



# Integration Note

Manufacturer:	PCS PulseWorx UPB Lighting
Model Number(s):	Various (See table)
Comments:	See Core Module Revisions required in Model Number table
Document Revision Date:	1/15/2014

**IMPORTANT: UPB products DO NOT work well with Lutron HomeWorks, RadioRA or GRAFIK Eye. Contact PCS if you have a job that requires both systems in the same building.**

## SUPPORTED FEATURES

### PCS PULSEWORX LIGHTING SYSTEMS SUPPORT THE FOLLOWING FEATURES:

**Powerline Communications:** No dedicated low voltage wiring to control switches or keypads.

**Switch Control:** Control of individual loads from virtual and simulated keypads on the Viewer Interface.

**Link Control:** Control of PCS Links (scenes) from virtual and simulated keypads on the Viewer Interface.

**LED control:** Gen1 devices LED state may be controlled appropriately from the g! system. (Enable LED Management in Configurator).

**Schedule Control:** Multiple schedules can be set using the Viewer software. The schedules are tied to the house mode.

**Automatic System Detection:** The g! system will automatically detect all the switches, keypads and links in the system either by reading the network or by importing the exported UPE file (g! version 6.5 required).

**Support for Inputs and Outputs:** The ICM (Input Control Module) and OCM (Output Control Module) allow the g! system to provide support for inputs (voltage or contact closure) and outputs (contact closure, 24VAC at 8A).

**Support for Multi Phase Power:** Phase Coupler/Repeater modules are available and may be used when controlled from g! Note that Multi-Packet control must be enabled, and cannot be used during discovery.

**RS232 or IP Control:** The PIM-R for RS232, PIM-IP (g! Version 6.5 required), and PCS PulseWorx UPB Gateway are compatible for control with the g! system. These devices allow g! two-way communication for control and feedback of UPB devices.

**Single Device Discovery:** g! Version 6.5 allows a single PCS ID to be discovered in Configurator.

**Customizable Scene Support:** g! Version 6.5 adds a new form of Customizable Scene which may be connected to a PCS Link. Changes made in the PCS Customizable scene are written to the PCS devices.

**Devices Supported:** The following table lists the devices that are currently supported:

Model Number	Description	Core Module Required
WS1D-6, 10, 15, 24	600 to 2400 watt wall switch	4.0
RWS-S, RWS-H	Standard and high power remote switch	4.0
WMC6, WMC8	6 and 8 button wall mount controllers	4.0
DTC6, DTC8	6 and 8 button desk top controllers	4.0

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PIM-R	RS-232 Serial Powerline Interface Modules	4.0
LM1-4	One channel lamp module	4.0
ICM, OCM	Input Control Module, Output Control Module	4.0
AM1	Appliance Module	4.0
KPC6, KPC8	Gen2 6 and 8 button keypads	4.0
FMR, FMD	Fixture Module – Dimmer or Relay	5.2
LM2-8	Two channel lamp module	5.2
KPLD6, KPLD8	Hybrid Dimmer and 6 or 8 button keypad	5.2
KPLDR6, KPLR8	Hybrid Relay and 6 or 8 button keypad	5.2
WS1DL	LED/CFL Dimmer	6.2
WS1R	10 or 20 Amp Relay Wall switch	6.5
KPC7	7 Button Keypad	6.5
PIM IP	Ethernet PIM	6.5

**PCS PULSEWORX LIGHTING SYSTEMS DO NOT SUPPORT THE FOLLOWING FEATURES:**

**Discovery using Multi-Packet:** While PCS may be controlled appropriately with Multi-Packet enabled, Discovery of the lighting devices must be done in Single-Packet mode.

**Limitations with Lighting Global Control and some PCS Devices:** The Lighting Global Control will not show correct state for PCS links in all cases. Hybrid Keypad devices will not display on the Lighting Global Control.

**Other PIM types:** Only the PIM-R RS-232 or PIM-IP Powerline Interface Module is compatible for discovery and control from a HC Controller. Other models such as the PIM-U are not compatible. It is recommended to connect PCS PIM-R to Com 1 or 2 on the HC controller.

**PIM-R on Global Cache:** The PCS PIM module is not compatible with a COM port on a Global Cache.

**Button Types:** UPStart may program PCS devices to do many things based on types of button press (double tap, press and hold etc). These modes are not integrated into the g! Viewer, and all buttons will act as “Link Activator”, “Toggle” or “Bright/Dim” as appropriate from the g! Viewer interface. Special button type settings should still work from the physical switches, but not from the Viewer.

**Button Press:** UPB devices do not transmit to g! based on button press, and g! cannot event map off a button press. UPB devices only send events for scene/load on/off.

**LED Control (GEN2 Devices):** GEN2 PCS devices do not support LED control, and LED Management should be disabled in Configurator. Properly configure Indicators in the Properties for each Keypad in UPStart instead. See UPStart/Pulseworx documentation for details. In addition, note that special LED tracking types (Room Tracking, for example) are not supported in the g! system.

Any feature not specifically noted as “supported” is not supported.
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## OVERVIEW

Installing a PulseWorx lighting system can be broken down into the following steps:

1. Work with the client to determine what lights will be controlled, where switches will be installed, and where keypads will be installed. See **Suggested Design Procedure** below.
2. Install and test each of the switches and keypads to confirm proper wiring. See **Installation Overview** for the list of steps required.
3. Program and test the lighting system for proper keypad and scene function. This process is discussed in **Programming Overview** below, and includes first offline and then online programming of the system.
4. Integrate the lighting system into the **g!** system and test proper operation. This step is outlined in **g! Configuration Details**.

## SUGGESTED DESIGN PROCEDURE

The following steps illustrate one approach to work with a client to arrive at a lighting system design that can be implemented successfully with PulseWorx.

### **STEP 1: ORGANIZE THE LOADS INTO GROUPS**

The first step is to put all the switches into groups: one group for each primary space or function. Typical groups include:

- Outside Lights: these are loads around the perimeter of the house that normally are controlled by switches scattered about at various locations.
- Pathway Lights: these are loads that provide the basic lighting to move around the house. Loads include the front door, the entry hallway, stairwells, the garage entryway, etc.
- Family Room Lights: these are loads in a room that combine to create a mood or atmosphere. Often there are numerous switches ganged at one location or ganged at several locations.

### **STEP 2: DECIDE HOW KEYPADS CONTROL EACH GROUP**

Once you have the switches in groups, decide what the home owner will want to do with each group. The result of this step is a list of keypads (6 button or 8 button), and the desired behavior for each button. Each keypad button is assigned as a scene or a toggle (remote switch):

- Scenes: each scene turns a group of lights on to specified levels. Scenes are most commonly used in spaces like family rooms and kitchens.
- Toggles (Remote Switches): these are controls that allow the home owner to turn on lights from anywhere in the house, and are most commonly used for outside lights (turn on the front door light) or remote lights (the basement light).

This process is probably the most important step, and should be done with the client's input. Here are some examples to help illustrate:

- Outside Lights: Place a keypad by the front door and the back door. Both will behave the same, and include buttons for:
  - All On: Turn on all the outside lights.
  - Evening: Turn on the normal lights that illuminate the driveway and front door.
  - Party: Turn on the yard spot lights and accent lights that highlight the landscaping.
  - All Off: Turn off all of the outside lights.
- Kitchen: Place a keypad in the kitchen with buttons for:

- All On: Turn on all of the lights in the kitchen.
- Evening: Turn on just the lights for a normal evening.
- Cook: Turn on the lights needed to cook and prepare dinner.
- Dine: Turn on the lights over the dining table, and dim the lights in the kitchen to provide the appropriate dining atmosphere.
- Late Night: Turn on the under-counter lights just enough to be able to walk around in the middle of the night.
- All Off: Turn off all of the lights in the kitchen.
- Basement Light: Add a single button on one of the keypads in the house to remotely control the basement light. The keypad button is illuminated when the light is on.
- Master Keypad: Place a keypad in the master suite with buttons for:
  - Outside All On: Turn on all of the outside lights.
  - Outside Evening: Turn on normal evening lights.
  - Outside All Off: Turn off all of the outside lights.
  - Inside All On: Turn on all of the inside lights.
  - Inside Evening: Turn on the normal evening lights: Kitchen Evening and Pathway lights.
  - Inside Late Night: Turn on pathway lights just enough to get around during the night.
  - Inside All Off: Turn off the inside lights.

### **STEP 3: PREPARE YOUR BILL OF MATERIALS**

The results of the first two steps are lists of switches, remotes and keypads along with a list of the desired behavior / commands for each lighting group.

For each switch, calculate the total load on the circuit: this will determine which switch / dimmer is needed at each location.

For each location, be aware that the 1500 and 2400 watt switch dimmers have a thicker heat sink, and to sit cleanly in a multi-gang box, should be installed with other similar switches. The “high power” remotes have the thicker metal, and are designed to mount with the high power switches, whereas the “standard” remote is designed to mount with the 600 and 1000 watt switches.

In addition to your list of required switches, refer to the **Connection Diagram** and **Bill of Materials** below to determine an overall list of required parts for the installation.

### **STEP 4: PREPARE YOUR LIST OF LINKS**

In a PulseWorx system, all lighting commands are ultimately reduced to links, and in PulseWorx documentation, the terms “scene” and “link” are often used interchangeably. A link is a lighting command that causes specific switches to change their state. If a switch is supposed to respond to the link, we say the switch is “enrolled” in that link. Links are identified by a number, or “Link ID”. Link IDs start at 1 and increment upwards in sequence.

Links are either “scenes” or “toggles”, as described above. In UPStart, a scene is referred to as a **Link Activator**, and a toggle is called a **Toggle Button**. If a link is used on more than one keypad, make sure it is set as a **Toggle Button** on both, or a **Link Activator** on both.

If you are using the input or output module (ICM, OCM), then add links for each input and output. For example, if you have one ICM and one OCM, then add links for Input1, Input2, Output1 and Output2. Links for the input module are either normally open or normally closed, and have corresponding link modes of **N.O. Input** and **N.C. Input**. Links for the output module don’t have a mode.

Using the examples above, our link list would look something like this:

Link ID	Link Type (Mode)	Room / Group	Link Name
1	Link Activator	Outside	Outside: All On
2	Link Activator		Outside: Evening

3	Link Activator		Outside: Party
4	Link Activator		Outside: All Off
5	Link Activator	Kitchen	Kitchen: All On
6	Link Activator		Kitchen: Evening
7	Link Activator		Kitchen: Cook
8	Link Activator		Kitchen: Dine
9	Link Activator		Kitchen: Late Night
10	Link Activator		Kitchen: All Off
11	Toggle Button	Basement	Basement
12	Link Activator	Inside	Inside: All On
13	Link Activator		Inside: Evening
14	Link Activator		Inside: Late Night
15	Link Activator		Inside: All Off

## INSTALLATION OVERVIEW

Once the system has been designed, the following steps are needed for installation.

**IMPORTANT: Contact PCS for help with installations involving three-phase power.**

Refer to the diagrams that follow for various wiring scenarios.

1. Rough-in the high-voltage electrical wiring for the lights as though you were using standard light switches.
2. For single-phase installations, during the electrical rough-in, at a convenient location, add a single-gang outlet box for the RS-232 PIM (Powerline Interface Module).
3. Run a Cat5 cable from the PIM to the g! system. If the PIM is installed in a finished wall, then you may wish to add a single-gang outlet adjacent to cleanly terminate the Cat5 to an RJ45 Female connector.
4. Install the PCS PulseWorx switches, remotes, keypads, Phase Coupler/Repeater (as needed) and PIM to PCS standards.
5. Power up the switches and keypads.
6. Switches and remotes come from the factory with default settings as listed below. Test the switches and remote switches to confirm that the appropriate load turns on and off as expected. Use the double-tap for any loads that should not be dimmed.

Double-Tap Top	Instant On (No ramp up)
Tap Top	Turn On
Hold Top	Dim Up
Hold Bottom	Dim Down
Tap Bottom	Turn Off
Double-Tap Bottom	Instant Off (No ramp down)

7. Keypads come from the factory with default settings as listed below. Press the buttons on the keypads to ensure proper function. IMPORTANT NOTE: Until properly programmed, pressing a keypad button will turn on or off all the lights in the house.

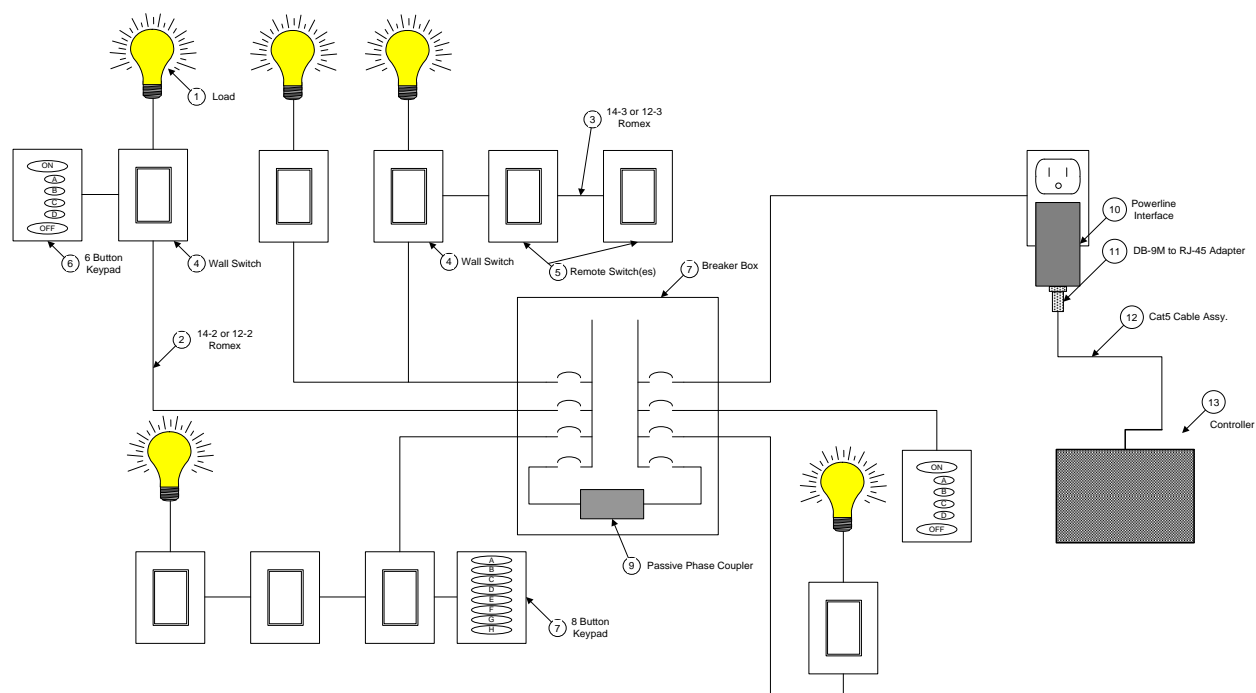
On Button	100% (All the way on)
A Button	80%
B Button	60%
C Button	40%
D Button	20%
Off Button	0% (All the way off)

8. Terminate and test the Cat5 cable from the PIM to the g! system.

## CONNECTION DIAGRAM- RS232

The diagram below shows an overview of a typical system. Refer to the **Bill of Materials** for additional detail, including specific part numbers.

On the following pages we have included more detailed wiring diagrams for common switch and keypad installation scenarios.



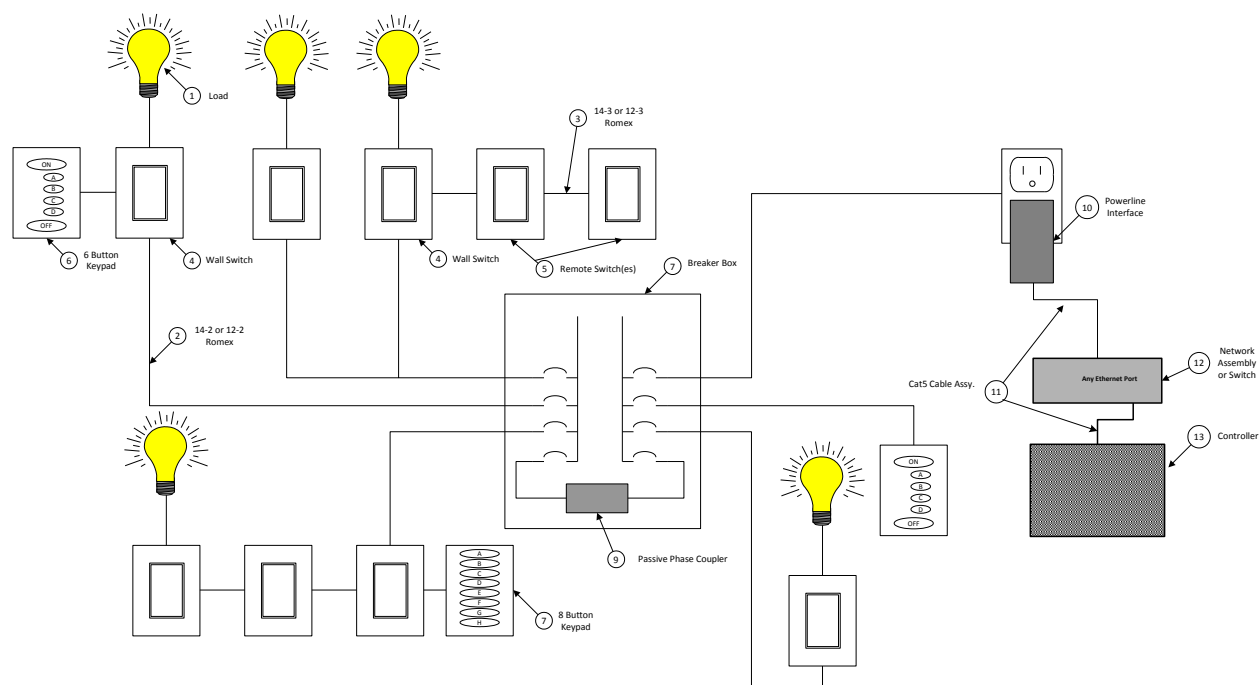
### BILL OF MATERIALS

#	Device	Manufacturer	Part Number	Protocol	Connector Type	Notes
1	Load	Various	N/A	N/A	Pigtail	
2	14-2 or 12-2 Romex	Various	N/A	N/A	Pigtail	
3	14-3 or 12-3 Romex	Various	N/A	N/A	Pigtail	
4	Wall Switch	PCS	WS1D-6, 10, 15, 24	UPB	Pigtail	
5	Remote Switch	PCS	RWS-S, H	UPB	Pigtail	
6	6 Button Keypad	PCS	WMC6	UPB	Pigtail	
7	8 Button Keypad	PCS	WMC8	UPB	Pigtail	
8	Breaker Box	Various	N/A	N/A	Terminal Strip	
9	Passive Phase Coupler	PCS	PPC-1	UPB	Pigtail	
10	Powerline Interface	PCS	PIM-R	UPB X RS-232	120VAC Male X DB-9 Female	Use for single-phase installations
11	DB9M to RJ45 Adapter	Elan	HA-CB-307	RS-232	DB-9 Male X RJ-45 Female	
12	Cat5 Cable Assy.	Installer	N/A	RS-232	RJ-45 Male X RJ-45 Male	Must terminate all 8 conductors
13	gl Controller	Elan	Various (ex. HC-12)	RS-232	RJ-45 Female	

## CONNECTION DIAGRAM- ETHERNET

The diagram below shows an overview of a typical system. Refer to the **Bill of Materials** for additional detail, including specific part numbers.

On the following pages we have included more detailed wiring diagrams for common switch and keypad installation scenarios.



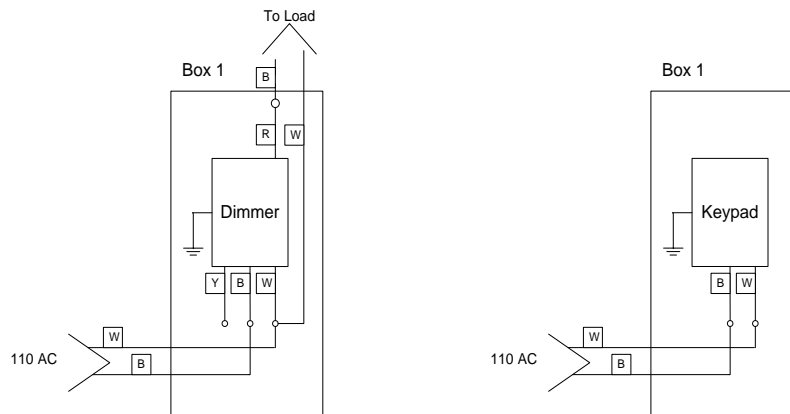
### BILL OF MATERIALS

#	Device	Manufacturer	Part Number	Protocol	Connector Type	Notes
1	Load	Various	N/A	N/A	Pigtail	
2	14-2 or 12-2 Romex	Various	N/A	N/A	Pigtail	
3	14-3 or 12-3 Romex	Various	N/A	N/A	Pigtail	
4	Wall Switch	PCS	WS1D-6, 10, 15, 24	UPB	Pigtail	
5	Remote Switch	PCS	RWS-S, H	UPB	Pigtail	
6	6 Button Keypad	PCS	WMC6	UPB	Pigtail	
7	8 Button Keypad	PCS	WMC8	UPB	Pigtail	
8	Breaker Box	Various	N/A	N/A	Terminal Strip	
9	Passive Phase Coupler	PCS	PPC-1	UPB	Pigtail	
10	Powerline Interface	PCS	PIM-IP	UPB X IP	120VAC Male X RJ-45 Female	
11	Cat5 Cable Assy.	Installer	N/A	RS-232	RJ-45 Male X RJ-45 Male	Must terminate all 8 conductors
12	Switch or Router	Various	N/A	IP	RJ-45 Female	
13	gl Controller	Elan	Various (ex. HC-12)	RS-232	RJ-45 Female	

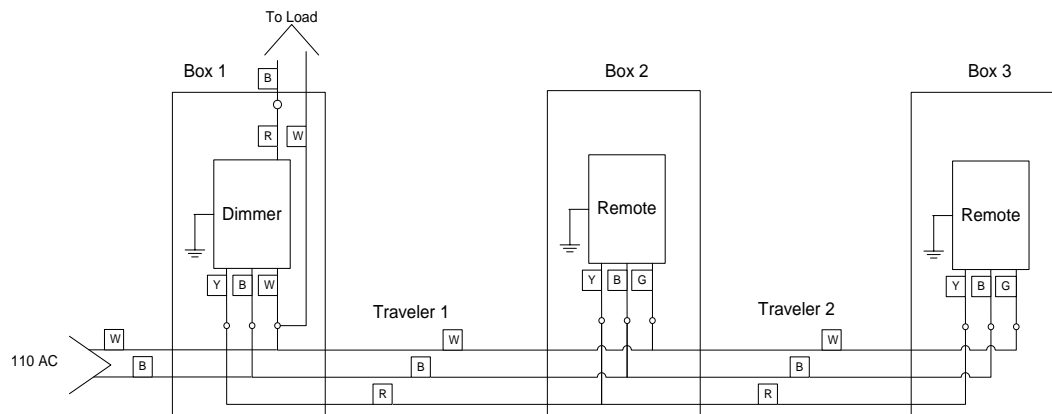
Note: during programming the PIM-IP should be set to a Static IP address for reliability. See details in **Assigning the PIM-IP a Static Address**.



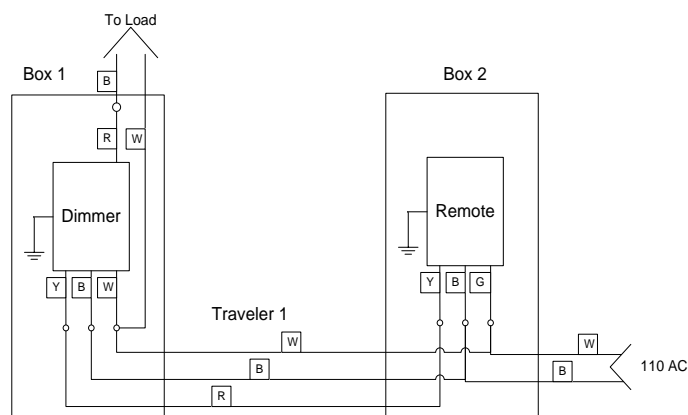
### WIRING DIAGRAM 1: SINGLE SWITCH, SINGLE KEYPAD



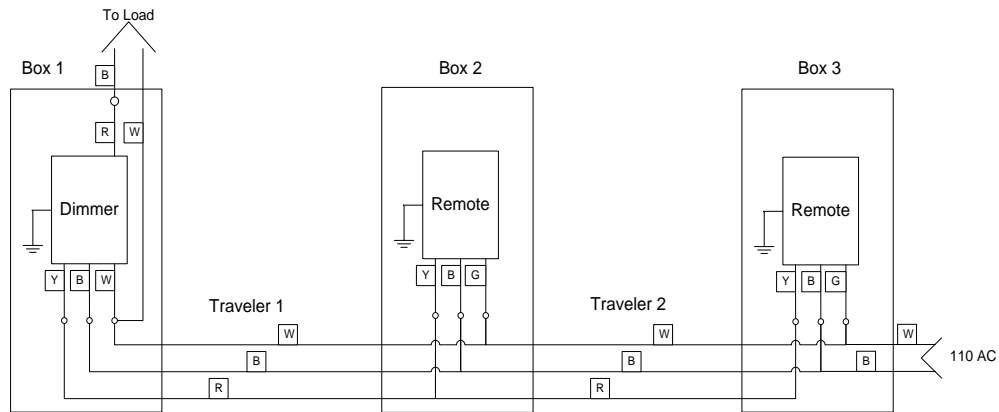
### WIRING DIAGRAM 2: SWITCH WITH ONE OR MORE REMOTES, POWER AND LOAD IN SAME BOX



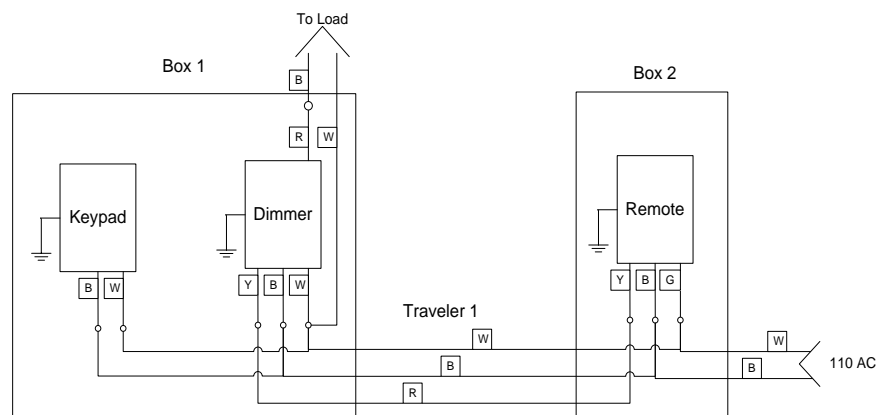
### WIRING DIAGRAM 3: SWITCH WITH ONE REMOTE, POWER AND LOAD IN SEPARATE BOXES



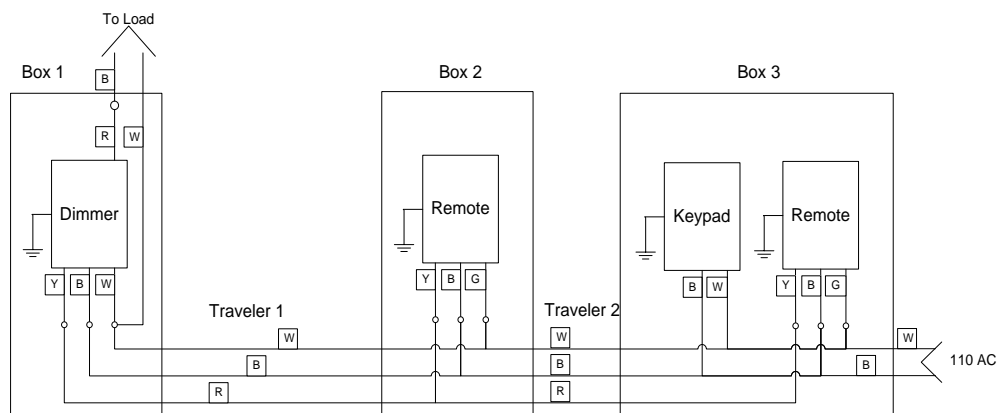
### WIRING DIAGRAM 4: SWITCH WITH MULTIPLE REMOTES, POWER AND LOAD IN SEPARATE BOXES



**WIRING DIAGRAM 5: SWITCH WITH KEYPAD AND ONE REMOTE, POWER AND LOAD IN SEPARATE BOXES**



**WIRING DIAGRAM 6: SWITCH WITH KEYPAD AND MULTIPLE REMOTES, POWER AND LOAD IN SEPARATE BOXES**



## PROGRAMMING OVERVIEW

The system programming can be done in two phases.

The offline phase consists of system design and definition and is accomplished prior to installation of the system, with the assistance of the UPStart Setup Tool from PCS. At the completion of this phase the system components (switches / dimmers and keypads), their locations, names, links (scenes) and switch memberships are defined.

The online phase involves assigning component IDs and uploading the design to the physical components (switches and keypads). This process is accomplished online, using the UPStart Setup Tool from PCS. Programming the system requires that the switches be powered up and working, and that you connect to the lighting system with your computer (through the RS-232 port on the PIM-R).

## THINGS TO KEEP IN MIND WITH PULSEWORX SWITCHES AND KEYPADS

Before describing the offline and online phases in more detail, here are a few items to bear in mind when designing and programming the PulseWorx system:

### WORKING WITH ROOMS

When you set up a group of switches, they should all have the same behavior. For example, in a kitchen, all the lights should have the same fade rates so they dim up and down together, and they should all have the same LED setting so that switches in a multi-gang box look the same.

To help organize switches, we suggest you place each group of switches from your design into its own **Room** when you add them during the programming process. This will allow you to visually see each group on its own, and allow you to much more easily confirm that all the settings in a group match.

### COPYING SETTINGS

One important feature of the UPStart Setup Tool is the ability to copy settings from one switch to another. After you setup your switches into Rooms, you should carefully setup the first switch in that room with the desired fade rates, LED settings and so on. Then simply copy those settings to the other switches in the room.

### WRITING TO A UPB DEVICE

After changing the configuration of a UPB device make sure you use the OK button to save the change not the X button in the upper right hand corner. After changing the configuration of a UPB device and writing the data to the device make sure you use the close button and not the X button. Using the X button is the same as cancel and will result in a mismatch between the Network computer file and the data on the switch. This behavior is in version 4.15 of UPStart.

### WORKING WITH INPUTS AND OUTPUTS

The ICM (Input Control Module) has two inputs and the OCM (Output Control Module) has two outputs. These devices should be thought of as modules that each contain two light switches. For the inputs, the system sees that a switch (input) has been turned on or off, and for outputs the system can turn a switch (output) on or off. In UPStart, the steps to configure the ICM and OCM are similar to the steps for setting up switches, and are described below.

### PULSEWORX FADE RATES

There are several fade rates that can be adjusted in a PulseWorx switch:

- **Default Fade Rate:** This is the fade rate that is used when you press and hold a rocker. Setting this too low will make it very hard to get the right brightness, while setting it too high will force the user to wait a long time to change lighting levels. We suggest a value of **3.3 seconds**. The Default Fade Rate is set on the Options tab in the Edit Device dialog.
- **Single-Tap Fade Rate:** This is the fade rate used when you turn on or off a switch by tapping the rocker. The default fade rate given above of 3.3 seconds seems slow to most people: we suggest

**1.6 seconds.** The Single-Tap Fade Rate is configured for the top and bottom rockers separately on the Options tab in the Edit Device dialog.

- **Link Fade Rate:** When you set up a switch, you specify the fade rate to use for each link. This is the fade rate used when someone presses a scene button on a keypad. As above we suggest **1.6 seconds.** The Link Fade Rate is set on the Receive Components tab of the Edit Device dialog.

It is very time consuming to change the fade rates for switches after the fact: we strongly recommend that you establish the fade rates for each group of switches before you begin programming the system. In cases where you or the customer may not be familiar with the fade rate behavior, install just a few switches and try different settings to determine what fade rates to use.

### **PULSEWORX GEN1 VS. GEN2 KEYPADS**

The Gen2 keypads (blue LEDs) have slightly different LED behavior than the Gen1 keypads (orange LEDs). As a result they require a different programming method to maintain proper LED tracking between g! and the physical devices. The basic difference is that with Gen1 keypads the g! software controls and maintains the LEDs status; with the Gen2 keypads we recommend that the PCS keypads are programmed to maintain LED status. Refer to PCS documentation and the keypad receive components section in the **Pulseworx Lighting System Programming – Offline Phase** below for details.

### **PULSEWORX LINKS (SCENES) DISCOVERED INTO THE g! SYSTEM**

PCS Links that are programmed to control devices within UPStart are automatically discovered into g!. The links are imported by their link number – not the name. If you rename the links in UPStart be sure to make a table of the link names and their link number to simplify working with them after they are imported into g!. *Note that g! always discovers link 1 & 2 pre-labeled ALL ON and ALL OFF.*

**Note:** the above is only true when using network discovery. If you read in the UPE configuration file, the names are preserved up to 16 characters.

### **EDITING UPB LINKS (SCENES) AND g!**

Prior to 6.5: PCS Links are NOT editable from the g! configurator. Any changes to a link will need to be done first in UPStart and then the lighting system will need to be rediscovered (click the discover devices button again) in the g! configurator to enable proper synchronizing and control. **Note:** it is also possible to manually adjust levels of loads already assembled in a PCS Link. See Changing Link (Scene) Settings (Manual).

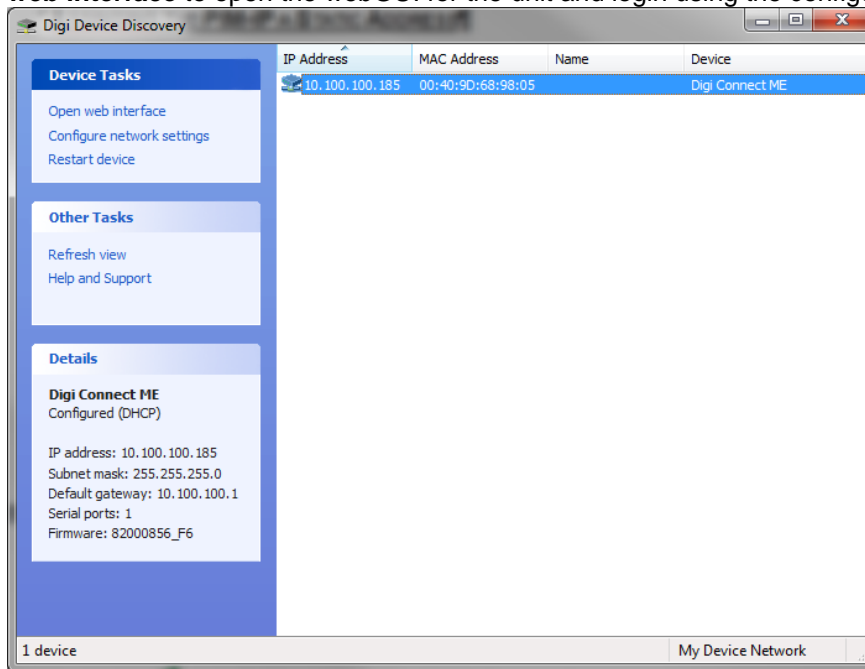
g! 6.5: PCS Links may be edited from the Viewer using the PCS Customizable Scene feature. See complete information within g! Configuration Notes.

### **ASSIGNING THE PIM-IP A STATIC ADDRESS**

The PIM-IP is strongly recommended to be set to a static IP address prior to g! integration to ensure reliable communication.

1. From UPStart, click **Tools** and select **UPB Interface Setup**.
2. With Interface Type set to **PIM-IP**, press the **Run PIM-IP Discovery Program** button.

- The Device Discovery screen appears and should find the PIM-IP. Select the PIM-IP and **Open web interface** to open the webGUI for the unit and login using the configured credentials.



- Click Network to open the appropriate settings. Assign a static IP address as below and Apply to save changes. The first IP lighting device used with g! should be set to 192.168.0.30, the second to 192.168.0.31, and so on. Subnet Mask is commonly 255.255.255.0, and the Default gateway is typically your router IP address. The PIM-IP may reboot on Apply.



## Digi Connect ME Configuration and Management

Home

### Configuration

Network

Serial Ports

GPIO

Alarms

System

Remote Management

Users

### Management

Serial Ports

Connections

### Administration

File Management

Backup/Restore

Update Firmware

Factory Default Settings

System Information

Reboot

## Network Configuration

### IP Settings

☐ Obtain an IP address automatically using DHCP \*

☒ Use the following IP address:

\* IP Address: 192.168.0.30

\* Subnet Mask: 255.255.255.0

Default Gateway: 192.168.0.1

\* Changes to DHCP, IP address and Subnet Mask require a reboot to take effect.

Apply

► Network Services Settings

► Advanced Network Settings

**Note:** The PIM IP may need to be manually rebooted if you use the HC power button to shut down the HC controller. See **Common Mistakes**.

## PULSEWORX LIGHTING SYSTEM PROGRAMMING – OFFLINE PHASE

The following assume you are working with UPStart Setup Tool version 4.2. Some of the dialogs may be slightly different if you are using a different version.

Step	Instructions	Comments
1	Click <b>File, New Network File</b> to open a new file for your project	<p>This dialog asks for a <b>Network Name</b>, a <b>Network ID</b> and <b>Password</b>. The defaults are fine.</p> <p><b>NOTE:</b> The <b>Network ID</b> is needed later in the <b>g!</b> Configurator.</p> <p><b>NOTE:</b> Do not set the <b>Network ID</b> to 0.</p>
2	Click <b>Device, Add</b> to add switches, keypads, and other modules	<p>Set the <b>Manufacturer</b> and <b>Product</b>, and click <b>Next</b>. Then set the <b>Room Name</b>, <b>Device Name</b> and <b>Unit ID</b>.</p> <p>The <b>Room Name</b> and <b>Device Name</b> are used to organize and display the switches, keypads and modules: create a new <b>Room</b> for each group of switches, and set the <b>Device Name</b> to something simple yet recognizable.</p> <p>As you add additional devices, UPStart will increment the <b>Unit ID</b> so that you can start at 1 and work upwards in order.</p> <p>Add all switches, keypads and other modules at this time. As you add them they will pop up in the tree structure at left.</p>
3	Click <b>Network, Link Names</b> to add and name the links	<p>Click <b>New</b>, then type in the <b>Link Name</b>. UPStart will set the first <b>Link Id</b> to 1, then automatically increment for additional links.</p> <p>Add all of the links at this time.</p> <p>Note that links can cause more than one switch to change: in other words, they can have one or more switches enrolled. For example, a link named <b>House All On</b> would have every switch in the house enrolled, whereas a link name <b>Pathway</b> would have just the lights between the garage and the kitchen enrolled.</p>
4	Setup the devices in the first <b>Room</b>	In the tree structure at left, select the first <b>Room</b> : this will display all the switches, keypads and modules from that room in the window to the right.
4.1	Right-click the first <b>SWITCH</b> from the window at right, then click <b>Edit</b>	This brings up the <b>Edit Device</b> dialog, which allows you to edit the settings for the switch.
4.2	Click the <b>Receive Components</b> tab to view the links in which this switch is enrolled	<p>Enroll the switch into the required links, up to a total of 16. For each link:</p> <p>Set the <b>Level</b>. Note that changing this level later while at the site is easy to do at the switch, so getting it perfect at this time is not critical.</p> <p>Set the desired <b>Fade Rate</b>.</p>

4.3	Click the <b>Options</b> tab to view the available switch options	<p>Select the desired <b>LED Color Control</b>.</p> <p>Confirm that <b>Report light level after rocker switch is pressed</b> is checked.</p> <p>If the light should not be dimmed, set <b>Dimming</b> to <b>Not Enabled</b>. For switches that support dimming, set the <b>Default fade rate</b>.</p> <p>Set the desired single-tap and double-tap behavior, <b>including the desired fade rate</b>, for both the top and bottom rocker.</p>
4.4	Save the settings for the first switch	Click <b>OK</b> to save your changes.
4.5	Copy the settings for the first switch in the room to any other switches in the room	<p>Right-click the <b>second</b> switch in the room and click <b>Copy Configuration</b>. In the list that appears at the bottom, select the switch you want to copy from (in this case the <b>first</b> switch programmed above) and then click <b>OK</b>.</p> <p>Repeat for the remaining switches.</p>
4.6	Right-click the first <b>KEYPAD</b> in the Room, then click <b>Edit</b>	This brings up the <b>Edit Device</b> dialog, which allows you to edit the settings for the keypad.
4.7	Click the <b>Transmit Components</b> tab to map the buttons to links	<p>Select the link name and mode for each button (On, Off, A, B, C and D for a 6 button keypad and A, B, C, D, E, F, G, and H for an 8 button keypad).</p> <p><b>Mode</b> is usually <b>Link Activator</b> or <b>Toggle</b>. A <b>Link Activator</b> turns on a link and is usually used for scene control in a Living Room / Dining Room area. The <b>Toggle</b> allows for on/off toggle control of a link and is usually used to control a single or group of lights.</p> <p>If a link appears on more than one keypad, you <b>MUST</b> set that link to the same mode (Link Activator or Toggle) on <b>ALL</b> keypads to get proper behavior.</p> <p>For the six button keypad, set the <b>UP</b> link to <b>Use Last Link</b> and the mode to <b>Bright Button</b>, and set the <b>DN</b> link to <b>Use Last Link</b> and the mode to <b>Dim Button</b>.</p>
4.8a	<b>For Gen1 Keypads:</b> Click the <b>Receive Components</b> tab to map the LED indicators to the appropriate links	<p>Press the <b>Match Link</b> button to match the links set in the transmit components tab to the LED indicators in the receive components tab.</p> <p>For each indicator, select <b>Do Nothing</b> for <b>When this indicator comes on</b>. Clear all of the group check boxes to the right: the indicator behavior is handled automatically by the <b>g!</b> system.</p>
4.8b	<b>For Gen2 Keypads:</b> Click the <b>Receive Components</b> tab to map the LED indicators to the appropriate links.	<p>Press the <b>Copy Links</b> button to match the links set in the transmit components tab to the LED indicators in the receive components tab.</p> <p>For each Link set the desired LED behavior, refer to the PCS documentation for details on making the LED track properly in their system.</p>

4.9	Click the <b>Options</b> tab to view the available keypad options	Select the <b>LED Brightness</b> as desired. Lower levels are preferable when the keypad is located in a bedroom.  Check that <b>LED Tracking</b> is on.(Not required for Gen2 Keypads)
4.10	Save the settings for the first keypad	Click <b>OK</b> to save your changes.
4.11	Copy the settings for the first keypad in the room to any other keypads in the room	Right-click the <b>second</b> keypad in the room and click <b>Copy Configuration</b> . In the list that appears at the bottom, select the keypad you want to copy from (in this case the <b>first</b> keypad programmed above) and then click <b>OK</b> .  Repeat for the remaining keypads.
4.12	Right-click the first <b>LAMP MODULE</b> in the Room, then click <b>Edit</b>	This brings up the <b>Edit Device</b> dialog, which allows you to edit the settings for the module.
4.13	Click the <b>Receive Components</b> tab to view the links in which this module is enrolled (or the Receive Ch 1/2 on the two channel module)	Enroll the module into the required links, up to a total of 16. For each link:  Set the <b>Level</b> . Note that changing this level later while at the site is easy to do at the switch, so getting it perfect at this time is not critical.  Set the desired <b>Fade Rate</b> .  Repeat for the 2 <sup>nd</sup> channel if there are two.
4.14	Click the <b>Options</b> tab	Select the desired <b>LED Color Control</b> .  If the light should not be dimmed, set <b>Dimming</b> to <b>Not Enabled</b> . For switches that support dimming, set the <b>Default fade rate</b> .  Confirm that <b>Report light level on lamp switch trigger activation</b> is checked.
4.15	Save the settings for the first module and program any remaining modules	Click <b>OK</b> to save your changes.
4.16	Right-click the first <b>APPLIANCE MODULE</b> in the Room, then click <b>Edit</b>	This brings up the <b>Edit Device</b> dialog, which allows you to edit the settings for the module.
4.17	Click the <b>Receive Components</b> tab to view the links in which this module is enrolled	Enroll the module into the required links, up to a total of 16. For each link:  Set the <b>Level</b> (100 %).
4.18	Click the <b>Options</b> tab	Select the desired <b>LED Color Control</b> .
4.19	Save the settings for the first module and program any remaining modules	Click <b>OK</b> to save your changes.
4.20	Right-click the first <b>INPUT MODULE</b> in the Room, then click <b>Edit</b>	This brings up the <b>Edit Device</b> dialog, which allows you to edit the settings for the module.
4.21	Click the <b>Transmit Components</b> tab	Select the link mode: N.O. Input or N.C. Input.  Select the link for inputs 1 and 2.
4.22	Click the <b>Options</b> tab	Select the desired <b>LED Color Control</b> .



4.23	Save the settings for the first module and program remaining modules	Click <b>OK</b> to save your changes.
4.24	Right-click the first <b>OUTPUT MODULE</b> in the Room, then click <b>Edit</b>	This brings up the <b>Edit Device</b> dialog, which allows you to edit the settings for the module.
4.25	Click the <b>Receive Ch 1</b> tab	Enroll the module into the required links: normally just Output 1, for example.  Set the <b>Level</b> (100 %).  Repeat for the <b>Receive Ch 2</b> tab.
4.26	Click the <b>Options</b> tab	Select the desired <b>LED Color Control</b> .
4.27	Save the settings for the first module and program remaining modules	Click <b>OK</b> to save your changes.
5	Program the remaining rooms	Select the next room in the tree structure at left and repeat the steps in #4.
6	Save your work	Click <b>File, Save</b> to save your changes.

## PULSEWORX LIGHTING SYSTEM PROGRAMMING – ONLINE PHASE

**IMPORTANT NOTE:** You should not program the lighting system while the **g!** system is also connected and communicating with the PulseWorx lights. Disconnect **g!** from the lighting system or turn off the **g! Controller** while you make changes to the lighting system.

Run the UPStart Setup Tool with the PIM connected to the lighting system and your computer.

Step	Instructions	Comments
1	Click <b>Tools, UPB Interface</b> to configure the PulseWorx interface.	<p>If you are connected with RS-232 to the PIM, set <b>Interface Type</b> to <b>Powerline Interface Module (PIM-R)</b>, and set the <b>Communications Port</b> to the correct COM port.</p> <p>If you are connected to the PIM-IP via Ethernet, set <b>Interface Type</b> to <b>PIM-IP</b>, and enter the <b>IP address</b>. Note you may also <b>Run PIM-IP Discovery Program</b> to locate the unit's IP address. <i>Note for reliability the PIM-IP is strongly recommended to be set to a static address.</i></p> <p>Click <b>Test</b>: if you don't see check marks for the items in the list below then stop and correct your setup</p>
2	Click <b>File, Open Network File</b> and locate the project file for this system	This will retrieve all of the switches, keypads and settings from the offline programming phase.
3	Program the devices in the first <b>Room</b>	In the tree structure at left, select the first room: this will display all the switches and keypads from that room in the window to the right.
3.1	Right-click the first switch or module in the window, then click <b>Install/Replace</b>	<p>This brings up the <b>Install / Replace Device</b> dialog.</p> <p>Put the selected switch into setup mode by tapping on the top rocker 5 times: the load will change state, and the LED on the switch will flash quickly.</p> <p>Click <b>OK</b> in the dialog to program the switch: when the programming is done, the switch is taken out of setup</p>

		<p>mode, and the dialog progress should indicate that programming is complete.</p> <p><b>Each switch takes roughly one minute to program.</b></p> <p>Repeat for the remaining switches or modules.</p>
3.2	In the same room, right-click the first keypad in the window at right, and then click <b>Install/Replace</b>	<p>This brings up the <b>Install / Replace Device</b> dialog.</p> <p>Put the selected keypad in setup mode: for 6 button keypads, press the <b>On</b> and <b>Off</b> button simultaneously until the keypad starts to blink, for 8 button keypads, press the top and bottom buttons.</p> <p>Click <b>OK</b> in the dialog to program the keypad: when the programming is done, the keypad is taken out of setup mode, and the dialog progress should indicate that programming is complete.</p> <p><b>Each keypad takes roughly one minute to program.</b></p> <p>Repeat for the remaining keypads in the room.</p>
4	Program the remaining rooms	Select the next room in the tree structure at left and repeat the steps in #3.

## OTHER PULSEWORX FEATURES

In addition to the steps and settings listed above, there are other features available in the PulseWorx system that may be useful in certain situations. A few are listed here as examples:

### DOUBLE-TAP BEHAVIOR

Each switch can be setup to send a link when the rocker is double tapped. This can be helpful to add a function at a location without the need for a separate keypad.

Consider pathway lighting from the front door to the garage. A keypad is installed at the garage door, because that door is most commonly used. No keypad is installed at the front door to minimize wall clutter. When someone taps the switch by the front door, the light in the entry goes on. When they double-tap the switch at the front door, all of the pathway lighting to the garage is turned on.

### CHANGING LINK (SCENE) SETTINGS (MANUAL)

After the system has been programmed, the user cannot make changes to the system from the keypads if the change requires that a new load or light be included in a scene, or that an existing load be removed from a scene.

On the other hand, if the customer simply wishes to change the dim level for the existing loads in a scene, then this can be accomplished as follows:

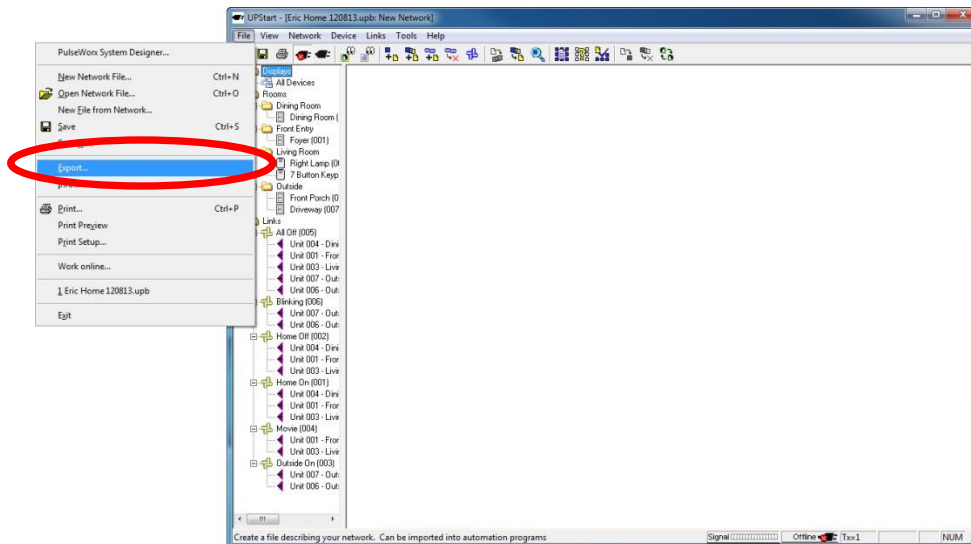
1. Press the scene button that should be changed
2. Set all the lights in the scene to their new desired settings
3. Tap the scene button on the keypad five times: the indicator will start to blink
4. Do not tap any other light switches or keypads, and wait for the indicator to stop blinking

## g! CONFIGURATION NOTES

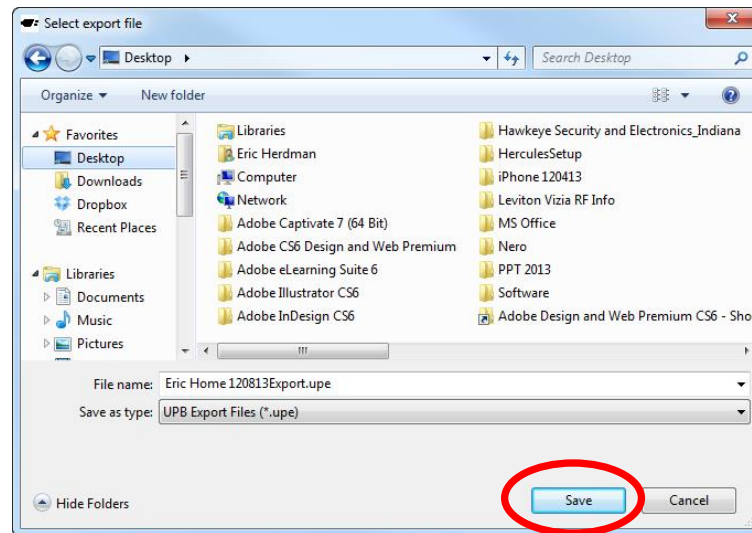
### READ CONFIGURATION FROM A UPE FILE

When you have completed programming in UPStart and are ready to attach the PCS system to the g! System for control, you may export a UPE file from UPStart to read into the g!System. To export a file:

1. Program the ELAN/PCS Lighting in the UPStart Software
2. Select File -> Export

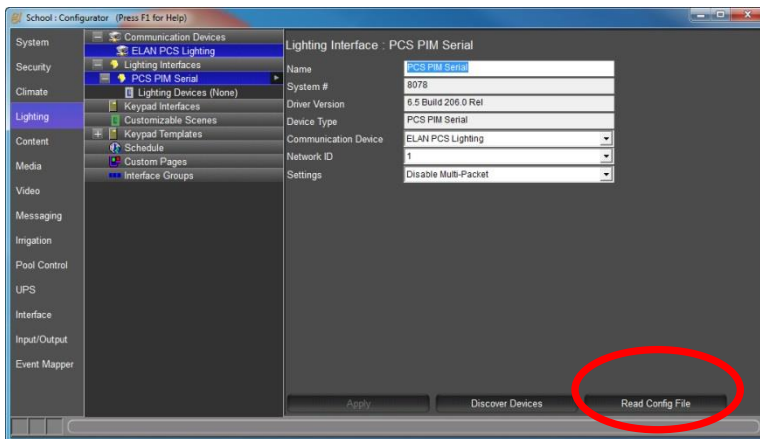


3. Save the file to your PC. It is recommended to include the date and customer in the filename.

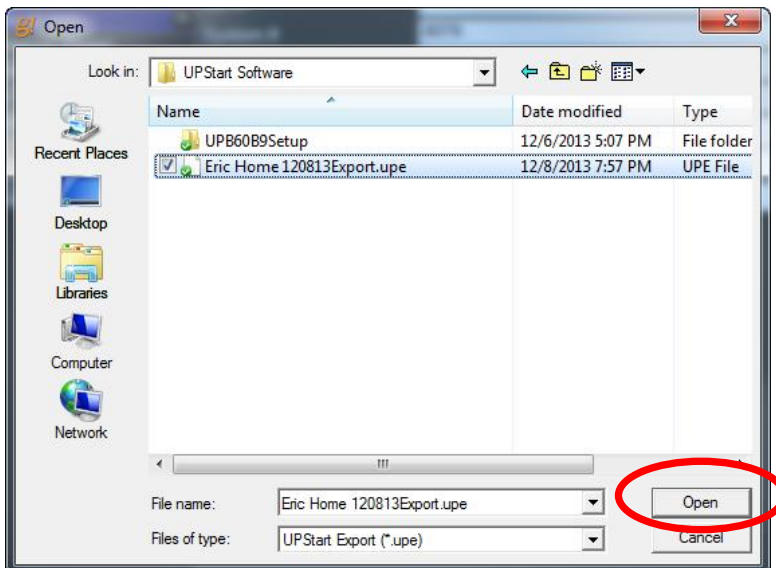


4. Open the g!Configurator and navigate to the Lighting tab
  - a. Add the PCS Lighting Interface as described in **g! Configuration Details** (if you have not already done so).

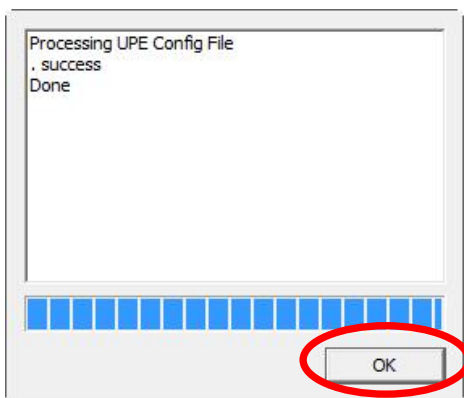
5. Select the Read Config File button



6. Locate where the upe file from UPStart was saved and select Open



7. Select OK when the upe file is finished loading



8. Setup the g!User Interfaces in the Interface Tab as desired and verify operation in the g!Viewer

### ADD A SINGLE PCS DEVICE

If a single PCS device was added after adding PCS to the g! System, it is possible to add a single device to g! without Discover Devices or Read Config File.

1. **Program the device completely in UPStart.**
2. Note the **UPB device ID number**.
3. Enter **Configurator**, and right-click an existing device. Choose **Discover New Device**.
4. Enter the **UPB ID** for the new device and click **Discover**.
5. If found, the device will read in from the network and add the correct type of device to Configurator and associate with appropriate Links. Status is shown on the bottom of Configurator. The device may now be used normally.

### PCS CUSTOMIZABLE SCENES

With g! version 6.5, PCS Links may be edited from the Viewer using the PCS Customizable Scene feature. In this situation, a PCS Customizable Scene is created and associated to a PCS Link number for either an existing PCS link, or new (with a previously unused Link number). A Customizable Scene button may then be associated with the PCS Customizable Scene, and the link may be edited in the same fashion as a generic g! Customizable Lighting Scene. Note that during installation the dealer must Configure the PCS Customizable Scene in Configurator and build the Custom Page for the Customizable Scene button to allow Viewer customization by the dealer or homeowner.

Devices	Variable Name	Setting	Comments
Customizable Scenes	Add New Scene	<Select>	
Add new Customizable Scene	Name	<User Defined> (Default: New Lighting Scene)	
	Type	<Select> PCS Lighting Scene	
	System	<Select> PCS Lighting Interface	
	Link #	<User Defined>	Enter a unused link number to create a new custom scene, or enter an existing link number to modify an existing link.
Custom Pages	Add New Custom Page	<Select>	
Custom Page	Add new Control	<Select>Light Scene Button Customizable	
Light Scene Button Customizable	Name	<User Defined>	
	Connect To	<Select>	Connect to the desired PCS Customizable Scene
Viewer		Tap to activate	Customizable Scenes are activate only
		Press and hold to edit scene	Changes are written as they are made to the PCS system
			Note that any modified or added Links will not appear in your UPStart file unless you read in changes from the network

**Note:** Any links edited or created by g! will not be present in your UPStart file.

Elan recommends doing the "Network>Read All" feature from UPStart the next time you use UPStart to incorporate any changes made from the g! system.

**g! CONFIGURATION DETAILS**

The following table provides settings used in the g! Configurator. Please refer to the *Configurator Reference Guide* for more details.

- “<Select>”                               Select the appropriate item from the list (or drop-down) in the Configurator.
- “<User Defined>”, etc.               Type in the desired name for the item.
- “<Auto Detect>”, etc.               The system will auto detect this variable.

Devices	Variable Name	Setting	Comments
Communication Devices	Name	<User Defined> (Default: <b>Lighting</b> )	
	Type	Serial Port or Ethernet	Choose correct type for the PIM you are using. PIM-R uses RS-232, PIM-IP uses Ethernet.
	Communication Type	Standard	
	Location	<User Defined> (Not Required)	
	Com Port or IP Address	<Select> or <User Defined>	Pick the Com port you are using (PIM-R). Enter the correct IP address (PIM-IP).
Lighting Interfaces			
	Name	<User Defined> (Default: <b>PCS PIM</b> )	
	Device Type	PCS PIM Serial, PCS PIM IP, OR PCS PGW	Pick the appropriate device type for the type of PIM installed
	Network Password	<User Defined> (Default: 1234)	Enter the correct network password as defined in UPStart Network Properties. Required for PCS Customizable Scene Feature
	COM Device	<Select> (Default: <b>Lighting</b> )	
	Network ID	<User Defined> (Default: 1)	The <b>Network ID</b> must match the Network ID in UPStart
	Settings	<User Defined> (Default: Disable Multi-Packet)	See Note 1
Lighting Devices			
<Read Config File>	Click the "Read Config File" button and navigate to the exported UPE file. Configurator will automatically populate all supported devices and links.		
OR			
<Discover Devices>	Click the "Discover Devices" button on the lighting interface in the Configurator to automatically discover devices configured in UPStart. (Not needed if you read in a config file)		
	Name	<Auto Detect>	This is the <b>Name</b> from UPStart, it can be changed if desired
	Device Type	<Auto Detect>	The device type as discovered (see note 2)
	Hide Device from Scheduler	<Select>	This option will hide or show the device on the schedule tab
	Disable LED Management (keypad)	<Auto Detect>	Set this to <b>No</b> for Gen1 keypads and <b>Yes</b> for Gen2 keypads
	Location	<Auto Detect>	This is the <b>Room</b> from UPStart (See Note 3, 4)
	Unit Number	<Auto Detect>	PCS unit ID #
Inputs / Outputs	<The inputs and outputs from ICM or OCM modules appear on the Input / Output tab>		
	Input Name	<Auto Detect>	The name of each input can be changed
	Device ID	<Auto Detect>	Input 1 or 2 on the ICM
	Output Name	<Auto Detect>	The name of each output can be changed
	Interface Device	<Auto Detect>	Output 1 or 2 on the OCM
<b>Notes:</b>			
1. Multi-Packet mode is supported only by Gen2 PCS devices, and is required if using SPR/TPR devices. Note that Multi-Packet must be DISABLED during Device Discovery. See additional info below			
2. If the device type is Unidentified PCS device, contact Elan tech support for assistance			
3. The <b>g!</b> system reads the <b>Room</b> value from the switch and displays it in the Location field.			
4. The light switches are sorted in the Configurator by <b>Room</b> , and then by <b>Unit Number</b> .			
<b>Notes:</b>			

## UPB MULTI-PACKET MODE AND SPR/TPR DEVICES

*Core Module 4.0.1621 or later required*

Gen2 PCS devices and g! support the use of UPB products in Multi-Packet mode. In this mode, UPB devices will repeat all transmissions 1-4 times (depending on settings). This mode can be very helpful in situations with high noise or long distances in between devices. In addition, this mode is required for use of Split-Phase or Triple Phase Repeaters in a UPB system.

g! supports Multi-Packet mode for control and feedback of a UPB system, however it cannot Discover Devices from the network in this mode. To Discover Devices in g! you must disable Multi-Packet on the PCS/Simply Automated interface and discover one phase of the install at a time as described below. This process is not required with PPC (Phase Coupler) devices, and only is required with active repeating SPR/TPR devices.

1. Install all devices including SPR/TPR device, and program in UPStart per standard PCS documentation in preparation for integration with g!. Note that Multi-Packet should be enabled by default in UPStart for all installs with SPR/TPR devices, but you may verify this setting by editing device properties and checking the Advanced tab under Transmission Attempts.
2. With appropriate circuit breakers disabled in regard for your safety, disconnect the SPR/TPR device and remove it from the install.
3. Locate outlets on each phase of power in the install to attach the PIM-R to. *It may be helpful to use a heavy duty extension cord to attach the PIM to different outlets.*
4. Discover the 1<sup>st</sup> Phase devices:
  - a. Power up the appropriate breakers (if disabled earlier).
  - b. Attach the PIM to an outlet on the 1<sup>st</sup> Phase of power, and to the g! Controller (via serial).
  - c. In Configurator, ensure that Settings: Multi-Packet is DISABLED.
  - d. Discover Devices.
  - e. Wait for all devices on this phase of power to be discovered into Configurator.
5. Move the PIM to an outlet on the next phase, and Discover Devices in Configurator to discover all UPB devices on the 2<sup>nd</sup> Phase as above.
6. If there are 3 Phases in the install, move the PIM to an outlet on the 3<sup>rd</sup> phase, and repeat Discover Devices to discover all devices on the 3<sup>rd</sup> phase as above.
7. Move the PIM back to the desired permanent install location.
8. With appropriate circuit breakers disabled in regard for your safety, install the SPR/TPR device back on the network per PCS standards.
9. In Configurator, change Settings: to Multi-Packet Enabled. g! is now ready to control your Multi-Packet devices on all phases. Note that if any changes are made to the network in UPStart, you will need to repeat the above steps to learn any new settings into the g! software.



## COMMON MISTAKES

1. Installing UPB in the same building with Lutron HomeWorks, RadioRA or GRAFIK Eye systems. The power supplies that Lutron manufactures create noise on the power line that interferes with UPB communications. Contact Elan or PCS for suggestions to minimize the noise if you need to make both systems work together.
2. Installing UPB with noisy dimmers. Some standard 120V dimmers, when set to very low brightness, will create noise on the power line that can interfere with UPB communications. Contact Elan or PCS for suggestions to isolate the noise from noisy dimmers.
3. Failing to properly program the PCS devices from UPStart PRIOR to discovering the system in g!. We strongly recommend fully designing and programming the lighting system in UPStart prior to discovering the system into g!. This will save a lot of time not going back and forth between UPStart and g!.
4. Insufficient UPStart version for device support. Check you have the latest UPStart if desired devices are not available for addition. PIM-IP/KPC7 required version 6 build 29 at time of writing.
5. Communication Issues. PCS PIM-R devices can sometimes report “Error: Could not put PIM in PULSE mode” when attempting discovery from the g! system. If you encounter this issue, check the following:
  - Bear in mind the PIM is not compatible with Global Cache com ports.
  - Network ID set in Configurator to match UPStart.
  - Known good, straight-through serial connection: tested adapter and cable, with cable of appropriate length (typically less than 50ft). It is especially helpful if the same cable that was used to program UPStart is used when integrated with the g! controller to rule out odd cable problems.
  - Verify correct connections and serial port settings.
  - If using an HC Controller, it may be helpful to use Com 1 or 2 on the HC.
  - The PIM should be located in a standard outlet, and power strips/surge strips should be avoided whenever possible for best power line communication.
  - It is possible to put away the PIM “uncleanly” if you exit UPStart without going “offline” first.
    - i. You may wish to re-connect to UPStart and ensure proper disconnection from your PC to leave the PIM in the correct mode.
    - ii. Alternatively, it may be helpful to disconnect all serial cables from the PIM, and power cycle it by removing it from the outlet for a few seconds. Once it has fully powered up (watch LED to stabilize), then reconnect the serial cable and try again.
    - iii. Reset the PIM to default:
      - Gen2: **Push-button:** The push-button on the front of the PIM-R is used to put the device back to its factory default condition. To set the PIM-R back to factory defaults first press the pushbutton **5** times rapidly. The Status LED will blink blue. Next, press the pushbutton **10** times. The Status LED will blink red. Finally, press the pushbutton **2** times. The Status LED will stop blinking. The device is now restored to its factory default state.
      - Gen1: **Push-button:** The push-button on the front of the PIM-R is used to put the device back to its factory default condition. To set the PIM-R back to factory defaults first press the pushbutton **5** times rapidly. The Status LED will blink green. Next, press the pushbutton **10**. The Status LED will blink red. Finally, press the pushbutton **1** time. The status LED will become solid amber. The device is now restored to its factory default state.

6. Cannot communicate with PIM-IP. Note the PIM-IP only supports a single connection.
  - If you cannot communicate with g!, check UPStart is not still in Online mode with the PIM.
  - If the g! controller is locally shut down, such as removed power cord, or turned off on the face of the unit, and the PIM itself did not lose power, it is possible the PIM still has the previous socket open. Power cycle the physical PIM-IP unit to make it ready to communicate again.
  - If you still cannot communicate, check the IP address is correct and the PIM-IP is online using the PIM-IP Discovery feature in UPStart.
  - Verify all settings in Configurator are correct.
7. Customizable scene does not modify/add devices to links.
  - Check the correct link number is used in the PCS Customizable Scene, and the Customizable Scene button is linked to the correct PCS Customizable Scene.
  - Check the device is available and online (unplugged Lamp module etc.)
  - Check the Network Password provided in Configurator is correct. If this field is not accurate, Elan cannot write changes to the PCS network.