Converging Systems/Hardware and Software Initial Setup and Commissioning Guide

Setup Guide	
Manufacturer:	**Converging Systems, Inc.**
Model Number(s):	**CS-Bus Motor and Lighting Controllers**
Developer/Manufacturer:	Converging Systems Inc.
Document Revision Date:	11/29/2019 Rev 10.1

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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).

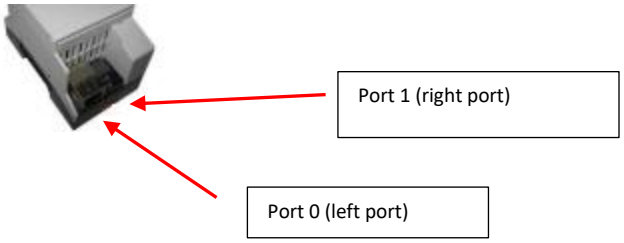
However, regardless of whether you desire to interface ***more than one*** lighting controller (or motor controller) each with its own controllable operation (i.e. its own **Z**one/**G**roup/**N**ode or **Z/G/N** address) with either the e-Node (Ethernet) or the IBT-100 (RS-232c communication), and/or 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.

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

COMPONENT HARDWARE SETUP

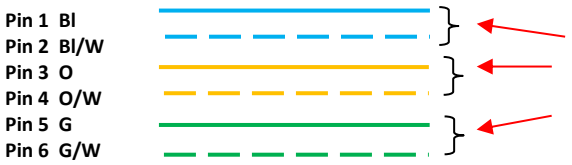
1. Connect each LED lighting controller (and/or Motor controller) sequentially using Port **1** of the previous device to Port **0** of the next sequential device. Use **CS-BUS Color Standard** for your wiring.



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 i***nconsistent*** 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, see below for a workaround.

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



You must maintain twisted pairs on pins 1&2,

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

2. Connect an available **CS-BUS** port on the first or last LED Lighting or Motor Controller to Port 0 (**repeat Port 0**) 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 (i) beginning and the (ii) 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 last device of the chain. Since the e-Node or the IBT-100 is used as the first item in the chain, those units have built-in termination and no additional beginning of chain termination is required. It is important, however, other than the last device on the chain, **NOT TO TURN ON TERMINATION 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 (**ZGN**) addressing as well as to turn specific types of bi-directional communication necessary to have third-party control systems react to lighting or motor status changes. This section is an abridged version of necessary steps which need to be followed. For more information, consult Converging Systems' website including

-Various Quick Start Guides (controller specific)
-ILC-x00 Intelligent Lighting Controller (long version)
-IMC-x00 Motor Controller Manual

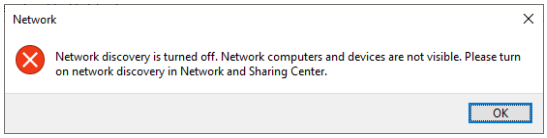
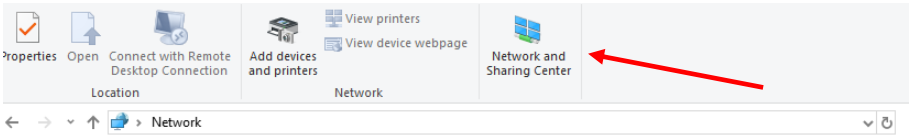
A. Please follow the below steps under "**e-Node Programming**" when using the e-Node for Ethernet communication or to set-up parameters such that this communication device can properly be discovered/supported by third-party control systems.

B. Then, after you have performed the above **e-Node Programming**, proceed to **CS-Bus Device Discovery/Commissioning** to set up parameters such as Activation, Address Setting, Alias Name configuration and Bi-directional (NOTIFY) communication.

NOTE: If you are using the IBT-100 (serial interface adapter) you must first commission your system using the steps (A&B below). One completed, visit the IBT-000 interface guide at the end of this section.

e-Node Programming

Step	Summary	Details
E-1	e-Node IP Address setting	**Background**. The Converging Systems e-Node and similar Converging Systems Communication Devices support various network discovery protocols: **-uPnP** (Universal Plug and Play) **-SDDP** (**S**imple **D**evice **D**evice **P**rotocol This allows third-party platforms which support these discovery protocols to automatically discover these communication devices often without changing the factory default addressing of the target communication device.

		By default, our IP-based communication devices support as the default power-up configuration-DHCP Enabled. In the event you desire to change this factory default from **Enabled** to **Disabled** permitting -Static addressing (assigned IP address without setting up reservations), -Custom gateway addressing, -Custom DNS configurations there are currently two ways to proceed. • Method 1—Windows Network Discovery Process using a PC computer's **uPnP** discovery method. (see Step E-1b) • Method 2--Manual configuration using the **e-Node Pilot** application (using UDP). (See Step E-1c) Please follow these directions below, if you do not need to change any of these factory defaults, you can jump ahead to CS-Bus Device Discovery/Commissioning now.
E-1b	e-Node setup using Windows' network discovery (**uPnP**)	**Converging Systems Network Discovery works best using CHROME** -Select the File Explorer icon (or Windows Explorer icon in older Windows versions) on your computer. You can find this icon on your taskbar).  -Scroll down to networks  **Note**: ***Network Sharing and File Discovery*** may need to be turned On within your computer (if Network Discovery was previously set to Off).  - You can do this through the Network and Sharing Center and simply turn on this feature.  -Double click on the target e-Node or similar device to launch its webpage.

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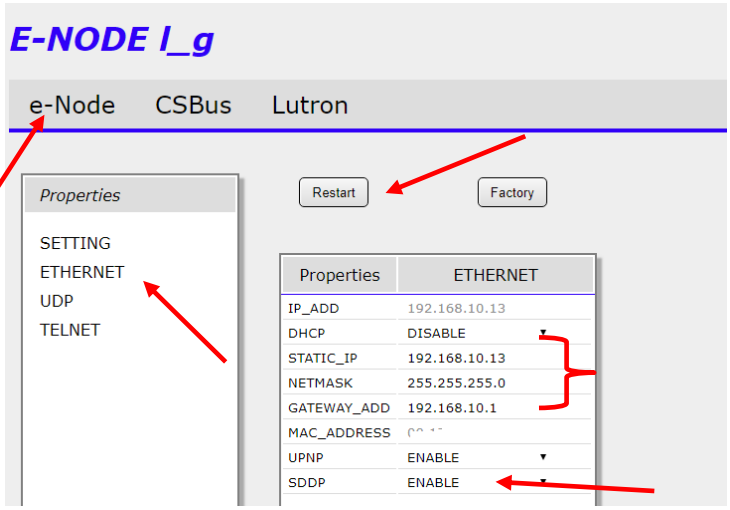
Embedded Webpage that launches


-Click on the menu bar to continue.

-Under the e-Node tab, select Ethernet and the network settings will appear.


-Enter the new desired IP (STATIC_IP) address, update the Gateway_ADD(ress) and under DHCP select DISABLE (from the scroll down) and then hit Restart to save and reboot.

NOTE: You can also see the settings for various network discovery protocols above. Should you wish to disable these defaults for various reasons (and not to have automatic discovery with any platform (other than with UDP using Pilot), adjust these settings here.

-You have completed the communication device customization. You may now proceed to Step CS-1b in the next section.

NOTE: there is no reason to proceed to E-1C below for this just accomplishes the same goal as this subsection using the e-Node Pilot application.
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<tr>
<td>E-1c</td>
<td>e-Npde setup using e-Node</td>
<td>-Launch the (PC compatible) e-Node Pilot application available from the Converging Systems</td>
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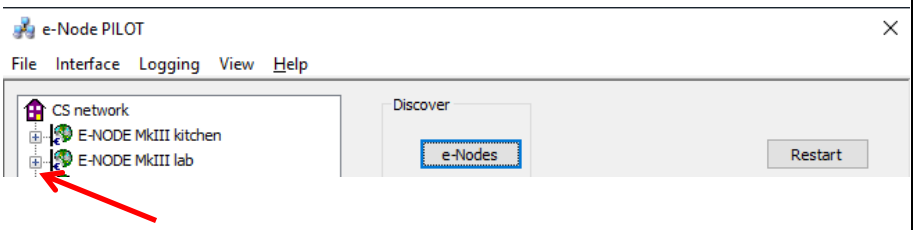
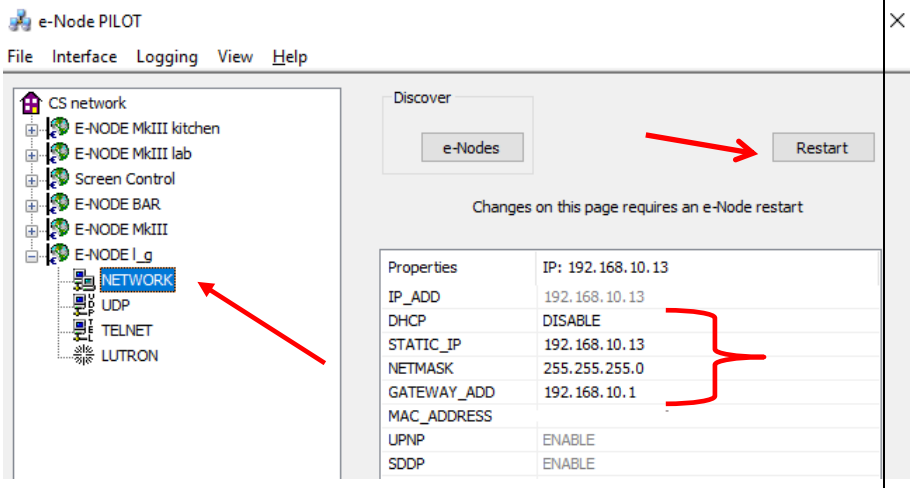
	Pilot application	https://www.convergingsystems.com/downloads_library.php. **Note**: It is highly advised to make a ***hardwired*** Ethernet connection from the e-Node to your network switch and another ***hardwired*** Ethernet connection from your switch to your computer running the Pilot application for this application uses UDP communication which is not wi-fi friendly. ***Without a hardwired connection and using the e-Node Pilot application, Data may be lost or corrupted and you may not get reliable results such as*** ***-inconsistent discoveries,*** ***-incomplete data collection, or*** ***-non-predictable programming/updating.*** ***If any of these symptoms are experienced it would be prudent to either secure a wired connection or simply pursue setup using the steps outlined in E-1b above*** -Select the **+** mark in front of the e-Node found to expand the menu. (If you have more than one e-Node or similar device, select the correct one that you wish to modify before proceeding.)  -Select the **Network** tab to expose network settings.  -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:***

		STATIC_IP	xxx.xxx.xxx.xxx	Your new static IP address
		GATEWAY_ADD	xxx.xxx.xxx.xxx	Typically, the address of your network's gateway
		FINALLY, ***and only after you have set the above variables***, select **DHCP**	And Set to **DISABLE**	Now reboot the e-Node for this to take effect.
		-If you have made any changes to this page, you must **Restart** the e-Node for the updates/changes to take effect. **-**Now proceed to Step CS-1c in the next section.		

CS-BUS Device Commissioning/Customization

Step	Summary	Details
CS-1	CS-Bus (Lighting and Motor Controller) Discovery	**Background**. As with the e-Node Discovery and Commissioning detailed in the above section, currently there are also two ways to proceed to (a) Discover, (b) Address, and (c) Customize special features for connected (or integrated) ILC-xxx/IMC-xxx devices. **Note: It is imperative that you perform these tasks prior to moving on into integration with your third-party control system. Without success commissioning, the third-party control system may not be able to control Converging Systems' devices.** • Method 1—Windows Network Discovery Process using a PC computer's **uPnP** discovery method. (see Step CS-1b) • Method 2--Manual configuration using the **e-Node Pilot** application (using UDP). (See Step CS-1c Here are the Pros and cons of both approaches.

Pros and Cons of Web Pilot Application (Method 1)

Pros	Cons
No need to download separate e-Node Pilot application. Web page can be discovered and operated with Chrome browser	Need to enable Network Discovery (temporarily on PC)—no big deal
Only method currently to program Lutron connectivity seamlessly including snooping of Lutron devices on the network. Only method to monitor Lutron button pushes and other network traffic through a concurrent telnet session (very useful)	Cannot do network monitoring for troubleshooting-Traffic Window/Trace is not available currently.

		On-board User Interface to control the first four devices discovered (only) | No UI for the 5th and subsequent discovered devices through embedded webpage. Since the webpage is really for set-up and diagnostics, probably not a big deal.

Pros and Cons of e-Node Pilot Application (Method 2)

Pros	Cons
Tool allows for commissioning **as well as** testing.	If no Internet connectivity is available, one needs to have downloaded program from CSI's website in advance
Robust colorful UI designed to enable testing of **any** device with **any** ZGN address. In addition, application can send direct commands to test units in addition to the standard UI controls available.	Need to turn off some firewalls temporarily to enable UDP Ports 4000 and 5000 access (no big deal)

Proceed to either by selecting the correct link below:

- Method 1—Windows Network Discovery Process using a PC computer's **uPnP** discovery method. (see Step CS-1b)
- Method 2--Manual configuration using the **e-Node Pilot** application (using UDP). (See Step CS-1c

CS-1b

CS-Bus (Lighting and Motor Controller) discovery (**uPnP**)

Preparations to Begin Discovery-using a CRHOME BROWSER

-Follow the Steps in E-1b above to expose the embedded e-Node webpage.

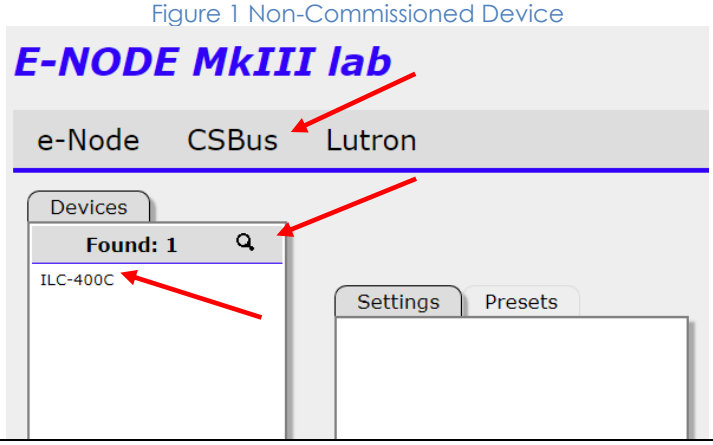
-Click on the menu bar to continue.

Discovery Process/Assignment of UID Numbers

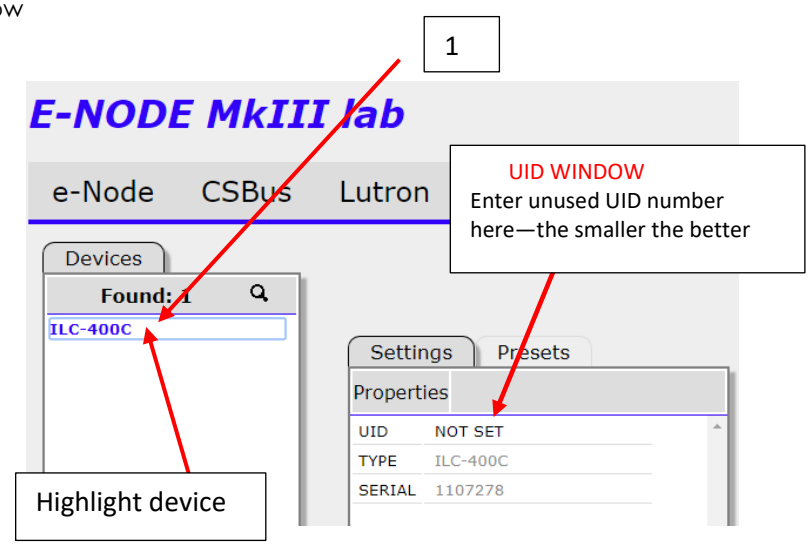
Background. It is necessary to **Activate** a motor or lighting controller to become integrated within an e-Node/controller system. This activation occurs once a virgin controller is given an unused/UID (unique IP) address.

-Under the **CSBus** tab, select the s**pyglass icon** to discover any ILC-xxx/IMC-xxx device properly wired/ powered/and located on your same network.

Figure 1 Non-Commissioned Device



-Once a device populates within the **Devices** window (ILC-400c in this case), click on it to reveal available information about the device within the **Settings** window

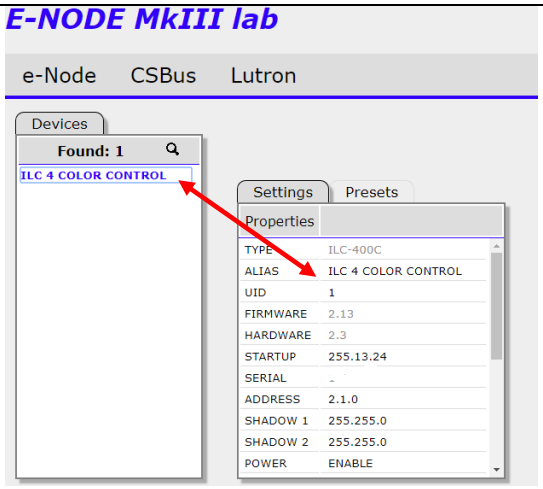


- If the **UID window** shows **NOT SET**, this is an indication that the discovered device has not been activated previously and **MUST NOW BE ACTIVATED**. Simply, (a) **Assign** any unused UID (unique ID) number, (b) **Type** in that unused UID number in the space provided, and (c) Press **ENTER** (on your computer) to save the entry.

-Next, press your browser's **Refresh** button, and once again **highlight** the device being programmed within the **Devices** windows, and select the **Setting** window to observe its newly programmed data.

-Continue this process for each non-activated unit until all units are Activated (and no more **NOT SET** indicators are present).

Figure 2- UID Assignment Device



--Thereafter, any non-commissioned Device (ILC-xxx or IMC-xxx) will appear with their default factory name (i.e. ILC-400 for this device, or other similar reference name for other devices), and all already commissioned devices will appear with their user -updated names (if name has been changed by installer).

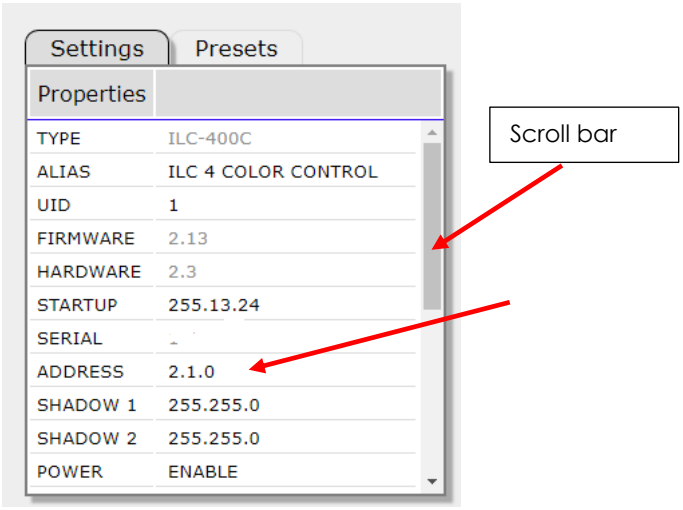
IMPORTANT: **If you by chance enter duplicate UIDs for two controllers, the system will fail to work**. In this case since you may not know which unit was the original and which was the duplicate, you must **reset both units** according to documentation found for the respective controller on the Converging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

Best Practices to Avoid Issues Here: *Make sure no two devices are ever assigned the same UID address which will cause a failure (like have two MAC addresses for an Ethernet device)*. You can visually scan all UID addresses assigned if there is any doubt as to if that UID had been previously assigned (to the same e-Node). Try to use smaller numbers as opposed to larger numbers as this will expedite the Discover process. For larger systems, installers typically create a network map and assign UID numbers sequentially to devices on the CS-Bus so that troubleshooting downstream can become more seamless.

Customization Process-**Z/G/N** Addresses

Background. It is necessary to activate a motor or lighting controller to become integrated within an e-Node/controller system. This activation occurs once a virgin controller is given an unused/UID (unique IP) address.

-Under the **CSBus/Settings** window, scroll down to the **ADDRESS** area



-Enter a discrete **Z**one/**G**roup/**N**ode address (preferably a non-zero number like 2.1.1 or similar) for each Lighting or Motor Controller identified as detailed above. For more information on **Z**one/**G**roup/**N**ode addressing, review the detailed explanation of **Z**one/**G**roup/**N**ode addressing within the Background on Addressing section of this document.

BEST PRACTICE

Best Practice-Never leave a device with any Z/G/N set to "0" (i.e. 2.1.0 is not acceptable—2.1.1 is Acceptable)

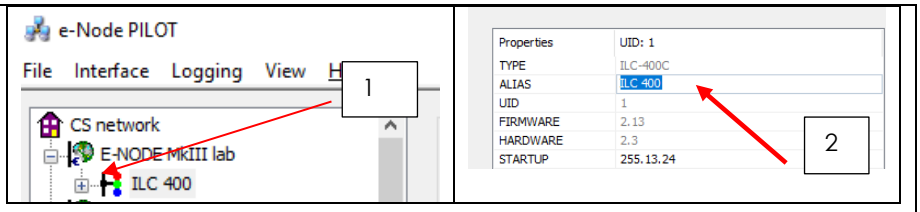
Assign Custom Name to Device

Background. Program a discrete **Alias Name** to each controller to facilitate identification in the future (and to aid in integration with third-party control systems).

-Select the **+** mark in front of the target Device (see detail #1 below) to expand its menu tree. Enter a new name in the **Properties** windows in the **Alia**s line (see detail #2) below).

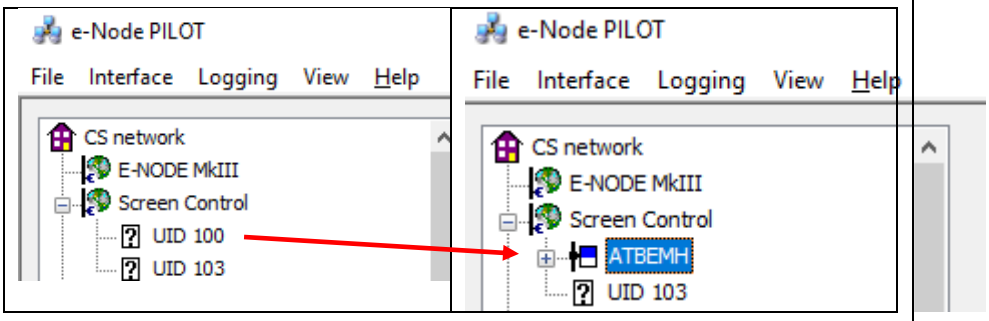
-Hit **Enter** on your computer and advance to each additional controller to customize their names as appropriate.

Note: Maximum 20 characters can be entered for the name with no special characters permitted.



-After an **Alias** name has been entered, you will be able to more easily identify/troubleshoot and integrate those devices into your third-party programming in the future

Best Practice-Set Descriptive Names Now.



Customization Process-NOTIFY Setting (for bi-directional comm)

Background. Turn on the **NOTIFY** flag in order to activate back-channel communication to enable third-party's User Interface including dimmers/sliders and other controls to automatically respond to changes in color states (which is a very desirable feature).

-In order to invoke bi-directional communication such that the third-party control system controls can automatically reflect changes in color states (i.e. HSB level, On/Off status) as well as other supported attributes, scroll down to the **NOTIFY** enter and set the **NOTIFY** flag to either

-**COLOR** (for the **HSV** or Hue, Saturation, Value/Brightness color space), or to

-**VALUE** (for the old school **RGB** or Red, Green, Blue color space—*old school because there is no dimmer in this color space*), or to

-**BOTH** (for both sets of feedback--not really recommended in larger systems where bus traffic may become excessive-but quite fine for most smaller systems)

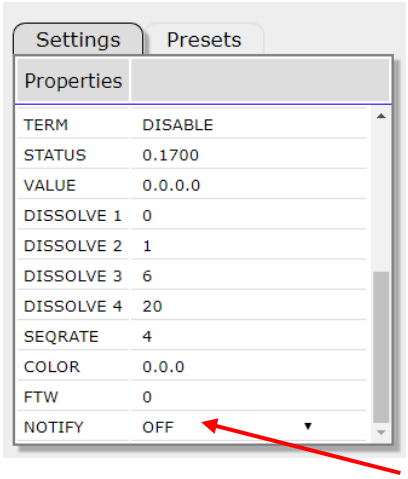
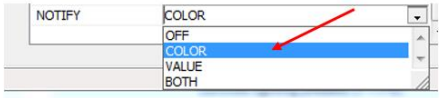
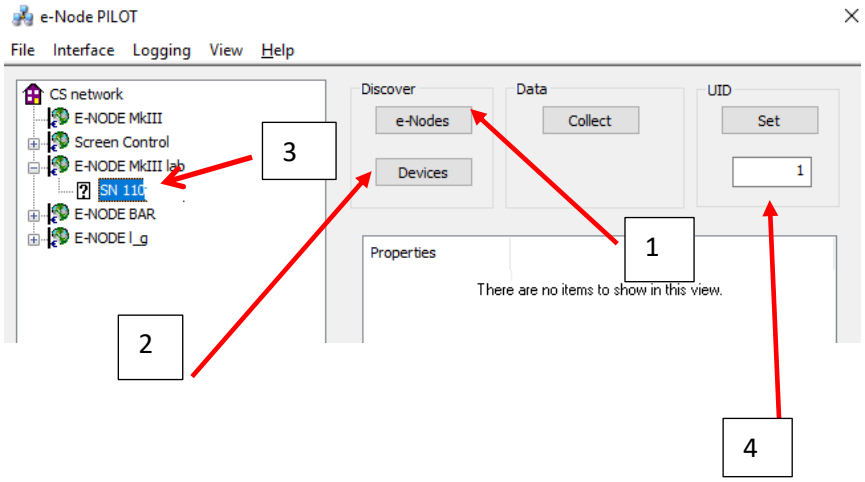
		 ***Best Practice-Set to Both***   -Now proceed to the Control4 Composer Programming for Control 4 integration.
CS-1c	Device Discovery/Setup using -e-Node Pilot Application	**Preparations to Begin Discovery** -With e-Node **Pilot** application, select the **Discover e-Nodes button** (see detail #1 below) and any e-Nodes that have been powered-up and which exist on the same subnet as your computer will populate within the left window. -Next select the **Discover Devices button** (see detail #1 below) and any non-commissioned device(s) (ILC-xxx or IMC-xxx) will appear as a Serial Number (**SN xxxxxx**) entry (see detail #3 below).

Figure 3



Discovery Process/Assignment of UID Numbers

Background. It is necessary to activate a motor or lighting controller to become integrated within an e-Node/controller system. This activation occurs once a virgin controller is given an unused/UID (unique IP) address.

- Assign an unused **UID** (unique ID) to each LED and Motor controller to be addressed. First, select by highlighting a **SN XXXXX** entry (see detail #3 above) which appears next to the **?**. Next, select the default auto-generated **UID numbe**r (see detail #4 above) and select

IMPORTANT: **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).

Best Practices to Avoid Issues Here: *Make sure no two devices are ever assigned the same UID address which will cause a failure*. You can visually scan all UID addresses assigned if there is any doubt as to if that UID had been previously assigned (to the same e-Node). Try to use smaller numbers as opposed to larger numbers as this will expedite the Discover process. For larger systems, installers typically create a network map and assign UID numbers sequentially to devices on the CS-Bus so that troubleshooting downstream can become more seamless.

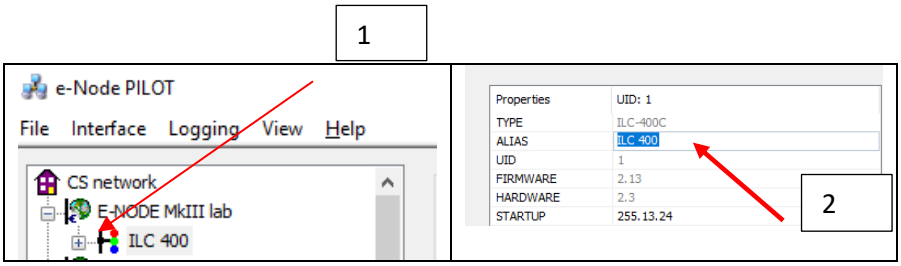
Assign Custom Name to Device

Background. Program a discrete Alias Name to each controller to facilitate identification in the future (and to aid in integration with third-party control systems).

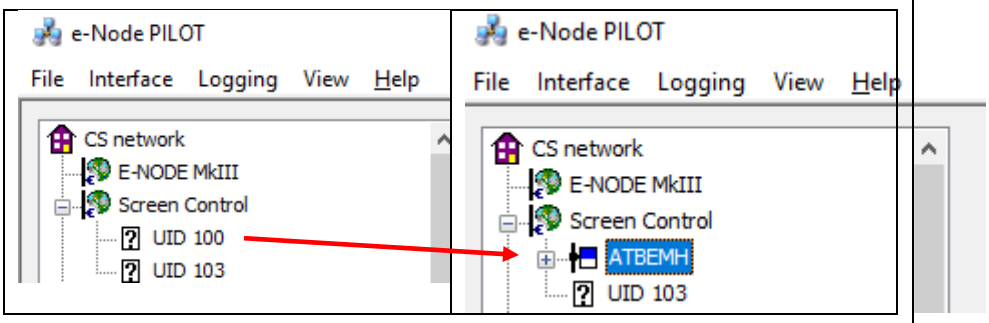
-Select the **+** mark in front of the target Device (see detail #1 below) to expand its menu tree. Enter a new name in the **Properties** windows in the **Alia**s line(see detail #2) below).

-Hit **Enter** on your computer and advance to each additional controller to customize their names as appropriate.

Note: Maximum 20 characters can be entered for the name with no special characters permitted.



-After an **Alias** name has been entered, you will be able to more easily review al devices in your system.



BEST PRACTICE

Best Practice-Set Descriptive Names Now.

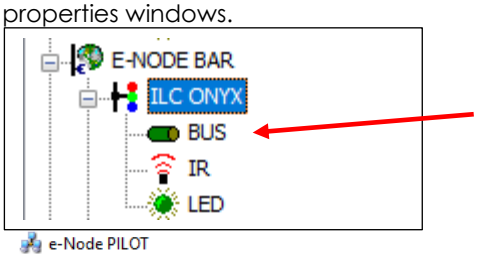
Customization Process-**Z/G/N** Addresses

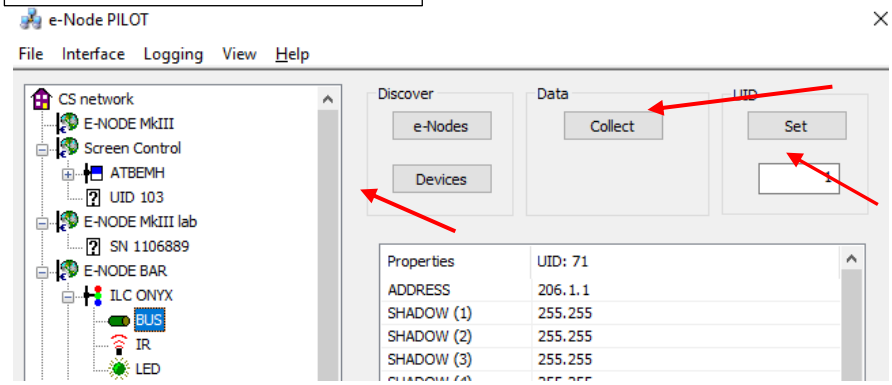
Background. Program a discrete **Z**one/**G**roup/**N**ode address for each Lighting or Motor Controller activated an assigned a UID address above.

For more information on **Z**one/**G**roup/**N**ode addressing, review the detailed explanation related to **Z**one/**G**roup/**N**ode addressing within the Background on Addressing section of this document.

-Click on the "**?**" mark and/or the "**+**" mark in front of the targeted controller to expand its data fields.

-Next, 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/**G**roup/**N**ode address separated by **PERIODs** and hit **ENTER**. When the field turns BLUE you know the data has been successfully entered. This sample shows a **Z/G/N** assigned of 206.1.1

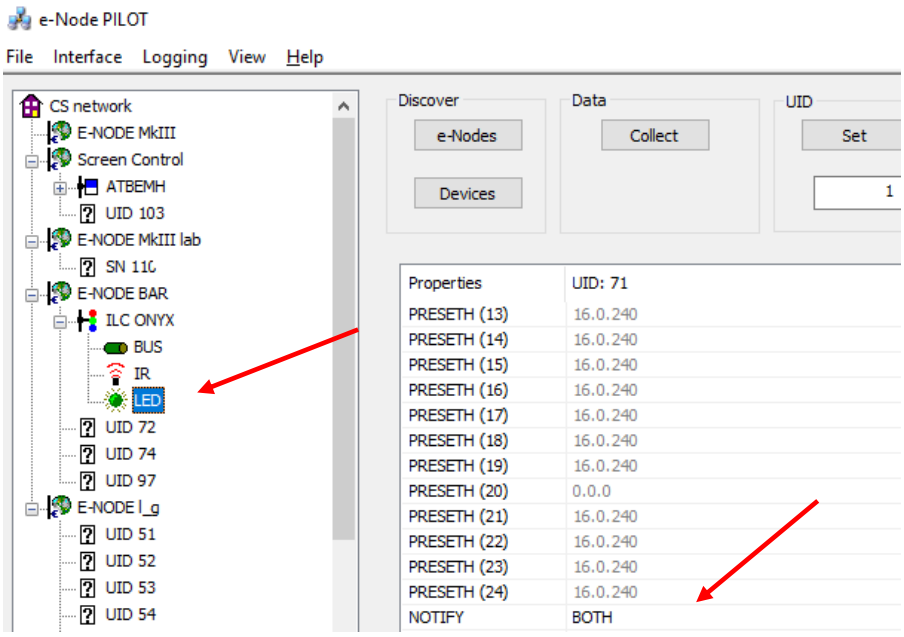
Best Practice-Never leave a device with any Z/G/N set to "0" (i.e. 2.1.0 is not acceptable—2.1.1 is Acceptable)

Customization Process-NOTIFY Setting (for bi-directional comm)

Background. Turn on the **NOTIFY** flag in order to activate back-channel communication to enable CONTROL4's dimmer sliders to automatically respond to changes in color states (which is a very desirable feature).

Note: Depending upon the target controller, this **NOTIFY** function may be at the top or bottom of the menu tree--just scroll to find the entry.

-Highlight the **LED** tab

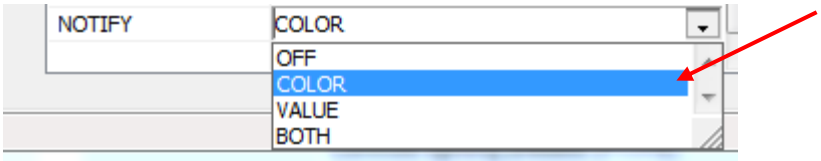


-Select an appropriate entry for **NOTIFY** from the choices below:

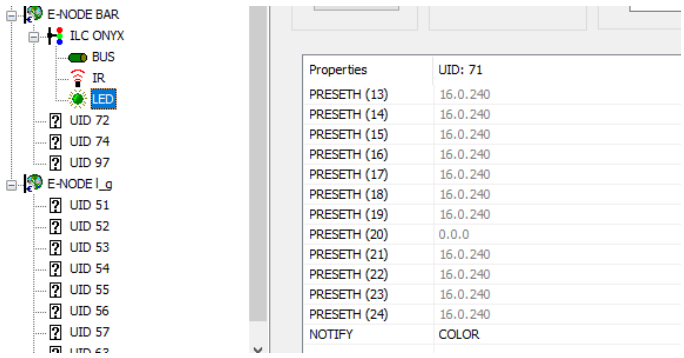
-**COLOR** (for the **HSV** or Hue, Saturation, Value/Brightness color space,) or to

-**VALUE** (for the old school **RGB** or Red, Green, Blue color space—*old school because there is no dimmer in this color space*), or to

-**BOTH** (for both sets of sliders--not really recommended in larger systems where bus traffic may become excessive



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



Best Practice-Set to Both

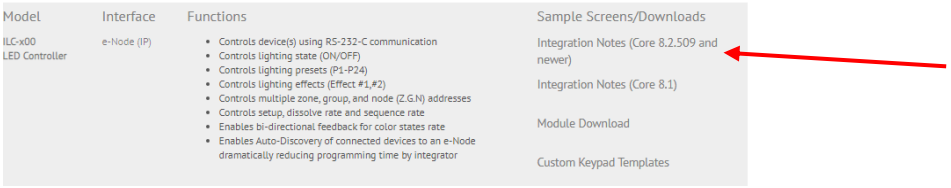
Now proceed to the specific Third-Party Platform Integration portal

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

-Click on the relevant icons your particular system and launch that platform's webpage.

-Search for the relevant Integration Note download for your chosen hardware.

-Program/Customize as directed.



Model	Interface	Functions	Sample Screens/Downloads
ILC-x00 LED Controller	e-Node (IP)	• Controls device(s) using RS-232-C communication • Controls lighting state (ON/OFF) • Controls lighting presets (P1-P24) • Controls lighting effects (Effect #1,#2) • Controls multiple zone, group, and node (Z.G.N) addresses • Controls setup, dissolve rate and sequence rate • Enables bi-directional feedback for color states rate • Enables Auto-Discovery of connected devices to an e-Node dramatically reducing programming time by integrator	Integration Notes (Core 8.2.509 and newer) Integration Notes (Core 8.1) Module Download Custom Keypad Templates

IBT-100 Programming

All of the communication parameters to support the IBT-100 are typically built into third-party platform drivers 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 where the IBT is supported, after the specific lighting controllers are programmed, the e-Node will no longer be required to act as the front-end communication device.

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, no further set-up is required. However, this is not recommended.