Converging Systems Inc.

e-Node™ Lutron®

e-Node Interfacing with Lutron Guide

Version 1.01

Revision History

Date	Version	Description	Author
10/01/2012	1.0	Consolidated Version	AD
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1   Overview

The e-Node™ has built in capabilities to communicate with various Lutron® systems. Communication is achieved with a "TELNET" connection to the Lutron Ethernet adaptor. While it is possible to configure the e-Node using "Pilot" application, the preferred method is the use the web page interface. This section will take you through all of the steps required to set up an e-Node device to work in conjunction with Lutron lighting panels (Main Control Units) and a Lutron provided Ethernet network adapter. Please remember configuring a Lutron lighting system and a customized e-Node to communicate with each other takes not only knowledge of the Lutron system, but of networking as well. Installers with limited networking experience are advised to contact a networking professional before attempting the following installation.

2   Compatible Lutron systems

See Table 1 for currently compatible Lutron lighting panels and compatible Lutron Ethernet adapter.

Lutron Main Units	Lutron Provided Control Interface	Reference Section	e-node Application
GRAFIK Eye^R QS	QSE-CI-NWK-E (Ethernet Version)	Sec. 2.2	Lutron Tracker QS
GRAFIK Eye^R 3100/3500 Series	GRX-CI-NWK-E (Ethernet Version)	Sect 2.2	Lutron Tracker GRX
RadioRA^R 2	RadioRA 2 RR-MAIN-REP-WH	Sec. 2.1	Lutron Tracker RA

Table 1

What you will need

- One or more Lutron Main Unit(s) specified in Table 1
- One Lutron Provided Control Interface specified in Table 1
- Any additional Lutron System Accessories
- Interconnect cabling between all Main Unit(s), Control Interface, and System Accessories
- CAT 5 network cable[1] (to connect Lutron Control Interface-Ethernet to network switch)
- CAT 5 network cable[1] (to connect e-Node to network switch
- Computer connected to same network switch which can run the Lutron PC application DeviceIP[2]

> Note: [1]Standard Ethernet straight cable—crossover cables are not utilized here.
> [2]Lutron documentation also permits determination of key values using a Telnet session on any computer console. Please refer to Lutron's documentation on using Telnet if a PC is not available.

2.1 RadioRa 2

The RadioRA2 system consists of a RadioRA 2 Main Repeater (RR-MAIN-REP-WH). This network device will respond with Telnet messages when a RadioRA 2 device is activated. The settings for the RadioRA 2 Main, and all associated devices is established with the Lutron commissioning software (e.g. Essentials). Each device has an ID associated with it called the integration number. Each device can also have many keys pushes associated with it. There is also an action number associated with each button, typically a 3 for a push, and a 4 for a release. The e-node RadioRA 2 application tracks the integration number (ID), the Key press number (Key), and the action (3 for a press) by listening to Telnet messages. A CS-Bus lighting or motor controller can then be set to activate based on a RadioRA 2 function.

The RadioRA 2 main controller can also be configured with "Phantom" keys. These can be made to operate various Lutron devices. There are web pages build into the e-Node with HTML buttons that will select one of the "Phantom" buttons. This will allow the activation of a Lutron device based on a button push of a device with a browser such as an iPAD®, iPhone®, or Android® device.

The RadioRA 2 system should be first fully configured with the Lutron commissioning tools. It should have a static IP address, or at least an address which does not change. You will need to know this address later when setting up the e-Node. The IP address of the RadioRA 2 system should also be within the same subnet as the e-Node.

2.2 QS and GRX

Please note that the e-Node comes factory set for DHCP enabled (with static IP as a user-selectable option), while the Lutron^R Control Adapter (NWK-E) comes only with Static IP addressing (default IP address of 192.168.250.1). It is important to make sure your network router can properly see the Lutron Control Interface (Ethernet version). You may have to change your network router or the Lutron Control Adapter as appropriate to make sure both can be seen.

2.2.1 Setting Up e-Node and Lutron Control Interface Components

- Locate a convenient location for e-Node to be installed within 328' (100m) from an Ethernet network switch (not provided). CAT 5 (or better) cabling should be run from e-Node to the network switch. Make sure that the Lutron Control Interface can also be located within 328' (100m) of the same network switch or commonly connected network. Connect similar CAT5 wiring between the Lutron Control Interface and the network switch.
- Turn on Dip Switch #6 on the respective Lutron Control Interface. Make sure all other DIP Switches are turned off.
- Power up both the e-Node and the Lutron Control Interface as well as the connected Lutron Main Units (and connected accessories).
- To configure the e-Node to communicate with the Lutron Control Interface it is first necessary to determine and record that Control Interface's critical **NETWORK PARAMETERS**. In addition, in order for the e-Node to control and monitor lighting scene and shade control commands which are typically tied to the first logical Main Control Unit (if more than one are installed), it is necessary to determine the **DeviceID** (sometimes referred to as "serial ID" or "Control Unit Number on Link") of that first logical Main Control Unit as well as associated **Keypad ID (or KID)** information for connected peripherals in some cases as well. Proceed to the next step to determine this information.

2.2.2 How to Determine Network Parameters

- If your Lutron device is set to the factory defaults, you can find those values within Table 2 below. If those defaults have been changed, proceed to the next step. Otherwise, proceed to Section 1.3.
- If the Lutron Control Interface network parameters have been modified, it will be necessary to determine any updated values using one or more methods specified by Lutron. The easiest way to determine those values is to launch the Lutron provided PC application called **DeviceIP** on a PC connected to the same network as the Lutron Control Interface. After you have identified any updated parameters, note them on the Table 2 below and continue to the next section below under "How to Determine DeviceID."

Lutron Control Interface

Attribute	Default Value	Current Value
IP Address	192.168.250.1	
Subnet Mask	255.255.255.0	
Telnet Port	23	
Login for Connection 1	nwk	
Login for Connection 2	nwk2	

Table 2

2.2.3 How to Determine DeviceID

In many cases, the Lutron Main Control Unit may have a unique factory assigned **serial ID** number. In other cases, the Main Control Unit carries a simple reference (number) where no factory **serial ID** number is provided. Refer to the table below for which type applies to your equipment.

DeviceIDs (DID) for Various Lutron[R] Main Control Units

Control Panel Type	Factory Assigned serial ID #	Detail	Enter value as DeviceID (DID)
GRAFIK Eye 3100/3500 Series	❌	*No* unique factory value--assigned values range from A1 to A8 (8 addresses) during Main Control Unit setup. The first unit is typically A1.	These values are not required with the e-Node *Lutron Tracker App* software.
GRAFIK Eye QS Series	✅	Each unit has a customized case sensitive **serial ID** number. This is an 8-digit hex number with a dash between the first four characters and the second four characters. **Note**: Note: This 8-digit hex number may have been reassigned by the installer to a different 1 to 32-character case sensitive alpha-numeric entry (alias name or "NAME"). Enter either the reassigned NAME value or the original **serial ID** number in the column to the right as the DeviceID or DID.*	Control Unit **DID**:_____

Table 3

*note: GRAFIK EYE QS Control Units have a factory assigned *serial ID* number. You can easily determine this number by powering off your Lutron Control Unit and powering it on once again. At boot up, on the lower right hand corner of the User Display you will see this 8-digit **(case sensitive)** hex number or alternative 1-31 character **(case sensitive)** address for a few seconds. For 8-digit hex numbers, add a preceding 0x in front of the 8-digit number and disregard the "dash" when transcribing the number onto Table 3 above as the **DeviceID** number. An example of this **DeviceID** entry might be as follows:

QS DID	0x000b10de

2.2.4 How to Determine Accessory Keypad ID addresses (KID).

In many cases, the Lutron Keypad units may have a unique factory assigned **serial ID** number (i.e. in the case of seeTouch[R] QS keypads). In other cases (GRAFIK Eye 3100/3500 series products), the Lutron Keypad units broadcast a simple reference number. Refer to the table below for which type applies to your equipment.

Keypad IDs (KID) for Various LutronR Keypad Devices

Keypad Device	Factory Assigned serial ID #	Detail	Enter value as Current Keypad ID (KID)
GRAFIK Eye 3100/3500 Series	❌	*No* unique factory value--assigned values range from 1 to 16 (addresses reported as I to X) during Accessory Control setup. The first unit is typically 1.	These values are not required with the e-Node *Lutron Tracker App* software.
GRAFIK Eye QS Series	✔	Each unit has a customized case sensitive *serial ID (or QS serial number).* This number can be found on the LutronR QS serial number label on the back side of the keypad. This is an 8-digit hex number with a dash between the first four characters and the second four characters. Note: This 8-digit hex number may have been reassigned by the installer to a different 1 to 32-character **case sensitive** alpha-numeric entry (alias name or "NAME"). Enter either the reassigned **NAME** value or the original **serial ID** number in the column to the right as the Keypad Device ID or **KID**.*.	K1ID:_____ K2ID:_____ K3ID:_____ K4ID:_____ K5ID:_____

Table 4

*note: For 8-digit hex numbers (such as those which appear on the serial number label on all seeTouch® keypads), disregard the "Dash" when transcribing the number onto Table 4 above and add a preceding 0x in front of the eight digit number. An example of this **KID** might be as follows:

QS DID   `0x000b10de`

2.2.5 How to link set CS-Bus *Lighting Operation* with Lutron Control Panels

Theory of Operation. The GRAFIK Eye family of controllers allow for 16 scenes of information to be stored and recalled. Of these 16 scenes, 4 scenes can be controlled from the front panel on one (or more linked) GRAFIK Eye family controllers while some or all of the 16 scenes can be programmatically selected from additional linked Lutron accessory devices, infrared wireless devices as well as RF wireless devices. In addition, there are also pair of Master Up and Master Down override buttons which can be used to raise or lower the brightness from an existing lighting preset to a higher or lower level respectively. And finally, there is an "OFF" button which turns the lighting levels currently selected to OFF. See **Figure A6-1** above for the location of these buttons (on the GRAFIK Eye console itself). Typically, scenes are comprised of lighting levels as well as linked or referenced shade (motor) states.

Default Operation. The e-Node's *Web-page Lutron Tracker Application* has factory-set defaults for how CS-Bus lighting products will react to Lutron scene information. Without any additional programming, you can simply accept the e-Node defaults and one or more Lutron GRAFIK Eye consoles running in conjunction with a properly set-up e-Node, will enable the Lutron lighting controller's **scene** buttons to activate not only the pre-existing Lutron scene settings (previously setup

by the Lutron installer) **but also** the CS-Bus compatible ILC-100 lighting controller's scene information (set to the default CS-Bus address*). The factory e-Node defaults for lighting (scene) control activated when connected to a Lutron Control Unit (or connected Accessory keypads) are as follows.

Lutron Control Buttons	ILC-100 System Lighting Preset
Scene 1	Preset 1
Scene 2	Preset 2
Scene 3	Preset 3
Scene 4	Preset 4
Scene 5	Preset 5
Scene 6	Preset 6
Scene 7	Preset 7
Scene 8	Preset 8
Scene 9	Preset 1 (on second ILC-100 device)
Scene 10	Preset 2 (on second ILC-100 device)
Scene 11	Preset 3 (on second ILC-100 device)
Scene 12	Preset 4 (on second ILC-100 device)
Scene 13	Preset 5 (on second ILC-100 device)
Scene 14	Preset 6 (on second ILC-100 device)
Scene 15	Preset 7 (on second ILC-100 device)
Scene 16	Preset 8 (on second ILC-100 device)
Master UP	FADE Up
Master Down	FADE Down
Off	Off

2.2.6 How to link CS-Bus *Motor Operation* with Lutron Control Panels

Background/Theory of Operation. Depending upon the particular GRAFIK Eye system, motor control is handled differently. The table below summarizes the **default** functionality available from various supported GRAFIK Eye systems and accessory controls (wallpads, IR remotes and RF remotes). Refer to the applicable section below for your particular GRAFIK Eye[R] system.

Lighting and Motor Operation Functionality with QS Panels

System	Type of Direct Control Available on Control Unit		Wall Type Keypads		Handheld IR Remotes		Wireless (RF) Remotes	
	Scene Control	Motor Control	Scene Control	Motor Control	Scene Control	Motor Control	Scene Control	Motor Control
GRAFIK Eye 3100/3500	Scenes 1-4	N.A[1]	Scenes 1-16	N.A[1]	Scenes 1-8	N.A[1]	N.A	N.A[1]
GRAFIK Eye QS	Scenes 1-4	Up to 3 can be triggered from each QS panel	seeTouch Models Scenes 1-16	seeTouch Models Available Motor 1-X	Scenes 1-8	Handheld IR remote controls scene (lighting) devices[1]	Pico Scenes 1-16	Pico Control of wireless motors only

Notes:
[1] If a motor is mapped to a lighting scene, this device can control the motor using one of 16 available scenes.

GRAFIK Eye 3100/3500 Series. The GRAFIK Eye 3100/3500 controllers have no provision for controlling motors. However, the e-Node's *Web-page Lutron Tracker Application* enables motor control by assigning one or more available (lighting) scenes to motor operation. Triggering of motor operation could be through the Control Unit itself (if any one of the Scenes 1-4 were used for motor operation), through Wall-Type Keypads (for any scene), and/or through Handheld IR remotes (if any of the Scenes 1-8 were used for motor operation.

GRAFIK Eye QS. The GRAFIK Eye QS series has the provision for supporting up to three Shades (or motor operated objects) to be connected and controlled from (each) Control Unit. Up to three banks (or columns) of Shading Controls buttons are available to be populated on any QS Control Unit which can be ordered integrated with the original Control Unit or purchased as an upgrade subassembly at a later time. See Figure A6-1 above for the location of these Shading (motor) control buttons. Typical Control Units are configured with one bank of (Shading) buttons programmed for a Lutron shading product (first "Shading Column"). It is possible to allocate any unused Shading Columns (i.e. Shading Column 1, Shading Column 2, or Shading Column 3) to control CS-Bus compatible motor controllers.

An interesting feature exists here with respect to Shading (Column). An installer can choose to have shading buttons control **solely** Lutron shades (Scenario 1), control **solely** CS-Bus motor control products (Scenario 2), or control **both** type at the same time (Scenario 3). Except when it is prudent to have a single Shading (Column) control (i.e. Shading Column 1) manage both Lutron[R] and CS-Bus devices at the same time (because potentially they need to be linked or there are no more available empty slots), it is often more desirable to allocate a separate Shading Control Button (Column) assembly **to each** additional motor operation (see Scenarios 4, 5, 6 for examples here).

Examples how Lutron Shading and CS-Bus Motor Control Functions can be Controlled from a Lutron Control Unit

Scenario	Column1 Control		Column 2 Control		Column 3 Control	
	Lutron Shading Control	CS-Bus Shading Control	Lutron Shading Control	CS-Bus Shading Control	Lutron Shading Control	CS-Bus Shading Control
1	✔					
2		✔				
3	✔	✔				
4	✔			✔		
5	✔		✔			✔
6	✔			✔		✔

Default Operation. Depending upon the specific GRAFIK Eye system employed, a range of programming tasks (from no setup to some setup) may need to be performed in order to interface CS-Bus motor operation with Lutron panel push button operations. See the specific section below for more information.

GRAFIK Eye 3100/3500 Series. For GRAFIK Eye 3100/3500 series products, additional setup is required.

GRAFIK Eye QS. The e-Node's *Web-page Lutron Tracker Application* has factory-set defaults for how CS-Bus motor products will react to Lutron shade control features (you can learn more about this application in step #3 below) for GRAFIK Eye QS systems. Without any programming, you can simply accept the e-Node defaults and the Lutron GRAFIK Eye QS running in conjunction with a properly set-up e-Node will enable its **Shade** buttons to activate not only the pre-existing

Lutron shade settings (previously setup by the Lutron installer) but also the CS-Bus compatible IMC-100 motor controller's motor information (set to the default CS-Bus address). Shade # 1 control group will control one IMC-100 controller (with its default address), while the other two Shade control groups will control two other IMC-100 controllers (with unique addresses that will need to be changed from factory default values). Please proceed to the next step to make any changes in the default programming to customize your particular installation. If you desire to make address changes for other IMC-100 family controllers, please refer to separate documentation for those controllers.

3 Configuring e-Node

Access the web configuration pages of the e-Node, this is achieved by entering the IP address of the e-Node from a browser window, and entering the setup pages typically by clicking for an extended period of time on the home page splash screen logo-what about password ADMIN. Further information can be found in the e-Node Quick Start Guide.

Click on the "Apps" section to display the "Lutron Tracker" Apps setup.

Use the "Apply" button the store any change to the non-volatile memory inside e-Node.

Select the type of Lutron device you are using from the drop down selection box.
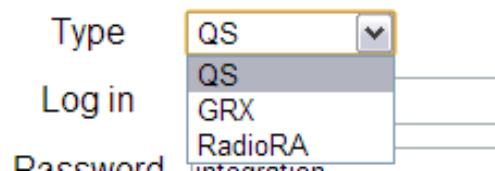
Enter the Telnet Login name for the Lutron device. For QS and GRX devices the default is "nwk" (Case sensitive). For Radio RA 2 the default is "Lutron." If you have changed the default names, enter the new name here.

Log in	nwk
Password	integration

RadioRA 2 also requires a password, the default is "integration." Again if you changed from the default, enter the new name here, The entry is case sensitive. QS-NWK and GRX NWK units do not require a password.

Use the "Apply" button the store any change to the non-volatile memory inside e-Node.

Enter the Device ID and any keypad ID's for QS devices, as discussed in section 2.2 above. These entries are not needed for RadioRA 2 or GRX. [1]

Use the "Apply" button the store any change to the non-volatile memory inside e-Node.

Device ID	0x000b10de
K1 ID	0x002a30c8
K2 ID	
K3 ID	
K4 ID	
K5 ID	

[1] Although available choices are A1 thru A8 (up to eight), provided all units are linked through initial Lutron programming, the **Lutron Tracker App** will automatically monitor all GRAFIK Eye 3100-3500 series Control Units bussed (linked) together without having to enter specific Control Unit ID Device numbers other than the primary (first) DeviceID (DID) number.

If you are using a QS or GRX Lutron system follow the guide in the next section, or proceed to section 3.2 if using a RadioRA 2.

3.1 QS & GRX Keypad tables

Click on the 'QS Keypad' tab to show the table settings for the QS and GRX devices.

There are a total of 6 pages of tables, you can move to the next page by clicking "Next" or back a page by clicking "Previous."

The first two pages define the scene controller selection. Scene 1 – 8, and Scene 9 – 16.

Against each scene number entry you can specify the CS-Bus message you wish to activate. For example the default has Scene 1 action as "#2.1.0.LED=RECALL,1" this will cause an led lighting controller whose address is 2.1.X to switch to the color defined in preset 1 when a QS or GRX scene controller has selected scene 1.

To fully understand the format and commands see the CS-Bus messaging Manual.

Use the "Apply" button the store any change to the non-volatile memory inside e-Node.

e-Node	Network	Ports	**Apps**
Lutron Tracker			
Setup	QS Keypad		RA Keypad
	Scene 1 - 8		Next

1	Scene 1	#2.1.0.LED=RECALL,1
2	Scene 2	#2.1.0.LED=RECALL,2
3	Scene 3	#2.1.0.LED=RECALL,3
4	Scene 4	#2.1.0.LED=RECALL,4
5	Scene 5	#2.1.0.LED=RECALL,5
6	Scene 6	#2.1.0.LED=RECALL,6
7	Scene 7	#2.1.0.LED=RECALL,7
8	Scene 8	#2.1.0.LED=RECALL,8

Exit   Logoff   Apply

The next pages define the operation when a shade button is pushed on the QS, or GRX. The CS messages here are intended to operate CS motor controllers (IMC-100). See the IMC-100 manual to fully understand the commands and format.

The first three entries (Open, Preset, Close) are actions taken when the corresponding button on the Lutron Panel is released. The "Lower" and "Raise" are actions when the "Lower" and "Raise" buttons are depressed, while the corresponding "/Stop" is when the button is released.

Use the "Apply" button the store any change to the non-volatile memory inside e-Node.

e-Node	Network	Ports	**Apps**
Lutron Tracker			
Setup	QS Keypad		RA Keypad
Previous	Shade 1		Next

17	Open	#1.1.0.MOTOR=UP
18	Preset	#1.1.0.MOTOR=RECALL,1
19	Close	#1.1.0.MOTOR=DOWN
20	Lower	#1.1.0.MOTOR=DOWN
21	/Stop	#1.1.0.MOTOR=STOP
22	Raise	#1.1.0.MOTOR=UP
23	/Stop	#1.1.0.MOTOR=STOP
24		#1.1.0.MOTOR=STOP

Exit   Logoff   Apply

The final page selects the action associated with the master raise and lower buttons.

Proceed to section 3.3 to complete the setup.

3.2 Radio RA2 Keypad tables

Click on the "RA Keypad" tab to show the table settings for the QS and GRX devices RadioRA 2 devices.

There are a total of 6 pages of tables (48 total table entries number 1-48). You can move to the next page by clicking "Next" or back a page by clicking "Previous." Each row Entry is numbered sequentially for reference purposes only and is a Lutron RadioRA2—CS-Bus Linkage Operation or "Linkage Operation"). Any or all Entries for Linkage Operations can be populated. You may jump around within the various pages of row Entries if you find a relevant command under CS Message that you wish to use for speed of entry. Use the "Apply" button the store any change to the non-volatile memory inside e-Node.

Note: *Suggested (ID,Key,Press) entries are provided for convenience to the installer. If you wish to disable any row Entry for a Linkage Operation, just enter 0,0,0 in lieu of the factory setting. MAKE SURE you do not substitute periods for the commas.*

RadioRA 2 operations are identified by the Integration number (ID) of a device, a key button (Key), and an action (3 for a press, 4 for a release). You can configure the (ID,Key,Press) entries for any entry that you wish to control

a CS-Bus Messaging device through the e-Node. Do not configure (ID,Key,Press) entries for any device presses that will ONLY control non-CS-Bus Messaging activities (i.e. like an incandescent light or any other load not connected to the CS-Bus).

Example 1. For example, if for your first Linkage Operation (Entry 1) you wanted a Lutron desktop controller's (device ID of 2), Button #7 when pressed, to automatic trigger a CS-Bus device with address 2.1.1 to illuminate to a previously set color preset of #1, the corresponding entry on the e-Node web-setup software would be as follows:

Entry	ID,Key, Press	CS Message
1	2,7,3	#2.1.1.LED=RECALL,1

Example 2. If for your second Linkage Operation (Entry 2) you wanted you wanted a Lutron Pico® remote's (device ID of 9), Master Raise button #6 when pressed, to automatic trigger all CS-Bus devices that share the same Zone number of 2 and Group Number of 1 to receive a wildcard command of FADE-UP, the corresponding entry on the e-Node web-setup software would be as follows:

Entry	ID,Key, Press	CS Message
2	9,6,**3**	#2.1.0.LED=FADE_UP

In this case, it would be desirable to send a STOP command when the Pico Master Raise button **was released** to prevent the CS-Bus connected devices from continuing to fade until its upper limit was reached. Using the Lutron definition for a button release, the necessary Linkage Operation to STOP a Fade from the above Pico device would be as follows:

Entry	ID,Key, Press	CS Message
3	9,6,**4**	#2.1.0.LED=STOP

To fully understand the format and commands see the CS-Bus messaging Manual.

3.3 Telnet

Once the above messaging table entries are set, the Telnet communication needs to be configured.

Select the "Network" Tab and the "Telnet" Tab. Enter the IP address of the Lutron network adaptor. It is important that this address is within the same subnet as the e-Node.

Click "Apply" to enter the address, and then click "Enable"

To have the e-Node access the Lutron adaptor correctly, the e-Node should be reset at this time. You can either power cycle by removing the power and reapplying after a short time (5 sec), or press the physical reset button on the e-Node for a half-second and then release, or you can press the reset button on the "e-Node" "info" page.

It may take some time for the e-Node to communicate with the Lutron interface. Typically less than 3 minutes.