Converging Systems/Creston Home Interface Guide

Control of Converging Systems e-Node and CS-BUS compatible LED and/or controllers through Ethernet (IP) (or DMX fixtures)

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Integration Note

Manufacturer:	**Converging Systems, Inc.**
Model Number(s):	**CS-Bus Motor and Lighting Controllers**
Crestron Home Code Base	V3.006.0132 and later
Driver Developer:	Converging Systems Inc. (Crestron Developer Partner)
Document Revision Date:	11/11/2022 Rev 1.0

Integration Note Table of Contents

Please the following table of contents to help you navigate through this Integration Note.

Revision Update:

OVERVIEW AND SUPPORTED FEATURES

The Converging Systems' e-Node gateways are designed to act as the communication intermediary between a Crestron Home and Converging Systems' lighting or motor controllers.

The Converging Systems ILC-x00 family of **LED** lighting controllers are networkable devices which can provide support for Converging Systems' Flexible Linear Lighting Arrays (FLLA) RGB, RGBW, and monochrome LED devices as well as specific third-party surface mount and recessed RGBW fixtures

The Converging Systems IMC-x00 family of **MOTOR** controllers are networkable devices which can provide for third-party motor platforms.

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

- Discrete control of LED states (ON/OFF) including feedback of ON/OFF
- Bi-directional control of Hue/Saturation Brightness color settings for RGB, and RGBW devices using Converging Systems FLLA LED elements.
- Bi-directional control of Brightness settings for monochrome devices using Converging Systems FLLA LED elements.
- One-directional control of R, G, B, and W settings with RGB, and RGBW devices using Converging Systems FLLA LED elements.
- Bi-directional 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
- Bi-directional control of Circadian Rhythm (Sunrise to midday sun to Sunset dynamic settings) using Converging Systems RGBW FLLA devices. SOLAR COMMAND
- Ability to set specific RGB value for color through script (for 3-channel color and 3-channel DMX).
- Ability to set specific RGBW value for color through script (for 4-channel color).
- Support of communication utilizing Telnet with or without authentication (Port 23)
- Ability to store and recall specific colors set by a user within ILC-x00 controllers.
- Ability to recall specific Effects stored within specific ILC-x00 controllers.
- 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) (WIP)
- 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.
- Ability to adjust ramp time for Custom Buttons
- Control via all thin client interfaces (Crestron Touchscreen, keypads)

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

- Circadian Tuning settings on third-party DMX fixtures
- Exact color temperature output on third-party DMX fixtures (although a close approximation might be possible) using RGBW adjustments and then the Store/Recall functions
- Ability to set HSB value for LEDs through Quick Actions)

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

- Motor UP/Down
- Stop (using a repeat directional button pressed a 2nd time
- Store and Recall of Presets 1~20 (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**:**

- Motor Position Feedback (for CS-BUS motor controllers that provide this level of functionality).
- Store and Recall of Presets 1~20 (for CS-BUS motor controllers that provide this level of functionality) (with Version 1 of driver)

Note:

*with Version 2 of motor driver

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	Crestron Home Device Specific Commands	ILC-100c ILC-300	ILC-400	ILC-450	ILC-100m & ILC-400 in mono mode	e-Node DMX
General LED Control Commands						
ON	On	✓	✓	✓	✓	✓
OFF	Off	✓	✓	✓	✓	✓
~~EFFECT,n~~	~~Effect~~	~~✓~~	~~✓~~	~~✓~~		~~✓~~
STORE,#	Store	✓	✓	✓	✓V5	✓
RECALL,#	Recall	✓	✓	✓	✓V5	✓
DISSOLVE.1=XX	Default Dissolve Set	✓	✓	✓	✓	✓
DISSOLVE.2=XX	Default Dissolve Set	✓	✓	✓	✓	✓
~~DISSOLVE.3=XX~~	~~Default Dissolve Set~~	~~✓~~	~~✓~~	~~✓~~	~~✓~~	~~✓~~
~~DISSOLVE.4=XX~~	~~Default Dissolve Set~~	~~✓~~	~~✓~~	~~✓~~	~~✓~~	~~✓~~
~~SEQRATE=XX~~	~~Default Dissolve Set~~	~~✓~~	~~✓~~	~~✓~~	~~✓~~	~~✓~~
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	Hue	✓	✓	✓		✓
~~SAT_UP~~	~~Sat Up~~	~~✓~~	~~✓~~	~~✓~~		~~✓~~
~~SAT_DOWN~~	~~Sat Down~~	~~✓~~	~~✓~~	~~✓~~		~~✓~~
SAT_S	Sat	✓	✓	✓		✓
~~STOP~~	~~Stop~~	~~✓~~	~~✓~~	~~✓~~	~~✓~~	~~✓~~
COLOR=H.S.L						
RGB Color Space Commands						
RED,R	Red	✓	✓	✓		✓
GREEN,G	Green	✓	✓	✓		✓
BLUE,B	Blue	✓	✓	✓		✓
VALUE=R.G.B						
WHITE,W	White	✓	✓	✓	✓	✓
~~RGB,R.G.B~~	~~RGB~~	~~✓~~	~~✓~~	~~✓~~		~~✓~~
~~RGBW,R.G.B~~	~~RGBW~~		~~✓~~	~~✓~~		
~~STOP~~	~~Stop~~	~~✓~~	~~✓~~	~~✓~~	~~✓~~	~~✓~~
Correlated Color Temperature (CCT) Commands and SUN (Circadian) Commands						
CCT,XXXX	CCT	✓	✓	✓		✓
~~CCT_UP~~	~~CCT Up~~	~~✓~~	~~✓~~	~~✓~~		~~✓~~
~~CCT_DOWN~~	~~CCT Down~~	~~✓~~	~~✓~~	~~✓~~		~~✓~~
~~SUN,XXX~~	~~SUN~~		~~✓~~	~~✓~~		
~~SUN_UP~~	~~SUN Up~~		~~✓~~	~~✓~~		
~~SUN_DOWN~~	~~SUN Down~~		~~✓~~	~~✓~~		
Bi-Directional Commands						

COLOR=?	Automatic polling within Driver. **Note**: Driver achieves function with Notify ON	✓	✓	✓	✓	✓
VALUE=?	Automatic polling within Driver **Note**: Driver achieves same function with Notify ON					
STATUS=?	Automatic polling within Driver **Note**: Driver achieves same function with Notify ON					
Accessory e-Node Command/Setup Parameters						
Telnet Login with Authentication (with e-Node***)		✓	✓	✓	✓	✓
Telnet Login without Authentication***		✓	✓	✓	✓	✓

Notes:

* Reserved

** Possible with enhancements to Driver

*** By turning off or on authentication within e-Node through Web-Pilot or Pilot application

Motor Commands

Table 2

General Commands	Crestron Home Device Specific Commands	IMC-100 (with e-Node)	BRIC ("Bric Mode") (with e-Node	CVM ("IMC-300MKII")
General Motor Control Commands				
GOTO				
UP	Raise	✓	✓	✓
DOWN	Lower	✓	✓	✓
STOP	Stop	**	**	**
MOTOR RIGHT				
MOTOR LEFT				
RETRACT	Raise			
~~TOGGLE~~				
STORE,#		✓****	✓	✓****
RECALL,#		✓****	✓	✓****
~~PRESET.X=XX.XX~~				
Bi-Directional Commands				
~~STATUS=?~~				
POSITION=?	Automatic			
Accessory e-Node Command/Setup Parameters				
Telnet Login with Authentication (with e-Node***)		✓	✓	✓
Telnet Login w/o Authentication***)		✓	✓	✓

Notes:

* Reserved

** By simply hitting the same directional button a 2nd time

*** By turning On or OFF Authentication in Web Pilot or Pilot application

**** With Version 2 of driver will handle stores and recalls from 1 to 20 (update on Converging Systems site at https://www.convergingsystems.com/software/local_profiles_library.php#crestronhome

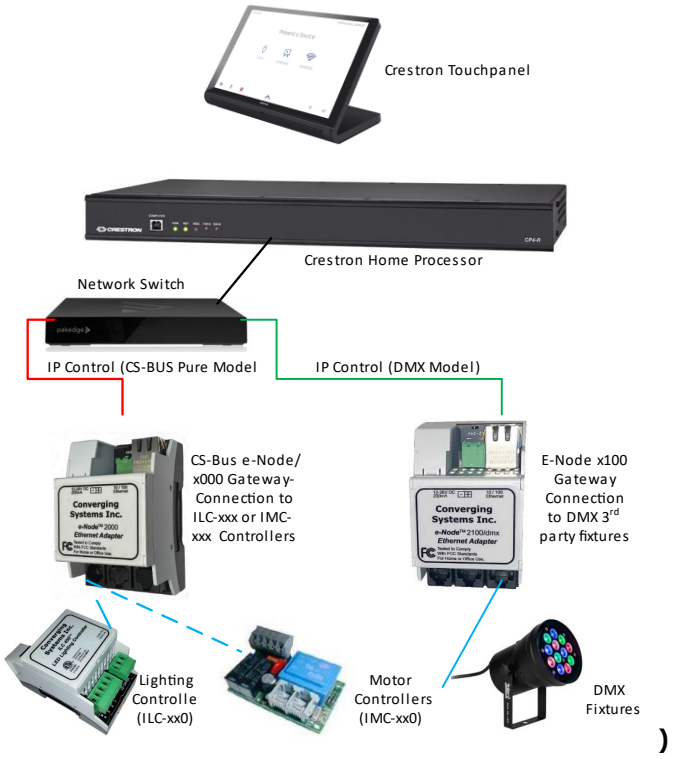
INTEGRATION REQUIREMENTS-CONVERGING SYSTEMS CONFIGURATION

NOTE: Converging Systems LED and Motor Controllers REQUIRE a communication device (i.e., e-Node/2x00 or e-Node/4x00 for Ethernet connectivity). It is not possible to connect CSI LED or Motor controllers to a Crestron Home controller in any other way.

The system will need to be installed and configured according to the Converging Systems documentation, prior to integration with the Crestron Home system. The Converging Systems e-Node web-page commissioning tool can be accessed by selecting the triple settings icon on the e-Node webpage

NOTE: It is recommended that the Converging Systems' controller(s) as well as the e-Node Ethernet gateway (communication device) are running the latest version of firmware available at the time of installation

WIRING DIAGRAM (for IP connection



)

Figure 1

Wiring/Configuration Notes:

1. Maximum length of CS-Bus cabling from e-Node to the last ILC-xxx/IMC-x00 controller using CAT5e or better cabling (and obeying the 1-1 pin-out requirements for the RJ-25-RJ25 cable and a twisted pair of the same color carrying the signals on pins 3 and 4 of an 6P6C cable) = 4000 feet
2. Maximum number of ILC-xxx/IMC-xxx 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 Crestron system = 254

BILL OF MATERIALS (for IP control)

Table 3

#	Device	Mfg.	Part Number	Protocol	Connector Type	Notes
1	Crestron Home	Crestron	CP4-R MC4-R DIN-AP4-R	Ethernet	RJ-45	
2	Network Switch	Various	Various	Ethernet	RJ-45	
3	e-Node/2x00 or e-Node/4x00	Converging Systems	e-Node (or CVM)	Ethernet	RJ-45 (for Ethernet)	
4	Lighting Controller (or Motor Controller)	Converging Systems	ILC-x00 or IMC-x00	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) luminaries	Converging Systems	FLLA-Monochrome/Bi-White/RGB or RGBW type		1-color 2 pin 2-color 3 pin 3-color 4 pin 4-color 5 pin	
5 alt.	Alternate RGBW Fixture	Various	Various	Requires ILC-450	8 pin Phoenix type	

COMPONENT HARDWARE SETUP

NOTE: Please refer to Appendix 1 for a reference document for general hardware instructions for Converging Systems devices. You may also find the Quick Start Guides that accompanied your hardware useful. In addition, these documents provide additional detail as to Best Practices for wiring and setup.

-Once completed with this work, proceed to the next section-Component Software Setup.

Other relevant and more detailed information can also be found as follows:

Lighting Control
https://www.convergingsystems.com/lighting_install_library.php
Motor Control
https://www.convergingsystems.com/motor_install_library.php

There are also a number of short Quick Start Guides for various products that can be downloaded from the above links as well.

Best Practice-Setup Hardware before proceeding to the next section

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

NOTE: Please refer to Appendix 1 for a reference document for complete software commissioning for Converging Systems devices. This includes information on software commissioning including Activation/ Addressing and Turning on Bi-Directional Communication (NOTIFY). You may also refer to Quick Start Guides that accompany your hardware. In addition, these documents provide additional detail as to Best Practices for programming. ‘

-Once completed with this work, proceed to the next section-Composer Setup and Programming.

Other relevant and more detailed information can also be found as follows:

Lighting Control
https://www.convergingsystems.com/lighting_install_library.php
Motor Control
https://www.convergingsystems.com/motor_install_library.php

There are also a number of short Quick Start Guides for various products that can be downloaded from the above links as well.

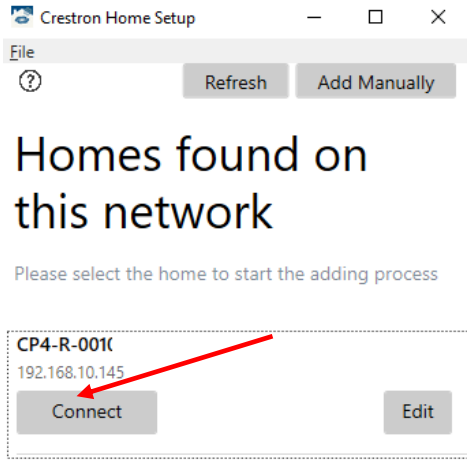
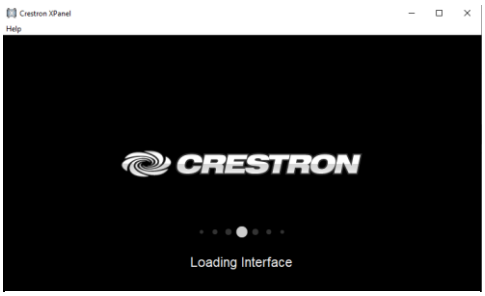
Best Practice-Active/Address and Customize Software (within Hardware) before proceeding to the next section

Driver Details

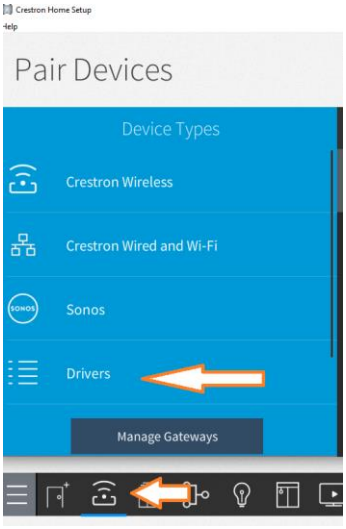
Drivers can be found within Crestron Home for Converging Systems (see table below for specific driver nomenclature). Search on ***Converging Systems*** as shown below. There may be a number of available drivers make sure that you use the ***Next*** option to review all drivers.

Note: Make sure you have loaded in the latest Crestron Home drivers for Converging Systems. Allow Crestron Home to search for new drivers before proceeding.

Note on latest Drivers--In some special cases, the latest driver may only be available on the Converging Systems website. See
https://www.convergingsystems.com/software/local_profiles_library.php#crestronhome for the latest drivers. If you are downloading driver(s) from the Converging Systems' website, make sure you install as per separate documentation (provide link).

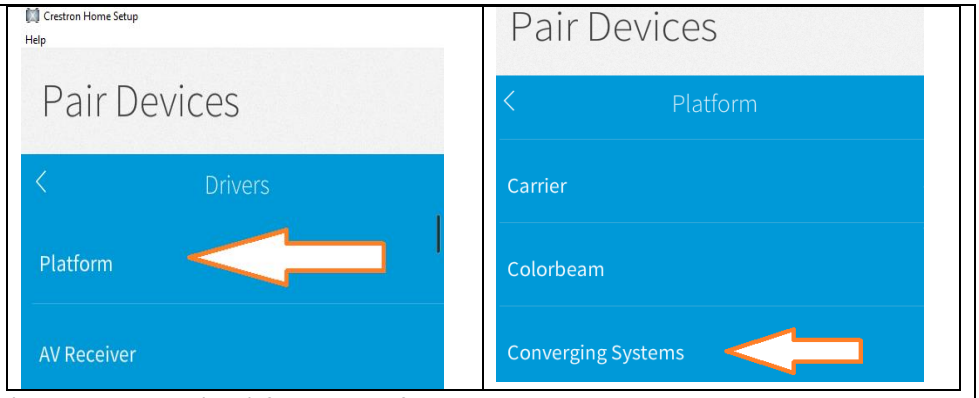
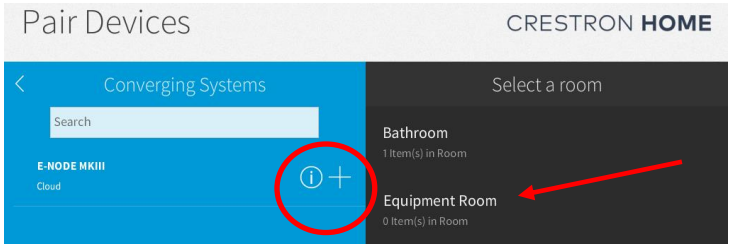
Type	Step	Detail
CH-1	Load Crestron Home Setup	-Launch the *Crestron Home Setup* app which is used to setup your Crestron Home processor (dealer setup software). After it is launched, select **Refresh** to auto-discover "Homes found on this Network" and hit "Connect" for applicable Home/processor.  -Enter your credentials when prompted to launch the Crestron XPanel.   **Crestron Home Setup**
CH-2	Load Platform Driver	Select the **(Step 2) Pair Devices** icon to continue

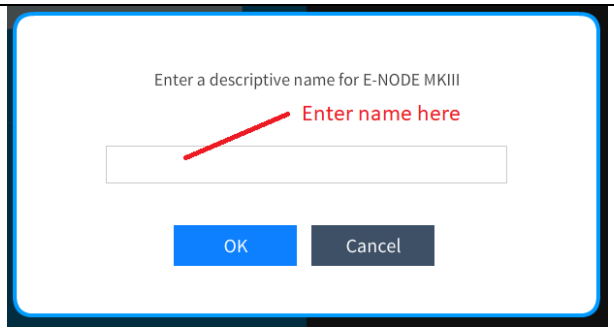
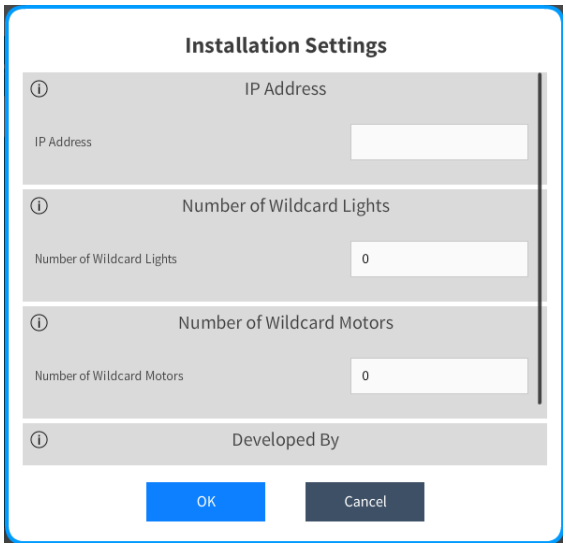
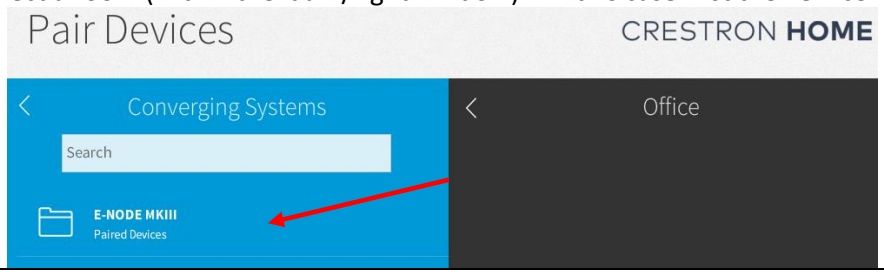
Select **Drivers**



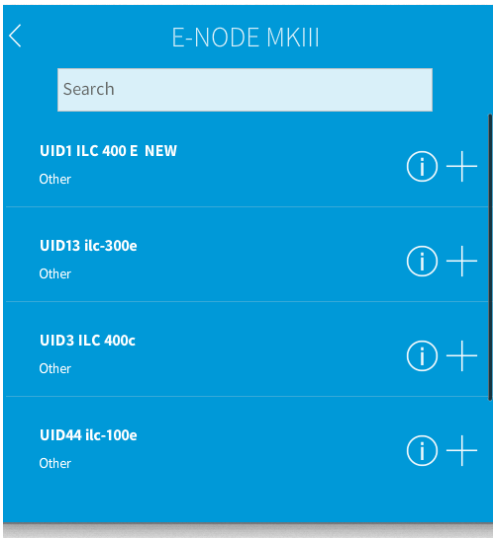
-Next, allow the Crestron auto-download procedure to complete (when the rotating icon stops).

-Select **Platform** and scroll down and select "Converging Systems."
Note: If you do not find Converging Systems, you may need to download and install it manually*).

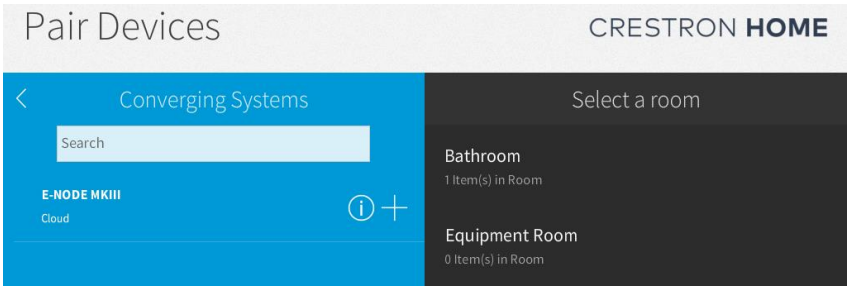
		 *Note: see link (tbd) for more information.
CH-3	Adding Devices (**communication** devices and **ZGN** controllers)	**Background on Device Placement** You will be adding a communication device (e-Node/xxx) below in step **CH-4** and one or more **ZGN** Devices (controllers) in step **CH-5**. With respect to the communication device (e-Node type), it really does not matter into what "room" that you place this device, but you must place it somewhere. What is important, however, is where you place the individual controllers (lighting and motor) that will be controlled through Crestron touch panels, keypads and mobile apps. Individual controllers, which we refer to as **Z**one/**G**roup/**N**ode (ZGN) Devices, must be placed into the appropriate room where they can be found and controlled. See CH-4 after completing CH-3 to proceed.
CH-4	Add e-Node (**communication** device/gateway)	**Example**: Let's add the e-Node (named e-node MKIII) to the Equipment Room. -Select a room (within the dark/right window)—in this case the "Equipment Room"  -Select the "**+**" mark next to the target e-Node that you wish to position (within the Blue Box above) -Step 3: Provide a useful name for the communication gateway (i.e., e-Node MKIII) and select **OK** to continue

		 -Within the **Installations Settings** window, enter the e-Node's **IP Address** -Within the same window, enter the **Number of Wildcard Lights** (or Motors) (i.e., virtual device) that are desired to be auto-populated (i.e., a virtual device with a ZGN of 2.1.0 will control specific devices with addresses of 2.1.1 and 2.1.2 and 2.1.3 etc.) **Note:** Phantom Wildcard Devices are useful if you want a single virtual Crestron UI device to be able to be populated in one or more rooms to control multiple controllers rather than just a single controller. This cuts down on bus traffic and eliminates any delays encountered with typical macros that generate a kind-of "popcorn" effect when triggered.  - Select **OK** to continue
CH-5	Add ZGN controllers (and assign to applicable Rooms)	Example: Let's add several discovered ZGN controllers to two different rooms—in this case the Office and the Bathroom -Select a room (within the dark/right window)—in this case first the "Office" 

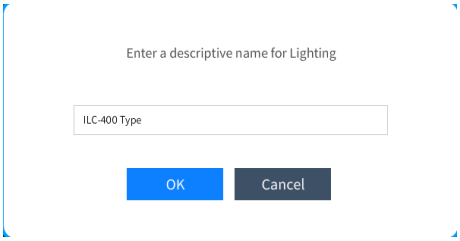
-Select the e-Node that was set up in the above step (CH-4), and discovered/connected ZGN controllers will auto-populate underneath the Search window.



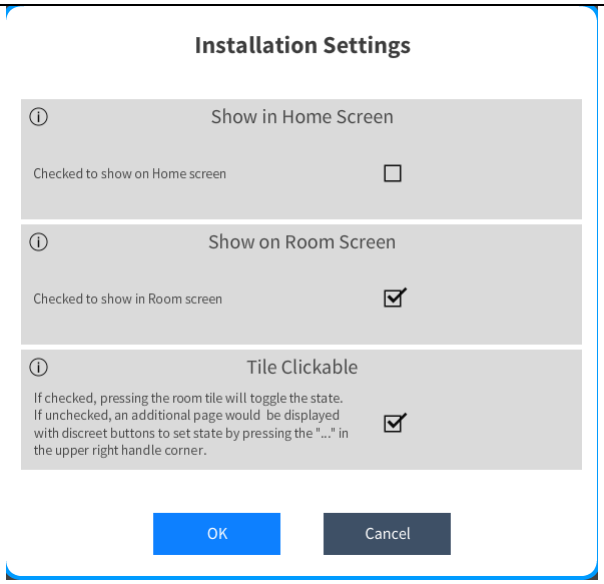
- Select the "**+**" mark next to the targeted ZGN controller that you wish to position -- in this case the "UID1 ILC 400 E NEW"



-Provide a useful name for the ZGN controller and select **OK** to continue

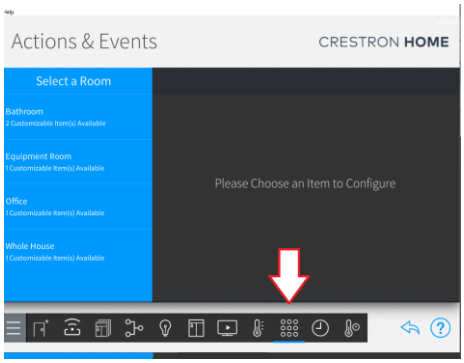


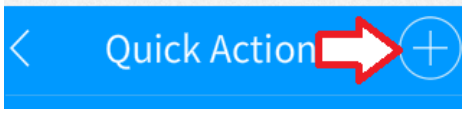
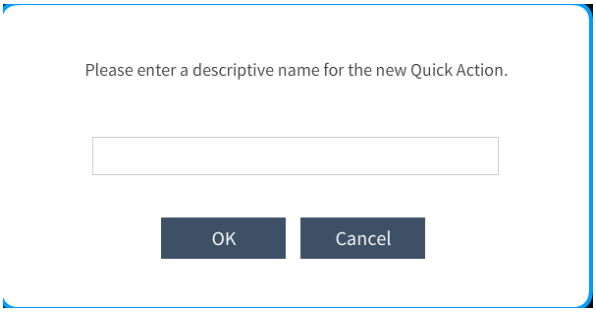
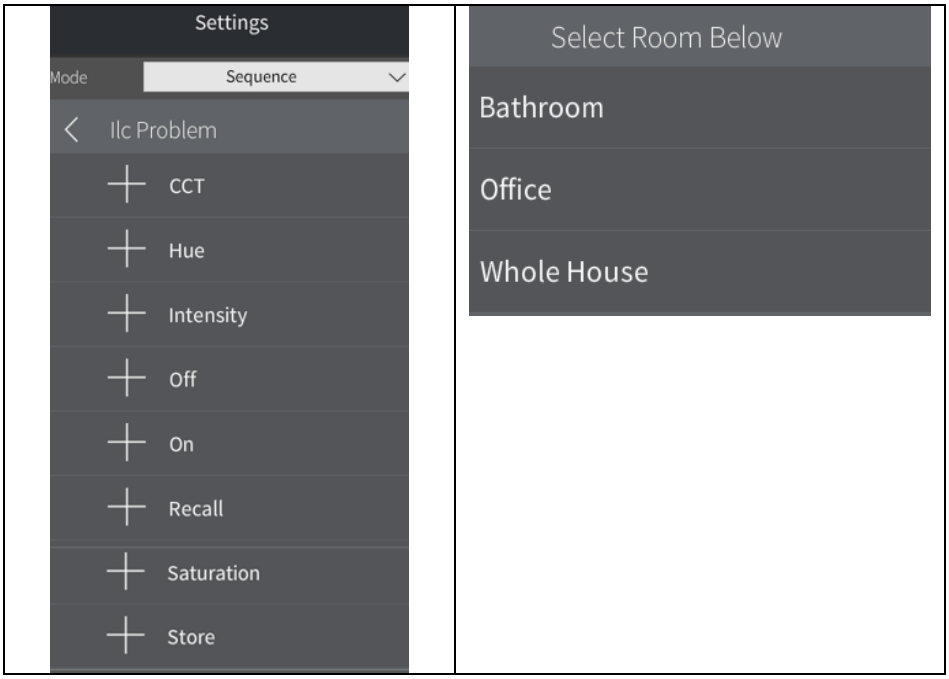
-Within the **Installations Settings** window, choose from available options.

		 - Select **OK** to continue

Programmable Events

Note Programmable Events have three triggers
-When all of the loads power off
-When all of the loads power on
-When some of the loads power on (on triggers on the initial transaction from either all OFF or All ON)

PE-1	Create new Quick Action type	-Go to the Actions and Events Tab  -Select a Room, and select Quick Action  -Select the “+” mark to add a new Quick Action

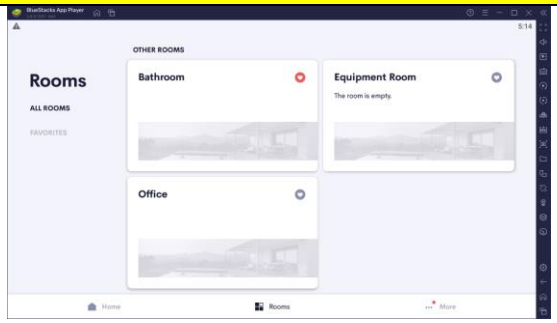
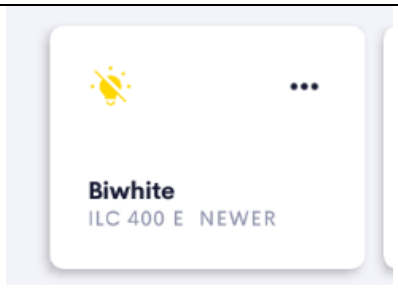
		 -Name your new Quick Action  -Select "**OK**" to continue -Next to "Mode" scroll down and select "Sequence"
PE-2	Customize Entry	-The following pulldown will appear. Select one or parameters followed a room selection. 

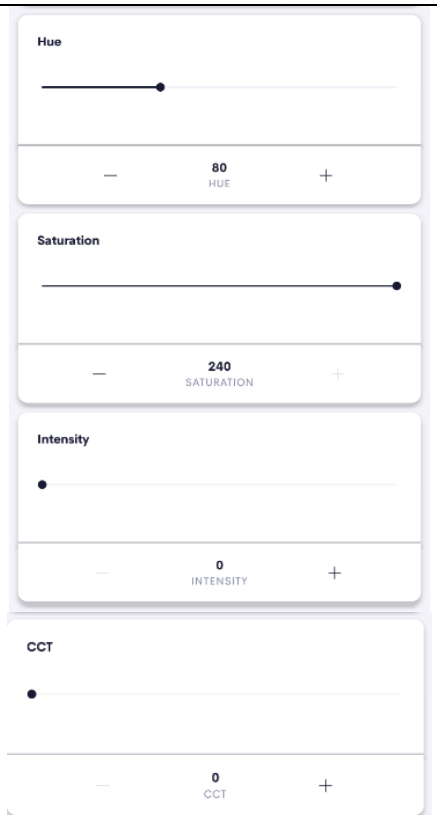
Nuances/Known Issues

-The driver will automatically communicate with the e-Node to import dynamically and changes to the current configuration. For instance, new ZGN (i.e., any additions made through the e-Node webpage discovery process) devices, any name changes, and changes in ZGN addresses will be automatically reflected in the existing Crestron programming.

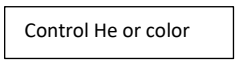
-Any controller changes to existing discovered controllers (i.e., color to bi-white to mono) may require a reboot of the Crestron processor.

End-User Experience

Details	User Interfacel
Room View -Displays the rooms that are active and where loads are programmed -Monochrome loads will have a brightness slider. - • RGB and uncalibrated HSB loads will have HSB sliders (or RGB/RGBW if dealer configured • Ful Spectrum loads will have HSB and CCT sliders	
Adjustment Controls General Each room will display an ON/OFF toggle and intelligently configured sliders for control of the targeted load (with … control) Status “light bulb” reacts to ON/OFF Status (bi-directional feedback)	
Adjustment Controls-Full Spectrum Devices (calibrated LED type) -Sliders will reach to actual state (bi-directional feedback) -Sliders will control HSB (or RGB or RGBW if dealer configured alternatively)	

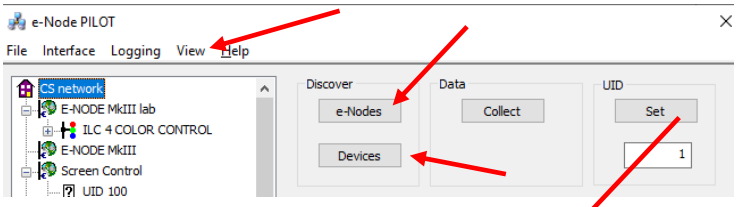
Adjustment Controls-RGB devices (and uncalibrated RGBW devices) -Sliders will reach to actual state (bi-directional feedback) -Sliders will control HSB (or RGB or RGBW if dealer configured alternatively)	
Adjustment Controls-Bi-White Devices -Sliders will control Intensity and Color Temp (CCT) -Sliders will reach to actual state (bi-directional feedback)	
Adjustment Controls-Monochrome Devices -Slider will control Intensity only -Slider will reach to actual state (bi-directional feedback)	

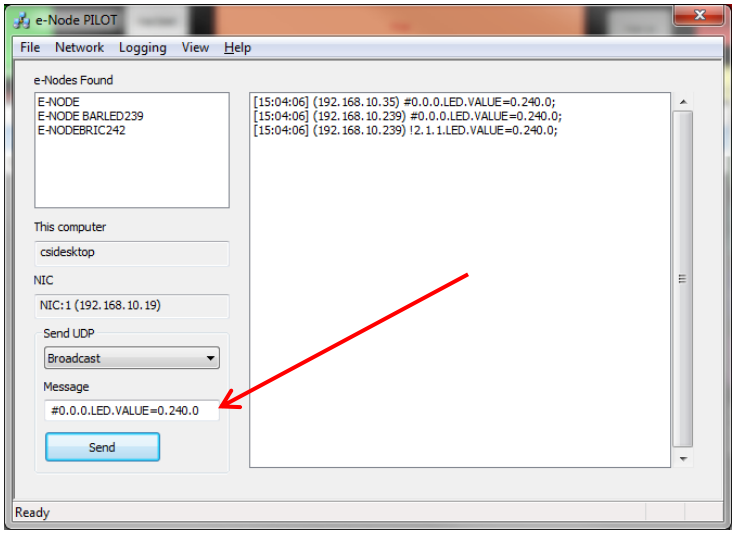
Test Project (WIP)

Step #	Step Overview	Detail
3a	Test Project.	- Within **System Design**, double click on the device that you wish to test to expose the Direct Control window.
3b	Test with User Interface.	With either a Crestron app or a touch screen, verify operation.  Figure 2
3c	Test with Actions/Execute	-Create an Action within the Scripts window and select Execute
3d	Test with Crestron remote	-You should also be able to control the LED using various supported Crestron Home remotes (and other keypads). -Proceed through each button and interface to verify proper operation. If certain functions are not operational, check your programming within Composer.

Troubleshooting (WIP)

Step #	Step Overview	Detail
4a	Test communication to -Communication Device, and -LED and/or Motor Load Device(s)	-Within Composer, select the **System Design** tab and select the Communication Device to which the suspect ILC-xxx/IMC-xxx is connected. - -Invoke a button push or slider operation on a known good Crestron Home user interface and see if LUA code appears in the LUA window (shown below). You must see commands such as **#Z.G.N.TYPE=Command**, level going over on Telnet (see **#2.2.1.LED=SAT, 80** below). If you see the same command followed by a "**PRI 8**" as the next line in the sequence, you know data is getting to and being received by the target communication device for this is a mirroring/acknowledgement being broadcast back to the

		Crestron Home system from the communication device (in this case the e-Node). Provided you see the above type commands, you now know that (1) You have good communication from C4 to the Converging Systems' Com Node) (2) You have appropriate cor specific commands flowin devices (ON, OFF, etc.) Downstream commands successfullyseen by Comm Device
4b	Test backchannel communication from -LED and/or Motor Load Device(s)	-Follow the steps specified in Step 5a above and open the LUA output window for the **Communication Device** (i.e. e-Node) -Press any button on a C4 User Interface Device that will change the state of the ILC-xxx/IMC-xxx device such as an ON (if the LEDs are off) or an UP (if the Motor is down). -Monitor the LUA window (for the target Communication Device and see if you see backchannel data in the form of a "!" prior to a command that indicates -Color (for Hue, Saturation, and Brightness data) -Value (for RGB, or RGBW data) -Position (for Motor Position data) -Provided you see this type of bi-directional data (which you will only see if there is a state change (i.e. On to OFF, UP to DOWN, but not one OFF after a previous OFF), you now know that (i) Bi-directional data is traveling from a Converging Systems Load device (ILC-xxx/IMC-xxx) and is being received/monitor by a Director. **Note**: Typically, if downstream commands are working (see Step 5a) and upstream ! commands are **not** seen (Step 5b), you have not set **NOTIFY** to the appropriate setting within the Pilot application or the Web Pilot application.
4c	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 in the **Message** window 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 7 for more troubleshooting information.

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 Crestron Home driver, the user name is by default set to E-NODE MKIII and the password is ADMIN. More recent versions of the e-Node now have new usernames and passwords available (up to four different Telnet sockets can be maintained concurrently). Telnet 1/Password 1 are used for credentials. Unless you are using the system with older Converging Systems devices, use the new default username of Telnet 1 and password of Password 1.

   Note: Make sure that the settings within the e-Node match the setting within your MOTOR or LED module.

2. Forgetting to update **Z**one/**G**roup/**N**odes 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. Using commas between the Zone/**G**roup/**N**ode entries instead of periods (within the Address Tag)

4. Forgetting to check to make sure you have the latest Converging Systems drivers loaded you're your system. When you see the Local indicator within a loaded driver, it may be an older driver that has subsequently been replaced.

Appendix 1

Converging Systems System Setup/Configuration

Before proper operation between the Converging Systems' controllers and a third-party control 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 or the Web-Pilot application. Subsequently, matching communication parameters within the third-party control system are required-see specific directions for each system at

https://www.convergingsystems.com/inres_atoz.php.

In case you have not previously configured a Converging Systems controller product, please refer to the following directions.

Background

The Converging Systems e-Node is an Ethernet communication device which can be used to connect a supported third-party control system 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 a supported third-party control system 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.

Please download Hardware and Software Setup Guide from the Converging Systems website which can also be found **Resources/Installation Guides/System/Installation Guides or by going to these links below**

Type of Setup	**Link (look for Systems/Installation Guides)**
Led Lighting Control	https://www.convergingsystems.com/lighting_install_library.php
Motor Lighting Control	https://www.convergingsystems.com/motor_install_library.php

-Complete all the setup steps in the referenced document and then AND ONLY THEN proceed to Crestron Home Setup Software instructions above.

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 if you desire individual control. You can assign multiple controllers identical Z/G/N addresses after you have commissioned units and have verified that all units are operational.

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.

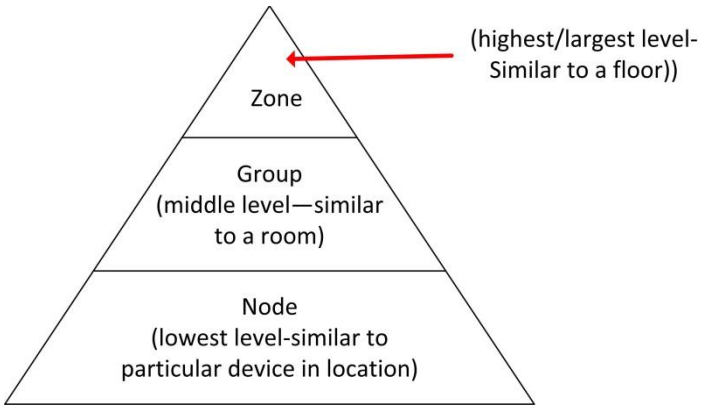


Figure 3

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 4

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 the Figure below shows both HSV and RGB on the same UI, this is probably more confusing for the typical user than the simple subset of HSV (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.**

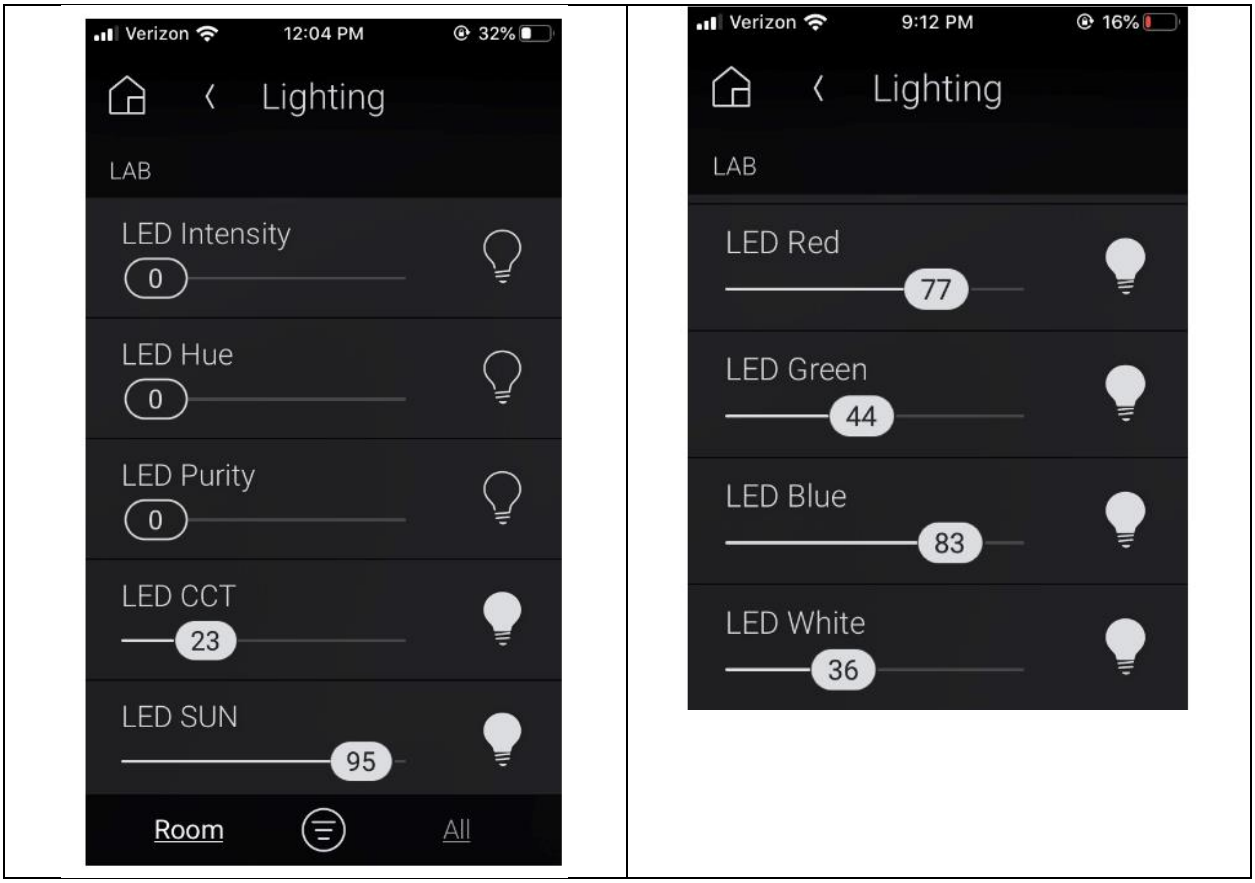


Figure 4

Appendix 4

Addressing Deep Dive

Topic	Section
How to Set up group control	Section 1

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

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

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

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

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

Specific controller address	Specific command that will trigger targeted controller
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, ***the status of the first controller whose node number is 1 greater than the wildcard command of "0" will respond and will be automatically remapped to the wildcard address of "0" from which the command emanated**** (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.

*Note: this is in 2018 updates to our ILC-400 firmware initially

2.0 Reserved.