ELAN Developer Partners	**Integration Note**
Manufacturer:	**Converging Systems, Inc.**
Model Number(s):	**ILC-x00 family of LED lighting controllers**
Elan Core Module Version:	Core Module Version: 8.1xxx (Schema 20 LUA driver)*
Driver Developer:	Converging Systems Inc. (licensed ELAN LUA Developer Partner)
Document Revision Date:	05/20/2017

***Note**: This current driver is not compatible with Elan g! Core Module 7.2. versions. For compatibility with Core Module 7.2 versions, please refer to the *CSI Integration Note* for Core Module Version g!7.2 (Schema 3 LUA Driver) and separate driver (V1.019) drivers.

Integration Note Table of Contents

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CONVERGING SYSTEMS

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

Note: If IP connectivity is possible within your installation, this is the preferred communication choice given the new Auto-Discovery feature available within Elan/Converging Systems' software. This feature is supported only with the e-Node and dramatically reduces the programming time required for initial Elan programming (for more information click here). Without Auto-Discovery, individual entries for all specific sliders and controls (red/green/blue or hue/saturation/brightness as well as individual scenes and effects must be manually added). With Auto-Discovery (only available with the e-Node), nearly all of these manual processes are eliminated.

Theory of Operation-note on IBT-100 use. The Elan/Converging System's driver queries an XML database present within the e-Node to make intelligent decisions as to the type and quantity of Devices auto-populated. Therefore if you wish to use the IBT-100 you must resort to manual Device entry which is quite acceptable for small installation. See Appendix 4 for step-by-step directions.

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 Elan drivers can be utilized.

THE FOLLOWING OPTIONS ARE SUPPORTED BY THE CONVERGING SYSTEMS CS-BUS (LIGHTING) DRIVER:

- Support of new Elan RGB Color Picker 

- Auto-discovery of ILC-100m, ILC-100c, and ILC-400 controllers previously identified and addressed through the e-Node Pilot application -This is a huge labor saving feature.
- 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.
- Support of communication utilizing 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 (using Customizable Scenes) stored within gSC controllers.
- Ability to store and recall specific colors set by a user within ILC-x00 controllers. (Schema 11 and later)
- Ability to recall specific Effects stored within specific ILC-x00 controllers. (Schema 11 and later)
- Ability to change Dissolve Rates (time it takes to transitions from one state to another) (i) for On and Off states, (ii) for Presets to other Presets (color) settings, and (ii) for state to state transitions within Effects. (Schema 11 and later)
- Ability to change Sequence Rates (time after any dissolve that a Preset color is maintained before transitioning to the next color in sequence) in Effects 1 and 4. (Schema 11 and later)
- Ability to store a Color Temperate or a Circadian Sun level setting within a Customizable Scene
- Control via all thin client interfaces (PC, Elan Touchscreen, Android, iOS,TS2, and HR2

THE FOLLOWING OPTIONS are not supported by CS-Bus (lighting) driver**:**

- Auto-Discovery using the IBT-100 serial interface controller (manual discovery as described in Appendix 4 is still possible)

THE FOLLOWING OPTIONS ARE SUPPORTED BY THE CONVERGING SYSTEMS CS-BUS (MOTOR) DRIVER:

- Motor UP/Down/Stop
- Motor Position Feedback (for CS-BUS motor controllers that provide this level of functionality).
- Store and Recall of presets (for CS-BUS motor controllers that provide this level of functionality)
- Support of communication utilizing Telnet with or without authentication (Port 23)

THE FOLLOWING OPTIONS are not supported by CS-Bus (motor) driver**:**

- Auto-Discovery using the e-Node or the IBT-100 serial interface controller (manual discovery as described in Appendix 4 is still possible)

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-100m	ILC-100c (sa)	ILC-400 (RGBW mode	ILC-400 (4 ch Mono)	e-Node DMX
	General LED Control Commands					
ON	eNode_On	✓	✓	✓	✓	✓
OFF	e-Node_Off	✓	✓	✓	✓	✓
EFFECT,n	Execute_Effect	✓	✓	✓	✓	✓1
STORE,#	Store Preset	✓	✓	✓	✓	✓
RECALL,#	Recall Preset	✓	✓	✓	✓	✓
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	2	2	2	2	2
SUN_UP	Sun_Up			✓		
SUN_DOWN	Sun_Down			✓		
SUN.S	Set_Circadian_Value			✓		
Elan's Customizable Scene	Can program any CS-Bus command to operate with memory retained in Elan processor	Elan	Elan	Elan	Elan	Elan
	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(W) Color Space Commands					
RED,R	Set_RED_Value		✓	✓		✓
GREEN,G	Set_GREEN_Value		✓	✓		✓
BLUE,B	Set_BLUE_Value		✓	✓		✓
VALUE=R.G.B	???					
WHITE,W	Set_BLUE_Value	✓	✓	✓	✓	✓

RGB,R.G.B	Set RGB Value		✓	✓		✓
RGBW,R.G.B	Set RGBW Value			✓		
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	✓	✓	✓	✓	✓
VALUE=?	Automatic polling within Driver **Note**: Driver achieves same function with Notify ON	✓	✓	✓	✓	✓
PRESETH.X=?		*		*		*
PRESET.X=?		*		*		*
Accessory Enode Command/Setup Parameters						
Verbose Mode						
UDP Port 4000/5000						
Telnet Login with 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.

** Integrated feature within LUA Dimmer Devices, LUA Scene Devices

1 Effect (1) only supported

2 Easiest to set within the ILC-xxx device using e-Node Pilot, or alternately you can use special driver field for adding two dissolve/seq rates into one device. See Appendix 4 for details.

Elan Feature is implemented through internal function within Elan programming rather than supporting this command.

Motor Commands 

Table 2

General Commands	Elan Naming Convention	IMC-100	BRIC ("Bric Mode")	IMC-300 (MKII)
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				

INTEGRATION REQUIREMENTS-CONVERGING SYSTEMS CONFIGURATION

NOTE: Converging Systems LED and most Motor Controllers REQUIRE a communication device (either an e-Node for Ethernet connectivity or the IBT-100 for serial connectivity). It is not possible to connect CSI LED or most Motor controllers to an Elan controller in any other way (except if those motor controllers have on-board serial or IP connections.

The system will need to be installed and configured according to the Converging Systems documentation, prior to integration with the Elan system. The Converging Systems e-Node Pilot application (required for setup) is available for download for free from the Converging Systems website (IP configuration using the e-Node is possible using both dynamic and 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. Directions for uploading new firmware on contained on the Converging Systems website.

WIRING DIAGRAM (for IP connection)

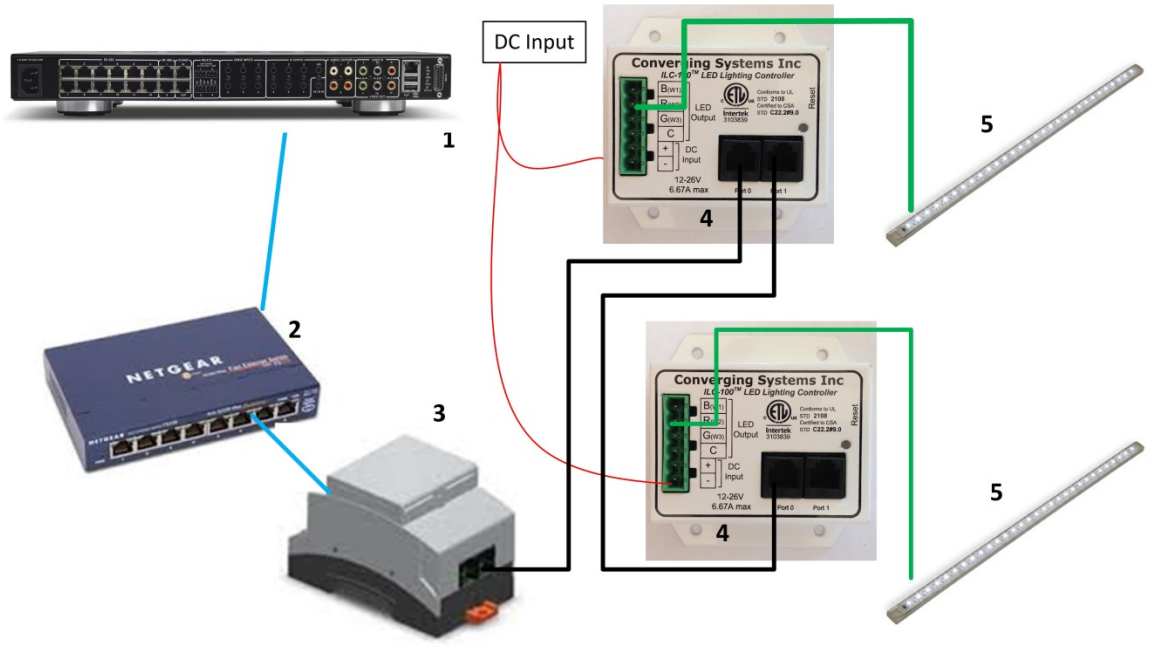


Figure 1

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
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)

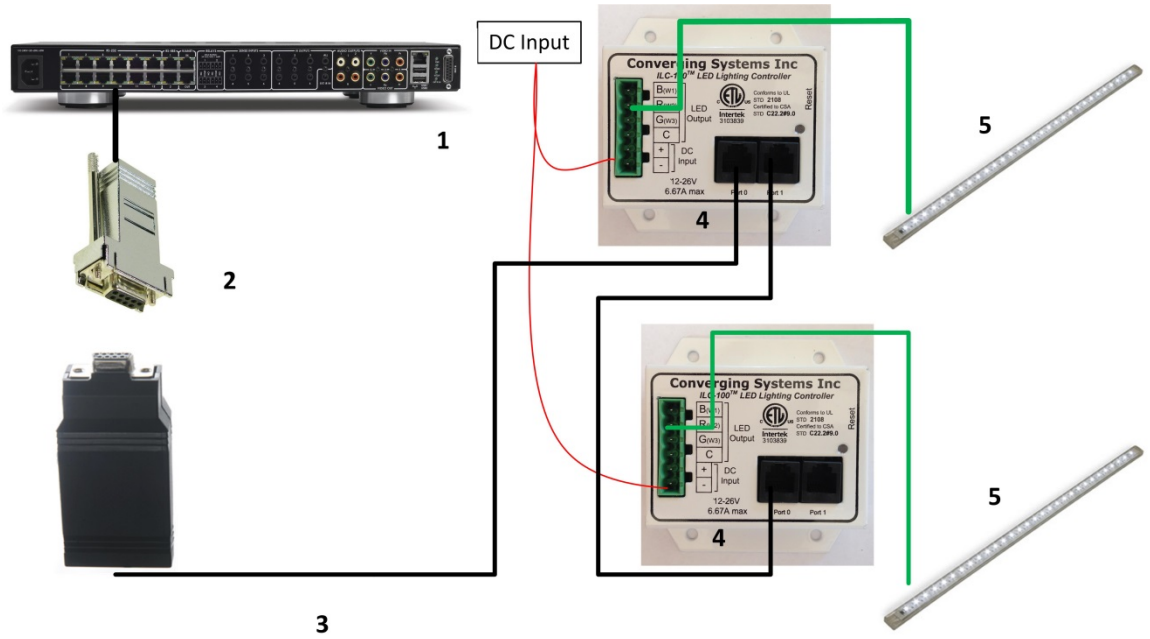


Figure 2

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 an Elan system = 254

BILL OF MATERIALS (for RS-232c connection)

Table 4

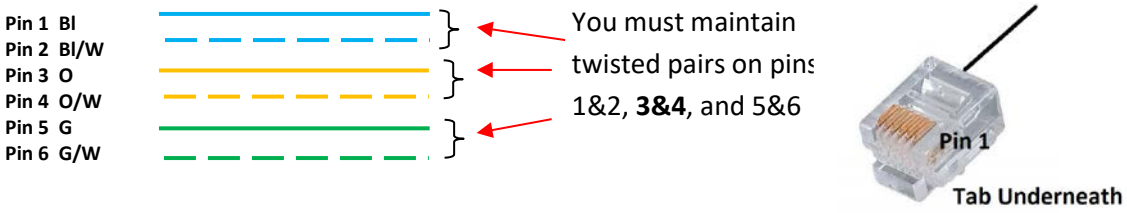
#	Device	Manufacturer	Part Number	Protocol	Connector Type	Notes
1	Elan Host Processor (gSC-n or similar)	Elan Home Systems	gSC-n or similar	Ethernet/Serial/IR	various	
2	RJ-45 to DB-9 dongle	Elan	RJ-45 to DB-9 straight dongle (CB-307 Male)	RS-232c	Pinouts RJ45 / DB9 1 / 9 2 / 1 3 / 4 4 / 5 5 / 2 6 / 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	

COMPONENT HARDWARE SETUP

1. Connect each LED lighting controller (and/or Motor controller) sequentially using Port **1** of the previous device to Port **0** of the next sequential device. Use **CS-BUS Color Standard** for your wiring.

> **NOTE**: The CS-BUS uses standard RJ-25 (RJ-11 6P6C) connectors available at Home Depot, and all electrical distributors). The mandatory pinout is 1-1, 2-2, 3-3, 4-4, 5-5, and 6-6 with twisted pairs on 1&2, 3&4 and 5&6). **You cannot use standard flat telephony cable for telephony cable does not use twisted pairs and the wiring topology is swapped (1-6, 2-5, 3-4, etc.). Failure to follow the CS-BUS wiring standard will void your warranty**. If you return a unit to Converging Systems with its communication chip destroyed this is a telltale sign that you used Telephone cabling. **REPEAT--DO NOTUSE TELEPHONY CABLE**. Also, do **not** attempt to use standard Ethernet cabling (568B or 568A) and simply chop off the browns for this will leave the twisted pairs inconsistent with our CS-BUS Wiring Standard (the middle two lines will not be a twisted pair and data integrity will be lost). If you do not have 6P6C RJ11RJ-25 modular connectors and wish to proceed, refer to Appendix 1 for a workaround.

CS-BUS WIRING STANDARD (using RJ-25/RJ-11 6P6C)



2. Connect an available CS-BUS port on the first or last LED Lighting or Mo available CS-BUS port on the e-Node or the single CS-BUS port on the IBT-100. Power on all units.

   Note: The CS-BUS by design is a modified IEEE-485 bus which requires termination on the beginning and the end of the CS-Bus. Please be advised that in most cases, termination is not required but if you do experience communication issues, it would be wise to turn on termination (in software using the Pilot software) on the first unit of the chain. If the e-Node or the IBT-100 is used as the last item in the chain, those units have built-in termination. It is important, however, not to turn on any other termination features on any other unit.

COMPONENT SOFTWARE SETUP (using e-Node and e-Node Pilot app):

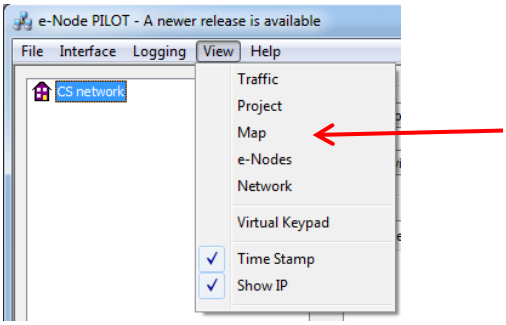
NOTE: Converging Systems LED and Motor Controllers REQUIRE a preliminary amount of initial setup/commission which requires the e-Node Ethernet adapter. This is required to set **Z**one/**G**roup/**N**ode addressing as well as to turn specific types of bi-directional communication necessary to have Elan dimmer sliders react to color state changes. This section is an abridged version of necessary steps which need to be followed. For more information, consult Appendix A and more detailed documentation available on the Converging Systems' website including

-e-Node Commissioning Guide (long version)
-ILC-x00 Intelligent Lighting Controller
-IMC-x00 Motor Controller Manual

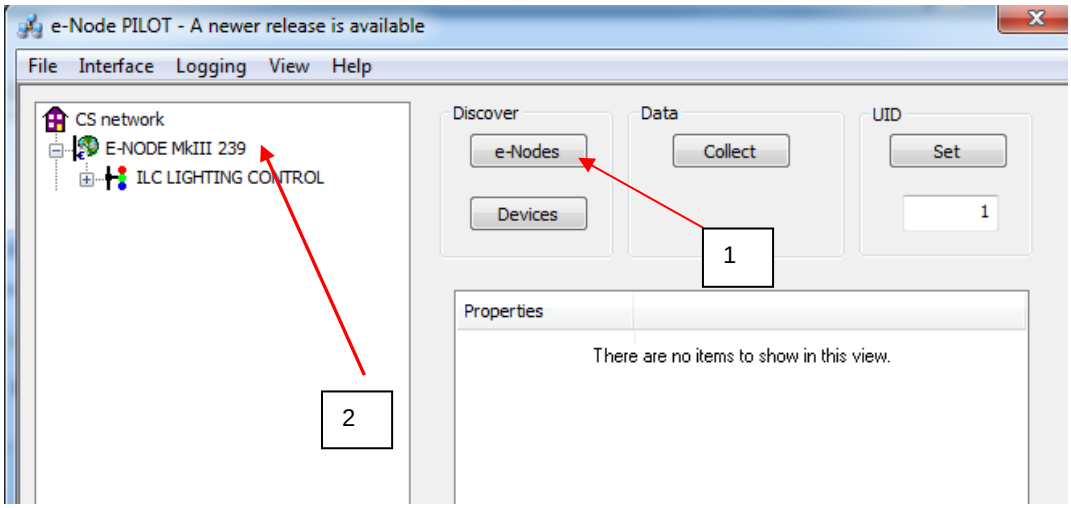
1. Launch Pilot. Launch the (PC compatible) e-Node Pilot application available from the Converging Systems website. Before calling for support
   - Make sure you **extract** the downloaded zip file before you run it.
   - Make sure all firewalls are turned **off** to enable UDP Port 4000 and Port 5000 traffic--Check your Firewalls and Anti-Virus software to verify this.
   - If using Parallels or VMWare, make sure that you have properly forwarded your wired network port.
   - Make sure and THAT YOU ARE **WIRED** FROM YOUR COMPUTER running Pilot TO YOUR SWITCH.

   Note: It is highly advised to make a ***hardwired*** Ethernet connection from the e-Node to your network switch and another ***hardwired*** Ethernet connection from your switch to your computer running the Pilot application. Data may be lost or corrupted otherwise.

2. Discover E-Node. Select the **View/Map** window.

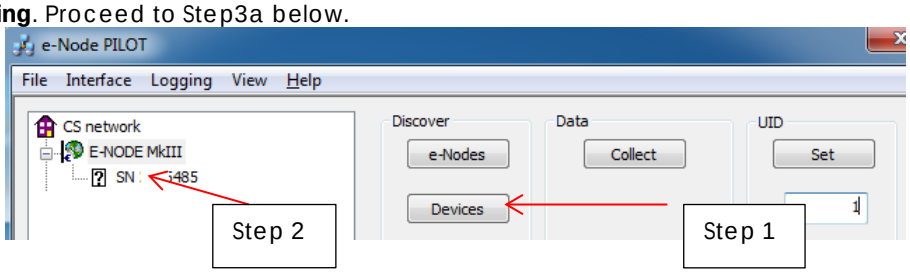


Then select the **Discover e-Node** button and any e-Nodes that have been powered-up and which exist on the same subnet as your computer will be populated on the left window.



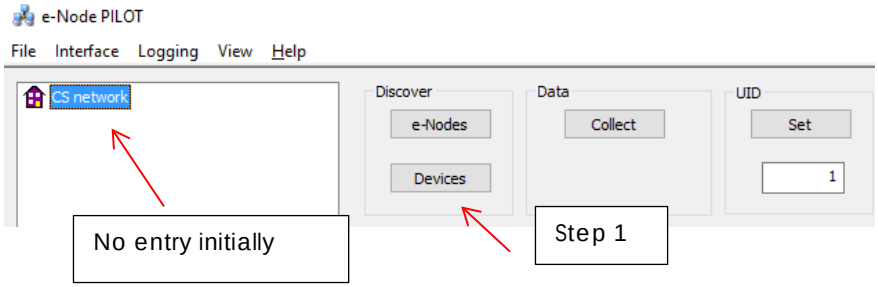
3. Discover Devices. It is necessary that all devices (led and motor controllers) are (i) discovered and then (ii) assigned a unique UID (Unique ID). The procedure to do so varies if you have earlier versions of ILC-x00 controllers or more current ones. To determine which version of firmware you have, start by selecting the **Discover Devices** button as shown below (entry Step 1 in pictures).

   i. If ILC-x00 family controllers are properly connected to your e-Node, and after the **Discover e-node** button has been selected, any ILC-x00 devices connected to that e-Node will auto-populate under that e-Node as a "**SN XXXXX**" entry. If this occurs, you have devices with **SN addressing**. Proceed to Step3a below.

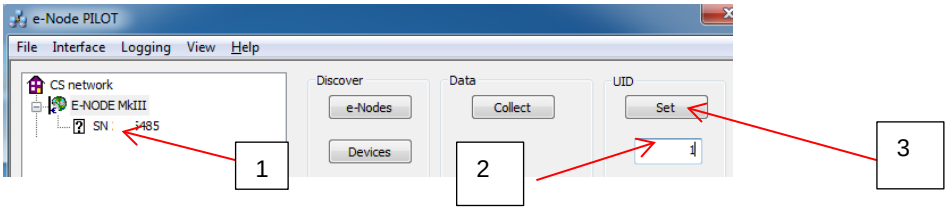


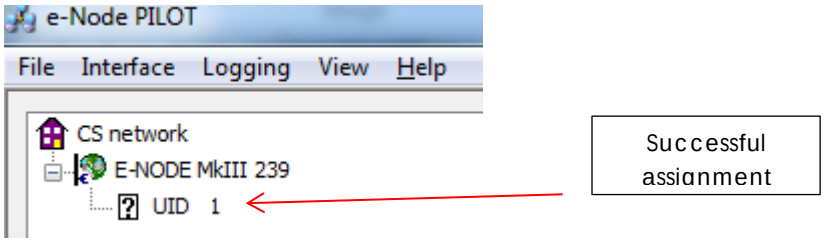
   ii. If ILC-x00 family controllers are properly connected to your e-Node, and after the **Discover e-node** button has been selected, and if ***no entries appear*** under the previously discovered e-

Node then you have **pre-SN Addressing firmware**. (Before you determine that this is the case, make sure the ILC-x00 devices are properly powered on and the interconnect cables with proper pinouts are connected between the e-Node and the ILC-x00 controllers.) If no entries populate, you have devices with **pre-SN addressing and an alternative process is required to discover these (earlier) firmware units**. Proceed to Step3b below.



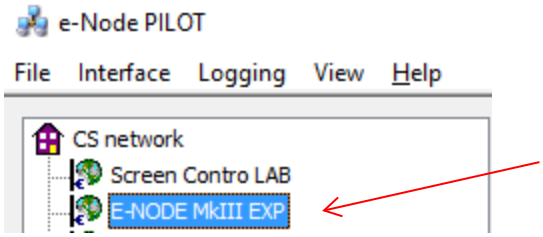
3a. Assign UID to Device (**for SN Addressing**). First select the **SN entry** for the device that you wish to assign a unique UID by highlighting that entry within Pilot. Next (i) assign an unused UID (unique ID) to the lighting or motor controller to be addressed (generally start with the UID value of "1" and work up sequentially) by entering each subsequent number under the UID set box. To finalize the UID selection, select the Set box and the "**SN**" entry will automatically change to the entered **UID** number.





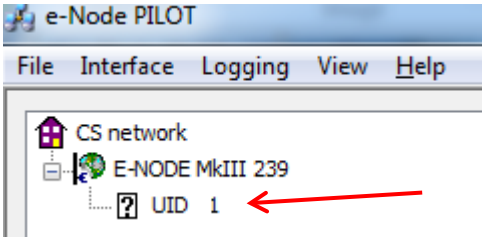
Proceed through all lighting and motor controllers connected to each e-Node until completed.

3b. Assign UID to Device (**for pre-SN Addressing**). First highlight the e-Node to which the target device Is connected.



Next (i) assign an unused UID (unique ID) to the lighting or motor controller to be addressed (generally start with the UID value of "1" and work up sequentially) by entering that number under the **UID set box**, then (ii) press the **Set** button and finally (ii) **carefully** press for ½ second the discovery/reset button on the ILC-xx device using a larger type paper clip (small paperclips have a hard time finding the internally positioned reset button).

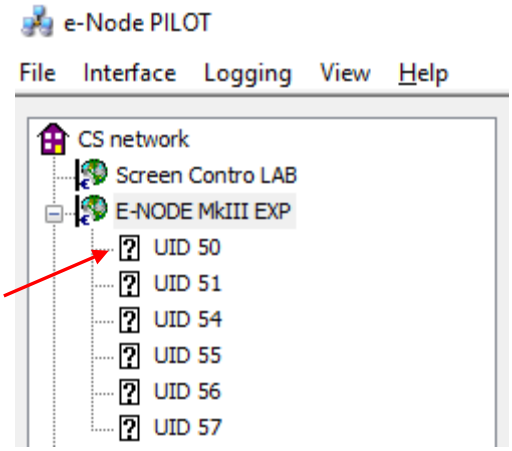
If successful, the device's on-board PCB LED will blink off for a moment then re-light AND the newly assigned UID entry will auto-populate under the e-Node to which it is connected.



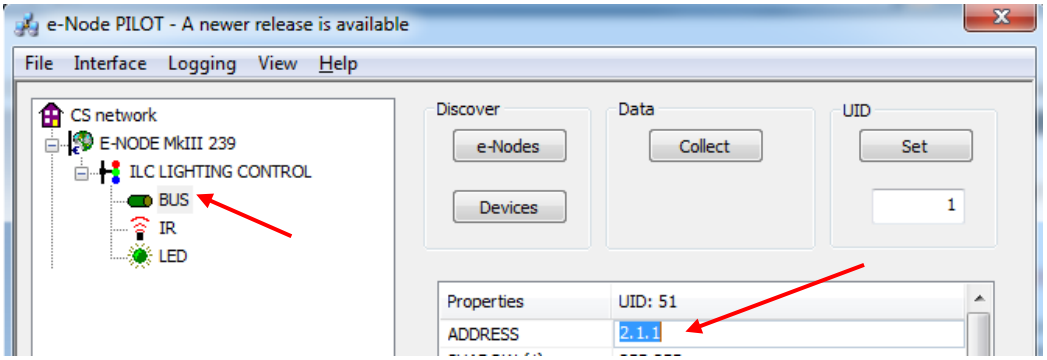
Proceed through all lighting and motor controllers connected to each e-Node until completed.

NOTE: If you by chance enter duplicate UIDs for two controllers, the system will fail to work. In this case since you may not know which unit was the original and which was the duplicate, you must **reset both units** according to documentation found for the respective controller on the Converging Systems website and then assign unique UIDs to each one again (i.e. "Unique" IDs).

4. Enter Z/G/N Addresses. Enter a discrete **Z**one/**G**roup/**N**ode address for each Lighting or Motor Controller identified within step #3 above. To do so, click on the "**?**" mark and/or the "**+**" mark in front of the targeted controller to expand its data fields. For more information on Zone/Group/Node address, review the detailed explanation of Zone/Group/Node addressing within the Background on Addressing section of this document.

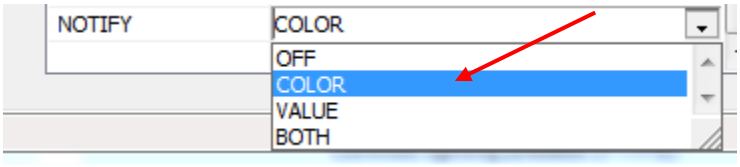


After the selected motor or lighting controller is expanded, a number of data fields with icons will appear. Select the **BUS** tab, to expose the BUS properties windows.

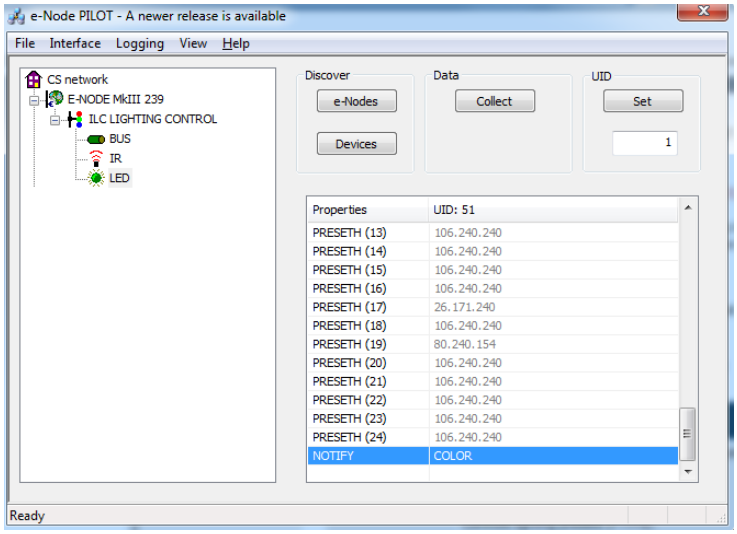


Enter the Zone/Group/Node address separated by **PERIODs** and hit **ENTER**. When the field turns BLUE you know the data has been successfully entered.

6. In order to invoke bi-directional communication for the ability for Elan's dimmer sliders to automatically respond to changes in color states (a really cool feature), set the **NOTIFY** Flag to either **COLOR** (for the HSV or Hue, Saturation, Value color space) or to **VALUE** (for the old school Red, Green, Blue color space—***old school because there is no dimmer in this color space***). If you want to have both sets of sliders (not really recommended in larger systems where bus traffic may become excessive), set the flag to **BOTH**.



Here is an example of NOTIFY set to COLOR in enable Hue/Saturation/Brightness sliders to operate.



The system will need to be installed and configured according to the Converging Systems documentation prior to integration with the Elan system. The Converging Systems e-Node Pilot application (required for setup) is available for download for free from the Converging Systems website under Resources/Software Downloads/Software (http://www.convergingsystems.com/downloads_library.php). IP configuration using the e-Node is possible using both dynamic and static addressing.

NOTE: It is recommended that the Converging Systems LED 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.

Elan Configuration

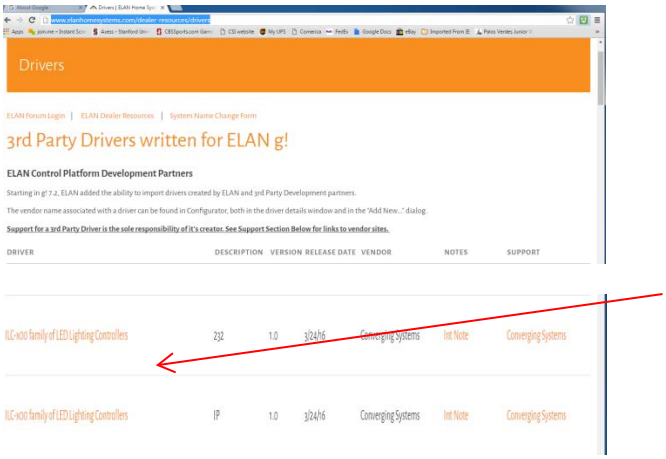
The configuration process will involve loading a lighting communication device (for the e-Node or the IBT-100) and one or more load devices (LED loads). Please follow the below steps to load one or more compiled EDRVC within Elan Configurator.

Installation Process

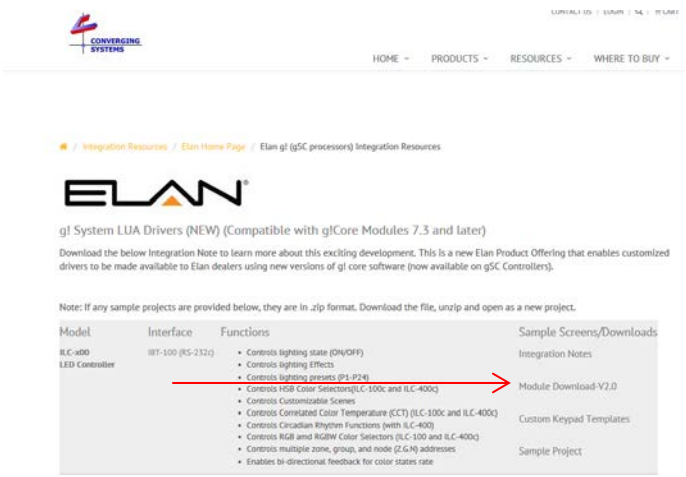
1. Import Converging Systems LUA driver into your project. (Ethernet or Serial as appropriate)

Step	Step	Detail
1a	Download the appropriate Converging Systems' **LUA** driver into convenient subdirectory below Elan Home Systems in your Program Files (x86) directory.	-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 Elan Dealer website.

http://www.elanhomesystems.com/dealer-resources/drivers



or on the Converging Systems' website http://www.convergingsystems.com/local_profiles.php

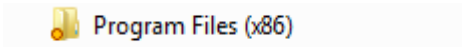


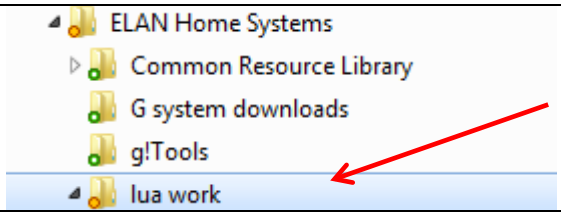
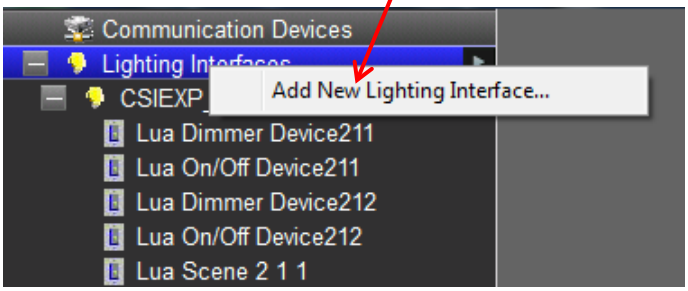
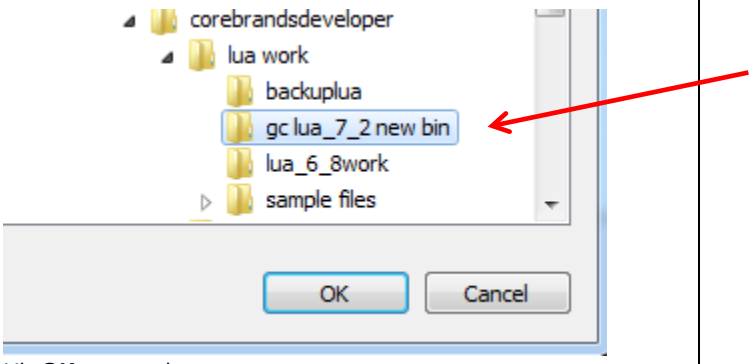
Note: always check on the Converging Systems website for the latest version.

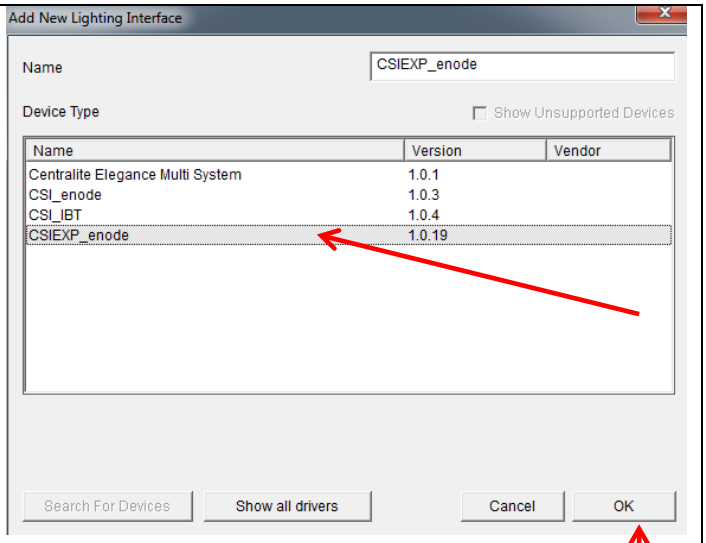
Select the appropriate file as below:

Type of Connectivity	
Ethernet connectivity	*CSIEXP_enode.EDRVC* file
RS-232c Connectivity	*CSI_IBT.EDRVC file*

-Place file within the Elan directory on your computer.

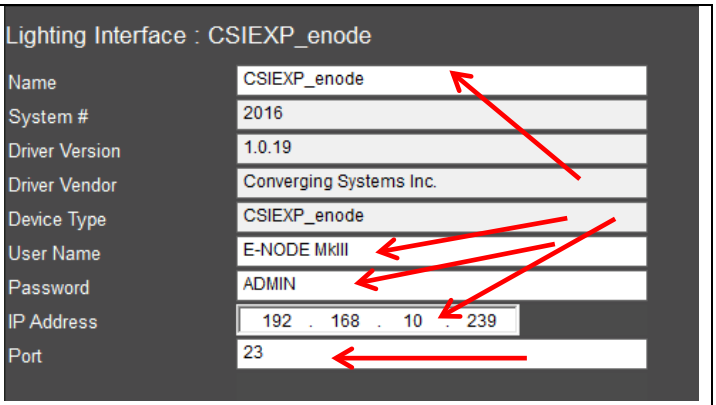


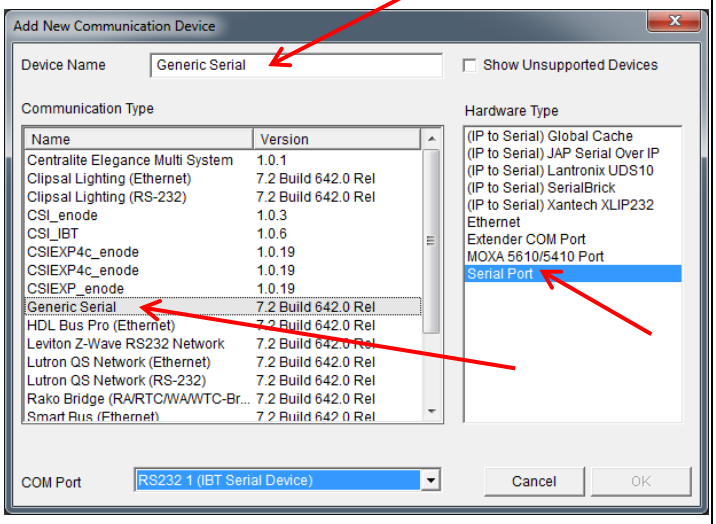
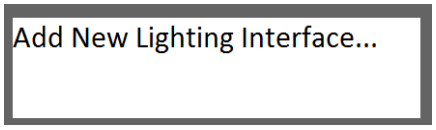
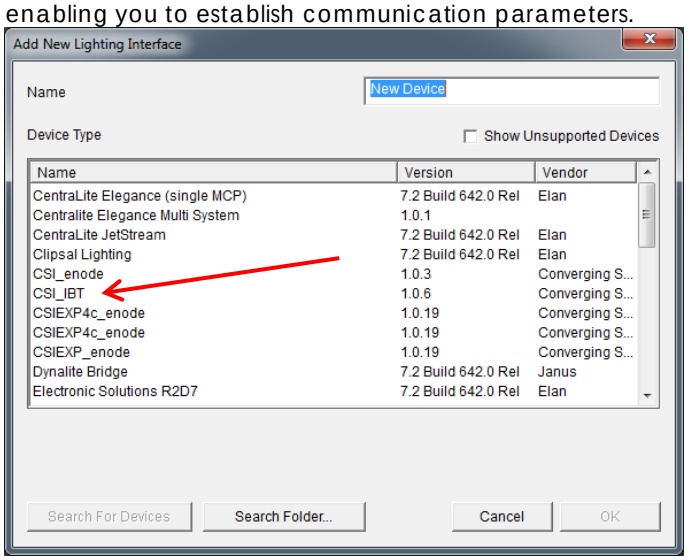
		
1b	Import the applicable **LUA driver** into your Elan Project **Note**: Make sure you download latest version from the Converging Systems' website or Elan's (if available) and ensure you know the location of the extracted EDRVC driver files on your computer's hard drive. **Note**: See the first page of the integration Note regarding compatibility between various Converging Systems' LUA drivers and particular Elan Core Modules.	-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.  -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.

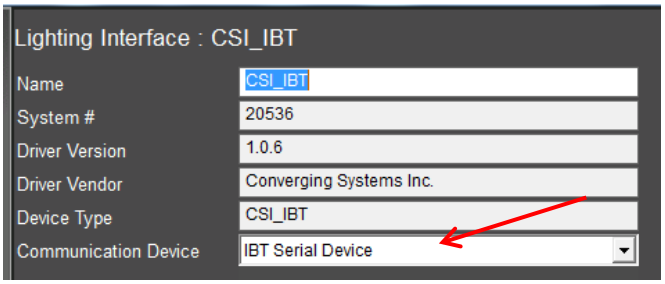
		 Hit **OK** to confirm -Your new **LUA** Driver has now been updated to your Elan Controller.

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 **Ethernet** 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 program 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 (communication) 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	- 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

	Device as well as (ii) a single Lighting Interface (through which lighting controllers will be added in **Section 3** below).	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.  -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**.**

3. Set-up Lighting Devices (i.e. ILC-x00 or other similar CSI controller) for the Converging Systems

BIG NEWS

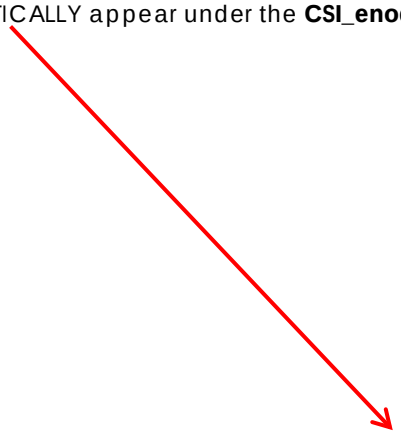
New Developments within the Elan/Converging Systems driver technology (V 1.25 or later) now allow nearly seamless and instantaneous discovery of all lighting controllers and their internal feature sets* (when initially discovered and connected with the e-Node), regardless of whether those devices are (i) monochrome (ILC-100m or IMC-400/monochrome mode, (ii) RGB (ILC-100c) or (iii) RGBW (ILC-400/RGBW mode). For documentation related to this new driver feature, follow the instructions within this section.

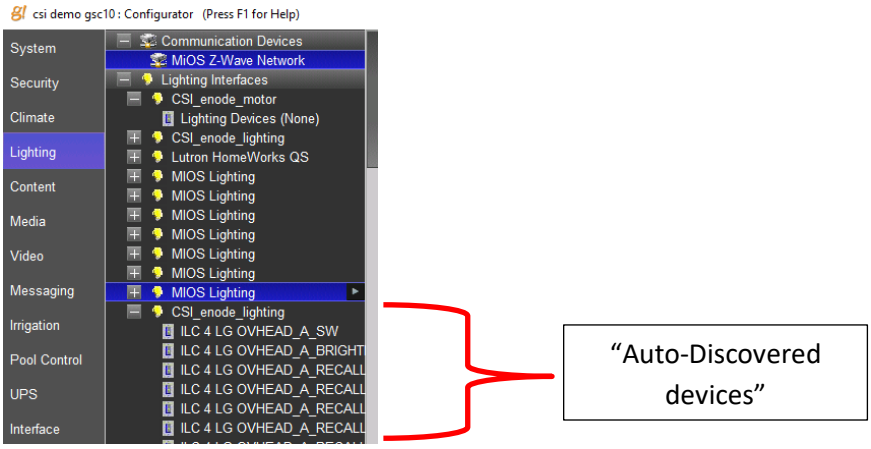
For the support of DMX fixtures using the e-Node/dmx (where the number of potentially supported devices and the resulting auto-generated device list would be extremely long) as well as for the support of motor control devices, see the separate directions in Appendix 4.

***Note:** Because the feature set available within the ILC-x00 family of LED controllers is always expanding, it may be necessary for an integrator to add new command(s) (Elan calls this **Add New Devices**) manually even after an Auto Discovery is performed. That insures that the Elan/Converging Systems interface is future proofed even without new Elan driver updates. For directions on how to add new Elan Lighting Devices (i.e. Add New Devices) that might handle an extra **Effect**, or **Preset,** or **Store,** or an extra unsupported command, please refer to Appendix 4 for directions on how to add specific types of features and how to map those to particular Elan GUI objects.

Background on Auto Device Discovery (Discover Devices)

The **Discover Devices** button permits the automatic discovery of a generous set of "Elan Lighting Devices" than can be quickly mapped to Elan sliders, buttons or other user controls within Elan Configurator. After initiating a **Discover Device** operation*, a number of "Auto-Discovered Devices" will AUTOMATICALLY appear under the **CSI_enode lighting** interface (see "Auto-Discovered Devices" below).





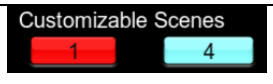
*Note: this is provided the **CSI_enode_lighting** interface is first discovered in Step 2 above-t***this Auto Discovery does not work with the IBT-100 serial interface adapter because there is no active XML database from which to query using serial communication***.

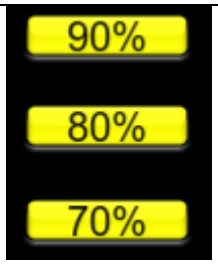
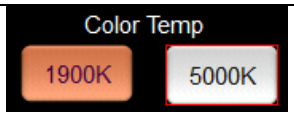
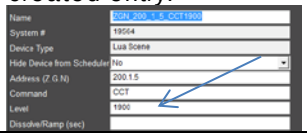
Depending upon the specific Converging Systems' software command desired, the matching Elan lighting/dimmer/scene/on/off/etc. control is automatically programmed by the driver and made available has an entry under the parent Lighting Interface (see "Auto- Discovered device" above in figure). As Elan increases the range of operations possible, Converging Systems' driver can be enhanced to automatically support those new operations.

This listing below documents the currently supported feature set with respect to the (current) Elan set of UI controls.

Table 5

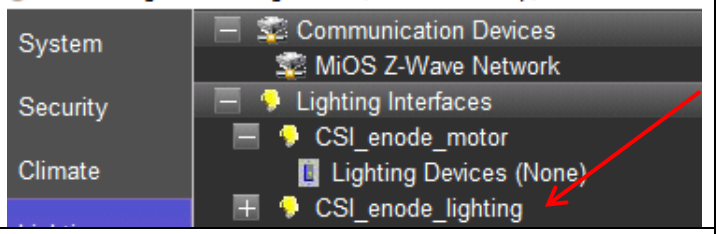
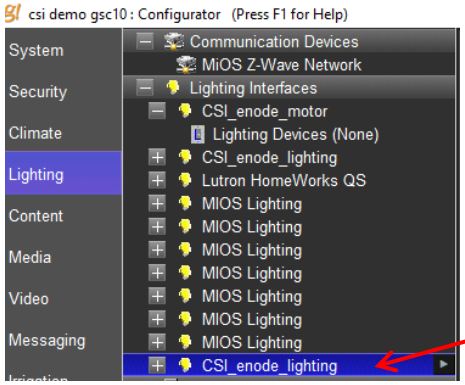
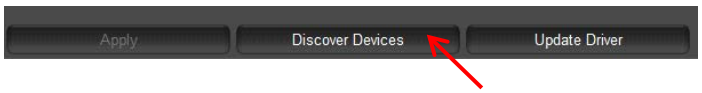
Elan UI Library Cholce	Entry within Elan Configurator (under Lighting Interface)	Elan Lighting Device	Application
 ....  ...  **Light Dimmer Control** (Sliders)	**Controller alias__RED** **Controller alias__HUE** **Controller alias__CCT** **Note:** Besides Red. Hue other parameters such as Green, Blue, etc. will be substituted in that	Lua Dimmer Device	**Light Dimmer Control** (Slider) for -Hue, -Sat -Brightness -Red -Green -Blue, -White -Color Temp- erature -Circadian Rhythm

	field and will appear as separate entities (Devices) for each Z/G/N address supported.		
 Light RGB Control	**Controller alias__RGB** **Note:** When using this control, it is recommended to also use a separate slider for Brightness (see above row)	Lua Dimmer(Multi-Ch.) Device	**Light Dimmer Control** (Slider) for -Red/Green/Blue color selection Note
 **Light Toggle Control** (with capability for dissolve setting)	**Controller alias__SW** **Note:** A separate device must be installed for ON/Off button set for each Z/G/N address	Lua On/Off Device Or Lua Scene (optionally) **Note**: Auto Discovery creates this device only as a Lua ON/OFF device.	**Button (Standard)** -On -Off
 **Button Standard** Scene Select-recall Preset	**Controller alias__RECALL1** **Note:** A separate device must be installed for each Recall desires. The Auto-Discovery process poplates a small number which can be manually duplicated by the Installer.	Lua Scene	**Scene** -Recall 1… Recall n
 **Button Standard** Scene Store (store Preset)	**Controller alias__STORE1** **Note:** A separate device must be installed for each Recall desires. The Auto-Discovery process poplates a small number which can be manually duplicated by the Installer.	Lua Scene	**Scene** -Store 1… Recall n
	No Device Required here (as long as other devices within this table are present).	LUA Scene	**Customizable Scene buttons** -Scene 1 to n

Light Scene Button (Customizable) Scene button	**Note:** Elan UI populates all available Devices (seen elsewhere within this table) for user selection		Note: this is different from a Recall n device which is hard coated with a particular value. Customizable scenes allow the end-user to make scene selections on the fly.
 **Button Standard** Recall Effect buttons (with capabiilty for dissolve)	**Controller alias__EFFECTn** **Note:** n reflects one of the various Effects auto-generated.	LUA Scene **Note**: A single device must be installed for each Z/G/N address to be supported as well as **for each** discrete index references (i.e. Effect1, Effect 2, etc.)	**Button (Standard)** -Effect 1 -Effect n
 **Button Standard** Fade Level controls	Provided a **Controller alias__BRIGHTNESS** entry is populated (Auto-Discovery generates it), this type of control is created using **Event Map** and by selecting **-System Family-Lighting System** **-Brightness** (entry for appropriate Z/G/N) -**Set Level** **-Options (and pick %)**	Relies on Lua Dimmer Device **Note**: A **single** Lua Dimmer Device is utilized to create any number of % buttons using Edit Event Map for each controller with a unique Z/G/N address.	- **Button (Standard)** to pick a Particular level setting
 **Button Standard** Color Temperature Selection	**Controller alias__CCTxxxx** **Note**: Auto Discovery creates a placeholder value of 2700K. Additional Devices can be created specifying other Color Temperature Values (CCT) by simply inputting the desired CCT value into the Level field for each newly created entry. 	LUA Scene **Note**: A single device must be installed for each Z/G/N address to be supported at a specific color temperature.	- **Button (Standard)** to pick a particular level setting

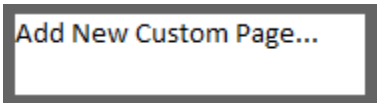
 (Color Picker)	WIP	WIP	WIP

Prior to the development of the Auto Discovery feature (**Discover Devices**) within the Converging Systems driver for Elan, the above GUI features and the required programming was a bit complicated, but now with Auto Discovery, the creation of these GUI objects is extremely SIMPLE and QUICK. Please follow the directions below

Step	Step	Detail
3a	Make sure the **CSI_enode_lighting** lighting interface is populated under the Lighting Tab under Lighting Interfaces	If you do not see this entry, go back to Step 2 to discover the Lighting Interface. 
3b	Discover Devices	-Make sure all of your Converging Systems' controllers have been properly discovered with the e-Node Pilot application (within the Component Software Setup section), and -Make sure all controllers have been assigned unique Zone/Group/Node ("ZGN") addresses again within the Component Software Setup section and as additionally detailed within Appendix 3. -Next Highlight the **CSI_enode_lighting** entry to reveal these buttons on the bottom of Lighting Interface page   **THEN AND ONLY THEN**, select the **Discover Devices** button on the bottom of the Lighting section. Please be patient—

		depending upon the number of devices and their type, this Auto-Discovery process could take 20 or more seconds. **Why is this important**: Depending upon you set-up you may have dozens of controllers with 10 or more entries (features) auto-populated all with factory default address (containing a zero) or improper addresses (not relevant for your particular installation perhaps) that would take an extremely long period of time to manually correct when in fact the Discover Device function will auto-generate all correct entries provided good information was initially available . Remember the old adage "Garbage In-Garbage Out." **We cannot stress how great the Discover Device feature is but only when it is used properly as documented above.** **Note: After you have Auto Discovered Devices, do not re-Auto-Discover devices again without first highlighting all previously Auto-Discovered Devices and first deleting those. The system will not selectively update entries—it must start from a clean slate.**
3c	Auto Discovery will occur	Underneath the **CSI_enode_lighting** will appear a number of "New Devices" that can be used in the next section to build GUI pages. **In general, if the above steps have been carefully followed, no changes to these auto-generated devices will be need to be made.** Note all the relevant and necessary fields will have been populated automatically from original settings set with the e-Node Pilot application. You can make any changes as necessary after the auto-generation process.
3d	Create any new Lighting Devices as required	The Converging Systems' software architects have make some general determinations as to the type and quantity of Devices that are auto-discovered. For instance, we have have established 1 or 2 **STORES** (scenes) and 1 or 2 **EFFECTS (sequences of colors with varying dissolve rates)** while many more entries are possible. You can simply examine the model from which you wish to duplicate the entry and carefully make copies with new entries as required. For more information on creating new Devices, see Appendix 4.

4. Create (or Modify) Various User Interface (UI) 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	-Go to the **Lighting** Tab and right click on **Custom Pages** , The following popup will appear 

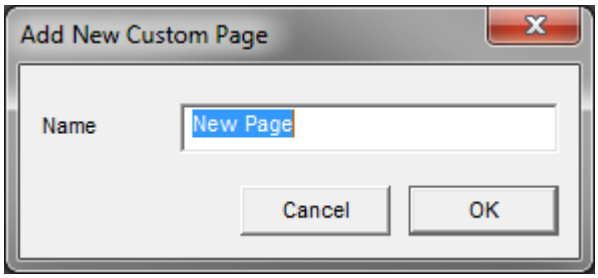
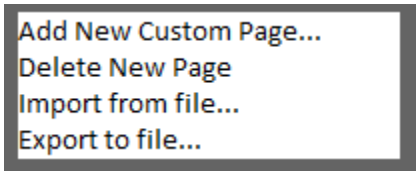
	uniquely developed to control Converging Systems' loads (LEDs in this case). This step will show how to import Converging Systems pre-programmed pages that you can edit and re-use for your own project.	Select this task and the following popup will appear.  Select an appropriate name and hit **OK**. -Hover 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.php Here is an example of a sample on which you can now begin working  Figure 3
4b	Now let us understand how generally buttons and sliders are created and programmed to trigger specific events.	Currently, there are specific types of Lighting Devices that are relevant for lighting control user interfaces and specfic types of other Devices that are relevant for motor control user interfaces. Refer to the Tables below which identifies these types.

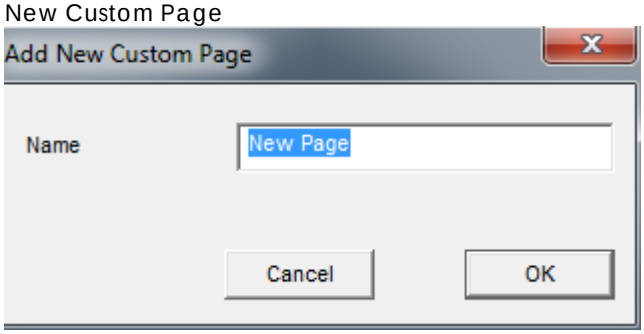
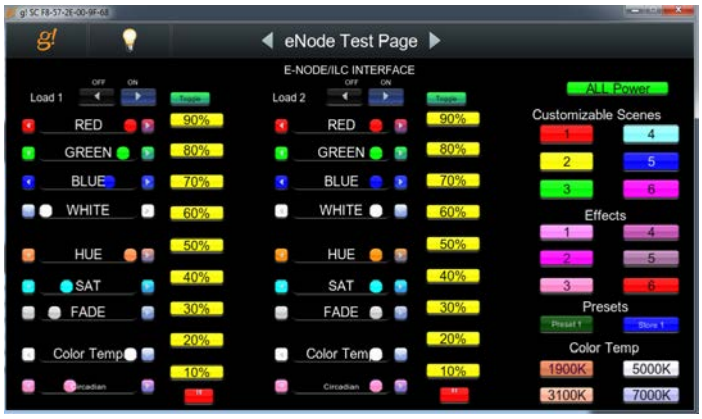
Table 6 (for Lighting Devices)

User Interface Type (see Table 5 for more information)	Elan Control Type
Slider (Hue,Sat, Brightness,Red, Green, Blue, CCT, SUN)	**Light Dimmer Control**
RGB Color Picker (R,G,B selection only assumes Saturation of fully on-and this does not control fade level)	**Dimmer (Multi-Channel) Device**
On/Off buttons (with capability for dissolve setting)	**Light Switch Control**
On/Off Toggle	**Light Toggle Control**
(Customizable) Scene button	**Light Scene Button (customizable)**
Recall/Store/Effect buttons (with capabiilty for dissolve)	**Button (Standard)**
% Set button	**Button (Standard)**
Color temperature setting button (not slider)	**Button (Standard)**

Table 7 (for Motor Devices)

User Interface Type	Elan Device Type
Slider (for motor position)	**Light Dimmer Control**
UP/Down/Stop buttons	**Button (Standard)**
Store Position	**Button (Standard)**
Recall Position	**Button (Standard)**

Note: Currently only the above Device types are relevant to the Converging Systems family of LUA drivers. ***Over time additional type devices may become available which may increase the functionality of choices available to the installer.***

		Provided you crated the requisite number of Lighting (or Motor) Devices, then all you have to concern yourself here is to make sure the **Address Tag** is accurate and when required you create an Event Map joining available commands to programmed devices. **NOTE: IF YOU DID NOT CREATE THE REQUISITE NUMBER OF DEVICES IN SECTION 3 ABOVE THROUGH DEVICE DISCOVERY, YOU WILL NEED TO CREATE AS MANY DEVICES (of the three or more Device Types available) FOR THE NUMBER OF SLIDERS OR BUTTONS REQUIRED RELATED TO A SPECFIC Zone/Group/Node ADDRESS**. See Appendix 4 for more information.
4c	Create applicable UI controls to control targeted operations	-Right click on the Custom Pages entry, to expose "Add New Custom Page  -Name the new Page and begin entering UI controls applicable specfied in the above two Tables. -Continue entering controls until you have completed the current New Page -As an example, below is a sample UI page provided from Converging Systems showing many of the supported UI types.  Figure 4 -This is an example of the new Elan RGB Color Picker enhanced with Converging Systems Saturdation and

<table>
<tr><td></td><td></td><td>Brightess controls (which are not inherently part of the RGB color model.

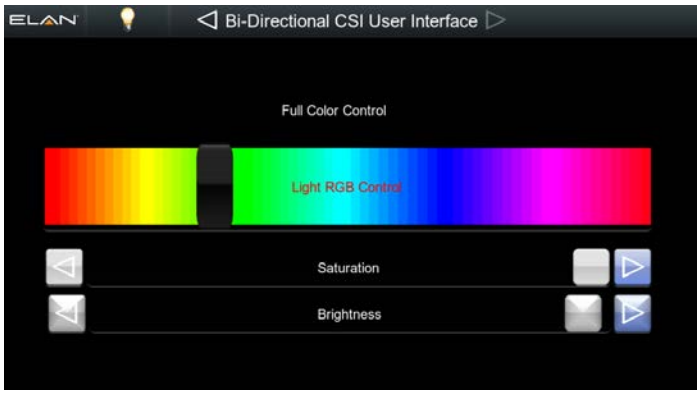
 

Figure 5</td></tr>
<tr><td>4d</td><td>Connect Controls (where applicable) to previously programmed Devices.</td><td>-There are two ways by which a UI control is programmed to control a Device programmed within Section xx of this Integration Note. The first of which is throught the Connect To box within the Properties pop-up within Elan Configurator for the UI control. The second of which is through the Event Map feature within Elan Configurator. In cases where the Connect To box is not exposed (i.e. Button (Standard), only the Event Map method is applicable.

-Refer to the Table below for a subset of currently supoorted UI types and the method by which those UI types are programmed to interact with previously programmed Devices.

Table 8
<table><tr><th>UI Control Type</th><th>Connect To</th><th>Event Map</th></tr><tr><td>Light Switch Control</td><td>Req’d</td><td>Optional</td></tr><tr><td>Dimmer(Multi-Ch) Device</td><td>Req’d</td><td>Optional</td></tr><tr><td>Light Toggle Control</td><td>Req’d</td><td>Optional</td></tr><tr><td>Light Dimmer Control</td><td>Req’d</td><td>Optional</td></tr><tr><td>Light Scene Button</td><td>Req’d</td><td>Optional</td></tr><tr><td>Button (Standard)</td><td>N/A</td><td>Req’d</td></tr></table>
-For each UI Control specified above which has a Connect To data entry location, right click on that control to generate the Properties box.</td></tr>
</table>

Figure 6 Example of a Red Slider

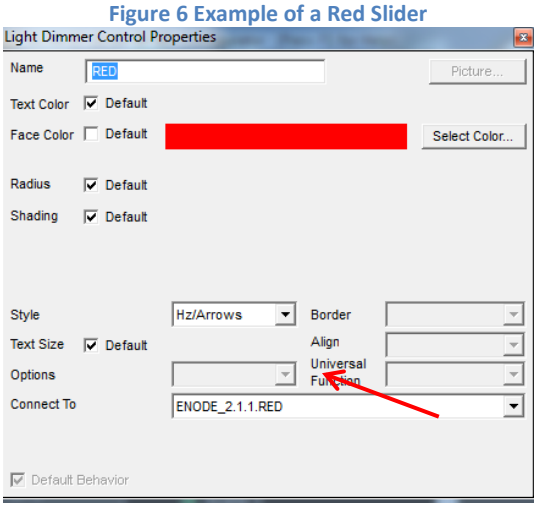
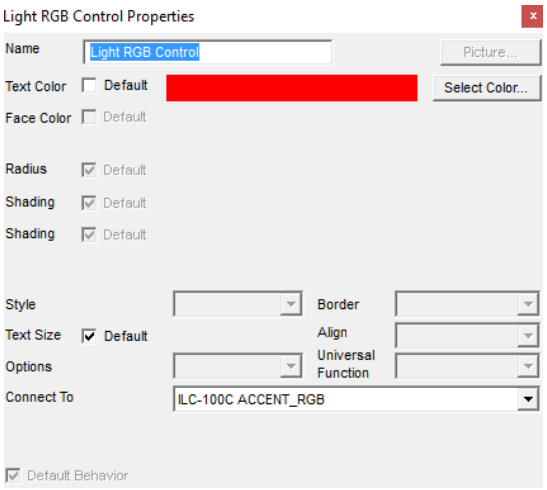
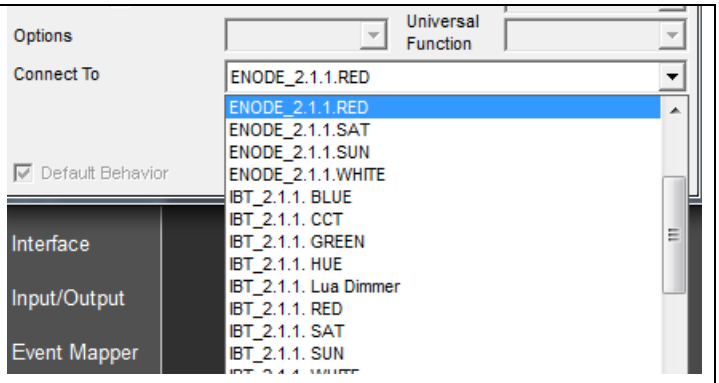
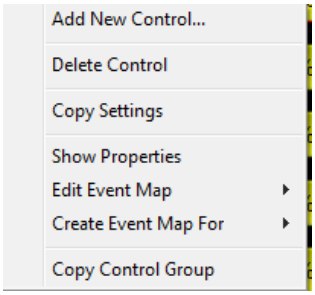
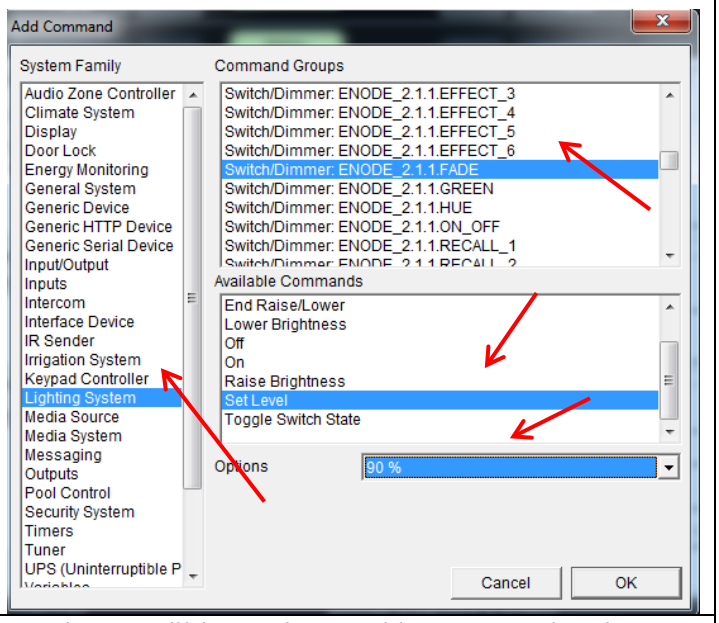


Figure 7 Example of a Multi-Dimmer RGB Picker



-Customize each of your controls as desired and where presented with a **Connect To** box, select from the pull down menu the applicabel Lighting (or Motor) device programmed for that UI. In this example, we are selecting the **Red** slider previsously progarmmed with **Z/G/N** address of 2.1.1 to be tied to the targeted slider.

		 -Continue programming all UI controls
4e	Program **Event Map** information for UI controls that do not support the **Connect To** function	-Right click on any UI control for which there is not a **Connect To** data field available to exposer this pop-up  -Either select the **Create Event Map For** option if there is not a **Edit Event Map** showing, Within the **Event Map** popup, program the desired operation to the previously programmed Device and to its specific operator. In this case, for a 90% percent fade button for following data fields are selected/entered.

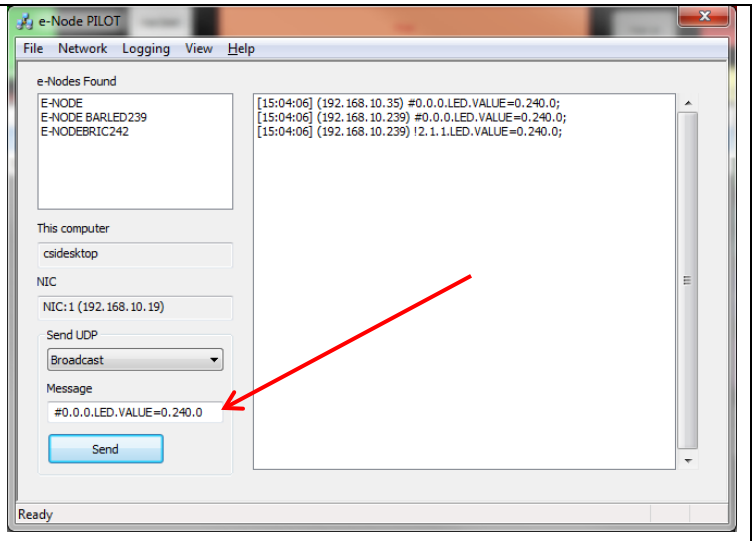
		
4i	Finish up your User Interface	Continue modifying and customizing your user interface as required. When you are done just hit **Apply** to upload all code changes to your Elan processor.

5. Test

5a	Launch the Elan Viewer and select a programmed button to operate.	Make sure your eNode/IBT-100 and connected controllers are properly working and tested using e-Node Pilot. Observe your connected LEDs (or motors) 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 8 for more troubleshooting information.

Elan CONFIGURATION DETAILS

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

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 9 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 Version	<Auto Detect>	
	Driver Vendor	Converging Systems	
	IP Address	<User Defined>	
	Port	<Auto Detect> (Default 23)	The field is discovered automatically.

Table 10 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)	

Table 11 Device Type (regardless of Communication Device Selected above)

Device Type Supported	Variable Name	Setting	Comments
Lua Dimmer (for each ILC-100 load)	**Name**	<User Defined> (Default **Lua Dimmer**)	
	System #	<Auto Detect>	
	Device Type	<Auto Detect> (Default **Lua Dimmer Device**)	
	Address Tag (Z.G.N)	<User Defined> **Note** Enter in format Z.G.N (with **periods** between the Z & G & N entries,	
	Command	<User Defined> **Note** Depending upon type of dimmer/slider you must customize the entry as appropriate. See **Dimmer Device Parameter Table** below for choices.	
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** (with **periods** between the Z & G & N entries,	
	Level	<User Defined> **Note** Enter reference number for specific index related to command (i.e. Preset **1**, Effect **1**, etc.) device	

	Dissolve/Ramp (sec)	<User Defined *dissolve rate*> **Special Case For Effect=1 and Effect=4 only:** A secondary data value for Sequence Rate (Seq Rate) can be entered ***after a comma*** following the initial <user defined dissolve rate> entry as follow: <user Defined dissolve rate>,<user Defined Seq Rate> **Note** Enter integer value from 0	**Dissolve Rate** is the time in seconds to transition from one state to another for a particular Dissolve feature (X) **Seq Rate** (which is used with Effect(1) and Effect(4)) specifies the time (after any dissolve) that the preset color is maintained before transitioning to the next color in sequence.
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 (Z.G.N) Tag	<User Defined> **Note** Enter in format **Z.G.N** (with periods between the Z & G & N entries)	
	Command	No required entry	
	Level	No required entry	
	Dissolve/Ramp (sec)	<User Defined> **Note** Enter integer value from 0 to highest supported value (in seconds)	

Table 12 **Dimmer Device Command Table**

Dimmer Type	Command
Hue	HUE <entry for a HUE slider in HSB color space>
Sat	SAT <entry for a Saturation slider in HSB color space>
Brightness	SET <entry for a brightness/fader slider in HSB color space>
Red	RED <entry for a RED slider in RGB color space>
Green	GREEN <entry for a GREEN slider in RGB color space>
Blue	BLUE <entry for a BLUE slider in RGB color space>

White (only for RGBW device driver-not for RGB device driver)	WHITE <entry for a WHITE slider in RGB color space with the ILC-400 controller>
CCT (for Color Temperature)	CCT <entry for a Correlated Color Temperature slider>
SUN (for Circadian rhythm)	SUN <entry for a Circadian Tuning slider with the ILC-400 controller>

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. Forgetting to enter the Command entry for sliders (RED, GREEN, etc., or spelling them wrong).
4. Using commas between the Zone/Group/Node entries instead of periods (within the Address Tag)
5. Forgetting to enter a numerical entry within the Level Tag for Effects, Recalls and Presets.
6. Forgetting to enter a numerical entry within the Dissolve/Ramp Tag for Device types which support Dissolve.
7. Forgetting to enter a secondary numerical entry within the Dissolve/Ramp Tag for Effect 1 and Effect 4 if you desired to vary both the Dissolve Rate as well as the Sequence Rate.
8. Make sure that you do not use the Communication Device created by more than one Generic Serial Device or Generic Ethernet Device.
9. Forgetting to create a Generic Serial Port when utilizing the IBT LUA driver for communication with the IBT-100.

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 Configurator 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:

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**).

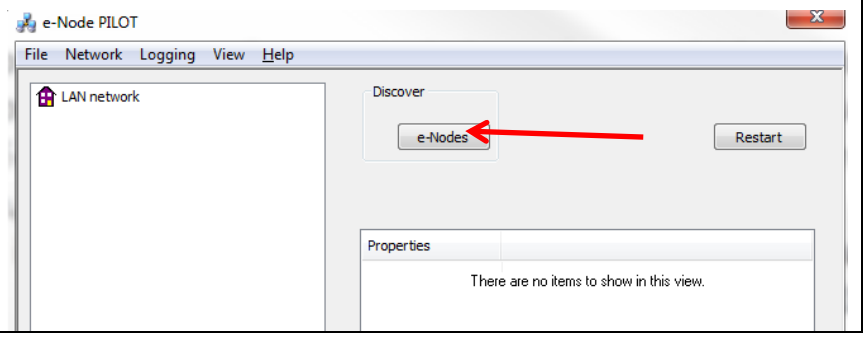
Recommended RJ-25 6P6C connections 6 wires		
e-Node Side	**ILC-x00 side**	**Color of wire**
Pin 1	**Pin 1**	**blue**
Pin 2	**Pin 2**	**Blue/white**
Pin 3	**Pin 3**	**Orange**
Pin 4	**Pin 4**	**Orange/white**
Pin 5	**Pin 5**	**Green**
Pin 6	**Pin 6**	**Green/white**

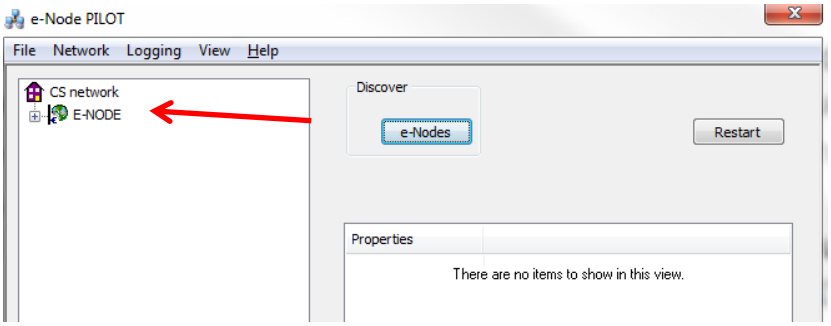
Suboptimal RJ-11 4P4C connection 4 wires		
e-Node Side	**ILC-x00 side**	**Color of wire**
Pin 1	**Pin 1**	**Orange**
Pin 2	**Pin 2**	**Blue**
Pin 3	**Pin 3**	**Blue/white**
Pin 4	**Pin 4**	**Orange/white**

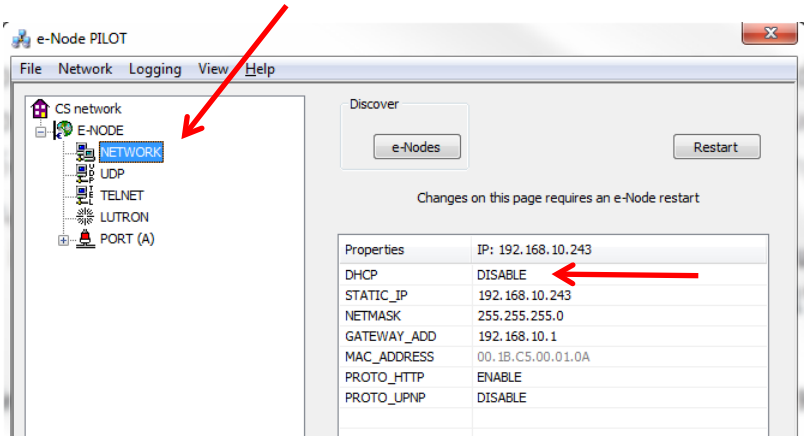
Note: For the purposes of commissioning if *you do not have* 6P6C RJ-25 connectors, you can use standard 4-pin RJ11 connectors, but follow the wiring directions above preserving twisted pairs on Pin 2/3 and Pins 1 /4. **This cable will not work for keypad communication or IBT-100 communication**.

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

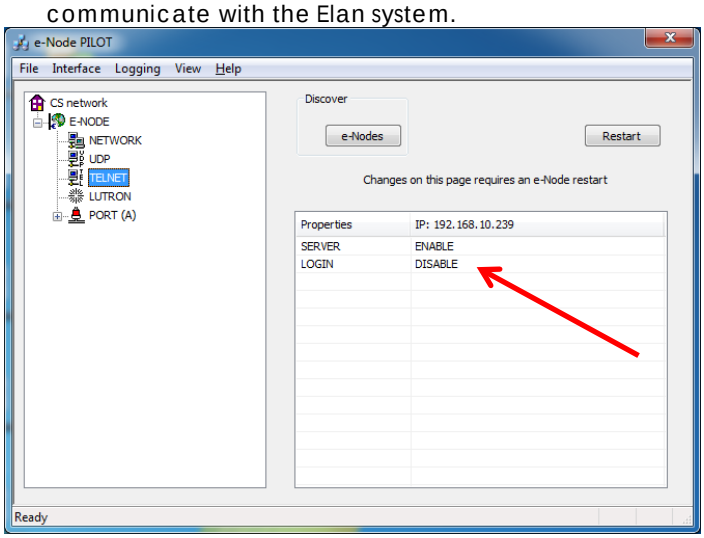
Step	Setting	Choices
EN-1	**e-Node IP Address** setting Set up the e-node with an appropriate Static or Dynamic IP address. Refer to the separate "e-Node Quick Start Guide" on how to make such settings.	Static or Dynamic Addressing -Launch the e-Node Pilot application. 

<table>
<tr>
<td></td>
<td></td>
<td>
-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 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.</td>
</tr>
</table>

		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 ***is supported***, 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. 

IBT-100 Programming

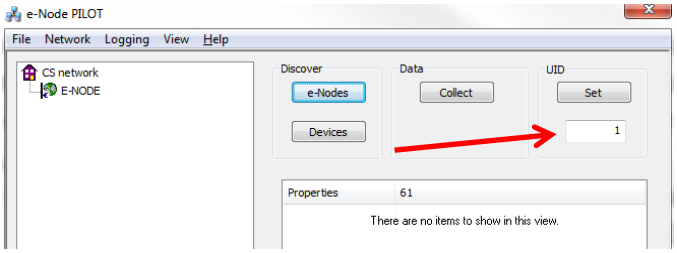
Auto-Discovery (Discover Devices) is not available using the IBT-100 because there is not an available XML file generated that can be used for this purpose. If you wish to use the IBT-100 within your installation, it will be necessary to perform manual Device data entry as per Appendix 4 of this document.

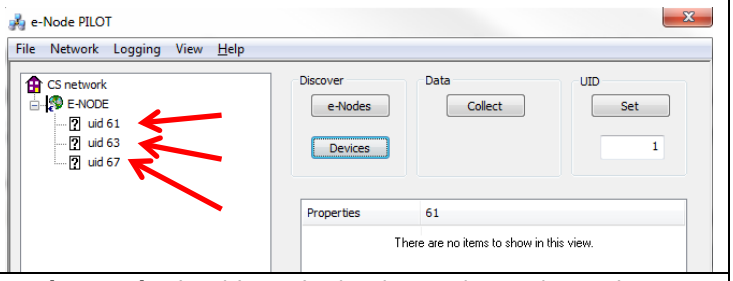
All of the communication parameters to support the IBT-100 are built into the Elan LUA driver and therefore no special programming is required of the IBT-100 serial adapter. However, certain features of the ILC-100/ILC-400 with respect to **NOTIFY** (which permits automatic signaling of color status 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.

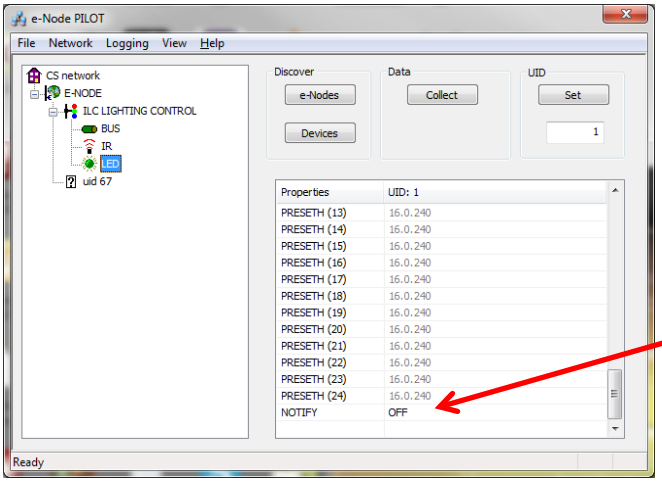
RS-232C Interfacing Note: If you plan on simply using the IBT-100 for serial communication and desire to have multiple lighting loads (more than one ILC-100 with a unique **Z**one/**G**roup/**N**ode address you must set up your system using the e-Node as specified above as well as the particular lighting 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 as well as the Component Software Setup of this document. 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**.  . **NOTE THE FOLLOWING DIRECTIONS ARE FOR THE LEGACY NON-SN ADDRESSING METHOD BY WHICH ADDRESSES AND DISCOVERY CAN BE PERFORMED. NEWER TECHNIQUES CAN BE FOUND IN THE BEGINNING OF THIS DOCUMENT.** 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 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. 
DV-2	Notify Mode	**<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: HSB color data — NOTIFY=COLOR RGB color data — NOTIFY=VALUE HSB and RGB color data — NOTIFY=BOTH*

		*__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.

Appendix 2

Background on Addressing

This information is only relevant for when you ***start*** adding buttons and sliders within the GUI section of your Elan 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 Elan Configurator 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 Z/G/N 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 (CS-Bus controllers) 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 state data (color or motor position) which is quite useful in auto-updating sliders and numerical readouts.

The figure below describes this hierarchy.

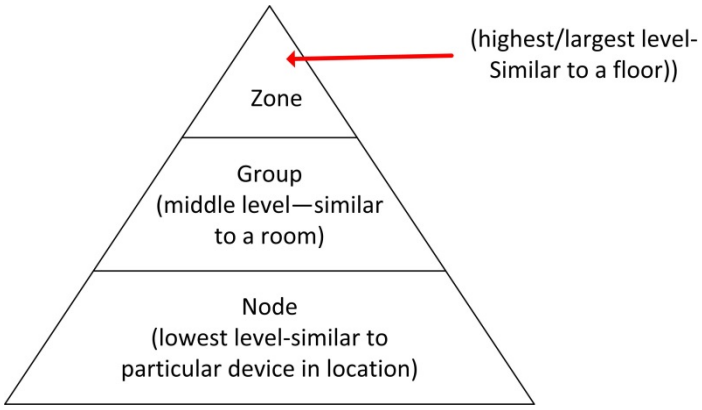


Figure 8

YOU MUST HAVE PRE-ASSIGNED Z/G/N ADDRESSES TO ALL LOADS BEFORE PROCEEDING WITH ELAN PROGRAMMING. See the Converging Systems' documentation on the e-Node Pilot application for more information here.

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 Elan Configurator.

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 5** 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 13

ILC unit	Zone/Group/Node Address
First Unit	2.1.**1**
2nd unit	2.1.**2**
nth unit	2.1.**3** or some other number up to **254**

Appendix 3

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.**

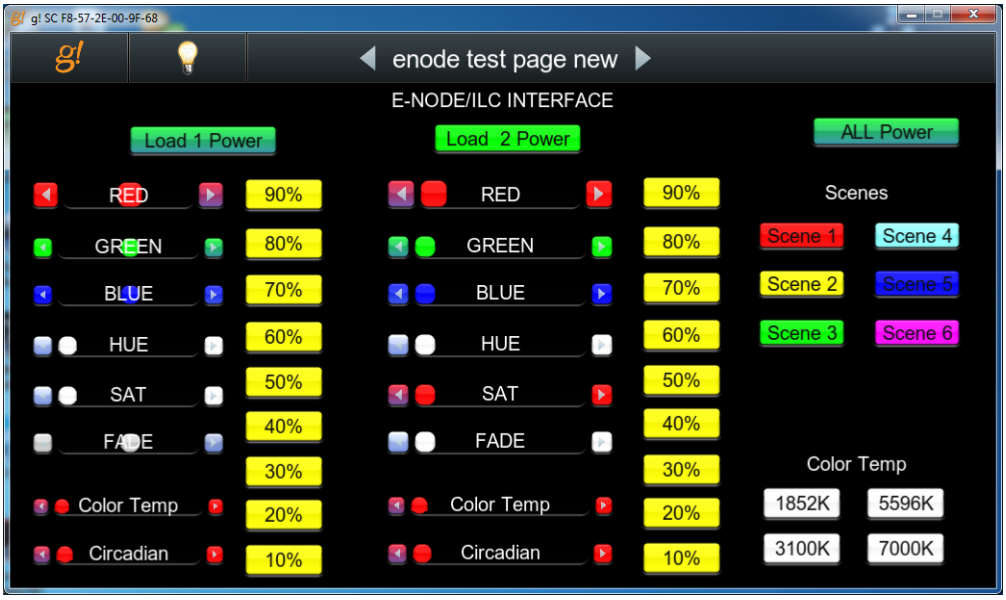


Figure 9

Appendix 4

Traditional Device Discovery Technique

This section documents the process to add New Lighting Devices (child to either the e-Node. the e-Node/dmx or the IBT-100) when

- the Discovery Device operation is not used, or
- Support for DMX fixtures is required using the e-Node/dmx, or
- Support for Motor control devices (currently not supported by Device Discovery), or
- Support for additional devices is required beyond those auto-generated entries

***Note:** Because the feature set available within the ILC-x00 family of LED controllers (and IMC-x00 family of Motor Controllers) is always expanding, it may be necessary for an integrator to add new command(s) (Elan calls this **Add New Devices**) manually even after an Auto Discovery is performed. That insures that the Elan/Converging Systems interface is future proofed even without new Elan driver updates. For directions on how to add relevant **New Devices** see the directions below.

Step	Step	Detail
1a	Background on Lighting Devices	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** of the main body of this document. **Before proceeding it is wise to understand your requirements before adding devices within this section**. The following sample UI shows the various types of **Lighting Devices** that would need to be added in order to support the functionality of this UI. The letter references are explained in the next table.

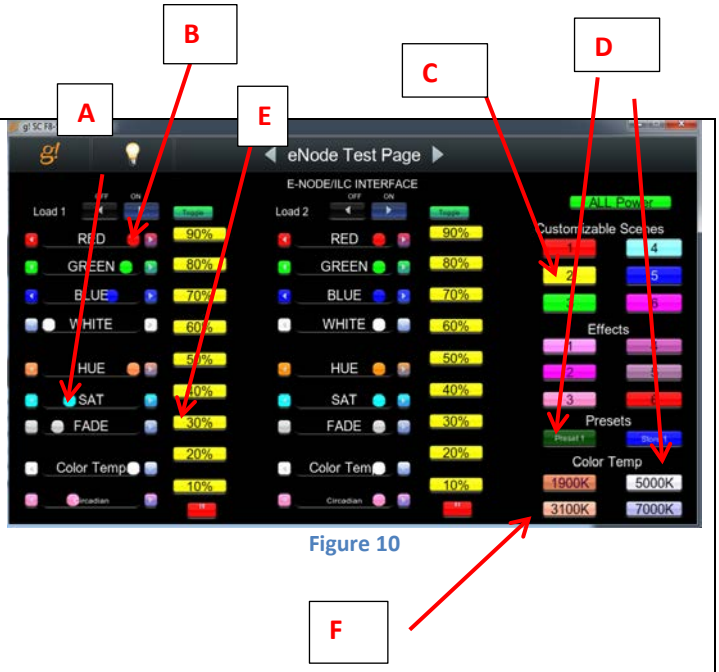


Figure 10

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

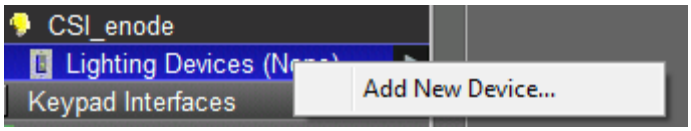
Table 14

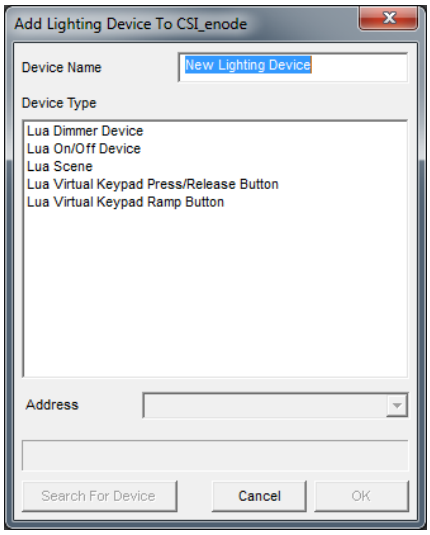
Ref. to above Figure	UI Type	Elan Lighting Device	Application
A	Slider (Hue,Sat, Brightness,Red, Green, Blue, CCT, SUN)	Lua Dimmer Device **Note**: A separate device must be installed for each type of Slider required for each Z/G/N address	**Light Dimmer Control** (Slider) for -Hue, -Sat -Brightness -Red -Green -Blue, -White -Color Temp-erature -Circadian Rhythm
B	On/Off button (with capability for dissolve setting)	Lua Scene Or Lua On/Off Device **Note**: A separate device must be installed for ON/Off button set	**Button (Standard)** -On -Off

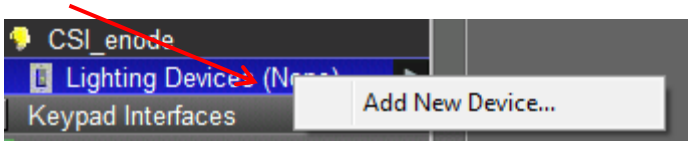
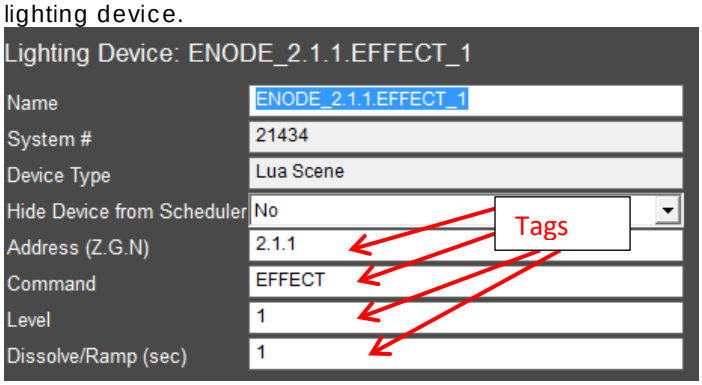
					for each Z/G/N address		
		C	(Customizable) Scene button	LUA Scene **Note**: A single device must be installed for each Z/G/N address to be supported regardless of the number of scenes to be supported.	**Customizable Scene buttons** -Scene 1 to n	
		D	Recall/Store/ Effect buttons (with capabiilty for dissolve)	LUA Scene **Note**: A single device must be installed for each Z/G/N address to be supported as well as for each discrete index references (i.e. Effect 1, Recall 1, etc.)	**Button (Standard)** -On -Off	
		E	% 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	- **Button (Standard)** to pick a Particular level setting	

		be populated.		
F	Color temperature setting button (not slider)	Lua Dimmer Device **Note**: A single device must be installed for each Z/G/N address to be supported regardless of the numbet of temperatur e settings buttons to be program-med.	- **Button (Standard)** to pick a particular level setting	

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** within the main body of this document and selecting **Add New Device**...





		Note: Additional devices may be displayed above that either (i) may be undocumented within this current Integration Note/Driver set, or (ii) may not be functional with the current revision level of the Converging Systems' LUA driver.
1b	Background on Addressing	This information is only relevant for when you ***start*** adding buttons and sliders within the GUI section of your Elan 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 Elan Configurator as **Zone, Group and Node Addresses.** For more information see **Appendix 2.**
1c	Now, let us Add Lighting Devices	- Right click on the auto-populated (generic entry) **Lighting Devices (None)** found below the **Lighting Interface** established in **Step 1c** above. A pop-up Add New Device... will appear  -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 the table above to match your requirements. Following is an example of the data entry window that may appear for your particular lighting device.  **Note**: Depending upon the lighting device to be added, 2 or more data entry **Tags** will appear in addition to a field for a user-entered **Name**. Occasionally additional *Tags* may appear than are not currently required to be filled out. Following are the **Tags** that may be required to be filled out depending upon the nature of particular user interface and the lighting device selected. Refer to the table below

for required and non-required **Tags** for each lighting device.

Table 15

	TAGS			
User Interface Type	**Address (Z.G.N)**	**Command**	**Level**	**Dissolve Ramp**
Dimming Device				
Slider	Req'd	Req'd for type		
On/Off button (without dissolve feature)	Req'd	Not req'd		
Scene Device				
Recall	Req'd	RECALL	Value	Optional
Store	Req'd	STORE	Value	Optional
Effect	Req'd	EFFECT	Value	Optional
On/Off button (with dissolve feature)	Req'd	Not req'd	Not req'd	Optional

Next are the descriptions for all Tags (which may or may not need to entered depending upon the type of User Interface required).

-**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 identification 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 each number (between 0-254) is entered with Periods (not Commas) separating those numbers:**

Address (Z,G,N) **Z▪G▪N**

For example, for a device with the following **Z/G/N** address:

Zone	2
Group	1
Node	1

you would enter the following with Elan Configurator (exactly as shown):

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

Command Tag. This is the type of slider for which control and feedback is desired. **The tag must be accurately entered using upper case letters spelled correctly.** Refer to the following table for the **Command Tag** information that must be entered for each Device Type to enable the operation of these types of controls.

Table 16

UI Type	Command Tag
Red Slider	**RED**
Green Slider	**GREEN**
Blue Slider	**BLUE**
White Slider (for ILC-400 controllers only)	**WHITE**
Hue Slider	**HUE**
Saturation Slider	**SAT**
Brightness (Fade) Slider	**SET**
CCT (correlated color temperature-RGB and RGBW devices)	**CCT**
SUN (circadian rhythm ILC-400 only)	**SUN**
Standard On/Off buttons	**(No entry)**
Recall (Preset within CS-Bus controller)	**RECALL** (where n is the scene or recall number)

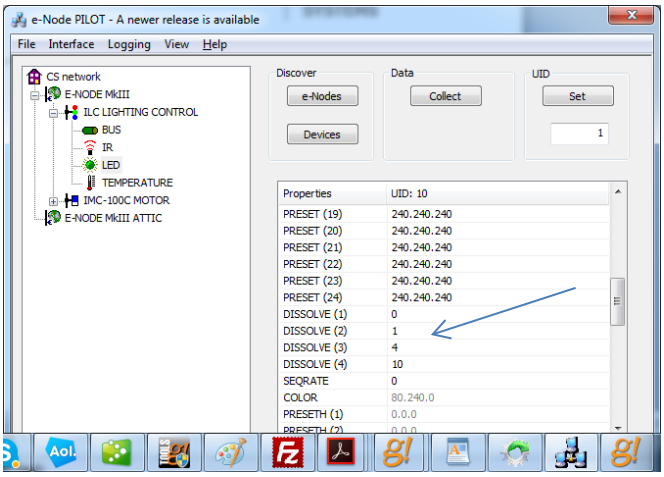
Level Tag. For applicable Command Tags (i.e. Recall, Store, Effect) this is the field for the numerical entry or index to be

either Recalled, Stored or activated through the applicable command. **The tag must be accurately entered using numbers or no control of a specific device will be possible.** Refer to the following table for the **Level Tag** information that must be entered for those Command Tags requiring such additional information.

Table 17

Command Tag Class	Level Tag
Effect	**0,1,2,3 (see controller documentation for all supported Effects)**
Store	**1-24**
Recall	**1-24**

Dissolve Tag. For applicable Dissolve/Ramp Tags (i.e. all supported UI controls other than sliders) this is the field for the numerical entry of a **Dissolve Rate** to be entered (if desired) in seconds. If the field is not entered, the factory default for the applicable **Dissolve Rate** will be utilized instead or the **Dissolve Rate** that was last entered through a command will be utilized. **The Tag therefore is optional and if not set through the Dissolve Tag will be maintained as the value originally set from the factory.** See below where the current setting of the Dissolve Rates can be seen using eNode Pilot software and a connected e-node. Refer to the Device Driver Toolkit for more information on Dissolve Rates.

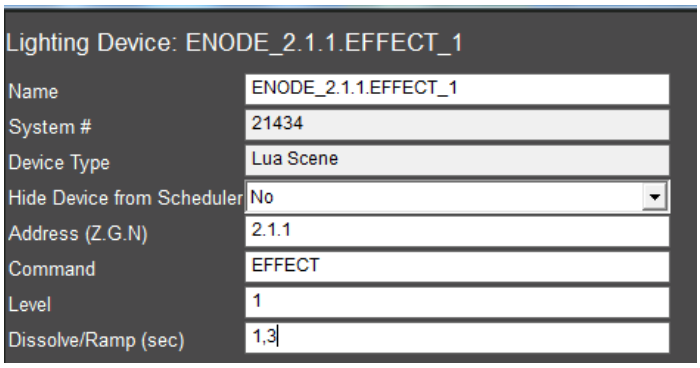


Special Case. In two special cases, for Effect(1) and Effect(4), an additional concatenated sub-TAG can be entered to change the SeqRate from the factory default as well. The Seq Rate specifies the time (after any dissolve)

<table>
<tr>
<td></td>
<td></td>
<td>that the preset color is maintained before transitioning to the next color in sequence.

Here in the example below, for Effect(1), a Dissolve rate of 1 second is specified as well as Seq Rate of 3 seconds. The format for this entry is :

<Dissolve Rate, Sequence Rate>

SUMMARY 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.

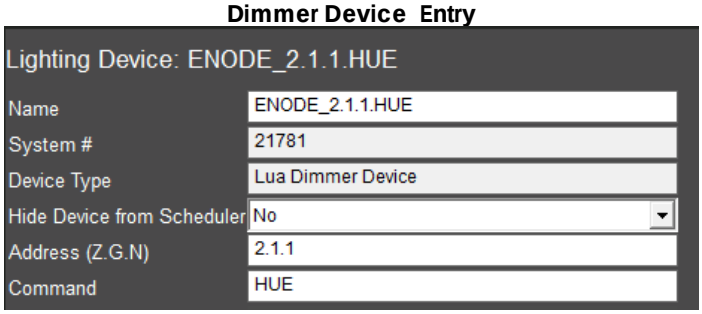
-Proceed to the next step to see several examples.</td>
</tr>
<tr>
<td>1d</td>
<td>Sample Lighting Devices added to enable specific UI controls</td>
<td>These sample projects show a combination of above available Device Types. These Device Types are also summarized in the table below for completeness.

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:

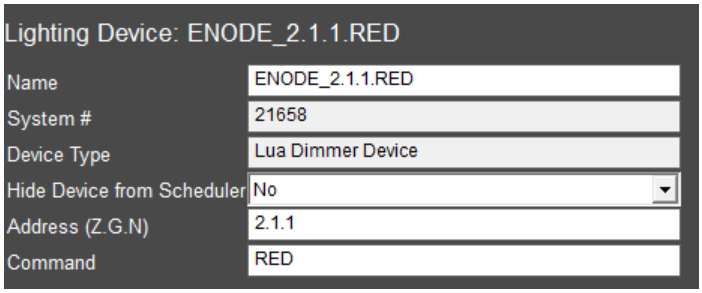
Table 18
<table>
<tr><th>Deisred button or slider</th><th>Device Type</th><th>Address (Z/G/N)</th><th>Command Tag Entry</th></tr>
<tr><td>Hue Slider</td><td>Dimmer Device</td><td>2.1.1</td><td>HUE</td></tr>
<tr><td>Sat Slider</td><td>Dimmer Device</td><td>2.1.1</td><td>SAT</td></tr>
<tr><td>Fade Slider</td><td>Dimmer Device</td><td>2.1.1</td><td>SET</td></tr>
<tr><td>ON/Off control (with capability for dissolve setting)</td><td>Scene Device</td><td>2.1.1</td><td>(no entry)</td></tr>
</table>
</td>
</tr>
</table>

The entry within Elan Configurator for **Hue** slider with a Z/G/N address of 2.1.1 would be as follows:

Dimmer Device Entry

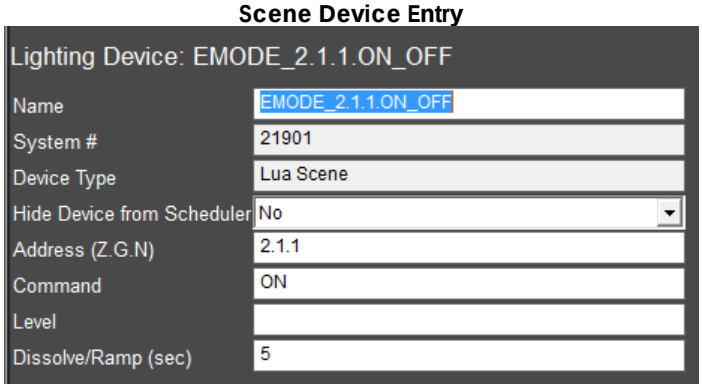


The entry within Elan Configurator for **Red** slider with a Z/G/N address of 2.1.1 would be as follows:



The entry within Elan Configurator for the On/Off control with a Z/G/N address of 2.1.1 would be as follows:

Scene Device Entry



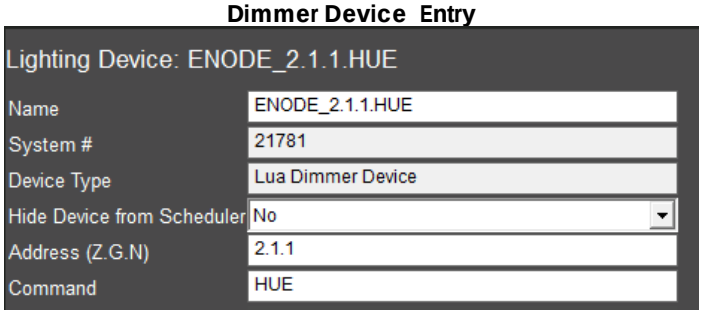
Example 2: If you have one ILC-100 LED controller with a **Z/G/N** address of **2.1.1** and you wanted a **Hue/Sat/Brightness** set of sliders along with a **Red/Green/Blue** set of sliders, and an **ON/OFF** control, you would need to create this following:

Table 19

Deisred button or slider	Device Type	Address (Z/G/N)	Command Tag Entry
Hue Slider	Dimmer Device	2.1.1	HUE
Sat Slider	Dimmer Device	2.1.1	SAT
Fade Slider	Dimmer Device	2.1.1	SET
Red Slider	Dimmer Device	2.1.1	RED
Green Slider	Dimmer Device	2.1.1	GREEN
Blue Slider	Dimmer Device	2.1.1	BLUE
ON/Off control (with capability for dissolve)	Scene Device	2.1.1	

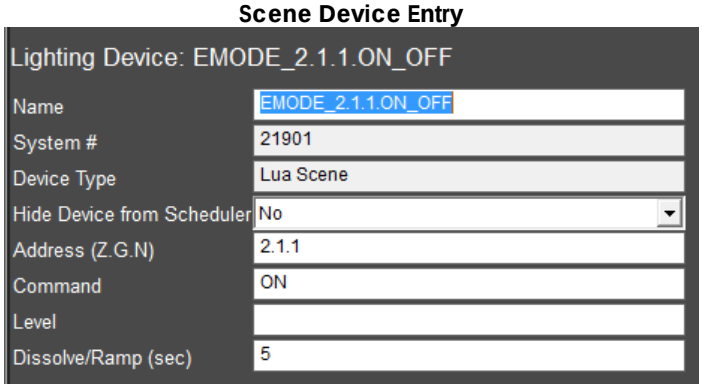
The entry within Elan Configurator for **Hue** slider with a Z/G/N address of 2.1.1 would be as follows:

Dimmer Device Entry



The entry within Elan Configurator for the **On/Off** control with a Z/G/N address of 2.1.1 would be as follows:

Scene Device Entry



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, a **Customizable Scene** (Scene 1) button for each controller, as well as a Standard Button that can select **Effect 1** (which cycles through Preset Colors 1 through 8 in an infinte loop with a **Dissolve Time** of 1 second and a **Seq Rate** of 3 seconds) for both controllers in unision, you would need to create this following:

Table 20

Deisred button or slider	Device Type	Add. (Z/G/N)	Com-mand Tag entry	Level	Diss/ Ramp (sec)
Hue Slider	Dimmer Device	2.1.1	HUE		
Sat Slider	Dimmer Device	2.1.1	SAT		
Fade Slider	Dimmer Device	2.1.1	SET		
Cust. Scene 1	Add Customizable Scene button and from Viewer add applicable devices created elsewhere throughout this example				
ON/Off control (with dissolve capability)	LUA Scene	2.1.1	(not req'd)	(not req'd)	n (for sec.)
Hue Slider	Dimmer Device	2.1.2	HUE		
Sat Slider	Dimmer Device	2.1.2	SAT		
Fade Slider	Dimmer Device	2.1.2	SET		
Cust. Scene 1	Add Customizable Scene button and from Viewer add applicable devices created elsewhere throughout this example				
ON/Off control (with dissolve capability)	LUA Scene	2.1.1	(not req'd)	(not req'd)	n (for sec.)

		ON/Off control (with dissolve capability)	LUA Scene	2.1.1	(not req'd)	(not req'd)	n (for sec.)
		Effect 1	LUA Scene	**2.1.0**	EFFECT	1	1,3
		Refer to the Elan Configurator programming entries under Example 1 or 2 above for the exact syntax for data entry.					

Appendix 5

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 addressed 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.

Table 21

	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.

Table 22

Specific controller address	Specific command that will trigger targeted controller
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.

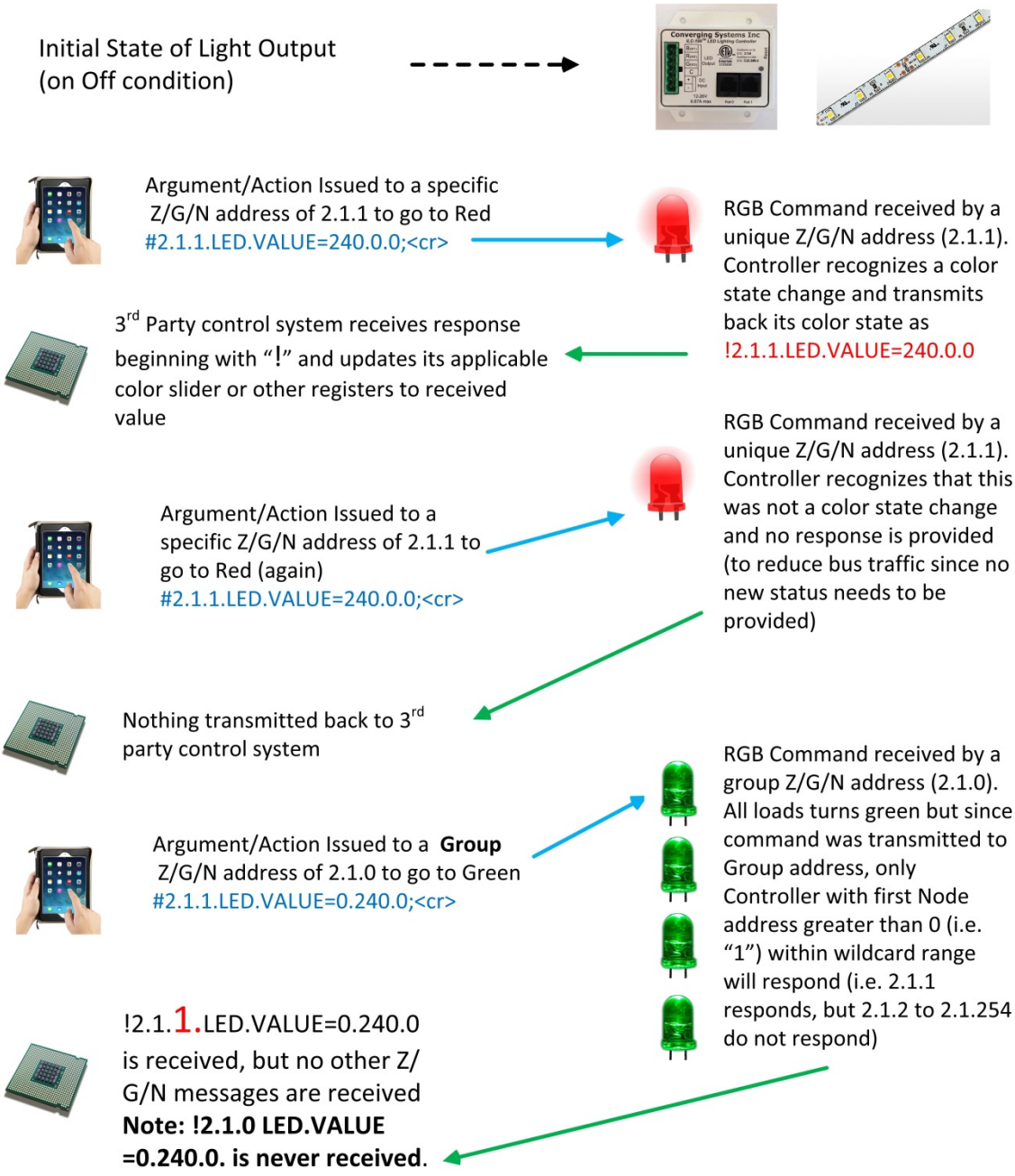

Initial State of Light Output
(on Off condition)
Converging Systems Inc
Argument/Action Issued to a specific Z/G/N address of 2.1.1 to go to Red
#2.1.1.LED.VALUE=240.0.0;<cr>
RGB Command received by a unique Z/G/N address (2.1.1). Controller recognizes a color state change and transmits back its color 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
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>
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)
!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.

Figure 11

Appendix 6

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 and 4-color lighting fixtures utilize the Red, Green, Blue (RGB) or RGBW illuminants 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 the host controllers 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 the host controller.

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

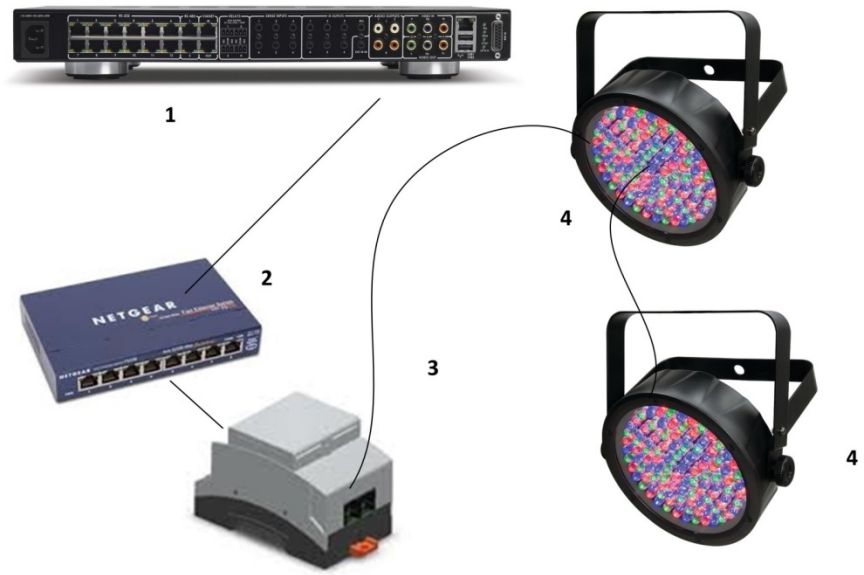


Figure 12

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	
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:

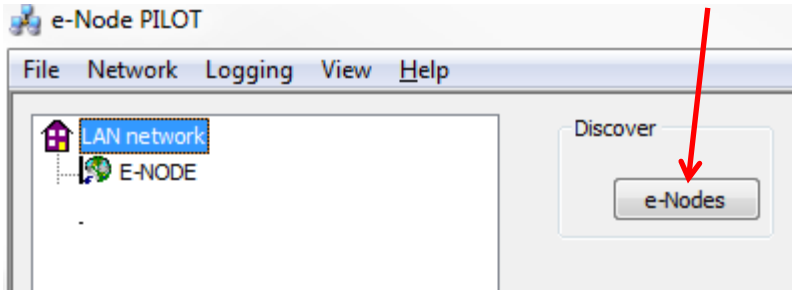
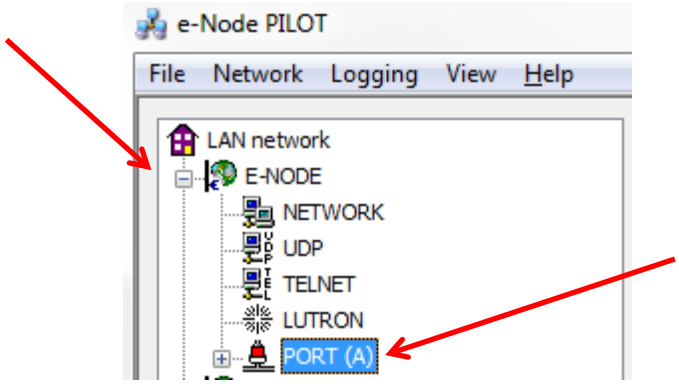
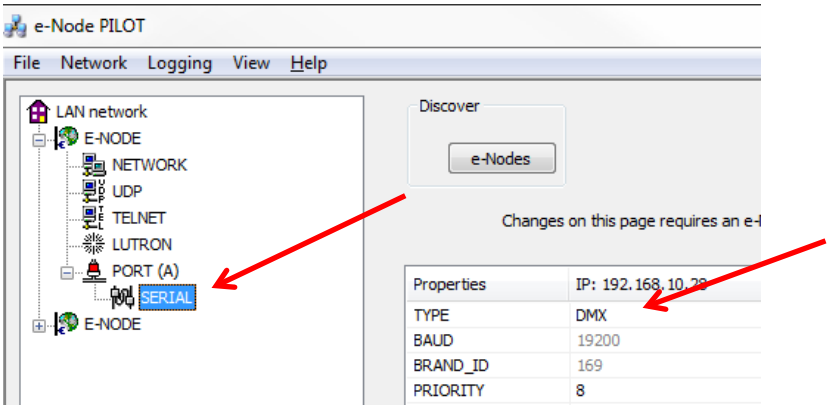
e-Node/dmx (MkIII) PORT 2 RJ-45 connector

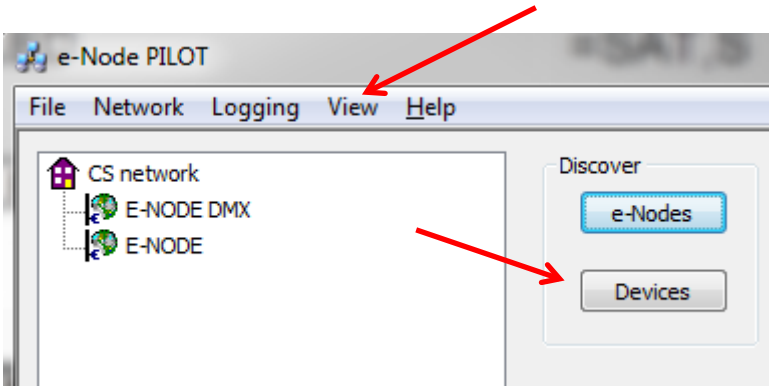
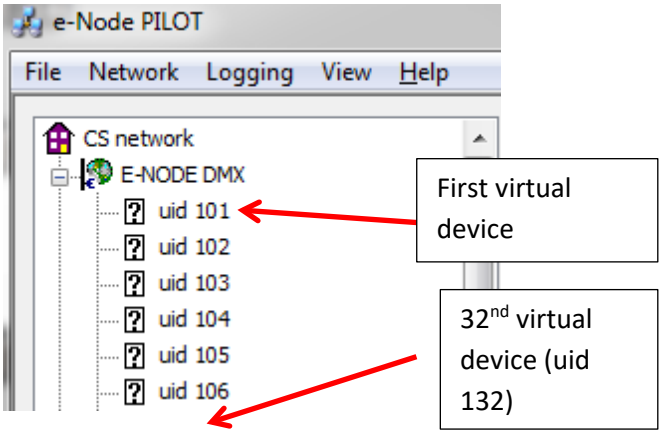
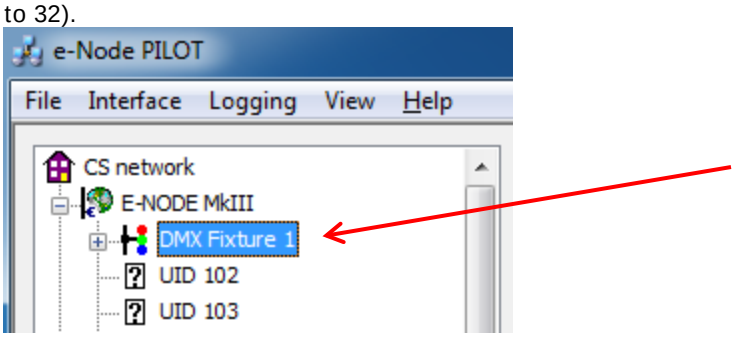
Pin	Signal
1	Data +
2	Data -
3	Do not connect
4	Do not connect
5	Do not connect
6	Do not connect
7	Ground
8	Do not connect

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.

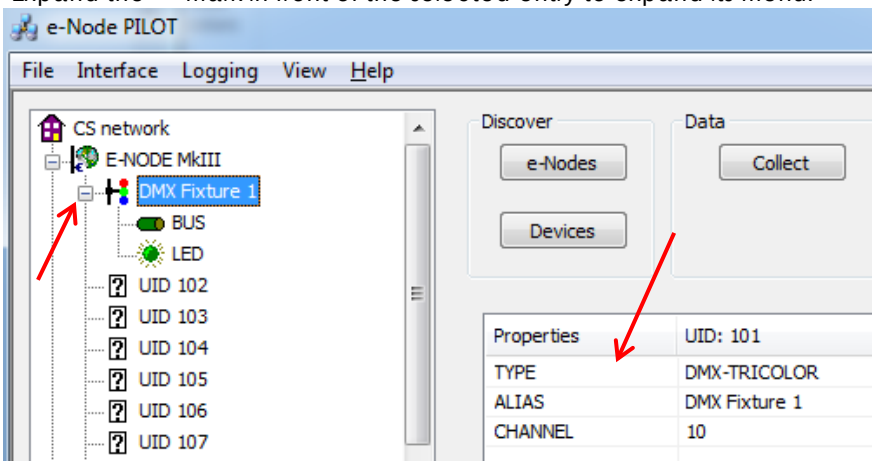
e-Node/dmx Programming

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).

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

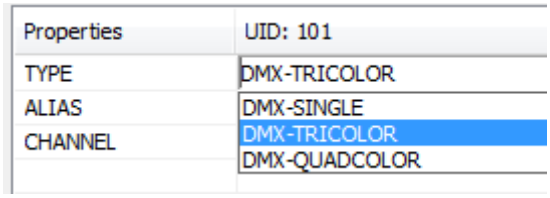
		entry is set to **DMX**, will the e-Node/dmx properly communicate to DMX fixtures.
DMX-3	Device Discovery	-Select the **View Map** tab and select the **Discover e-Node** button. Any e-Node(s) connected on the same network will appear as shown. -Select the Discover Devices button.  -Immediately 32 virtual "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	DMX Fixture Type	- Select the **View Map** tab and select a specific **uid entry** (101-132) such that the entry is highlighted and then switches to a specific **DMX Fixture** (1 to 32). 

-Expand the + mark in front of the selected entry to expand its menu.



-Within the **Properties** select the appropriate type of DMX fixture that you wish to support. For example, a 3-color DMX device (typically RGB colorants) is referred to as **DMX-TRICOLOR**, while a 4-color DMX device (regardless of those four colors) would be referred to as a **DMX-QUADCOLOR** and a 1-color DMX device would be referred to as a **DMX-SINGLE.**

Note: For each **UIDn/DMX** Fixture it is important to select the appropriate type in order for the embedded software to be able to properly adapt itself for the target output device.



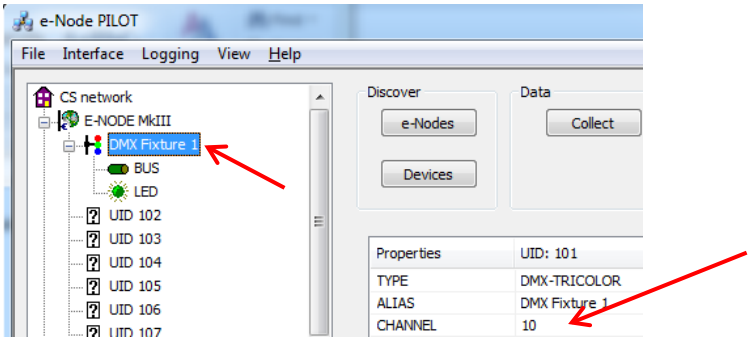
Note: The MKIII hardware release of e-Node/dmx is required for this level of functionality operating with firmware versions 1.02 or later.

DMX-5	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 a particular **UIDn/DMX Fixture** (regardless of the number for channels which are associated with that DMX Fixture). Specifically in the example below, the start DMX address for DMX Fixture 1 is **10** and the required number of successive DMX addresses is automatically internally assigned within the e-Node/dmx to those discrete channels within that fixture. For example, for a 4-channel DMX fixture which will be addressed with a default **Z/G/N** address of 2.1.1, the default start DMX channel would be 10 and the e-Node/dmx firmware automatically allocates 4 sequential channels for the 4 colors of that fixture (e.g. 10/11/12/13). Typically (unless the defaults are changed by the installer), Red would be assigned to DMX Channel 10, Green would be assigned to DMX Channel 11, Blue would be assigned to DMX Channel 12 and White would be assigned to DMX Channel 13. All DMX ***Start*** addresses and associated **Z/G/N** addresses can be changed by the installer. DMX start default channels, Z/G/N default addresses are mapped as shown in the following table:

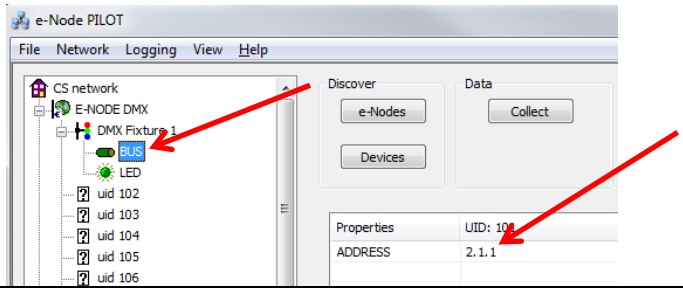
DMX Fixture	Default UID	DMX Channel Allocation	CS-Zone/Group/ Node
1	101	10-19	2.1.1
2	102	20-29	2.2.1
3	103	30-39	2.3.1
4	104	40-49	2.4.1
5	105	50-59	2.5.1
6	106	60-69	2.6.1
7	107	70-79	2.7.1
8	108	80-89	2.8.1
9	109	90-99	3.1.1
10	110	100-109	3.2.1
11	111	110-119	3.3.1
12	112	120-129	3.4.1
13	113	130-139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

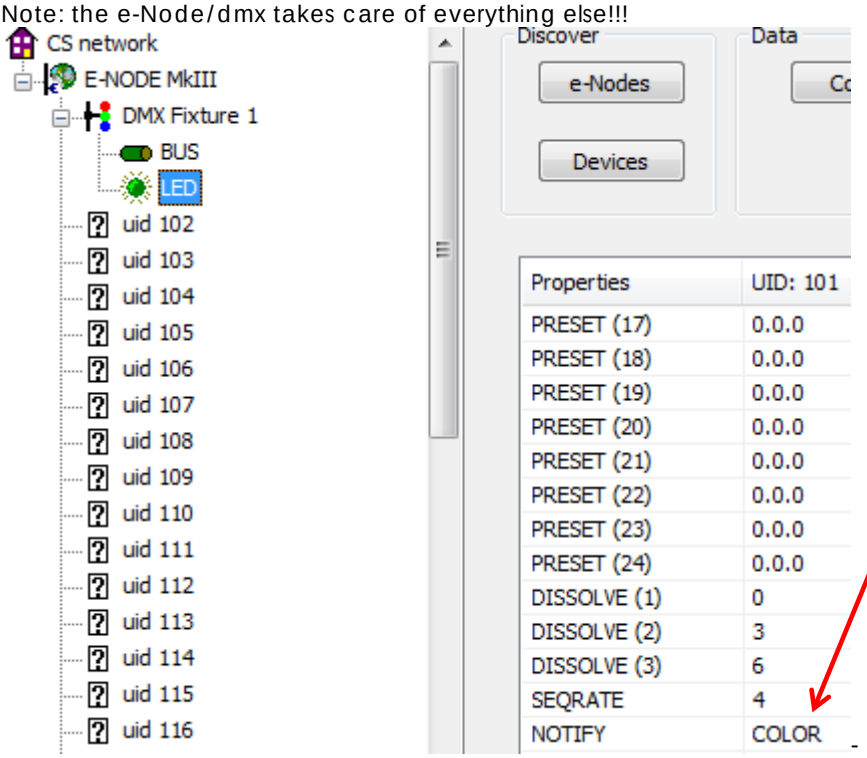
23	123	230-239	4.7.1	
24	124	240-249	4.8.1	
25	125	250-259	5.1.1	
26	126	260-269	5.2.1	
27	127	270-279	5.3.1	
28	128	280-289	5.4.1	
29	129	290-299	5.5.1	
30	130	300-309	5.6.1	
31	131	310-319	5.7.1	
32	132	320-329	5.8.1	

-If you desire to change any default DMX start address, click on the DMX Fixture entry and change the address as appropriate.



-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-6	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 7

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.

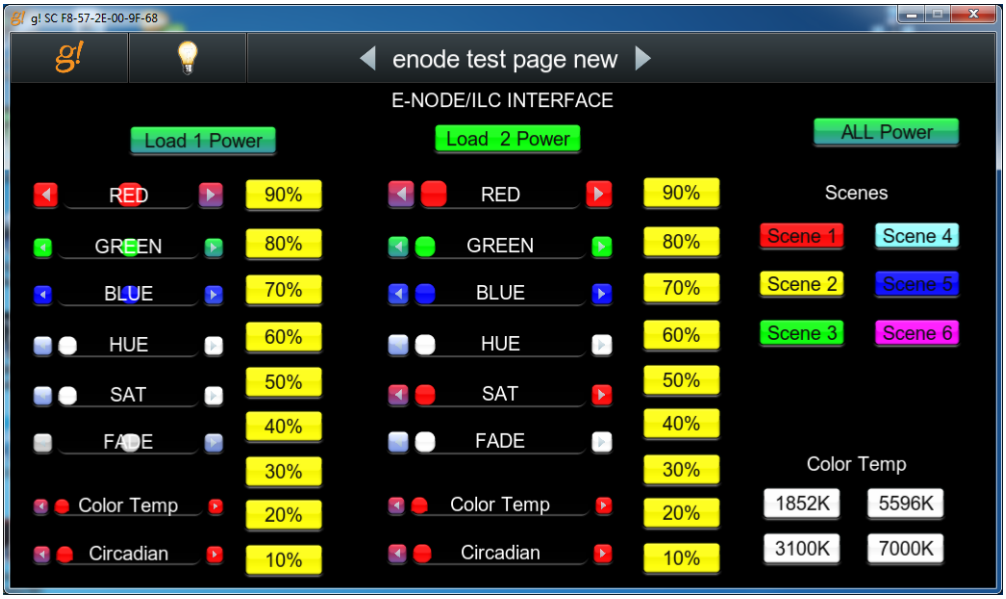


Figure 13

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.

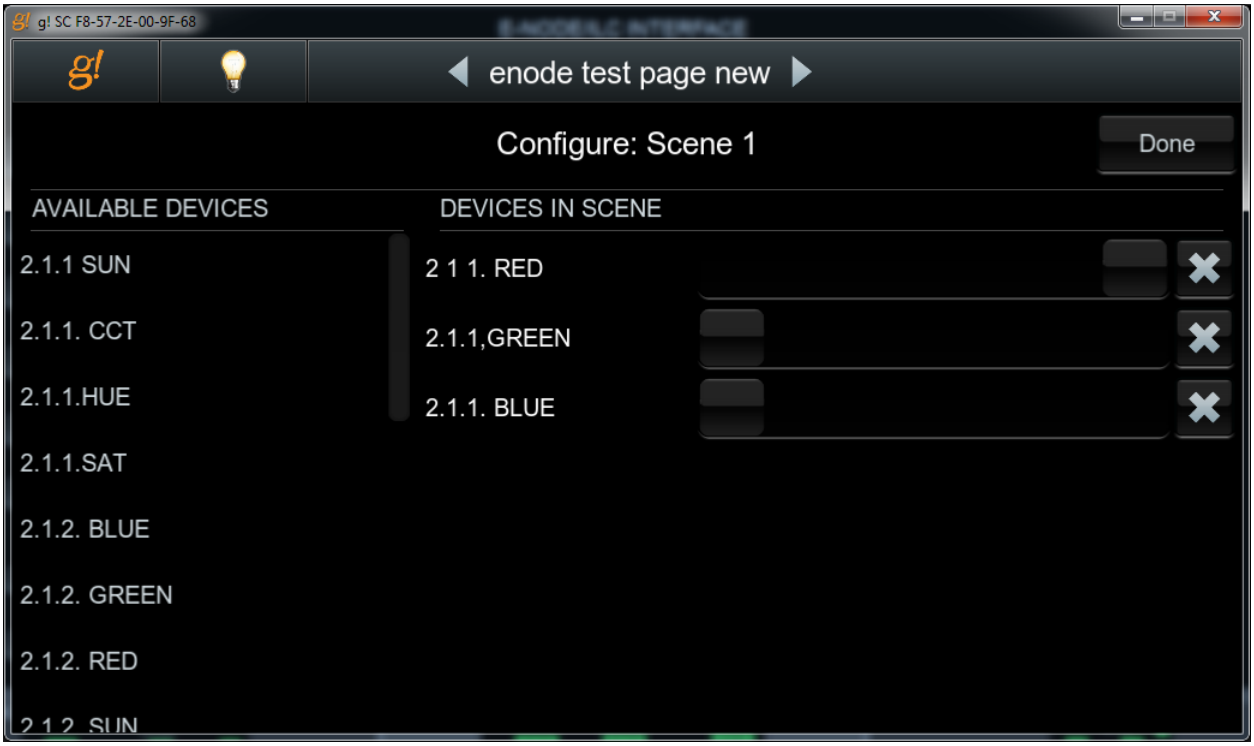


Figure 14

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.

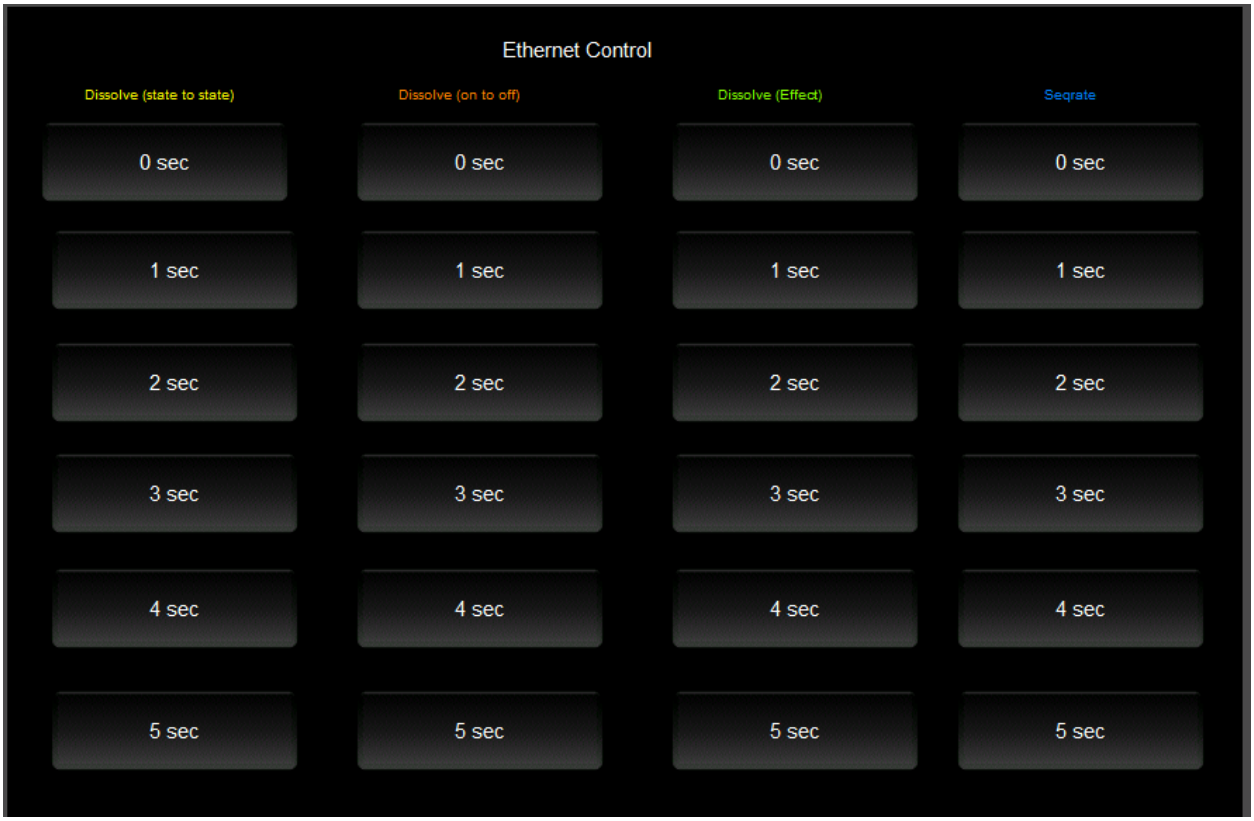


Figure 15

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.

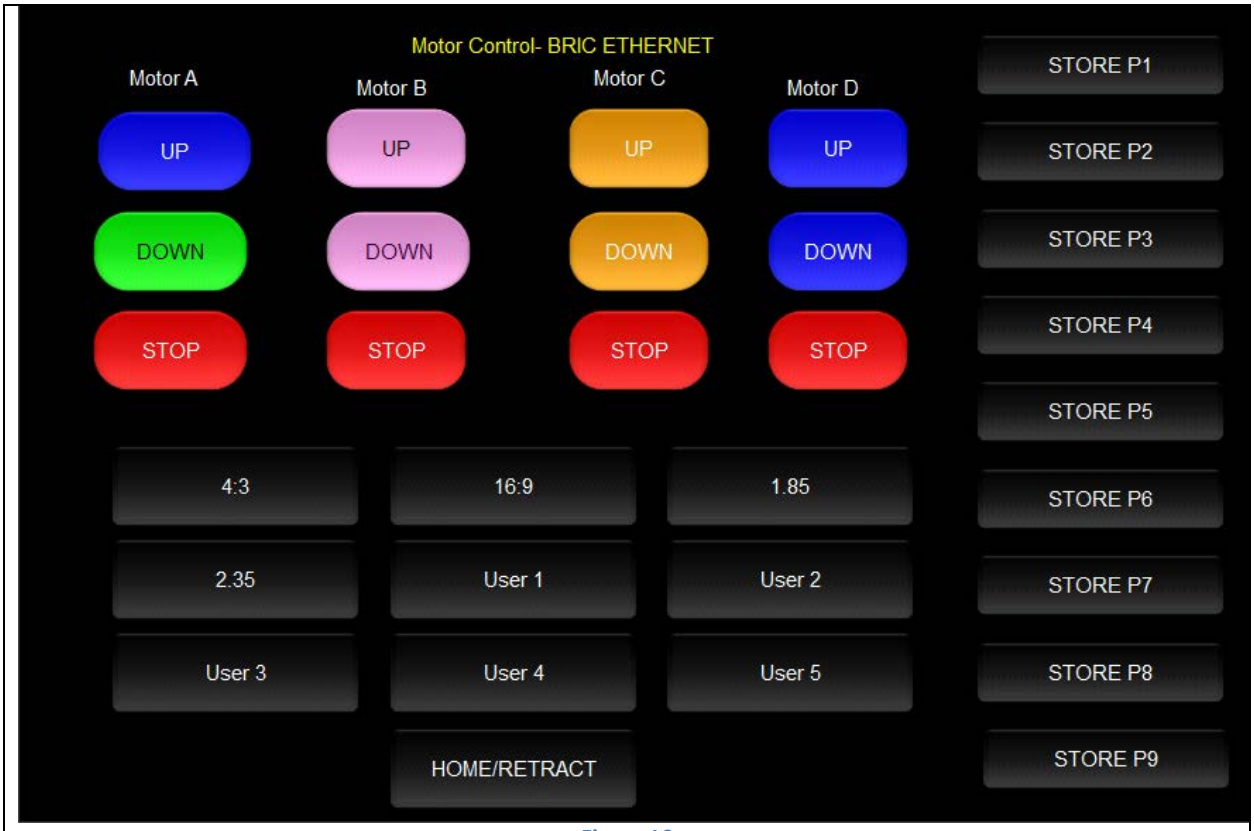


Figure 16

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.)

Figure 17

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

Appendix 8

Troubleshooting/System Monitoring