (i) Hue/Sat/Brightness or Red/Green/Blue adjustments, (ii) ON/OFF adjustments, and (iii) Scene adjustments.

Step	Step	Detail
4a	You can create a user interface (UI) for your system that is suited to your customer's requirements. This **Integration Note** references some pre-programmed UI pages that you may find useful. They contain sliders and buttons which are uniquely developed to control Converging Systems' loads (LEDs in this case). This step will show how to import Converging Systems pre-programmed pages that you can edit and re-use for your own project.	-Go to the **Lighting** Tab and right click on **Custom Pages** , The following popup will appear  Select this task and the following popup will appear.  Select an appropriate name and hit **OK**. -Hover over the **New Page** now listed under Custom Pages and right click to expose this popup.

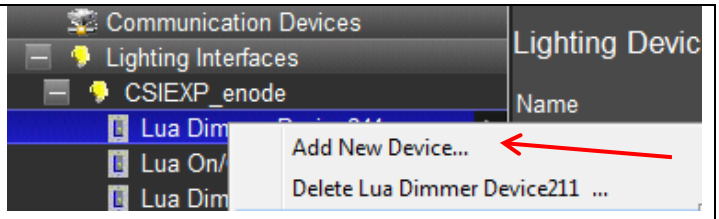
		 Select **Import from File** and browse for the ILC Ethernet Control LUA.ECV file available from the Converging Systems website. Click **OK** to import. http://www.convergingsystems.com/local_profiles.htm Here is an example of a sample on which you can now begin working 
4b	Now let us understand how generally buttons and sliders are created and programmed to trigger specific events.	There are three distinct types of controls that are relevant for lighting control. **Depending upon the type of lighting functionality desired (i.e. Slider, On/Off buttons or Scene select buttons) for a particular Zone/Group/node address you must select the available Elan LUA Device Type available.** These currently are: -Slider (Dimmer Device) -On/Off button (On/Off device) -Scene button (Lua Scene) **Note**: Currently only the above three Lighting types are available. ***Over time additional type devices may become available which may increase the functionality of choices available to the installer.***

<table>
<tr>
<td></td>
<td></td>
<td>Provided you crated the requistie number of LLighting Devices, then all you have to concern yourself here is to make sure the Address Tag is accurate and as required you create an Event Map joining available commands to programmed Ligting deive.s.set up event map

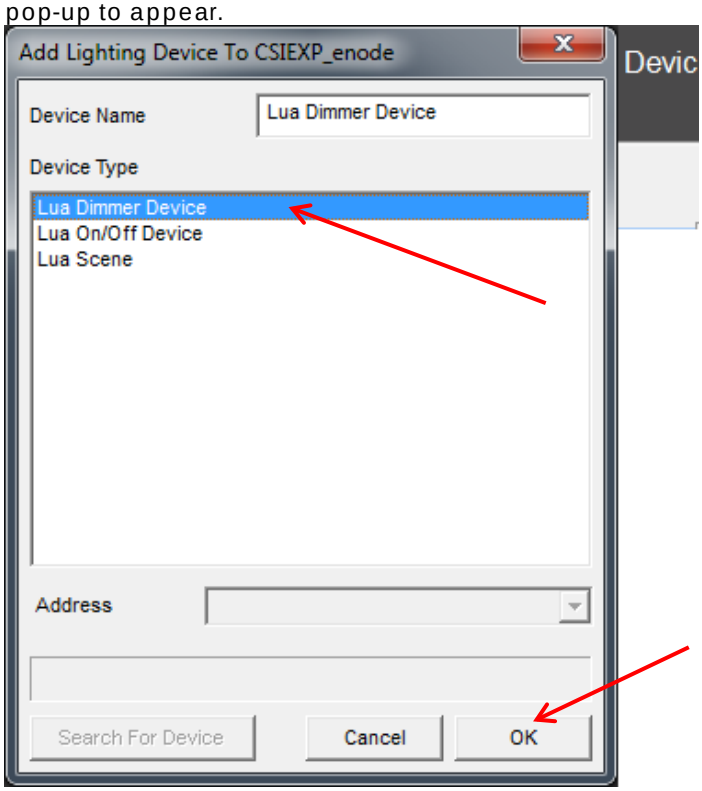
NOTE: IF YOU DID NOT CREATE THE REQUISITE NUMBER OF DEVICES IN SECTION 3 ABOVE, YOU WILL NEED TO CREATE AS MANY DEVICES (of the three or more Device Types avaialbe) FOR THE NUMBER OF SLIDERS OR BUTTONS REQUIRED RELATED TO A SPECFIC Zone/Group/Node ADDRESS.

Refer to the following table for the Device Type that must be created to enable the operation of these types of controls. The refernce under the Additional Reference column directs you to the information step below relevant to the creation of that device type.

Table 10
<table>
<tr><th>Control Type</th><th>Elan Device Type</th><th>Additional Reference</th></tr>
<tr><td>Red Slider</td><td>Lua Dimmer Device</td><td>Step 4c</td></tr>
<tr><td>Green Slider</td><td>Lua Dimmer Device</td><td>Step 4c</td></tr>
<tr><td>Blue Slider</td><td>Lua Dimmer Device</td><td>Step 4d</td></tr>
<tr><td>Hue Slider</td><td>Lua Dimmer Device</td><td>Step 4d</td></tr>
<tr><td>Saturation Slider</td><td>Lua Dimmer Device</td><td>Step 4d</td></tr>
<tr><td>Brightness (Fade) Slider</td><td>Lua Dimmer Device</td><td>Step 4d</td></tr>
<tr><td>Standard On/Off buttons</td><td>Lua On/Off Device</td><td>Step 4e</td></tr>
<tr><td>Recall (Scene)</td><td>Lua Scene</td><td>Step 4f</td></tr>
</table>
</td>
</tr>
<tr>
<td>4c</td>
<td>For each Slider that needs to be created, you must Add a New Lua Dimmer Device for a particular ILC-x00 controller (with a unique Z/G/N address).</td>
<td>-Right click under the communicate device (e-Node) that you programmed in Section 2 or 3 to reveal the following pop-up message.</td>
</tr>
</table>



-Select "**Add New Device**" which will trigger the following pop-up to appear.



-Select **Lua Dimmer Device** and hit **OK** to continue,

-Next, left click on the newly created device to review the following data entry field.

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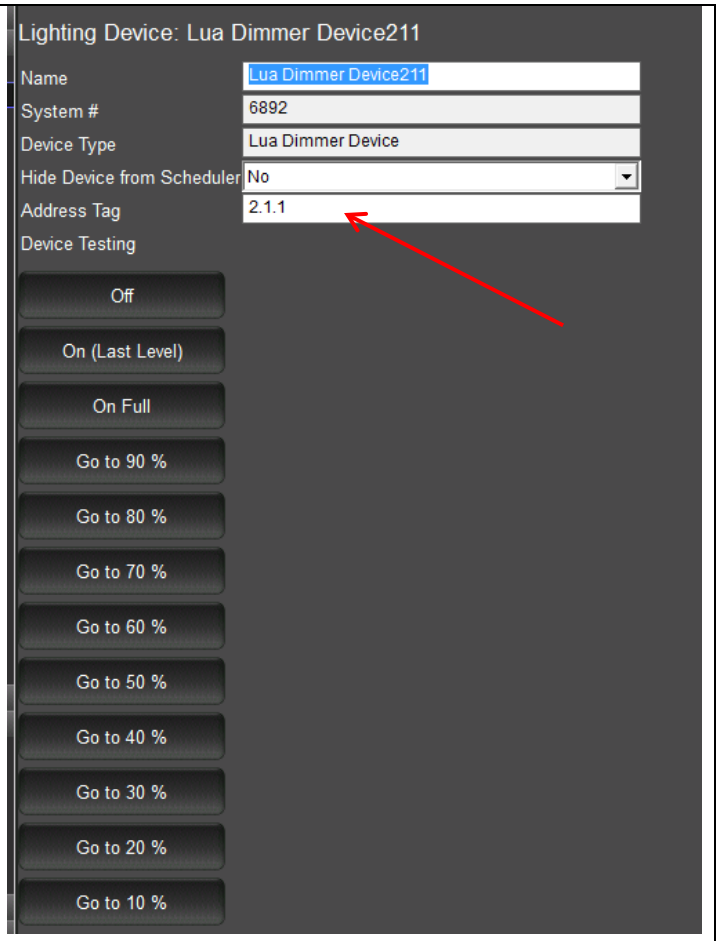
www.convergingsystems.com



--Enter the applicable Address Tag in the format **Z.G.N** or **Z.G.N,<parameter>**) with periods (and comma if indicated).

Table 11

System Family	Device Type	Address Tag
Red Slider	Lua Dimmer Device	Z.G.N,RED
Green Slider	Lua Dimmer Device	Z.G.N,GREEN
Blue Slider	Lua Dimmer Device	Z.G.N,BLUE
Hue Slider	Lua Dimmer Device	Z.G.N,HUE
Saturation Slider	Lua Dimmer	Z.G.N,SAT

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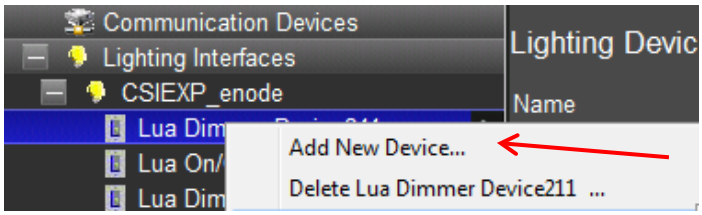
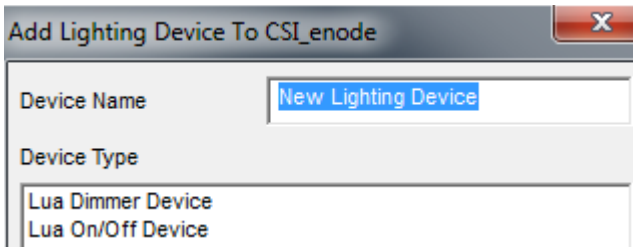
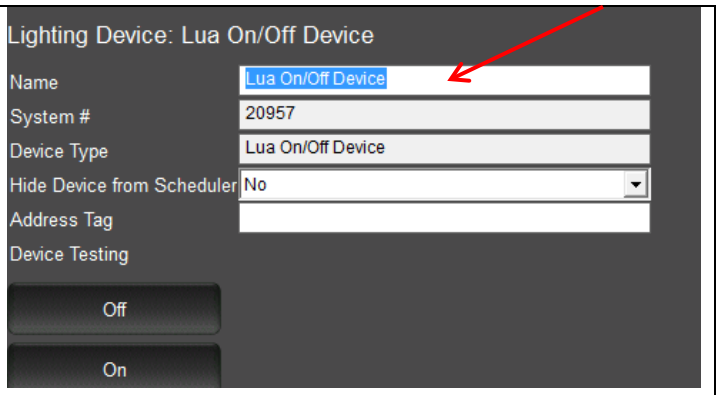
www.convergingsystems.com

		Device	
		Brightness (Fade) Slider	Lua Dimmer Device	Z.G.N
		Standard On/Off buttons	Lua On/Off Device	Z.G.N
		Recall (Scene)	Lua Scene	Z.G.N,n (where n is the scene or recall number)

-Hit **Apply** when finished

-For each new Slider repeat the above steps within this Step.

4e	For each set of **ON/OFF buttons** that need to be created, you must Add one New **Lua ON/Off Device** for a particular ILC-x00 controller (with a unique Z/G/N address).	-Right click ***under*** the communicate device that you programmed in **SECTION 3** above to reveal the following pop-up message.  -Select "**Add New Device**" which will trigger the following pop-up to appear.  -Next, left click on the newly created device to review the following data entry field.



--Enter the applicable Address Tag in the format **Z.G.N** or **Z.G.N,<parameter>** with periods (and comma if indicated).

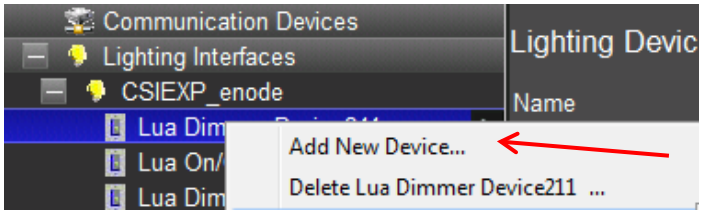
Table 12

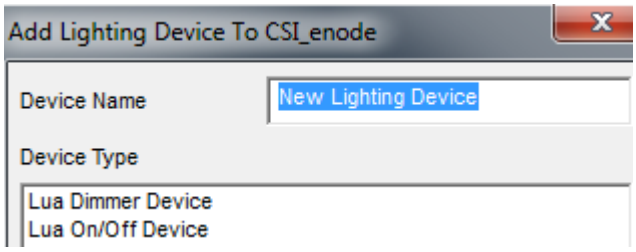
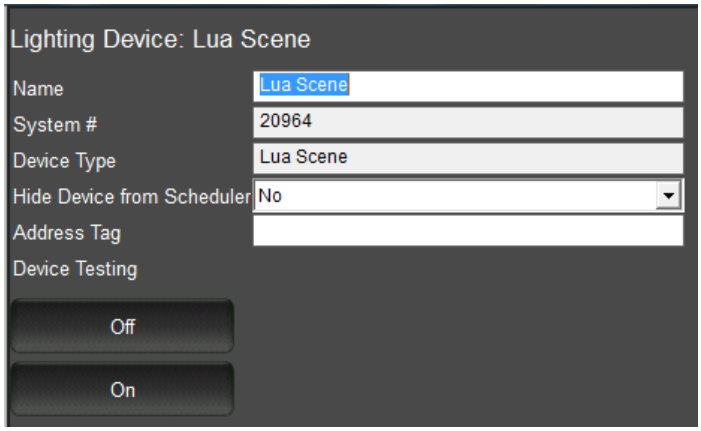
System Family	Device Type	Address Tag
Red Slider	Lua Dimmer Device	Z.G.N,RED
Green Slider	Lua Dimmer Device	Z.G.N,GREEN
Blue Slider	Lua Dimmer Device	Z.G.N,BLUE
Hue Slider	Lua Dimmer Device	Z.G.N,HUE
Saturation Slider	Lua Dimmer Device	Z.G.N,SAT
Brightness (Fade) Slider	Lua Dimmer Device	Z.G.N

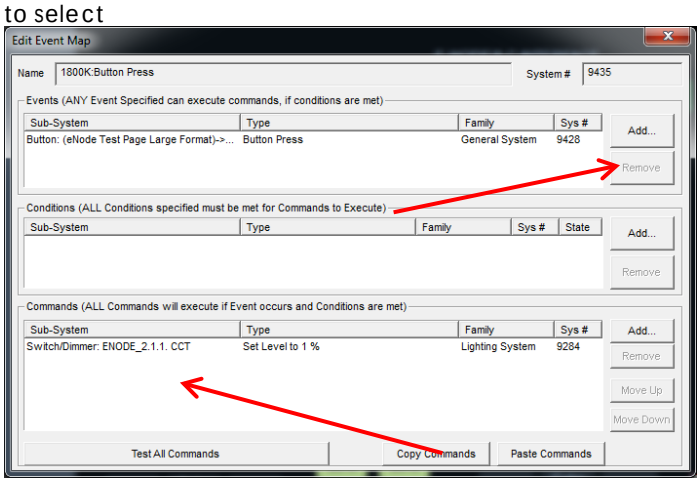
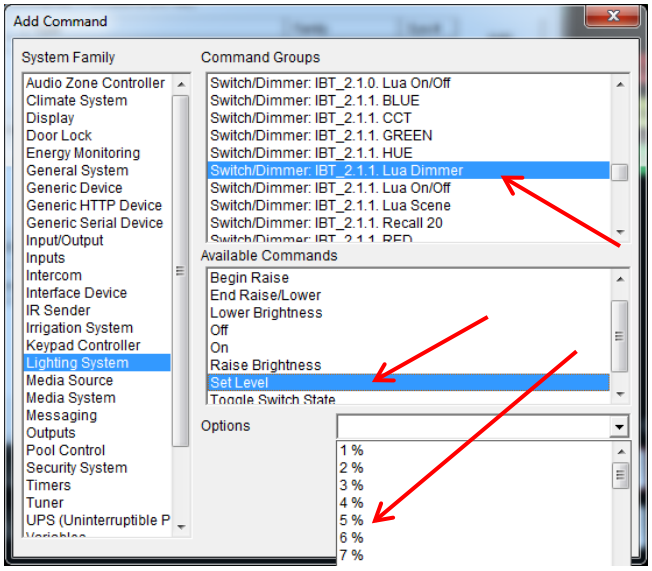
4f

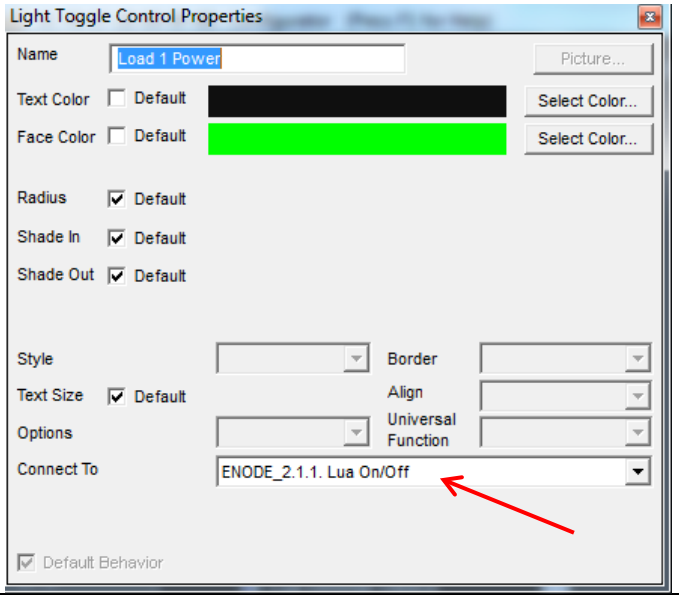
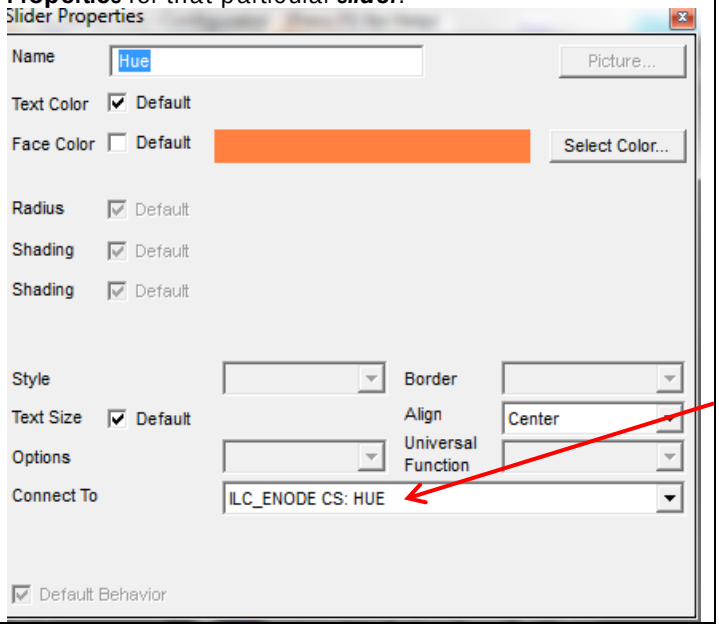
For each **Scene (Recall) button** that need to be created, you must Add one New **Lua Scene Device** for a particular ILC-x00 controller (with a unique Z/G/N address).

-Right click ***under*** the **Communicate Device** that you programmed in **SECTION 3** above to reveal the following pop-up message.



		-Select "**Add New Device**" which will trigger the following pop-up to appear.  -Next, left click on the newly created device to review the following data entry field.  --Enter the applicable Address Tag in the format **Z.G.N,<parameter>** with periods and commas as indicated. **Table 13** System Family / Device Type / Address Tag Recall (Scene) / Lua Scene / Z.G.N,n (where n is the scene or recall number)
4g	Button Programming	For **On/Off** buttons, **Scene** buttons, **Color Temperature** buttons and the like (but not sliders), right click on any button and select **Create Event Map** (or **Edit the Event** Map if an event has alread been programmed**)** for that particular ***button***. Within the **Commands** window, select

		Add and navigate to the specific command that you wish to select  Certain commands with variable inputs will require that those setting parameters be added as well. Here is an example of a dimmer command that allows an exact level to be entered. After that level has been entered, select **OK** to proceed. 

		-For example, in order to program the **ON** button to turn on LEDS with a partcular **Z**one/**G**roup/**A**ddress, the command currently would be **ILC-ENODE CS: ON** 
4h	Slider Programming	Right click on any pre-existing slider and select **Show Properties** for that particular ***slider***. 

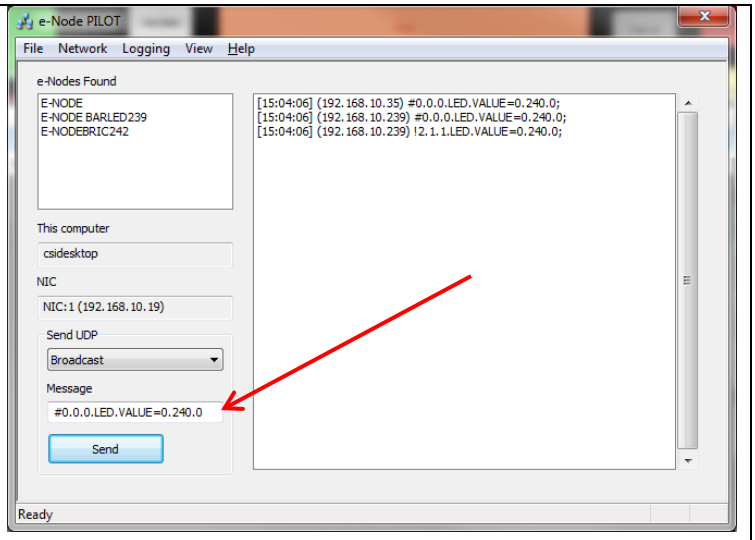
		Within the **Connects To data field,** select the appropriate command for the respective slider. In this case, the command for the Hue Slider is **ILC_ENODE CS:HUE**. The magic of the ENODE driver here is that the slider has automatically been programmed through this step not only to control the color output of the targeted LED, but will also update its postion based on a set of messages flowing between the g! processor the the targeted LED device which saves much additional programming effort on the part of the installer.
4i	Finish up your User Interface	Continue modifying and customizing your user interface as required. When you are done just hit **Apply** to upload all code changes to your g! processor.

5. Test

5a	Launch the g!Tools Viewer and select a programmed button to operate.	Make sure your eNode and connected controllers are properly working and tested using e-Node Pilot. Observe your connected LEDS and see if they operate properly. If so, you have successfully interfaced Converging Systems' controllers. If they do not operate, proceed to the next section.

6. Troubleshooting

6a	Launch the Converging Systems' Pilot application which communicates with the Converging Systems' e-Node Ethernet bridge.	Within the Pilot application, select the View Map Tab and discover e-Nodes and Devices. Then go to the Traffic Tab, and enter the following command to see if your e-Node and connected LED controllers are properly functioning. **#0.0.0.LED.VALUE=0.240.0**

		 The connected LEDS should turn GREEN Consult the e-Node documentation or see Appendix 6 for more troubleshooting information.

g! CONFIGURATION DETAILS

The following table provides settings used in Configurator …Please refer to the Configurator Reference Guide for more details. One table indicates IP settings for the e-Node Ethernet device. The next table shows RS-232c settings for the IBT-100.

Note: Currently only three (3) types of Lighting devices are available with the current release of LUA tools. These are as follows:

-Lua On/Off Device

-Lua Dimmer Device

-Lua Scene Device

Accordingly, no other functions other than those available in these three devices are currently available.

In the table below:

- "<User Defined>", etc. — Type in the desired name for the item.
- "<Auto Detect>", etc. — The system will auto detect this variable.

Table 14 e-Node Ethernet Communication

Devices	Variable	Setting	Comments
Communication (Lighting Interface)	**Name**	<User Defined> (Typical CSIEXP_enode)	
	System #	<Auto Detect>	
	Driver Vendor	Converging Systems Inc.	
	Device Type	CSIEXP_enode	
	User Name	**Converging Systems e-Node**	
	Driver	<Auto Detect>	
	Driver	Converging Systems	
	IP Address	<User Defined>	
	Port	<Auto Detect> (Default 23)	The field is discovered automatically.
Lua Dimmer (for each ILC-xxx load)	**Name**	<User Defined> (Default Lua Dimmer)	
	System #	<Auto Detect>	
	Device Type	<Auto Detect> (Default **Lua Dimmer Device**)	
	Address Tag	<User Defined> **Note** Depending upon type of dimmer/slider you must customize the entry as appropriate. See **Dimmer Device Parameter Table** below for choices. Choices are **Z.G.N** (for FADE), or **Z.G.N,<PARAMETER>** (for all other types0	
Lua Scene (for each ILC-xxx load)	**Name**	<User Defined> (Default **Lua Scene**)	
	System #	<Auto Detect>	
	Device Type	<Auto Detect> (Default **Lua Scene**)	

	Address Tag	<User Defined> **Note** Enter in format Z.G.N,n (with periods between the Z and G entry, a comma after then N AND A SCENE NUMBER for 'n' (Preset Number)	
Lua On/Off Device (for each ILC-xxx load)	**Name**	<User Defined> (Default **Lua On/Off Device**)	
	System #	<Auto Detect>	
	Device Type	<Auto Detect> (Default **Lua On/Off Device**)	
	Address Tag	<User Defined> **Note** Enter in format **Z.G.N** (with periods between the Z and G entry)	

Table 15 IBT-100 Serial Communication

Devices	Variable Name	Setting	Comments
Communication (Serial Port)	**Name**	<User Defined> (Typical IBT Serial Device)	
	Device Type	<Auto Detect> (Default Serial Port / Standard Configuration)	
	COM Port	<User Defined>	
	Protocol & Other Serial settings	<User Defined> (RS232, 57600,None, None, 8,1)	
Lighting Interface	**Name**	<User Defined> (Typical CSI_IBT)	
	System #	<Auto Detect>	
	Driver Vendor	Converging Systems Inc.	

	Device Type	CSI_IBT	
	Communication Device	<User Defined> (typically **IBT Serial Device)**	
Lua Dimmer (for each ILC-xxx load)	**Name**	<User Defined> (Default Lua Dimmer)	
	System #	<Auto Detect>	
	Device Type	<Auto Detect> (Default **Lua Dimmer Device**)	
	Address Tag	<User Defined> **Note** Depending upon type of dimmer/slider you must customize the entry as appropriate. See **Dimmer Device Parameter Table** below for choices. Choices are **Z.G.N** (for FADE), or **Z.G.N,<PARAMETER>** (for all other types0	
Lua Scene (for each ILC-xxx load)	**Name**	<User Defined> (Default **Lua Scene**)	
	System #	<Auto Detect>	
	Device Type	<Auto Detect> (Default **Lua Scene**)	
	Address Tag	<User Defined> **Note** Enter in format Z.G.N,n (with periods between the Z and G entry, a comma after then N AND A SCENE NUMBER for 'n' (Preset Number)	
Lua On/Off Device (for each ILC-xxx load)	**Name**	<User Defined> (Default **Lua On/Off Device**)	
	System #	<Auto Detect>	
	Device Type	<Auto Detect> (Default **Lua On/Off Device**)	

	Address Tag	<User Defined> **Note** Enter in format **Z.G.N** (with periods between the Z and G entry)	

Table 16 **Dimmer Device Parameter Table**

Dimmer Type	Address Tag
Hue	Z.G.N,HUE <entry for a Z/G/N address of 2.1.1 is 2.1.1,HUE>
Sat	Z.G.N,HUE <entry for a Z/G/N address of 2.1.1 is 2.1.1,SAT>
Brightness	Z.G.N,HUE <entry for a Z/G/N address of 2.1.1 is 2.1.1> **Note: there is no trailing parameter for this is a same functionality as a standard Fade**
Red	Z.G.N,HUE <entry for a Z/G/N address of 2.1.1 is 2.1.1,RED>
Green	Z.G.N,HUE <entry for a Z/G/N address of 2.1.1 is 2.1.1,GREEN>
Blue	Z.G.N,HUE <entry for a Z/G/N address of 2.1.1 is 2.1.1,BLUE>
White (only for RGBW device driver-not for RGB device driver)	Z.G.N,HUE <entry for a Z/G/N address of 2.1.1 is 2.1.1,WHITE>
CCT (for Color Temperature)	Z.G.N,HUE <entry for a Z/G/N address of 2.1.1 is 2.1.1,CCT>
SUN (for Circadian rhythm)	Z.G.N,HUE <entry for a Z/G/N address of 2.1.1 is 2.1.1,SUN>

COMMON MISTAKES

1. Forgetting to set TELNET credentials for Converging Systems e-Node device within the Lighting Interface page. Typically, Telnet sessions require a LOGIN ID. Currently within the Elan setup, Telnet is used with LOGIN. IF the LOGIN setting within the e-Node is set to **DISABLE**, the Elan processor will be unable to establish a Telnet session with the e-Node. Make sure it is set to ENABLE to enable this feature. If you have changed this feature within e-Node Pilot, you must hit the **RESTART** button in order for this change to become valid.
2. Forgetting to update Zone/Group/Nodes addresses within the default serial or IP driver for specific controllers. The default driver from Converging Systems is set to **2.1.0** for lighting devices, and **1.1.0** for motor devices. The "0" in the last location refers to a wildcard setting which causes all devices with a

Node address from 1 to 254 to respond. If you have a setup with uses specific addresses other than **2.1.1** for instance (i.e. **2.1.2** for the second controller, **2.1.3** for the third controller, etc.) you must update the serial or IP driver accordingly.

3. Make sure that you do not use the Communication Device created by more than one Generic Serial Device or Generic Ethernet Device.
4. Forgetting to create a Generic Serial Port when utilizing the IBT LUA driver for communication with the IBT-100.

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Appendix 1

Converging Systems System Setup/Configuration

Before proper operation between the Converging Systems' controllers and the Elan' system can begin, it will be first necessary for most applications to configure the Converging Systems' products using the e-Node Pilot (PC-based) application and the e-Node (Ethernet communication device). In addition, communication parameters within the Elan g!Tools software are also required. In case you have not previously configured a Converging Systems controller product, please refer to the extended instructions in this Appendix.

Background

The Converging Systems e-Node is an Ethernet communication device which can be used to connect the Elan Host to one or more Converging Systems motor and/or lighting controllers. Alternatively, the Converging Systems' IBT-100 serial interface device can be used alternatively to connect the same number of Converging Systems' controllers to an Elan processor in situations where Ethernet communication is not desired (but where bi-directional feedback is still required).

However, regardless of whether you desire to interface ***more than one*** lighting controller (or motor controller) each with its own controllable operation (i.e. its own **Z**one/**G**roup/**N**ode or **Z/G/N** address) with either the e-Node (Ethernet) or the IBT-100 (RS-232c communication), and/or you desire ***bi-directional communication/feedback*** between your user interface (UI) and a particular motor or lighting controller, **you must still follow the directions below under (i) e-Node Programming** and **(ii) ILC-100/ILC-400 Programming** in order to establish **unique ZGN address(es) for connected loads** and **turn on the NOTIFY command** which provides for that bi-directional communication.

Note: If you plan on utilizing the IBT-100 for serial communication and (i) ***you will not need*** more than one address other than the factory default **ZGN** address of 2.1.0 for lighting controllers or 1.1.0 for motor controllers, and (ii) ***you do not need bi-directional communication*** between the lighting load or the motor load and your User Interface, then you can proceed to the IBT-100 Set up Section and you may skip the (i) e-Node Programming section as well as (ii) the ILC-100/ILC-400 Programming sections below.

Settings that can be implemented using this setup are as follows:

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Communication Device Programming/Device Programming

Min requirements for this operation

- Computer running Windows XP or later OS, preferably with a wired Ethernet connection to a local router using CAT5 type cabling
- Converging Systems E-Node Ethernet adapter connected using CAT5 cabling to the above router.
- Download of the latest version of e-Node Pilot application, unzipped and operating on your computer platform
- Powered up and connected ILC-x00 controller using straight thru (1-1) wiring using a 6-pin RJ-connector (**Do not use 568A or 568B wiring and simply chop off the browns because this does not preserve twisted pairs on pins 1 / 2, 3 /4 , and 5/ 6 which is required**).

Recommended RJ-25 6P6C connections 6 wires		
e-Node Side	**ILC-x00 side**	**Color of wire**
Pin 1	Pin 1	blue
Pin 2	Pin 2	Blue/white
Pin 3	Pin 3	Orange
Pin 4	Pin 4	Orange/white
Pin 5	Pin 5	Green
Pin 6	Pin 6	Green/white

Suboptimal RJ-11 4P4C connection 4 wires		
e-Node Side	**ILC-x00 side**	**Color of wire**
Pin 1	Pin 1	Orange
Pin 2	Pin 2	Blue
Pin 3	Pin 3	Blue/white
Pin 4	Pin 4	Orange/white

Note: For the purposes of commissioning if *you do not have* 6P6C RJ-25 connectors, you can use standard 4-pin RJ11 connectors, but follow the wiring directions above preserving twisted pairs on Pin 2/3 and Pins 1 /4. **This cable will not work for keypad communication or IBT-100 communication**.

Please follow the below steps under "**e-Node Programming**" when using the e-Node for Ethernet communication or to set-up specific loads (lighting or motor) with unique, non-zero, **Z**one/**G**roup/**N**ode or **Z/G/N** addresses.

e-Node Programming

Step	Setting	Choices
EN-1	**e-Node IP Address** setting Set up the e-node with an appropriate Static or Dynamic IP address. Refer to the separate "e-Node Quick Start	Static or Dynamic Addressing -Launch the e-Node Pilot application.

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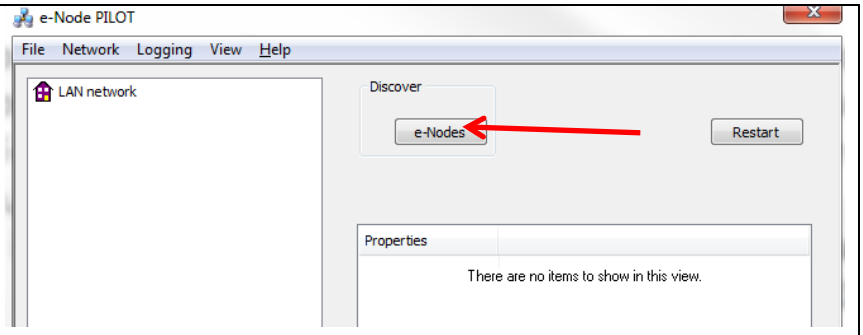
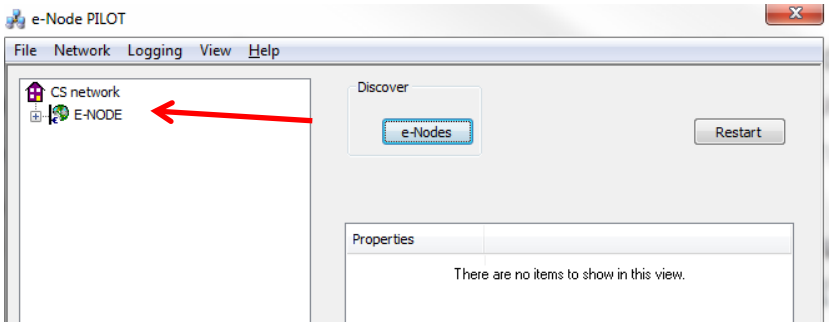
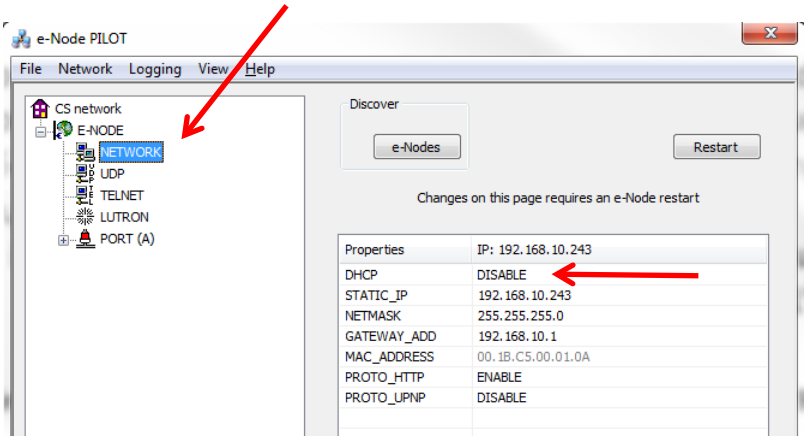
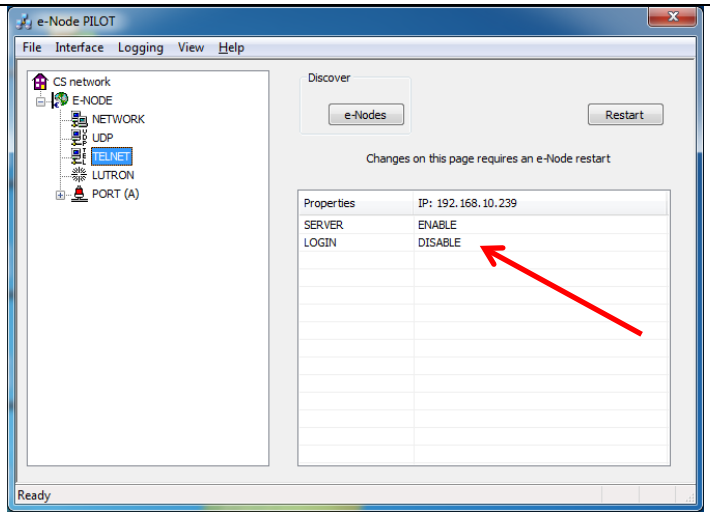
	Guide" on how to make such settings.	 **-**Select the **View e-Node** tab and select the Discover **e-Node** button**.** Any e-Node(s) connected on the same network will appear as shown.  -Select the **+** mark in front of the e-Node found to expand the menu.  -Review the **DHCP** entry, the factory default is ENABLE which means **DHCP** is activated. DISABLE for **DHCP** refers to static IP addressing. If you wish to set a **STATIC** IP address, enter the following variables ***in the order***

<table>
<tr>
<td></td>
<td></td>
<td>specified below:
<table>
<tr><td>STATIC_IP</td><td>xxx.xxx.xxx.xxx</td><td>Your new static IP address</td></tr>
<tr><td>GATEWAY_ADD</td><td>xxx.xxx.xxx.xxx</td><td>Typically the address of your network’s gateway</td></tr>
<tr><td>FINALLY and only after you have set the above variables, select DHCP</td><td>And Set to DISABLE</td><td>Now reboot the e-Node for this to take effect.</td></tr>
</table>
-Note: It is recommended that only STATIC addressing be used with the Elan processors.</td>
</tr>
<tr>
<td>EN-2</td>
<td>TELNET Port (transmit and receive)</td>
<td>Depending upon the functionality of the Elan driver and the installer’s specific settings, the suggested communication protocol between Elan and the e-Node is Telnet Port 23 communication (with or without Login). You will need at minimum (i) to turn on Telnet within the e-Node, and (ii) to adjust secondarily the setting for Login as required by the Elan driver.

1) Select the View e-Node tab and select the Telnet tab. Set SERVER to ENABLE.

2) Login Settings.
With the new LUA device drivers, Telnet communication with Login <u>is supported</u>, Within Pilot, set LOGIN to ENABLE and select the Restart button for the particular e-Node that you are utilizing to communicate with the Elan system.

b) If alternative Elan LUA drivers come to exist which permit LOGIN to be disabled, within Pilot set LOGIN to DISABLE and select the Restart button for the particular e-Node that you are utilizing to communicate with the Elan system.</td>
</tr>
</table>

IBT-100 Programming

All of the communication parameters to support the IBT-100 are built into the Elan LUA driver and therefore no special programming is required of the IBT-100 serial adapter. However, certain features of the ILC-100/ILC-400 with respect to **NOTIFY** (which permits automatic signaling of color status upon color state changes) described above will need to be programmed using the e-Node. But in this case, after the specific lighting controllers are programmed, the e-Node will no longer be required for Elan to Converging Systems communication using the IBT-100.

RS-232C Interfacing Note: If you plan on simply using the IBT-100 for serial communication and desire to have multiple lighting loads (more than one ILC-100 with a unique **Z**one/**G**roup/**N**ode address you must set up your system using the e-Node as specified above as well as the particular lighting load as specified below. However, if you do not care about bi-directional feedback or support of multiple controllers address, no further set-up is required. However, this is not recommended.

ILC-100/ILC-400 Programming

Step	Setting	Choices
DV-1	**ILC-x00 Discovery** and **Address Setup**	More thorough documentation of this step can be found in the *e-Node Commissioning Guide* referenced in Step EN-1 above. However for document completeness, an abridge

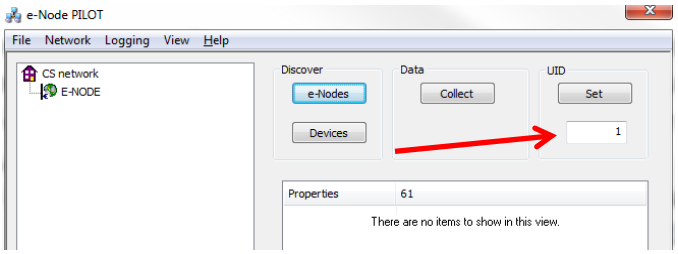
version of this guide is summarized below.

Background. From the factory the **ILC-x00** controllers do not have an assigned UID (unique ID) address. Units come equipped with a factory default address of **Zone**=2, **Group**=1, and **Node**=undefined or a 0. If you set up your Elan system to communicate with an ILC-x00 with an address of **2.1.0** the ILC-x00 will react but it will not provide feedback data which is required for automatic slider updates within the Elan systems. ***Therefore, it is advisable to set up a non-zero address for each ILC-x00 controller that is connected to either an IBT-100 or an e-Node.*** The directions below indicated how to perform this operation. (See **Step 2b** below as well as **Appendix 2** for more information on **Z**one/**G**roup/**N**ode addressing.)

Process.
(1) Power on the e-Node and any connected ILC-x00 controllers.

(2) Launch the Pilot application and select the Discover **e-Node** within the **View Map** tab.

(3) Now, under the **UID** window, select and enter a unique UID number/address (good to start with 1 and work upwards but never use a duplicate number) and select **Set**.



.

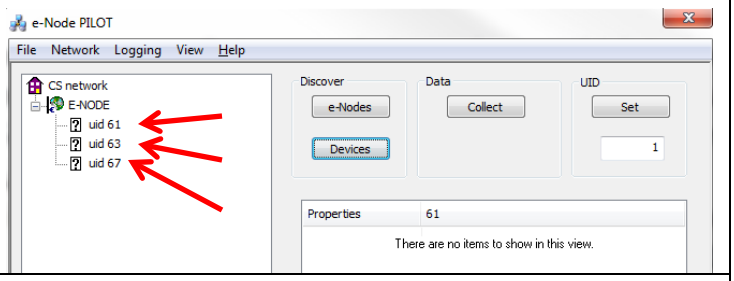
4) You will now need to hit the discovery button on your respective controller. Now close down the pop-up menu.

5) Now you will need to depress for approximately ½ second the "Discovery/Reset" button on an ILC-x00 controller for the unit to become programmed with the selected UID address. See the appropriate section for your particular device.

- **ILC-100.** Take a larger type paper clip or similar device and **gently** insert it into the reset/discovery hole on the side of the chassis and press the

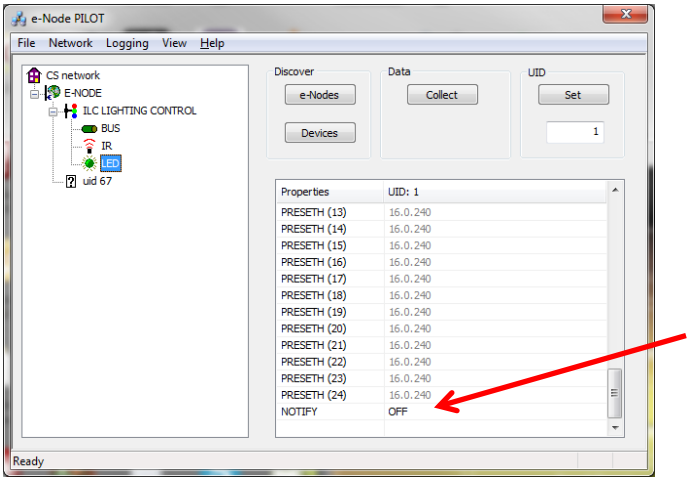
<table>
<tr>
<td></td>
<td></td>
<td>momentary button that you will feel for ½ second and then release. The existence of the ILC-100 will appear under the e-Node entry within Pilot.
• ILC-400. Remove the white plastic protective shroud to the left of the dual RJ-25 connectors with your finger nail or a small flat-headed to expose a push button mounted to the PCB. Depress the pushbutton for ½ second and then release. The existence of the ILC-400 will appear under the e-Node entry within Pilot

-If you have more than one connected controller (ILC-100 or ILC-400) continue this process until you have Discovered all devices. In the example below, three ILC-100 devices have been Discovered or found.

 
</td>
</tr>
<tr>
<td>DV-2</td>
<td>Notify Mode</td>
<td><u>Background</u>. Should you be implementing Color and Dimmer sliders within your project, the Elan system needs to receive color data back from the Converging Systems' controllers in order to update Elan's resources to automatically move the sliders and/or provide data within a data field. Converging Systems' lighting controllers can automatically notify the Elan system whenever there is a color/lighting state change (recommended).

In order to activate this NOTIFY feature within Converging System's controllers, it is necessary to first turn on the appropriate NOTIFY function within the targeted controller (under the LED entry). By default from the factory, NOTIFY is set to OFF to reduce the amount of bus traffic. It is recommended that one of these NOTIFY functions is utilized in any integration with Elan's products. These choices are as follows:

<table>
<tr><td>HSB color data</td><td>NOTIFY=COLOR</td></tr>
<tr><td>RGB color data</td><td>NOTIFY=VALUE</td></tr>
<tr><td>HSB and RGB color data</td><td>NOTIFY=BOTH*</td></tr>
</table></td>
</tr>
</table>

		*__Note__: this feature is newly added in V3.14 of ILC-100 firmware. However, if is recommended to reduce bus traffic, that either HSB sliders (with **NOTIFY=COLOR** chosen), or RGB sliders (with **NOTIFY=VALUE** chosen) should be used on a user interface. If it is absolutely required that both RGB and HSD sliders are implemented within the Customer User Interface (and **NOTIFY=BOTH** is chosen), there may be cases where the preponderance of bus traffic received from the LED controller might interfere with valid commands transmitted onto the bus. Although this rare, it may occur. Process. Within the e-Node Pilot application, select each controller (i.e. ILC Lighting Controller) that you wish to adjust from the **View Map** tab. Then open the **LED** tab. Find the **NOTIFY variable,** and set it to **OFF.** This will prevent the selected controller from broadcasting its status after every state change therefore reducing CS-Bus traffic.  **Note:** Prior to V 3.15 of the ILC-100 firmware, it is necessary to reboot the ILC-100 for this new setting to become active after it is changed. For versions 3.15 or later, simply changing this value within Pilot is sufficient. **Legacy Firmware Note**: Earlier version of Converging Systems' color controllers did not support the **NOTIFY** function. In those cases, it will be necessary to either update those controllers

		or accept having no bi-direction control from Elan. Contact Converging Systems for more information.

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Appendix 2

COLOR SPACE ISSUES

Note on Color Space.

Converging Systems recommends that only the HSB (Hue, Saturation and Brightness color space is used for it is infinitely more accurately and user friendly to control color. Although **Figure 4** below shows both HSB and RGB on the same UI, this is probably more confusing for the typical user than the simple subset of HSB (hue, saturation, brightness) controls**. Since there is no concept of dimming within the RGB color space, having RGB sliders only frustrates the user who may just want to dim an existing colored output. However, if the User is intent on having RGB sliders, we would recommend leaving the Brightness slider to get accurate dimming.**

Figure 3

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Appendix 3

ADVANCED Elan PROGRAMMING

AP Topic 1

1.0 How to set up group control of loads using sliders with feedback available to sliders.

Addressing Background CS-Bus controllers can be address with a unique **Z**one/**G**roup/Node (ZGN) address. Up to 254 entries can be used for each field. The first field is the **Zone** (or largest range), the middle field is the **Group**, and the last field is the **Node**. No two loads can share the same **Z/G/N** address. As an example, if you will be populating a pair of two controllers within each of two rooms on two floors of a building here would be the suggested addressing that could be used.

	Floor One	**Floor Two**
Room 1	2.1.1 for first controller in room. 2.1.2 for second controller in this room	
Room 2	2.2.1 for first controller in room. 2.2.2 for second controller in this room	
Room 3		3.1.1 for first controller in room. 3.1.2 for second controller in this room
Room 4		3.2.1 for first controller in room. 3.2.2 for second controller in this room

Group Addressing. In certain cases it is desirable is simply send a wildcard address for a group of controllers to all respond in unison rather than programming each individually to respond through macros. There are two problems with macros in general. One is that often they are executed serially which means that if you had two hundred loads referenced within a macro, the timing of the execution of the last command sent out might be delayed from the first command sent out. In this case, not all LEDs would turn on or OFF at the same time, potentially. The second issue involves the actual programming time required to program scores or even hundreds of commands for a simple ALL OFF button.

Within the CS-Bus software protocol is the concept of utilizing a "0" within any address field as a surrogate for defined numbers ranging from 1 to 254 within that same field. Thus, if you issued a command of #2.1.0.LED=ON:<cr> , all units with addresses of 2.1.1 to 2.1.254 would immediately respond. Please see the table below for an example of how various wildcards could be used.

Specific controller address	**Specific command that will trigger targeted controller**

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2.1.1	2.1.0 or 2.0.0 or 0.0.0
2.1.2	2.1.0 or 2.0.0 or 0.0.0
2.1.3	2.1.0 or 2.0.0 or 0.0.0
2.2.1	2.2.0 or 2.0.0 or 0.0.0
2.2.2	2.2.0 or 2.0.0 or 0.0.0
2.2.254	2.2.0 or 2.0.0 or 0.0.0
5.254.4	5.254.0 or 5.0.0 or 0.0.0

NOTIFY Command Background Converging Systems has a **NOTIFY** function which automatically provides color state feedback (from the targeted controller) provided a unique **Z**one/**G**roup/**N**ode (**Z/G/N**) address is provided with an action/argument payload to that specific controller. Specifically, if a command to invoke a color change is directed to a controller that has a **Z/G/N** address of 2.1.1, that specific controller with that address will respond back to the automation system as to its specific color state if and only if there is a color state change impacted on that specific controller.

In some cases as has been discussed above, there might be a requirement to send a group command or all hail command to more than one controller. In this case, the group command would be directed not to a single controller or load but to a series of controllers. To reduce bus traffic when a series of controllers is given the same command, ***only the first controller whose node number is 1 greater than the wildcard command of "0" will respond*** (which reduces bus traffic by up to 243 messages). The logic here is that if 254 controllers are all told to turn **Red**, only the surrogate for that group of controllers will respond and within the CS-Bus messaging logic that surrogate is the controller with a node of "1." So for example, if a **#2.1.0.LED.VALUE=240.0.0:<cr>** command is transmitted to 254 controllers, they will all turn to **Red** , but only the controller with an address of **2.1.1** will respond with its new color status. In this case, a command on the bus from that surrogate controller would come back as follows: **!2.1.1.LED.VALUE=240.0.0** (the exclamation mark indicates that it is a message from CS-Bus device rather from an automation controller). Please see the diagram on the next page for the theory of operation here.

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Initial State of Light Output
(on Off condition)

Argument/Action Issued to a specific Z/G/N address of 2.1.1 to go to Red
#2.1.1.LED.VALUE=240.0.0;<cr>

RGB Command received by a unique Z/G/N address (2.1.1). Controller recognizes a color state change and transmits back its color state as
!2.1.1.LED.VALUE=240.0.0

3rd Party control system receives response beginning with "!" and updates its applicable color slider or other registers to received value

RGB Command received by a unique Z/G/N address (2.1.1). Controller recognizes that this was not a color state change and no response is provided (to reduce bus traffic since no new status needs to be provided)

Argument/Action Issued to a specific Z/G/N address of 2.1.1 to go to Red (again)
#2.1.1.LED.VALUE=240.0.0;<cr>

Nothing transmitted back to 3rd party control system

RGB Command received by a group Z/G/N address (2.1.0). All loads turns green but since command was transmitted to Group address, only Controller with first Node address greater than 0 (i.e. "1") within wildcard range will respond (i.e. 2.1.1 responds, but 2.1.2 to 2.1.254 do not respond)

Argument/Action Issued to a **Group** Z/G/N address of 2.1.0 to go to Green
#2.1.1.LED.VALUE=0.240.0;<cr>

!2.1.1.LED.VALUE=0.240.0 is received, but no other Z/G/N messages are received
Note: !2.1.0 LED.VALUE =0.240.0. is never received.

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Appendix 4

DMX Options

Note on DMX Lighting Devices. There are many third-party lighting devices available in the marketplace that support the DMX512 lighting standard ("standard for digital communication). DMX devices were originally utilized for theatrical interior and architectural lighting application only, but recently their adoption rate has grown in other areas where colored lighting is desired. DMX 3-color lighting fixtures utilize the Red, Green, Blue (RGB) color space which although practical for theatrical uses and the trained lighting designer is quite limited for traditional dimming application ***for the technology inherently lacks the most basic dimming slider*** which would preserve a specific hue while lowering the brightness to full off. But that has all changed now...

Converging Systems' e-Node/dmx. Converging Systems has developed an adaptation of its lighting/dimming technology currently available within its ILC-x00 line of LED controllers and has re-purposed that technology into a separate product known as the e-Node/dmx. The existing Elan drivers compatible with the ILC-x00 LED controllers can also drive directly the e-Node/dmx (color engine/dmx translator), and the e-Node/dmx makes the necessary color adjustments within its own processor to translate incoming commands to outgoing DMX commands **and transmits those directly onto *a DMX bus***. What is unique about this implementation is that the Converging Systems' hue-accurate dimming technology (with a built-in dimmer slider) can now drive DMX fixtures by using Elan device drivers already in existence for other Converging Systems' products. (See the listing of commands that are supported with the e-Node/dmx device see LED Commands in this document.)

Please follow the directions which follow to drive DMX fixtures from an Elan System

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WIRING DIAGRAM (for DMX control using e-Node/dmx and IP)

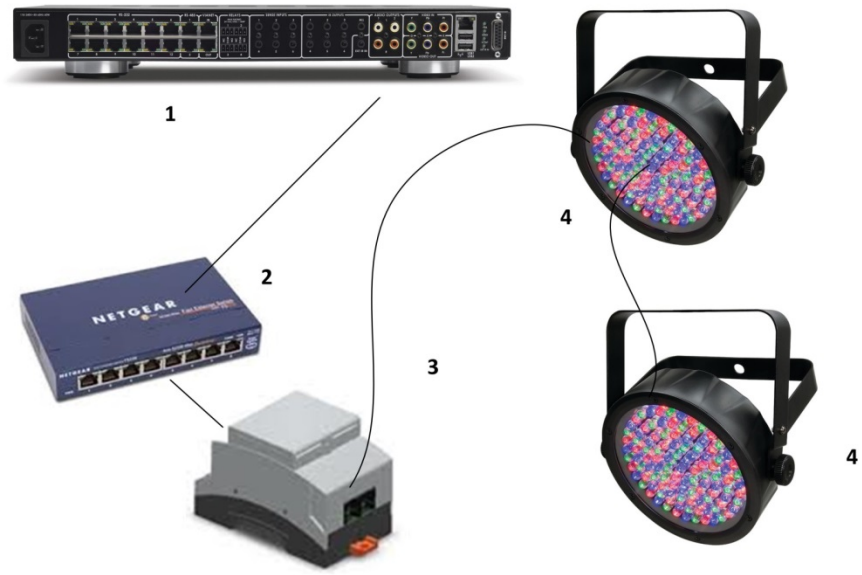

Figure 4

Wiring/Configuration Notes:

1. Maximum length of CS-Bus cabling from e-Node to the last DMX fixture using DMX cabling = 1200 meters (3,900 feet)
2. Maximum number of DMX fixtures connected to a single e-Node/dmx device = 32. If more than 32 fixtures are required, implement additional e-Node/dmx devices.
3. Maximum number of e-Nodes that can exist on a Elan system = 254

BILL OF MATERIALS (for IP control)

#	Device	Manufacturer	Part Number	Protocol	Connector Type	Notes
1	Elan gSC family processors	Elan	Various	Ethernet/USB/HDMI	various	
2	Network Switch	Various	Various	Ethernet	RJ-45	
3	e-Node/dmx	Converging Systems	e-Node/dmx	Ethernet	RJ-45 (for Ethernet) RJ-25 for local DMX bus	

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4	Third party DMX fixtures	Various	Various	DMX512	RJ-25 for DMX communication	Must terminate final OUT or THRU connector on last DMX fixture using a 120 ohm resistor

e-Node Programming/Device Programming

Minimum requirements for this operation.

-e-Node/dmx with power supply
-Necessary cabling to connect e-Node/dmx to first DMX fixture (see "e-Node Interfacing with DMX Guide"). For reference the pin-outs on the e-Node/dmx are as follows:

e-Node/dmx (MkIII) PORT 2 RJ-45 connector

Pin	Signal
1	Data +
2	Data -
3	No not connect
4	No not connect
5	No not connect
6	No not connect
7	Ground
8	

Note: Even though Converging Systems recommends that RJ-25 6P6C plugs should be used for most CS-Bus wiring, the DMX wiring can utilize a 4P4C RJ11 plug.

e-Node/dmx Programming

Step	Setting	Choices
DMX-1	e-Node/dmx setup	Follow the directions under e-node Programming in Appendix 1 (Step EN-1 and EN-2).

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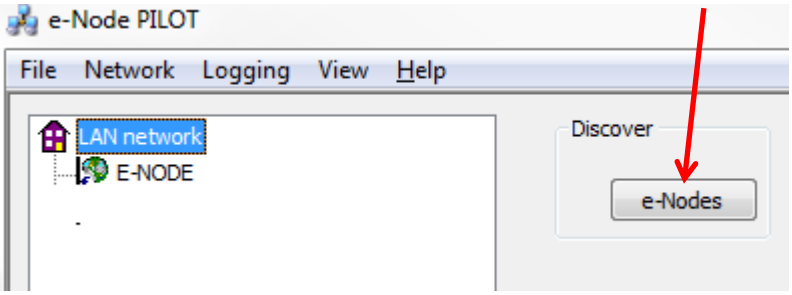
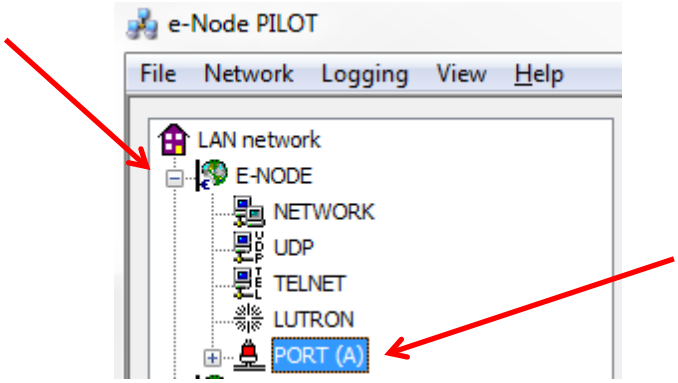
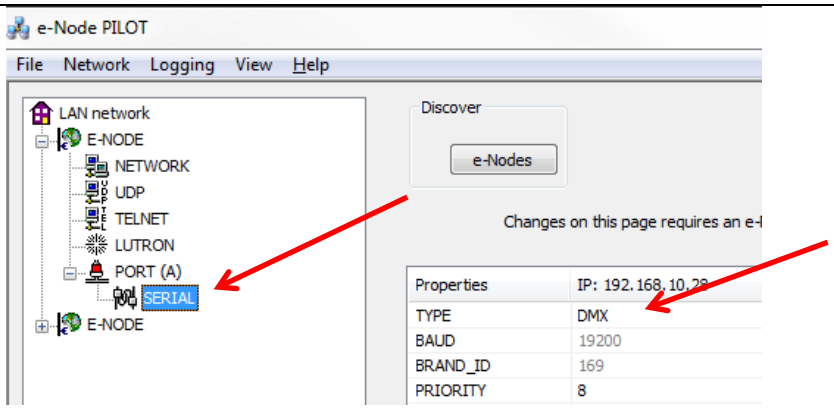
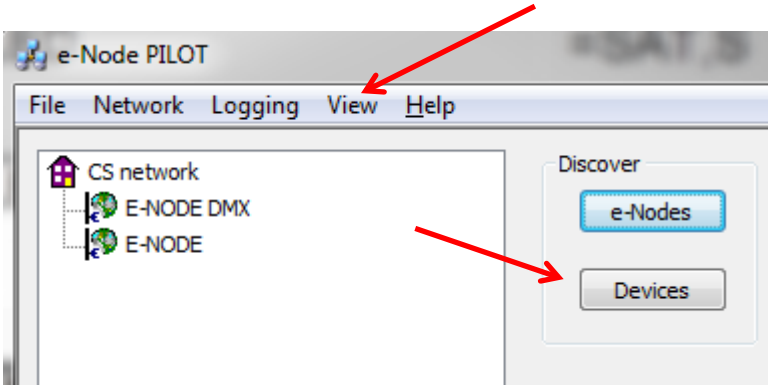
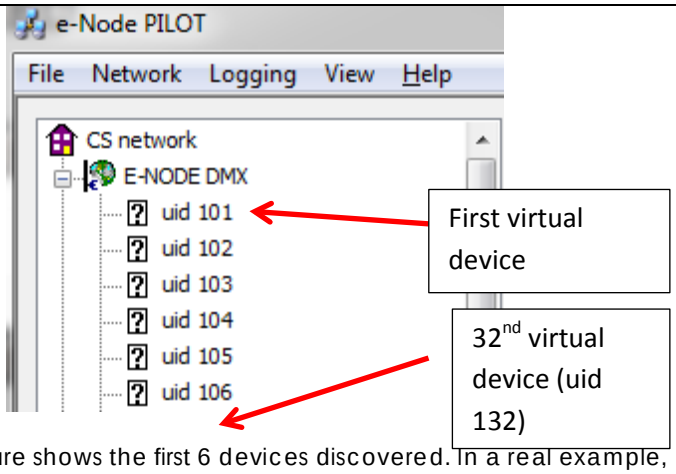
DMX-2	Verify the e-Node DMX is set to communicate to DMX fixtures	-Select the **View e-Node** tab and select the **Discover e-Node** button. Any e-Node(s) connected on the same network will appear as shown.  -Select the **+** mark in front of the e-Node/dmx that you wish to program to expose the sub-tabs.  -Expand the PORT(A) tab and then expand the Serial tab.

		 -Verify that after the **TYPE** entry, the data field indicates **DMX**. If it does not indicate **DMX**, select **DMX** from the pull down menu and reboot the e-Node/dmx in order to make this setting active. Note: the e-Node/dmx can also be configured to communicate with standard CS-Bus devices (ILC-100, ILC-400) and therefore only when this entry is set to **DMX**, will the e-Node/dmx properly communicate to DMX fixtures.
DMX-3	Device Discovery	-Select the **View Map** tab and select the **Discover e-Node** button. Any e-Node(s) connected on the same network will appear as shown. -Select the Discover Devices button.  -Immediately 32 virtual “DMX Devices” will appear as follows:



Note: this picture shows the first 6 devices discovered. In a real example, all 32 virtual devices will appear.

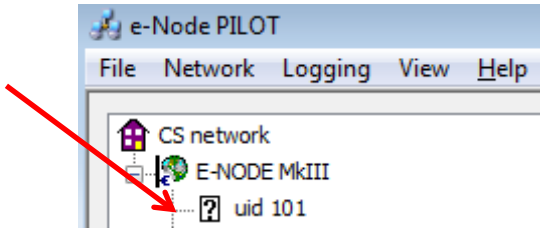
DMX-4 | Set up Device Addressing

The DMX data packet is mapped to CS messages by assigning a unique **Z**one. **G**roup. **N**ode number to three successive DMX channels. These are mapped as shown in the following table:

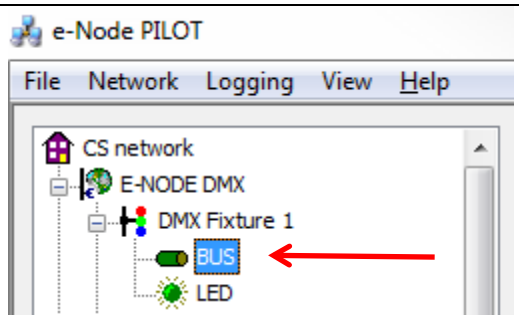
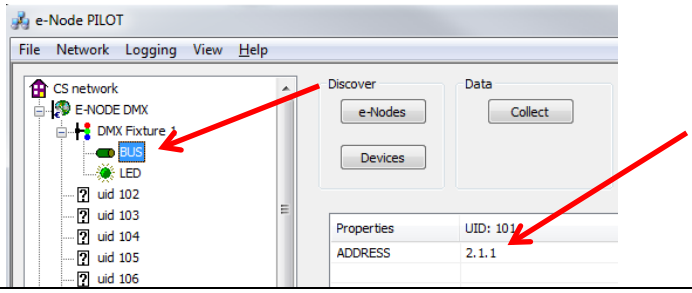
DMX Fixture	Default UID	DMX Channel Allocation	CS-Zone/Group/ Node
1	101	10-19	2.1.1
2	102	20-29	2.2.1
3	103	30-39	2.3.1
4	104	40-49	2.4.1
5	105	50-59	2.5.1
6	106	60-69	2.6.1
7	107	70-79	2.7.1
8	108	80-89	2.8.1
9	109	90-99	3.1.1
10	110	100-109	3.2.1
11	111	110-119	3.3.1
12	112	120-129	3.4.1
13	113	130-139	3.5.1
14	114	140-149	3.6.1
15	115	150-159	3.7.1
16	116	160-169	3.8.1

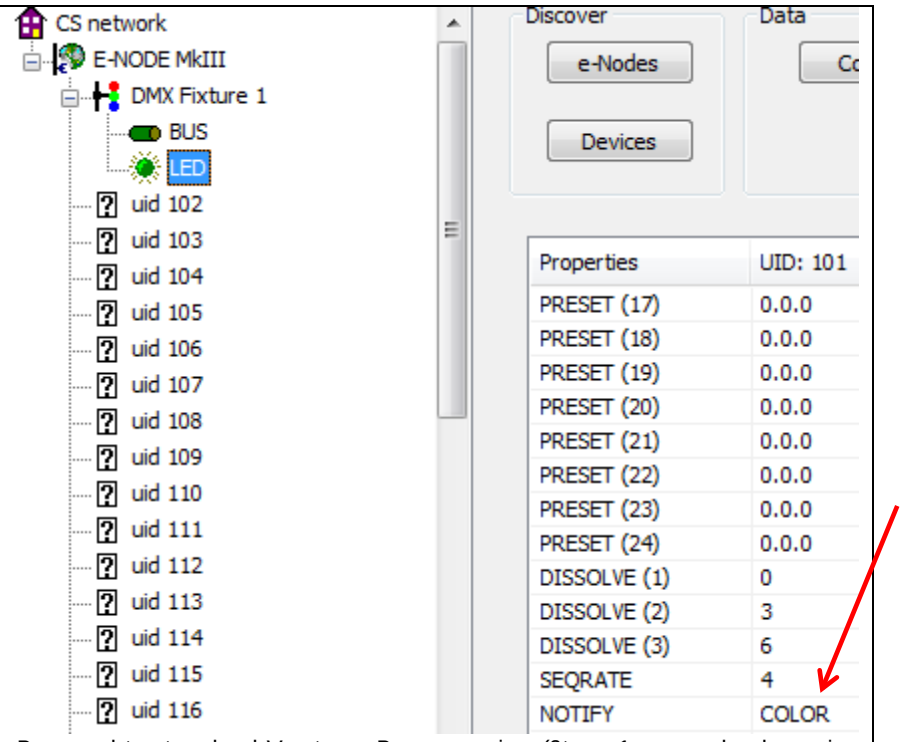
17	117	170-179	4.1.1
18	118	180-189	4.2.1
19	119	190-199	4.3.1
20	120	200-209	4.4.1
21	121	210-219	4.5.1
22	122	220-229	4.6.1
23	123	230-239	4.7.1
24	124	240-249	4.8.1
25	125	250-259	5.1.1
26	126	260-269	5.2.1
27	127	270-279	5.3.1
28	128	280-289	5.4.1
29	129	290-299	5.5.1
30	130	300-309	5.6.1
31	131	310-319	5.7.1
32	132	320-329	5.8.1

-To see these entries, click on the **?** in front of any particular **uid** listing which will expand its directory.



-After the directory is expanded, you will see these entries:

		 -If you desire to change any **Z**one/**G**roup/**N**ode address, click on the BUS entry, and change the address as appropriate. 
DMX-4	Turn on NOTIFY as applicable for your project	-Program the Device **Notify** parameter for the e-Node/dmx. Change the parameter for the specific device (UID-DMX Fixture) for which you which to invoke the NOTIFY function. **Note**: See section DV-2 in Appendix 1 for explanation of the NOTIFY function. Also understand In this case, you will not be programming ILC-100 or ILC-400 devices, so you can skip the ILC-100/400 section (Steps DV-1 and DV-2) in Appendix 1. -Proceed to standard Elan Programming (Steps 1 onwards above in the main body of this Integration Note). Note: the e-Node/dmx takes care of everything else!!!



-Proceed to standard Vantage Programming (Steps 1 onwards above in the main body of this Integration Note).

Note: the e-Node/dmx takes care of everything else!!!

Appendix 5

Sample User Interfaces

Elan Programming-User Interfaces

The individual installer typically designs the User Interface (UI) for the particular needs of the end-user. Converging Systems may add from time-to-time new UIs with advanced functionality. Sample UI screens are pictured below.

LED CONTROL ENVIRONMENTS

The following illustrations provide some sample UI for LED control interfaces.

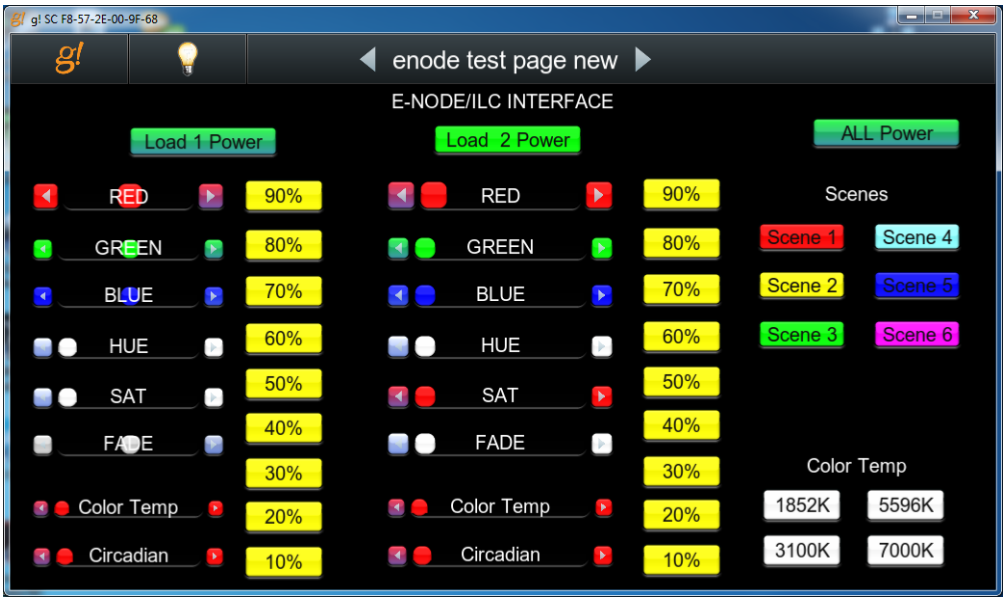


Figure 5

Note: Hue/Saturation/Brightness control. Individual power controls for two loads. (stored) Scenes (Presets 1-6) Color Temperature Sliders. Circadian Sliders. Discrete color temperature buttons.

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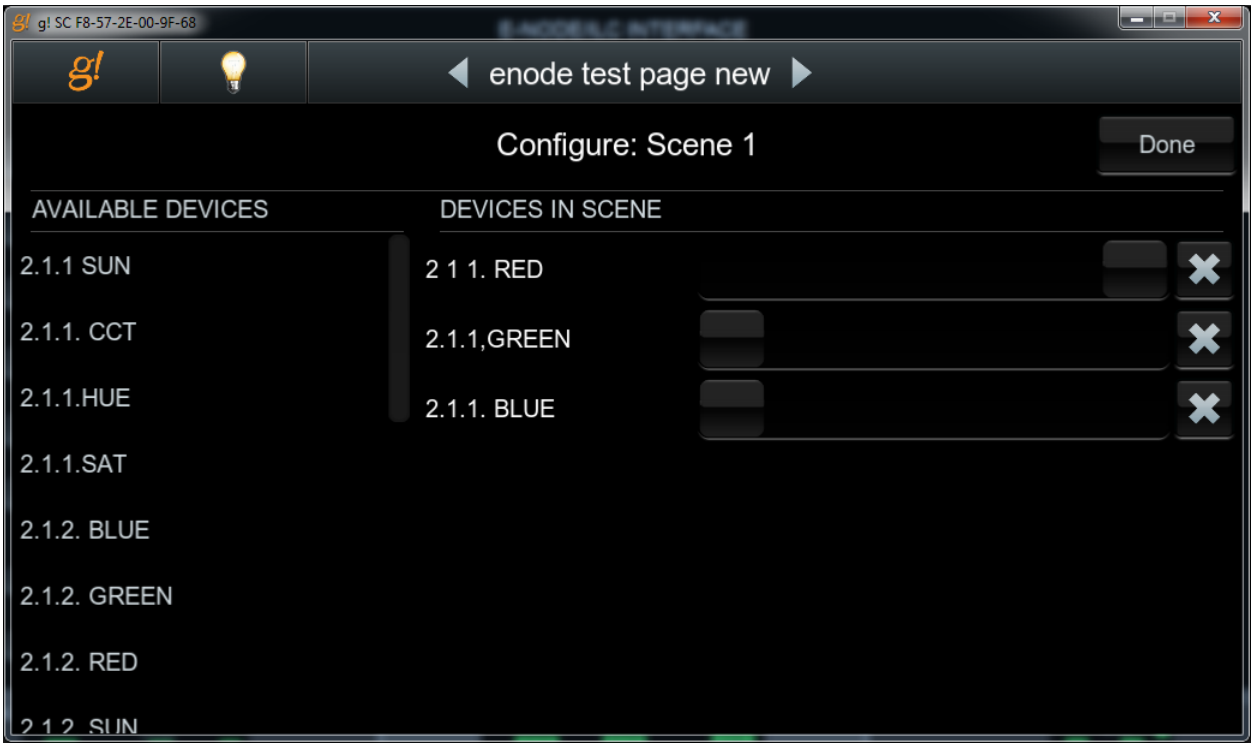

Figure 6

Note: Custom Scene Pop-up page (enable by hold and pressing on any Scene button for an extended period of time. Custom colors for Presets can be selected through this pop-up.

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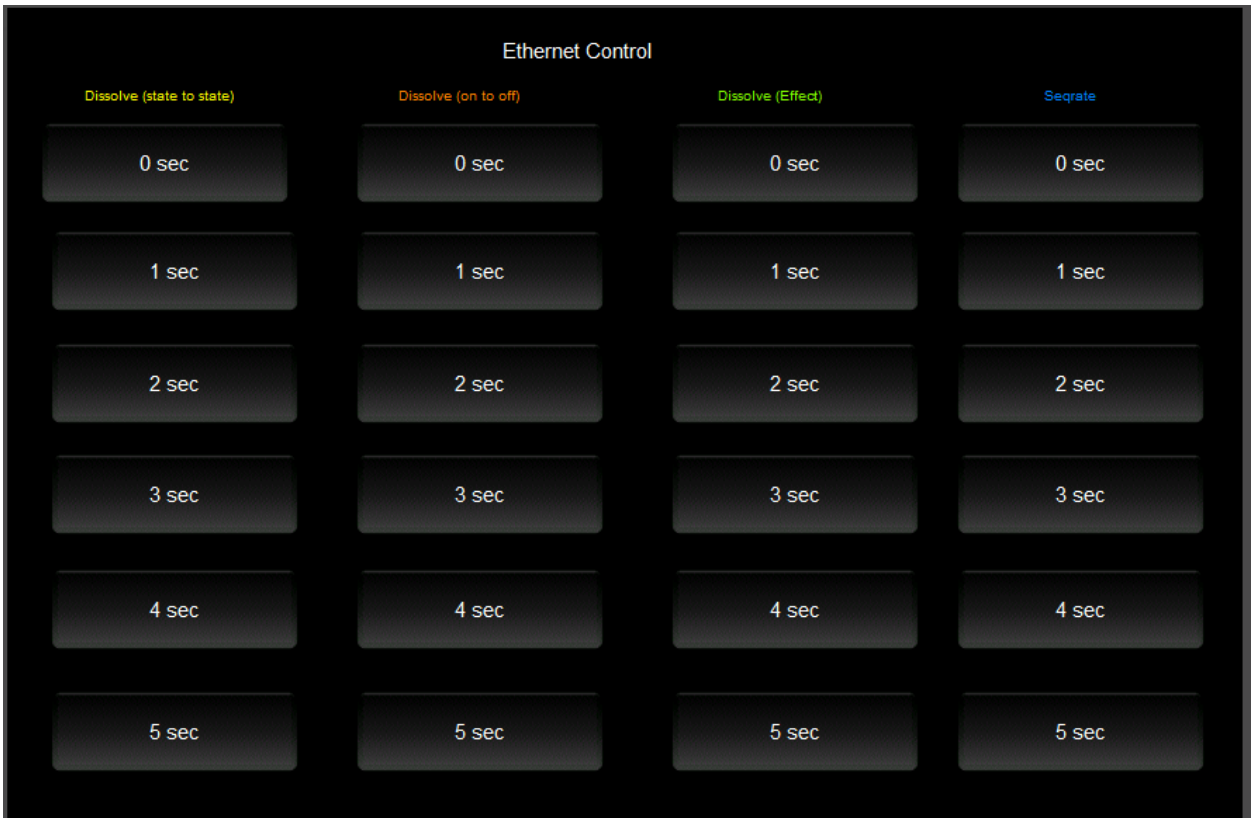

Figure 7

Note: This page is WIP and is not currently supported.

MOTOR CONTROL ENVIRONMENTS

The following illustrations provide some sample UI for motor control interfaces. Future updates to the LUA drivers will be made available supporting these screens.

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Figure 8

Note: Currently WIP. (Motor Control UP/Stop/Down for up to 4 motors. Preset Recall positions for up to 10 presets. Store Preset positions for up to 9 presets.)

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Figure 9

Note: Currently WIP. Motor Control UP/Stop/Down for up to 5 motors. Preset Recall positions for up to 3 presets for each motor. Store Preset positions for up to 3 presets for each motor

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Appendix 6

Troubleshooting/System Monitoring

(reserved)

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