

# *Layout Lighting Solution*

## **User Manual**

*Layout Lighting Solution User Manual*  
*Version 1.7*  
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# 1 Solution Overview

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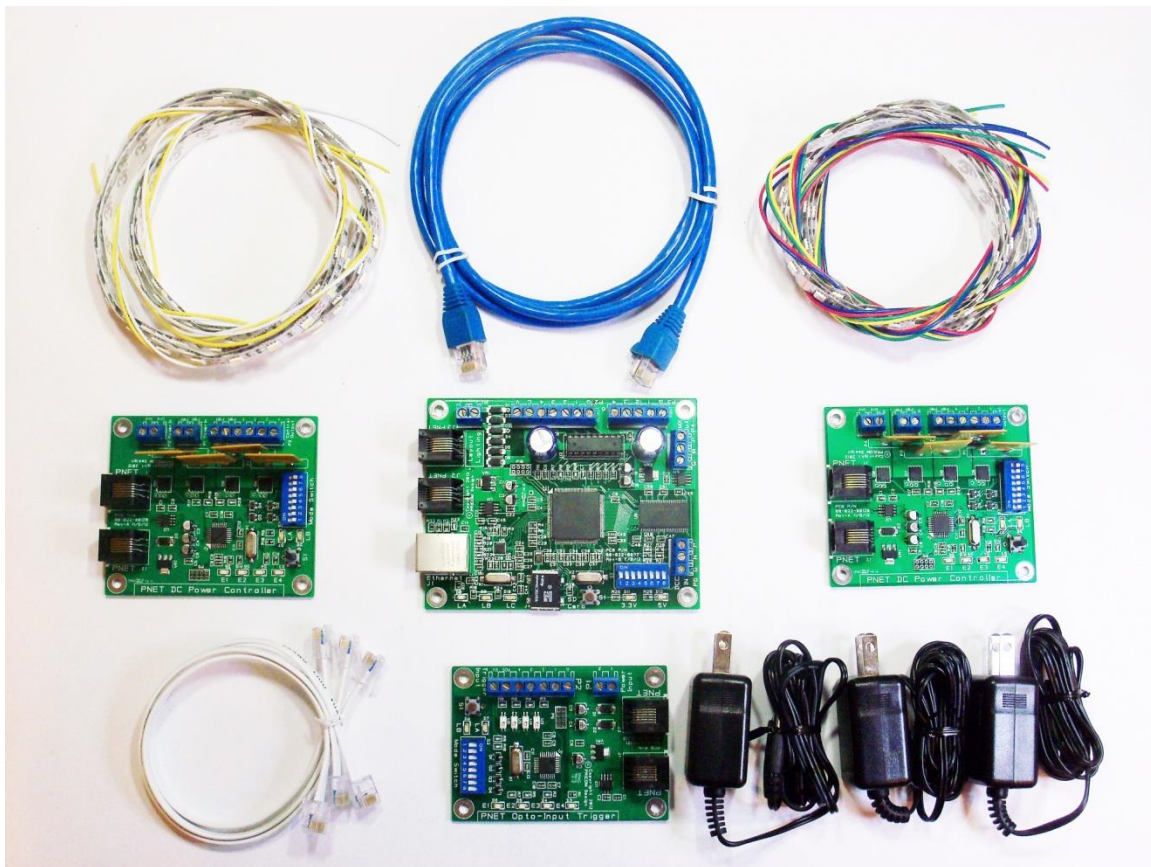
Congratulations!

Your PRICOM Layout Lighting Solution will bring you the next step to realism.

The Layout Lighting main board is the heart of a Lighting and Sound animation sequencer solution and measures only 3 ½ by 4 ½ inches. This small board includes a DMX-512 Dimmer Controller, complete PNET (*PRICOM Network*) host and slave implementation, DCC Receiver, full web server, along with local trigger inputs and control outputs, this is truly the most economical animation controller of its kind.

All configurations are stored on the included microSD Card, readily inserted into your computer to backup any configurations. By using a microSD Card you are able to mount the board to anything and anywhere, and easily update the firmware that the system uses.

The PRICOM Layout Lighting Solution is available as a complete Starter Kit pictured below. This represents a minimal configuration with One Layout Lighting Main Board, Two PNET Power Controllers, One PNET Opto-Input Trigger board, Two RGB LED Strips, and Two White LED Strips, 12VDC Power Supplies, and all necessary cables to make it work right out of the box.



## *Layout Lighting Solution – Overview*

Of course you can expand your system indefinitely, depending on the size of your application. DMX-512 equipment is available from many sources and priced quite economically for DJ applications.

You can control external devices with our line of PNET control products. We have Small current (PNET ULN-Output), large current (PNET DC Power Controller), and high output quantity (PNET Hex Driver) products to meet your specific applications.

You can trigger events with our line of trigger boards. PNET Opto-Input gives you 4 Optically Isolated Input Triggers, and PNET Block Occupancy gives you 4 DCC Block Detectors with small to large sensitivity. With these products you can control your Layout Lighting via external devices such as a button, block occupancy, motion sensor, etc.

We have even more PNET products in the planning stage now.

All configuration and control is performed over your local network using a web browser such as Internet Explorer, Firefox, Chrome, Safari, or other browsers. You can use a tablet, smart phone, or laptop for these functions, all it needs is a web browser.

In this manual, we will go over the features, configuration, and operation of not only the Layout Lighting Solution, but also how to use many of the other PRICOM Design products that work with the Layout Lighting Solution.

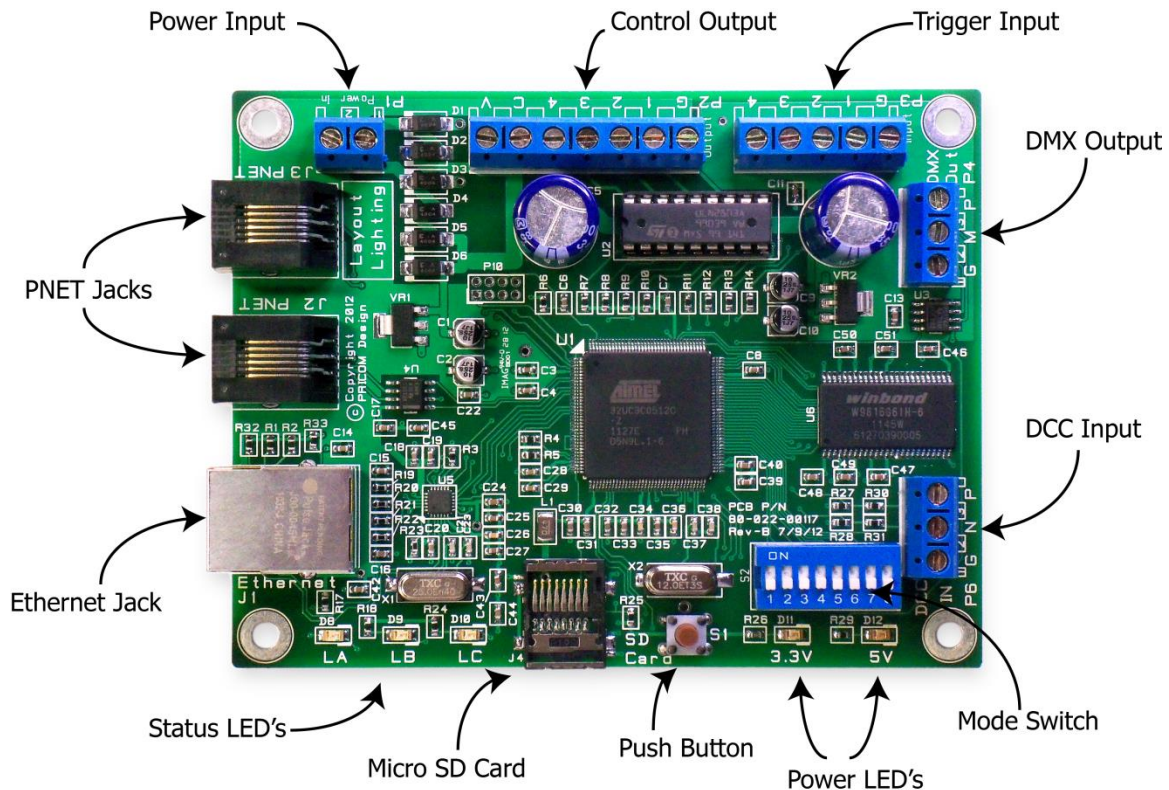




## 2 Layout Lighting Main Board

The following pages describe the features and functions of the Layout Lighting Main Board. Later in the manual we will go into more detail about the connections, and the software operations in a typical system. You can keep your solution simple, or make it as elaborate as you wish. With so many options and Configurations available to you, the possible uses are endless.

**Figure 1 - Layout Lighting Main Board**



### 2.1 Power Input

The Layout Lighting Main Board requires an external power source, which is applied to this terminal strip. 9-18V AC or DC power can be used, but we **strongly recommend** using 12VDC as this will be perfect for powering other PNET devices.

### 2.2 Power LED's

One Green LED indicator for 3.3V and another for 5V. Both of these LED's will be illuminated anytime power is applied to the Power Input. If either of these LED's is not lit, the rest of the board will not operate correctly.



## **2.3 Status LED's**

Three Status LED's are included to show the current operations happening on the Layout Lighting Main Board. LA is Blue, LB is Green, and LC is Red. Under normal operations, LA will show PNET activity, LB will show Web Server activity, and LC will show SD Card activity.

*These LED's have special meaning when performing Firmware Updates  
(please see the section on Firmware Updates later in this manual)*

## **2.4 Push Button**

The push button is used to initiate Firmware Updates. If the button is pressed when the power is applied, a new firmware image will be read from the SD card and written to the FLASH memory of the Layout Lighting Main Board.

*(Please see the section on Firmware Updates later in this manual)*

## **2.5 Micro SD Card and Socket**

All configuration and setup information is contained on this SD Card. You can use any standard computer to backup your configuration data from this card. When a new firmware update is desired, you simply copy the Firmware Image onto the SD card and use the Push Button to trigger a Firmware Update.

The connector used on the Layout Lighting Main Board is unique in that the card is loaded from the top and not from the front like some other connectors. One major advantage of this style is that it ensures that the card does not accidentally fall out when the device is mounted.

To load the card into the connector, simply insert the card into the socket from the top and while pushing down with your finger, pull towards yourself, you will feel when it is secure. If the card is not properly fitted into the socket, it will actually pop back up, the only time the card will remain down is when it is correctly inserted into the connector.

## **2.6 Ethernet Jack**

The Layout Lighting Solution uses a computer or laptop with a web browser for all setup and configuration. The Ethernet Jack must be connected to your home network in order to be accessed by a web browser. The Ethernet connection is 10/100 Mbit Ethernet. At power-up, the Ethernet Interface will request an IP address from your home router. You must know the address given by your home router so that you can enter that IP address into your web browser to reach the configuration pages.





## **2.7 PNET Jacks**

PNET (*PRICOM Network*) is the bus that allows many input and output modules to be simply connected to your system. Both jacks are the same, and can be used interchangeably. PNET uses standard 6-wire modular cabling, the same as most DCC cab bus wiring.

## **2.8 DCC Input**

Your Layout Lighting Solution can be directly attached to a DCC bus in order to use DCC events as trigger sources. This input is not isolated, so it is important to connect the DCC System Ground to the “G” terminal on this input.

*(See the connections section later in this manual for more details)*

## **2.9 DMX Output**

A key feature of the Layout Lighting Solution is the ability to mix-and-match DC dimmers connected to PNET, and AC dimmers connected to the industry standard DMX-512 interface. The DMX output allows you to purchase any compliant devices and simply attach them to the DMX-512 interface.

## **2.10 Trigger Input**

The Trigger Input provides direct attachment of 4 local push-buttons. These can be used for any function, but are perfect for master room light buttons. These inputs are not isolated, and so are best used for push-buttons and not any other more elaborate input triggers. For Optically Isolated Trigger Inputs, please consider our PNET Opto-Input Trigger Board which contains 4 optically isolated input trigger channels.

## **2.11 Control Output**

As its name implies, you may use this function on the Dream Player to control up to four outputs such as LED's, Relays, etc... The outputs can be controlled by Sequences configured with your web browser.

## **2.12 Mode Switches**

This DIP Switch can set master-control modes.

**All positions are currently un-used and reserved for future use.**



## 3 Connections

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The following section provides detailed instructions for connecting your Layout Lighting Solution. To get started quickly, all you need to do is connect the Power Input, the Ethernet, and PNET to any attached boards. The Starter Kit Assembly section of this manual describes setting up a basic first system. Then when you are ready, you can get more advanced and use the Trigger Inputs and Control Outputs.

### 3.1 Power Input

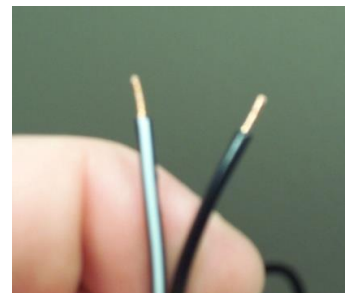
The Layout Lighting Solution is provided with a 12VDC wall transformer which matches the needs of any PNET boards attached. With a 12VDC input, the Main Board will draw about 250MA when active. You can use any suitable power supply of 9-18V AC or DC, but we **strongly recommend** using 12VDC as this will be perfect for powering other PNET devices.



If you wish to power multiple PNET boards, a single larger power supply can be used, just allow for 250MA for the Layout Lighting Main Board. As a convenience to you, we offer a full range of Power Supplies ranging from 12VDC @ 1Amp up to 12VDC @ 30Amp. Please visit our web site [www.pricom.com](http://www.pricom.com)

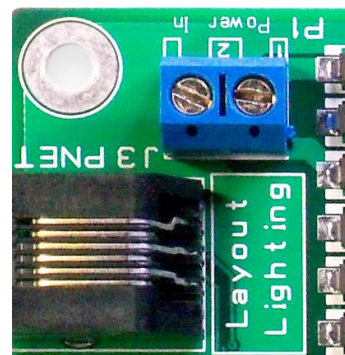


The power source used can be shared with other devices, but be careful as some of the PNET devices are polarity sensitive. The PNET Power Controller is a perfect example. Putting the Layout Lighting Main Board on its own 12VDC @ 2A power supply is usually sufficient and keeps the high-current supply separated and prevents accidental polarity issues.



To connect the power supply to the Layout Lighting Main Board, locate the 2-position “Power Input” terminal strip.

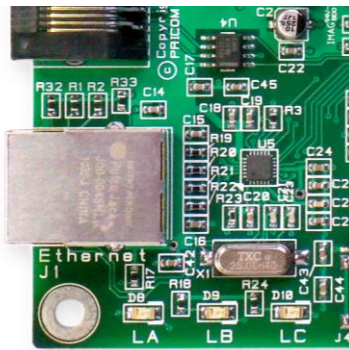
If your desired power-supply comes with a connector on the end, simply clip it off as shown to the right. Separate the two wires and strip some insulation off to expose the actual wires then twist them to keep the strands together. Secure the stripped wire ends to the 2 terminals of the Power Input terminal strip. The polarity of an AC or DC power source is not important as there is a bridge rectifier included on the Layout Lighting Main Board.



### 3.2 Ethernet Network Jack

Your Layout Lighting Solution leverages the best of Web Technology and utilizes HTML and java for all setup and configuration functions via a Laptop, Tablet, or Smart Phone. In order to achieve connectivity, you need to connect your Layout Lighting Main Board to an Ethernet Network. The Ethernet Interface will automatically negotiate 10Mbit or 100Mbit connection depending on your network router.

**Figure 2 - Ethernet Network Jack**



The Layout Lighting Main Board will automatically request an “IP Address” (Internet Protocol Address). This is the address that enables your PC/Laptop/Tablet to talk to the Layout Lighting Board. In order to automatically request this IP address, we utilize DHCP (dynamic host configuration protocol). If your home network does not support DHCP, please contact PRICOM ([help@pricom.com](mailto:help@pricom.com)) and we will help walk you through an alternate approach.

Even with DHCP, it is necessary for you to determine exactly what IP address was given by your home network. If you know how to login to your home gateway, you can look at the connected hosts list, and look for a MAC address that matches the sticker on the bottom of your Layout Lighting Main Board (1C:97:3D:00:xx:xx). Once you know the IP address given to your Layout Lighting Main Board, we suggest setting up a “reservation” so that it will always receive the same IP address.

We are working on a better solution to this IP address situation, please check our web site for software updates for this and all of our products.

### 3.3 PNET Network Jacks

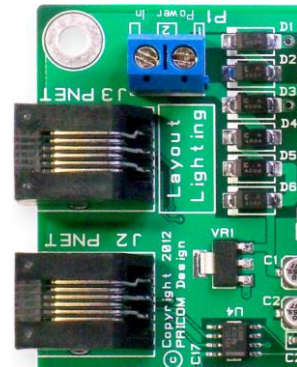
The Layout Lighting Main Board includes TWO PNET Jacks for convenient connection of many PNET devices. Both jacks are the same, giving you the flexibility to ‘loop’ through and connect many devices to the PNET network.



The cables are 6-wire Modular cables and can be flat or twisted pairs. PNET cables include 12VDC power that comes in very handy for the PNET Control Output as the 12VDC on the cable can power many of the smaller PNET boards. PNET Cables should be wired as “Straight Through” and not “flip” anywhere along the path. Nothing will be damaged if a cable is reversed, but the PNET Communications Data lines would be reversed making PNET malfunction. PNET cables can be plugged or un-plugged with the power on.

Figure 3- PNET Jack Pinout

Pin	Name	Description
1	+12VDC	PNET Power Supply
2	GND	PNET Signal Ground
3	PNET	Communications Data
4	PNET	Communications Data
5	GND	PNET Signal Ground
6	+12VDC	PNET Power Supply



**ATTENTION:**  
**The PNET Bus Requires Termination!**  
We have included a terminator with your kit. There needs to be at least ONE terminator in order for PNET to function. Ideally, there should be a terminator at each end of your PNET Bus.

To create your own terminators, simply put a single 120 Ohm resistor between the PNET Communications Data pins 3 & 4.  
Place one of these termination resistors at each end of the PNET bus.

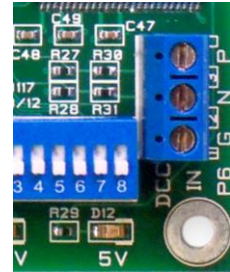
### 3.4 DCC Input Terminal Strip

Another key feature of the Layout Lighting Solution is the ability to trigger events from DCC mobile or accessory commands. To facilitate this connection, we provided a DCC Input Interface. This input is NOT isolated, so it is important to keep the Ground of all systems the same. The DCC System Ground should be attached to the “G” terminal of P6 in order to reduce the chance of noise and grounding issues. Since DCC is not polarity sensitive, the “N” and “P” terminals can be reversed, but the Negative and Positive terminals are as follows:



**Figure 4 – DCC Input Terminal Strip (P6)**

Terminal	Name	Description
1	“G”	System Ground
2	“N”	DCC Signal -
3	“P”	DCC Signal +

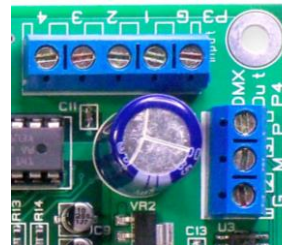


### 3.5 DMX-512 Output Terminal Strip

A tremendous amount of expansion is possible using DMX-512 which is a professional standard for Digital Control of AC Dimmers. We have leveraged the popularity of this standard to your advantage. Many products for the DJ industry are available including Dimmer Packs, LED “PAR” Cans, etc. The Professional Connector is a 5-pin XLR style connector.

**Figure 5 - DMX Output Terminal Strip (P4)**

Terminal	Name	Description
1	“G”	DMX Shield/Ground
2	“M”	DMX Signal -
3	“P”	DMX Signal +



In the Semi-Professional market, a 3-pin XLR style connector has been made universally standard. This makes the cables to connect DMX-512 signals a simple XLR microphone cable. Microphone cables are easy to find and easy to obtain the connectors for. With this in mind, we made our DMX-512 connections using a 3-position terminal strip, matching the pinout for the 3-pin XLR connector.

**Figure 6 - DMX 3-Pin XLR Connector Wiring**

Terminal	Name	Description
1	“G”	DMX Shield/Ground
2	“M”	DMX Signal -
3	“P”	DMX Signal +

### 3.6 Trigger Input Terminal Strip

Local push-buttons can be wired to the Layout Lighting Solution enabling direct connection of external event sources. A typical application for this would be a master control push button panel. This section describes the electrical connections for the Trigger Inputs. To program the trigger inputs to cause actions within sequences and steps, see the section on Programming.



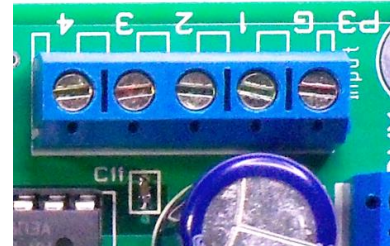


The Trigger Inputs of the Layout Lighting Solution are NOT optically isolated which means you need to be careful about sharing ground pins with external sources.

As a convenience to your wiring, you simply need to connect buttons between the appropriate trigger input and the ground terminal.

Figure 7 – Trigger Input Terminal Strip (P3)

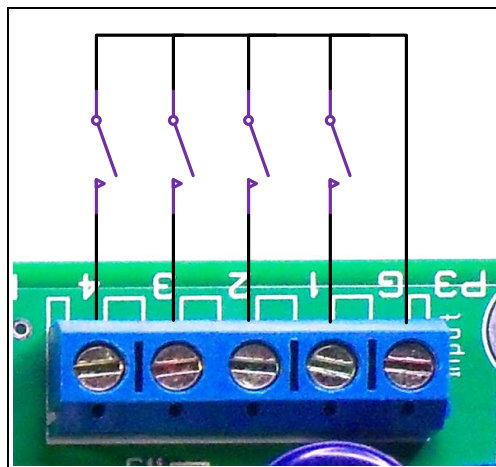
Terminal	Name	Description
1	GND	Trigger Ground
2	Trigger-1	Trigger #1 Input
3	Trigger-2	Trigger #2 Input
4	Trigger-3	Trigger #3 Input
5	Trigger-4	Trigger #4 Input



The trigger input terminals (Trigger-1 to Trigger-4) provide connection to the trigger inputs. Terminal #1 (GND) is connected to the local ground for all 4 trigger inputs. Since these inputs are intended for Push Buttons, there is no need for power, and we have provided the appropriate pull-up resistors on the board.

The following example shows how to connect switches (or relays for that matter) directly to the Layout Lighting Main Board. Each Trigger Input can then be individually connected to the GND pin through any suitable switching device such as a push-button or relay.

Figure 8 - Simple Trigger Input Button Connections





### 3.7 Control Output Terminal Strip

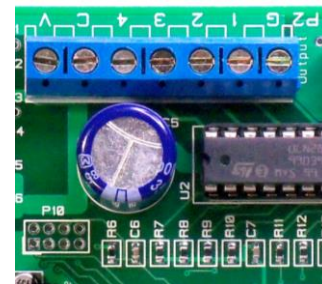
The Layout Lighting Solution is capable of controlling many types of devices and loads connected to the Control Outputs. This section describes the electrical connections for the Control Outputs.

The Control Outputs of the Layout Lighting Main Board are not isolated in any way from the Ground of the system. If grounding problems become an issue for your application, an external relay can be used to isolate the load from the Layout Lighting Solution.

As a convenience to your wiring, you may use the power supplied on the Control Output Terminal Strip, but doing so will draw power from the internal 5V regulated supply used to power the Layout Lighting Main Board. Use this convenience power for LED's, or small relays. If you intend to power any larger loads, please consider an external power source for the Control Outputs.

**Figure 9 – Control Output Terminal Strip Pinout (P2)**

Terminal	Name	Description
1	GND	Convenience power supply ground
2	Output-1	Control Output #1
3	Output-2	Control Output #2
4	Output-3	Control Output #3
5	Output-4	Control Output #4
6	Clamp	Common Clamp Diode Connection
7	5V	Convenience power supply (5VDC)



The control output terminals (Output-1 to Output-4) provide connection to a Darlington Transistor Array (Collector) used to Sink Power, but cannot Supply Power. Each Output is capable of sinking 400MA using the ULN2803 in the socket at U2. The Darlington Array has its Emitters connected to the GND Terminal #1. External or Convenience power can be used to power the load, but the reference and current ground will be using GND Terminal #1.

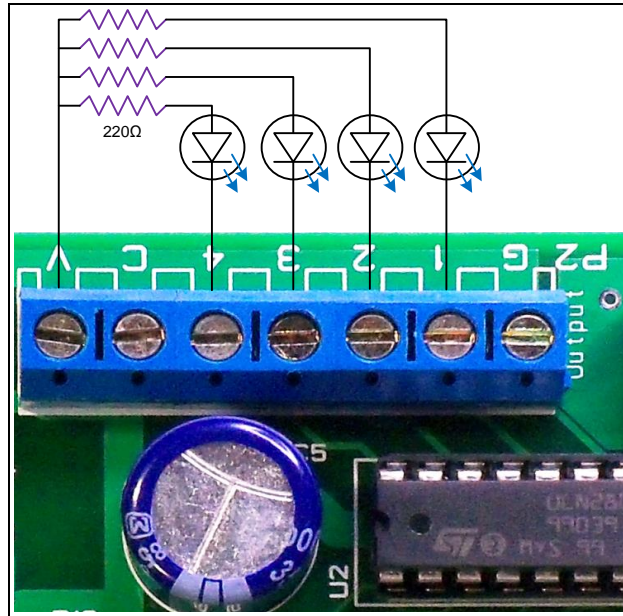
Terminal #6 (Clamp) is connected to the Darlington Array protection diodes (Cathode) for all 4 outputs. If you are driving an inductive load such as a relay, the Clamp terminal should be connected to the power source being used for the load. This Clamp Terminal will prevent the back-lash of the relay from destroying the Darlington Array. If you are simply driving LED's this terminal can be left un-connected.

Terminal #7 provides a local power source that is not isolated from the Layout Lighting Main Board, but can be used to simplify wiring if just powering LED's or other small loads. Power used from this terminal can cause the on-board voltage regulator to become hot under load.



The following example shows a simple way to connect status LED's to the Layout Lighting Solution using the convenience 5VDC power supply. The LED's will require current-limiting resistors since each Control Output can sink 400mA and would burn-out the LED's. Since the LED's do not present an inductive load, the Clamp terminal has been left un-connected.

**Figure 10 - Simple Control Output LED Connections**



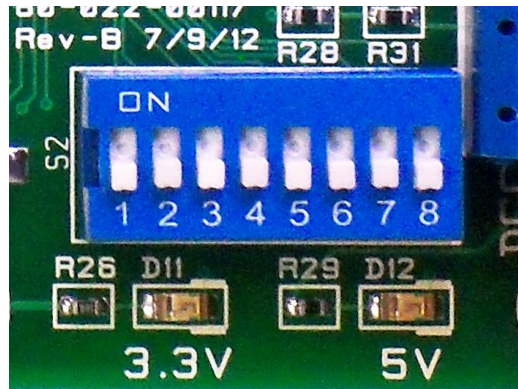
The Control Outputs can also be used to drive conventional DC powered lamps or DC powered relays. However, if you need to control larger DC loads, please consider the PNET DC Power Controller as a High-Current 4-channel controller conveniently connected to PNET. At 8Amps per channel, you can control some serious loads!

### **3.8 Mode Switches**

The Layout Lighting Solution has many options available through programming using the web interface. We placed a DIP Switch to set modes, but have not implemented any use for them yet.



Figure 11 - Mode Switch Settings



(All Switches are unused and reserved for Future Use)

### 3.9 Mounting Holes

The Layout Lighting Main Board can be mounted to any non-conducting surface using the supplied mounting holes. We suggest using a .25” or .375” nylon stand-off to keep airflow around the board. Our favorite screw to use is #6 x 1” or #6 x .75” depending on the length of your standoffs. The mounting holes are electrically isolated, and using steel screws is fine, but please be careful not to over tighten them.



## 4 Starter Kit Assembly

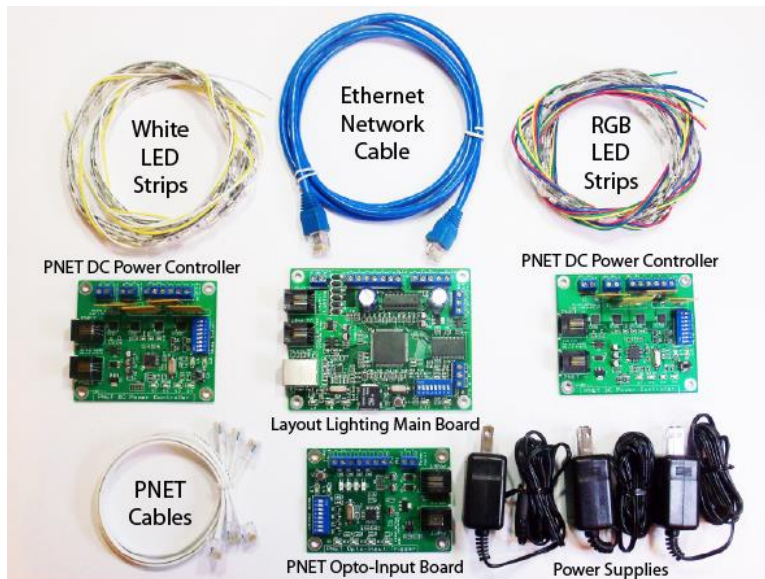
Previously in this document, we have described the Layout Lighting Main Board features and its connections. This section will introduce you to the rest of the components included in the Layout Lighting Solution Starter Kit. This section will cover all the basic connections and operations, even if you purchased individual parts not the Starter Kit.

Additional data for each module is included in their respective Quick Start Guides. Please refer to the individual quick-start manuals in addition to this guide. This manual combined with our web site videos should get you up and running in the fastest possible manner.

### 4.1 Starter Kit Contents

Whether you purchased a Starter Kit, or selected the exact components you need, you will end up with items similar to those pictured below:

**Figure 12- Layout Lighting Starter Kit Contents**



Essentially, you will need a Layout Lighting Solution Main Board, Power Supplies, Ethernet Cable, PNET Cables, and some number of PNET DC Power Controllers.

It is possible to operate the Layout Lighting Solution with only DMX-512 dimmers and no PNET dimmers at all. LED lighting provides such an economical alternative to other light sources that we have included 2 sets of Red, Green, Blue (RGB) and White LED strips in the Starter Kit. We have included 2 one meter lengths of RGB, and 2 one meter lengths of White LEDs. The combination of RGB & White strips allows infinite color mixing and flexibility.



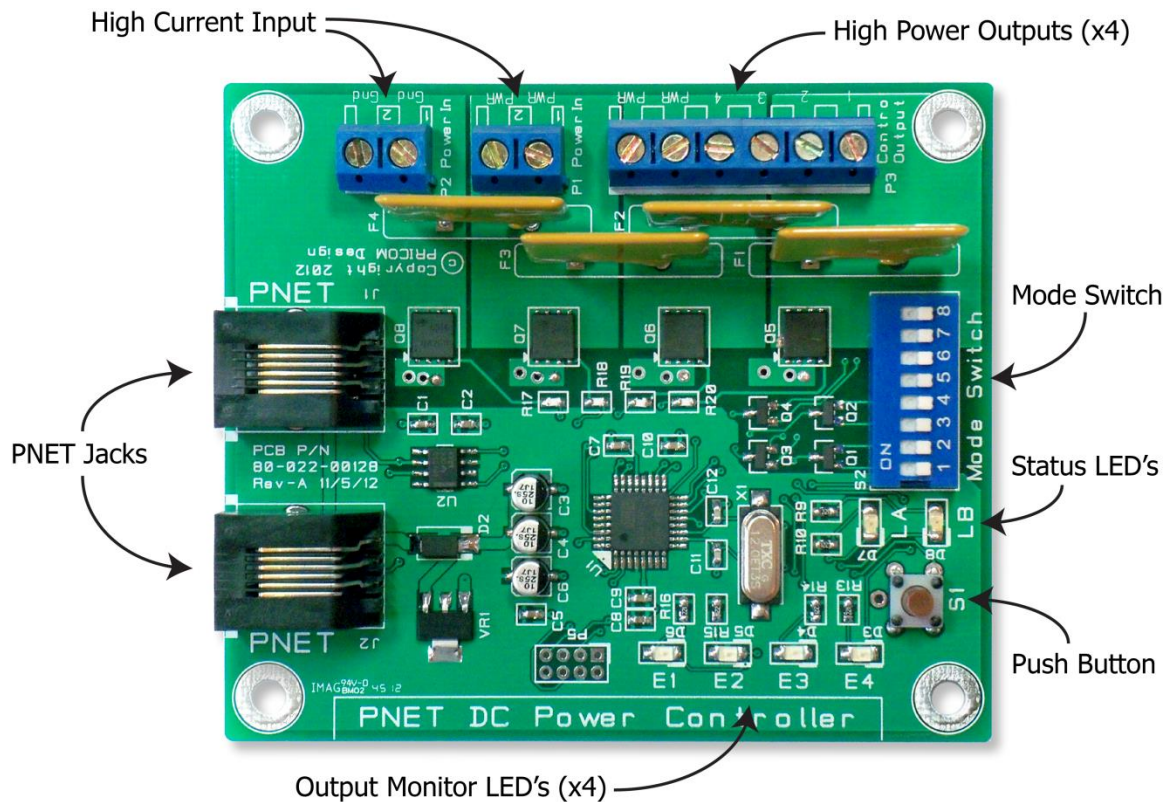


The power supplies included in the Starter Kit are enough to power the Layout Lighting Main Board as well as separate 12VDC Power Supplies for each of the PNET DC Power Controller Boards. Each LED strip draws about 1Amp at 12VDC, so each PNET DC Power will require about 2A at 12VDC. If you are connecting more than 2 Metres of LED strip to a PNET DC Power Controller, you will need a larger Power Supply.

## 4.2 PNET DC Power Controller

The PNET DC Power Controller is a key element in the control of low-voltage DC lights, including LED strips. The DC Power Controller can supply up to 8Amps @ 12VDC on each of the 4 outputs. That adds up to a total of 32Amps @ 12VDC maximum capacity for each PNET DC Power Controller. With that kind of power, care must be used to ensure wiring is correct, especially the High Current DC Power Input Polarity.

**Figure 13 - PNET DC Power Controller**



Looking at the picture above, please note the High Current Input Terminal Strip. To the left are 2 terminals BOTH labeled GND. This provides the easy ability to 'chain' multiple DC Power Controllers onto a shared 12VDC power Bus.

Similarly, the High Current Input PWR terminals are connected together to allow easy 'chain' ability onto a shared 12VDC power Bus.

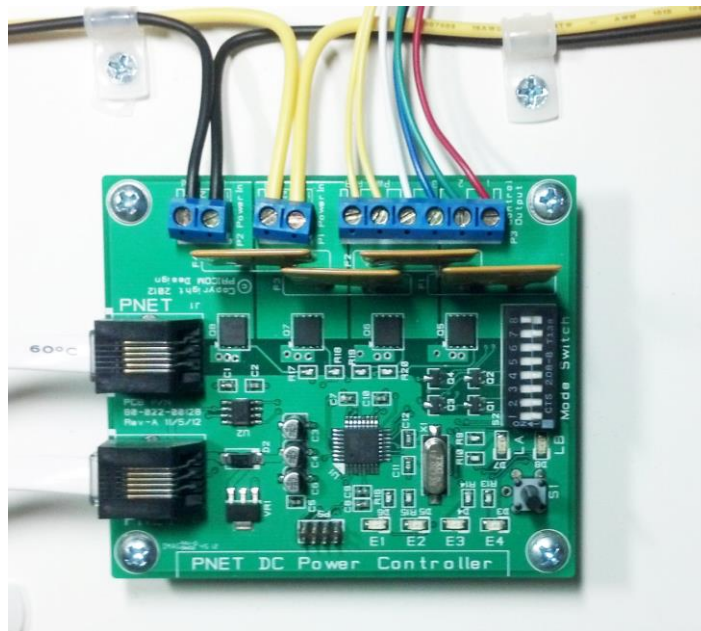


The Control Output Terminal Strip is used to connect to the Starter Kit LED strips. Our strips are pre-wired with Yellow Wires on the 12VDC connections, and the matching color on the ‘sink’ side of each LED color. Red=Red, Green=Green, Blue=Blue, White=White.

**Figure 14 - PNET DC Power Controller Connections**

Terminal	Name	Description	RGB Strip	White Strip
1	Output-1	Dimmer Output #1	Red Wire	
2	Output-2	Dimmer Output #2	Green Wire	
3	Output-3	Dimmer Output #3	Blue Wire	
4	Output-4	Dimmer Output #4		White Wire
5	PWR	Power supply output (12VDC)	Yellow Wire	
6	PWR	Power supply output (12VDC)		Yellow Wire

**Figure 15 - PNET DC Power Controller Wiring**



As you can see in the table and pictures above, we have assigned PNET DC Dimmer #1 to Red, #2 to Green, #3 to Blue, and Dimmer #4 to White. This matches the standard order of R,G,B,W. The two small Yellow wires receive the +12VDC from the High Current Input bus wire (Large Yellow) connected to terminal strip position ‘PWR’ and makes the wiring to a large 12VDC bus quite convenient. As you can also see from the picture above, we used Black as our GND and Yellow as our 12VDC Power Bus. Notice the Black coming in and going out to the next board are NEXT TO EACH OTHER. Similarly, the Yellow 12VDC Power Bus wires enter and exit this module NEXT TO EACH OTHER.

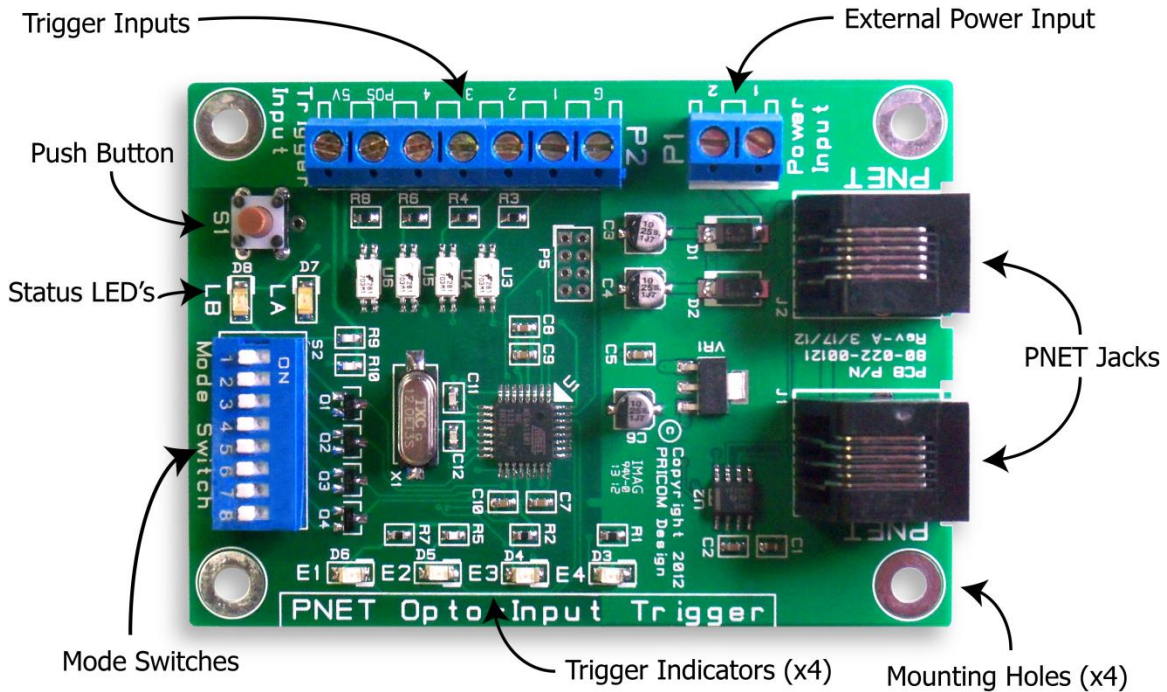




### 4.3 PNET Opto-Input Module

Included in the Layout Lighting Starter Kit is a PNET Opto-Input module. This facilitates easy connection of external triggers, with the advantage of Optical Isolation. You can use Block Occupancy Detectors, Push Buttons, Relays, or even a DCC Decoder as trigger inputs to the PNET Opto-Input module.

**Figure 16 - PNET Opto-Input Module**



The PNET OptoInput Module can be powered directly from the PNET cable, so no external power supply is needed. Since the Trigger Inputs are Optically Isolated, you need to provide power for the Opto Isolators. We provide a local ‘convenience’ power supply that you can simply ‘jump’ back to the POS terminal in order to supply the isolators with their power. To do this insert a small length of wire between the POS and 5V slots on the Trigger Input terminal strip. Then wiring Push Buttons is a mere matter of connecting each trigger input terminal to ground through a push button.

**Figure 17 - PNET Opto-Input Connections**

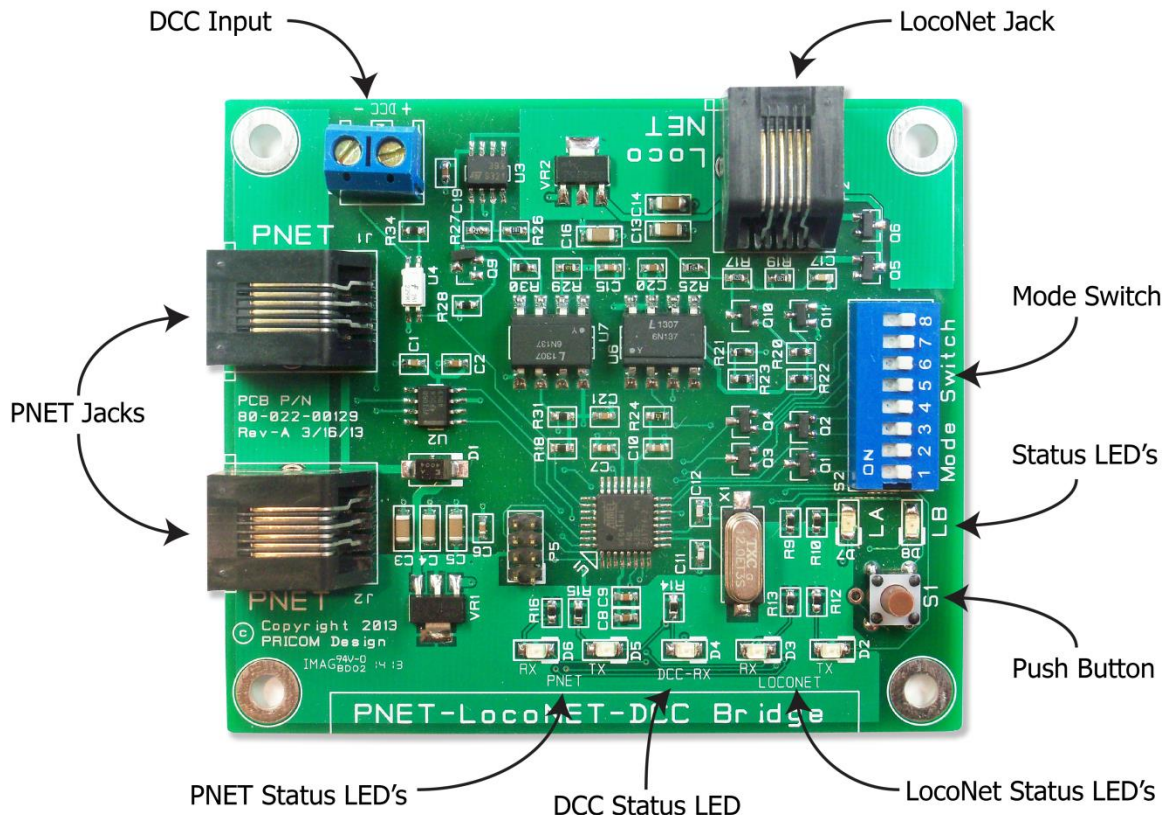
Terminal	Name	Description
1	GND	Convenience power supply ground
2	Trigger-1	Opto-Isolated Trigger #1 Input
3	Trigger-2	Opto-Isolated Trigger #2 Input
4	Trigger-3	Opto-Isolated Trigger #3 Input
5	Trigger-4	Opto-Isolated Trigger #4 Input
6	POS	Opto-Isolator Shared Power Input
7	5V	Convenience Power Supply (5VDC)



## 4.4 Optional LocoNet® Bridge Module

For synchronizing to a LocoNet® Fast Clock, we have available an optional PNET to LocoNet® Bridge Module. This module is both a PNET node as well as a LocoNet® node. This Module listens to the LocoNet® and when it receives a Fast Clock update (either fast clock setting, or fast clock broadcast) it translates the LocoNet fast clock to a PNET fast clock packet.

**Figure 18 - PNET to LocoNet® Bridge Module**



The connections for the LocoNet® Bridge Module are quite easy. Simply connect the LocoNet jack to your LocoNet, and the PNET jack to your PNET. You can loop your PNET cable through either jack as they are both the same. The Mode Switch is not used yet, so that is all there is to connecting this highly useful module!

## 4.5 Power Connections

Connect your Layout Lighting Main Board using the included 12VDC wall-transformer. This process is discussed in the “Connections” section earlier in this manual.

The only other power connection needed is the appropriate 12VDC Power to the PNET DC Power Controller Modules, covered in the Starter Kit Assembly section of this manual. Since the 12VDC could be quite high current, it is worth double checking your



connections before you proceed in order to prevent a short circuit. If the polarity is accidentally reversed, 12VDC at high current will melt the PNET cables, so please use caution with these high current sources.

## 4.6 Ethernet Connection

The Layout Lighting Solution requires a Wired Ethernet Connection in order to communicate with a web browser for setup and configuration. Simply plug the included Ethernet Cable to a local Ethernet connection on your home network. The Layout Lighting Solution supports 10/100 Mbit Ethernet. If the included cable is not long enough, feel free to change to a longer cable as needed.

## 4.7 Connecting PNET Cables

PNET is the *PRICOM Network*, it is based on the CAN automation bus, and is a multi-drop broadcast style of network. PNET modules can be daisy chained with standard 6-wire modular wiring of the “straight through” variety. Your Starter Kit includes enough PNET cables to get you going. If you need to make more, or make longer cables, use the same wire you use for your cab bus. Digitrax, NCE, and others all use the same style of connectors and cabling. We chose this type of connector so that you would not have to run out and buy more tools or cable. We also offer a complete line of assembled and tested PNET cables on our web site [www.pricom.com](http://www.pricom.com)

**ATTENTION:**  
**The PNET Bus Requires Termination!**  
 There needs to be at least ONE terminator in order for PNET to function. Ideally, there should be one at each end of your PNET Bus.

## 4.8 DIP Switch Settings

Operating modes are set using the on-board DIP Switch. The most important setting is the “slot number”. The slots are numbered from 0-63, using the DIP Switch position 1-6 to set the slot number desired.

**Figure 19 - Slot DIP Switch Settings**

Slot	Switch 1 2 3 4 5 6	Binary	Slot	Switch 1 2 3 4 5 6	Binary
0	↓↓↓↓↓↓	000000	8	↓↓↓↑↓↓	000100
1	↑↓↓↓↓↓	100000	9	↑↓↑↓↑↓	100100
2	↓↑↓↓↓↓	010000	10	↓↑↓↑↓↑	010100
3	↑↑↓↓↓↓	110000	11	↑↑↓↑↓↑	110100
4	↓↓↑↓↓↓	001000	12	↓↓↑↑↓↑	001100
5	↑↓↑↓↑↓	101000	13	↑↓↑↑↓↑	101100
6	↓↑↑↓↑↓	011000	14	↓↑↑↑↓↑	011100
7	↑↑↑↑↓↓	111000	15	↑↑↑↑↓↑	111100



The Slot setting is important so that devices can talk to each other on the PNET. There can be any number of devices with the same slot number, so you don't have to worry about making a mistake. With a PRICOM Layout Lighting Solution, you can send Control Output events to any output on any slot, so there is much flexibility for slot assignments.

These Slot Numbers apply to ALL PNET I/O Modules EXCEPT the LocoNet Bridge, and the Layout Lighting Solution Main Board. In the Starter Kit, that means the Slot Applies to the PNET DC Power Controller and the PNET OptoInput Module.

Trigger Inputs from the OptoInput Module carry a different type of command, so the Slot can be set the same as a PNET DC Power Controller. With the PNET DC Power Controller, the Slot specifies the PNET Dimmer Number in the Web Interface. To get you going quickly, we suggest setting one of your PNET DC Power Controller Modules to Slot-0 (switch 1-6 off) and the other PNET DC Power Controller Module to Slot-1 (switch 1-on, switch 2-6 off). This will give PNET Dimmer Number from 1-8 across the 2 PNET DC Power Controller Modules.

The other Switch Setting of interest on the PNET DC Power Controller is Switch #8 which selects the Switch or Dimmer Mode. When switch #8 is off, the Control Outputs operate in Switching Mode. When switch #8 is on, the Control Outputs operate in Dimming Mode. For the Layout Lighting Solution Starter Kit, we suggest setting switch-8 ON for both of your PNET DC Power Controller Modules, which puts them both into "Dimmer Mode".

***This completes you Starter Kit assembly, continue on to the next section to learn about how to configure and operate your new PRICOM Layout Lighting Solution.***



## 5 Software and Configuration

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The following section will outline the steps needed to setup and configure your new Layout Lighting Solution Starter Kit. We will go through the basic configurations and get you running as fast as possible. Please consult our web site for videos going into more details and advanced configurations.

### 5.1 Terminology

There are some terms that you should understand before moving forward with navigating the configuration and operation of your Layout Lighting Solution. There are 4 major terms, understanding these will greatly assist you during the next set of instructions.

**Scene:** a scene is a grouping of lights and/or structures on your layout. An example would be “City”, “Country”, “Warf”, “Old Creek”, “College Avenue Station”, etc. Each “scene” will have some controlled lights associated with it. You should divide your layout into these scenes based on how many individually controlled dimmers you have. If the “City” and the “Suburbs” have the same lights, then breaking into smaller scenes doesn’t really gain you anything. However, for each area of the layout with addressable control of overhead lighting, or structure lighting, you do want to create a “scene”. You can create up to 64 individual scenes.

**Preset:** a preset is a specific set of lighting levels (dimmer settings) for a given scene. You could call them something like “Day”, “Night”, “Evening”, “Afternoon Storm”, etc. You can have up to 32 presets per scene.

**Sequence:** a group of actions that create an effect. “Sunset” is an example of sequence, “Dawn” would be another. You can also create specialized sequences such as “Afternoon Storm”. A Sequence can be free-running or triggered by an event (time, button, fast clock, etc).

**Sequence Step:** the individual step within a Sequence. A Sequence Step might be something like “Wait for Trigger”, “Fade to Scene and Preset”, “Delay for Time”, etc.

### 5.2 Finding the Layout Lighting Board

With the Ethernet cable connected to your network, apply power to the Layout Lighting Main Board. The PNET DC Power Controllers don’t need power yet as we are just connecting the network and browser.

When power is applied, the Layout Lighting Main Board will request an IP address from your gateway router using DHCP. We need to know what IP address was given in order to access the Layout Lighting Solution from a PC or Tablet. This information can be found in your gateway router. Below is an example screen shot of a NetGear router:





**Figure 20 - Router Attached Devices**



Your own router will probably be different, but each router has a screen labeled something like “Attached Devices” which shows all the DHCP devices in your network.

In the above screen capture, you can see there is a “Wired Device” with the MAC address starting with “1C:97:3D:xx:xx:xx” which is the PRICOM Design MAC address range. This specific Layout Lighting Solution was given the IP Address of 10.10.10.162 using DHCP.

It would be a good idea to create a DHCP Reservation so that each time the Layout Lighting Solution powers-up, it gets the same IP Address.

Many home routers we have seen default to “192.168.1.x” and will give out addresses starting between 2 and 5. So your IP address might be “192.168.1.6” or something like that.

We are working on a more elegant way to locate your Layout Lighting Solution IP Address. Please check our Web Site for software updates.



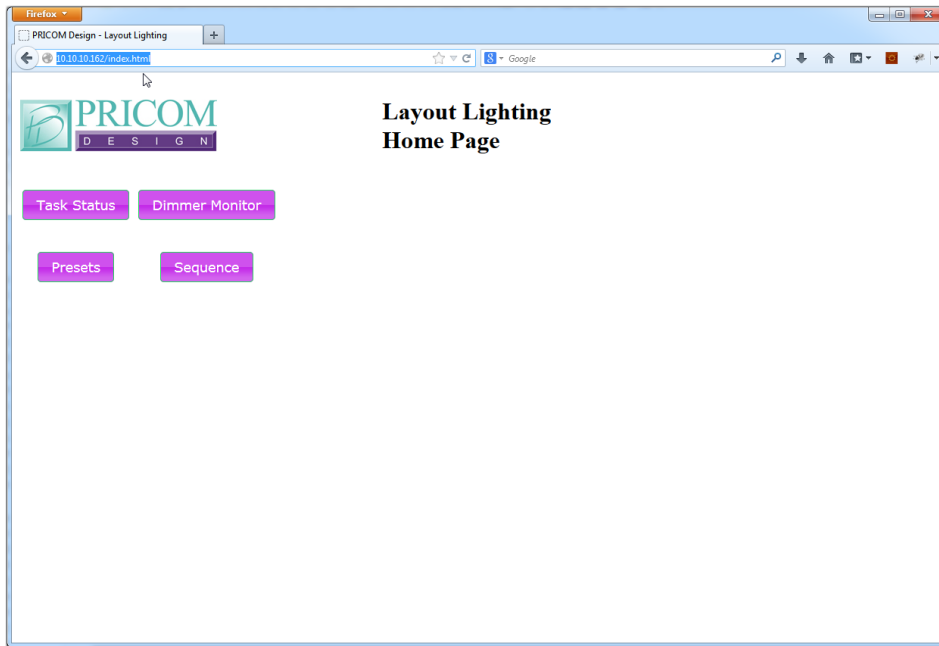


### 5.3 Launching a Browser

Now that we know the IP address of the Layout Lighting Solution, we can launch a web browser to access the setup and configuration pages. In these images, we used Firefox, which we recommend or use Chrome. However any standard web browser should work.

First we start by launching the browser, then typing in the IP address we found in the router Attached Devices screen.

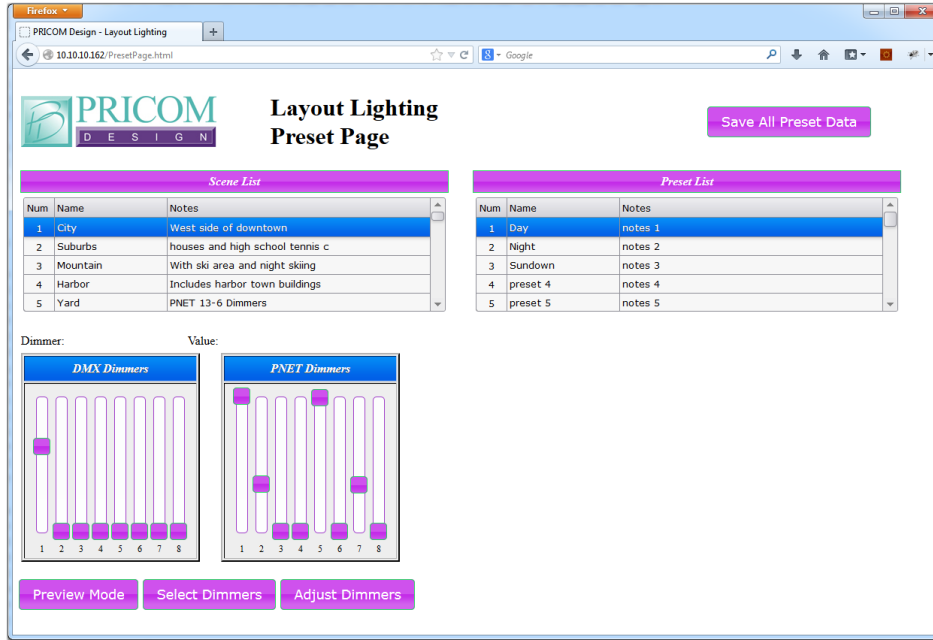
Figure 21 - Layout Lighting Home Page



Since 10.10.10.162 was given by our DHCP Server, we typed that into the browser address bar, as seen above. You don't need to type [HTTP://](http://) or even type the "index.html" all you need to type is the specific IP address of your board.

In the home page, we have the option of showing "Task Status", "Dimmer Monitor", "Presets" and "Sequence". We will start with creating some sample Scenes and Presets, so click on the "Presets" button. You will get a screen similar to the one below:

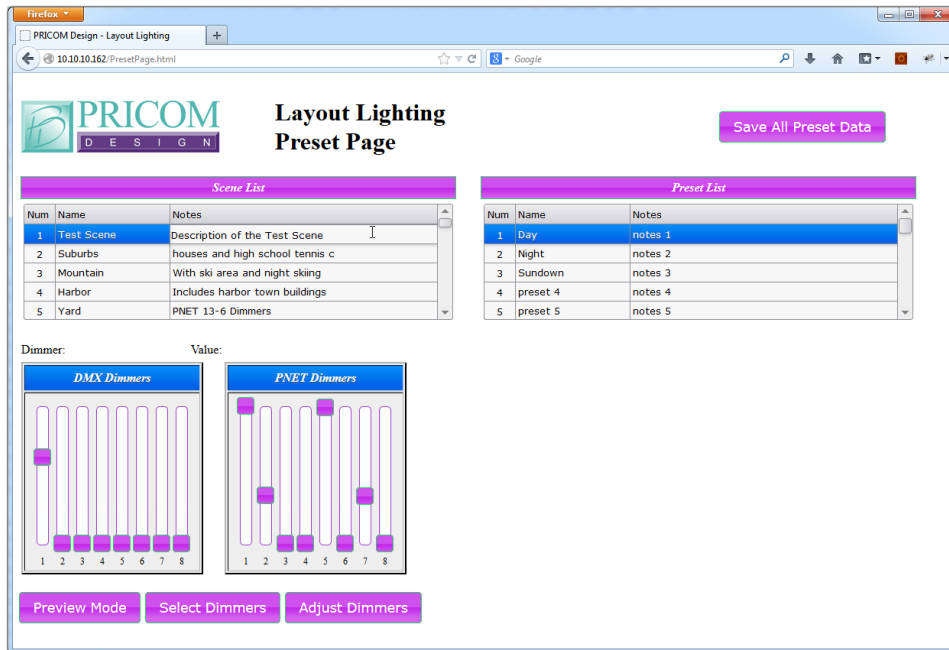




## 5.4 Creating Scenes

The left side of the screen lists “Scenes” while the right side lists “Presets”. Remember our Terminology above, so first we want to name/create some Scenes.

You can name a scene simply by double-clicking on the “Name” or “Notes” fields of the left “Scene List”. Below we have edited the name to “Test Scene” and the notes to something sensible:



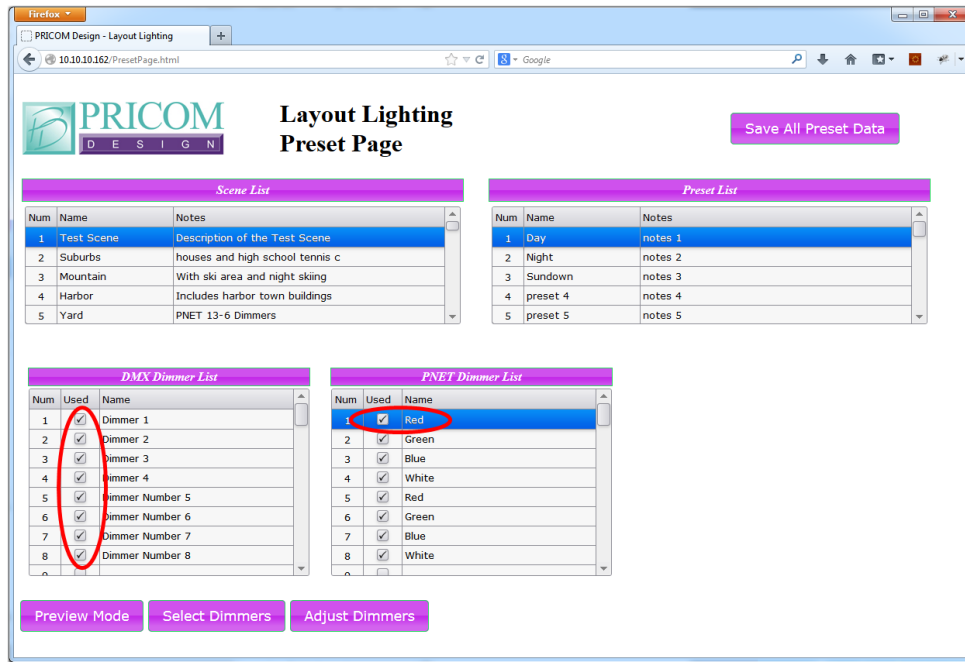
That is all you need to do to create Scenes and give them names that make sense.



## 5.5 Assigning Dimmers

With a Test Scene created and named, we next select what Dimmers are associated with that Scene. Make sure you have selected the desired “Scene” from the Scene List.

To associate dimmers with the selected Scene, click on the “Select Dimmers” button.



In this case, you can see that we have selected DMX Dimmer 1-8, and PNET Dimmer 1-8 (and maybe more) with this Scene. You can double click on the Dimmer Names to give them more sensible names, such as Red, Green, Blue, and White as shown in the example above.

To Enable a dimmer, Check the box. To Disable a dimmer, un-Check the box.

Since we set our PNET DC Power Controller’s for Slot-0 and Slot-1, that represents PNET Dimmer 1-8 (1-4 on Slot-0, and 5-8 on Slot-1). Naming them Red, Green, Blue, and White will keep you from confusing the colors.

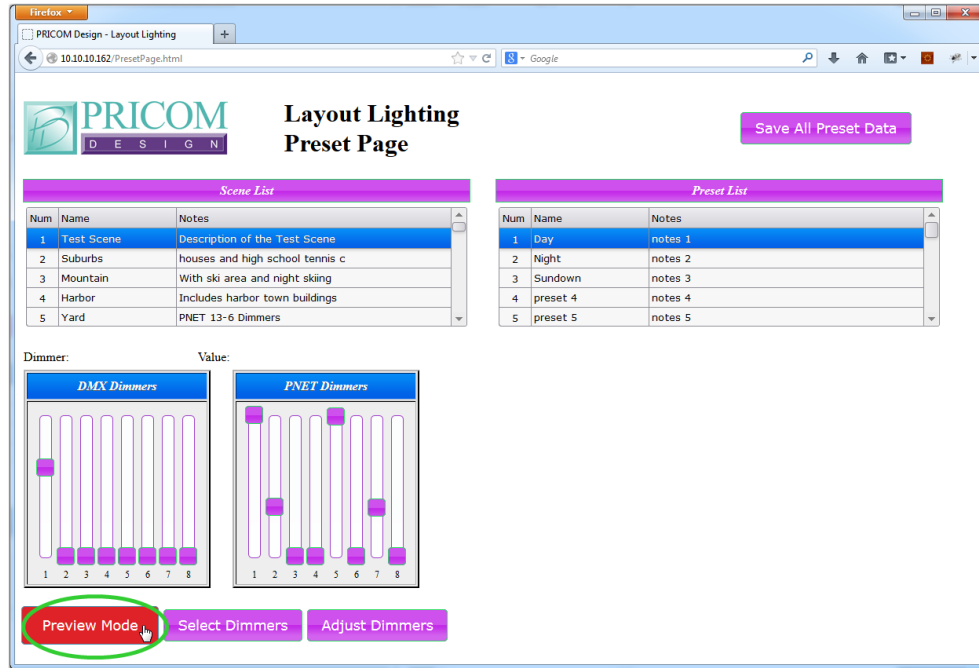
Now that we have configured the Dimmers for our scene, click the “Adjust Dimmers” to get back to the Dimmer Value Adjustment screen.



## 5.6 Creating Presets

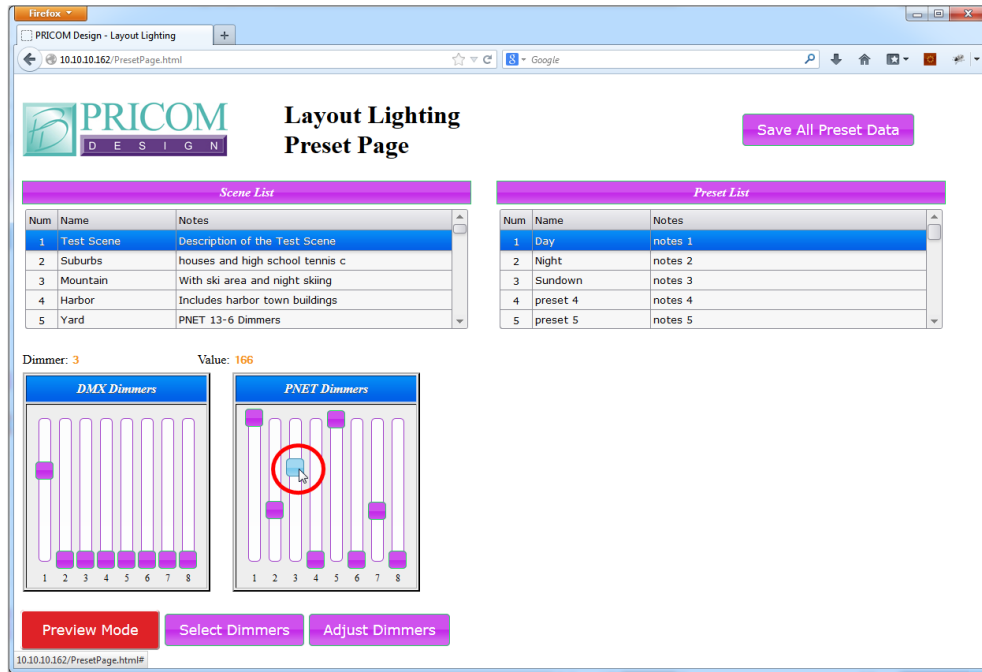
The right side of the screen below shows the “Preset List”. Just like the other lists, you can double-click and change the Name or Notes to make sense for future reference.

In the screen below, we named the first few Presets “Day”, “Night”, and “Sunset”. These can be any name, and are only for your reference. Once we have our Scenes and Presets named and selected, it is time to set some lighting levels. The best way to adjust levels is using “Preview Mode”.



Preview Mode allows you to see the current preset and scene on the layout, without having to worry about other scenes and presets interfering. In other words, Preview Mode allows you to directly see what the dimmer settings will look like directly on the layout!





While in Preview Mode, try clicking and dragging any of the dimmer sliders. In the screen above, we are dragging PNET Dimmer 3 to change the level. This is the Blue LED Strip connected to Slot-0, so we are adding Blue light to our Test Scene, Day Preset.

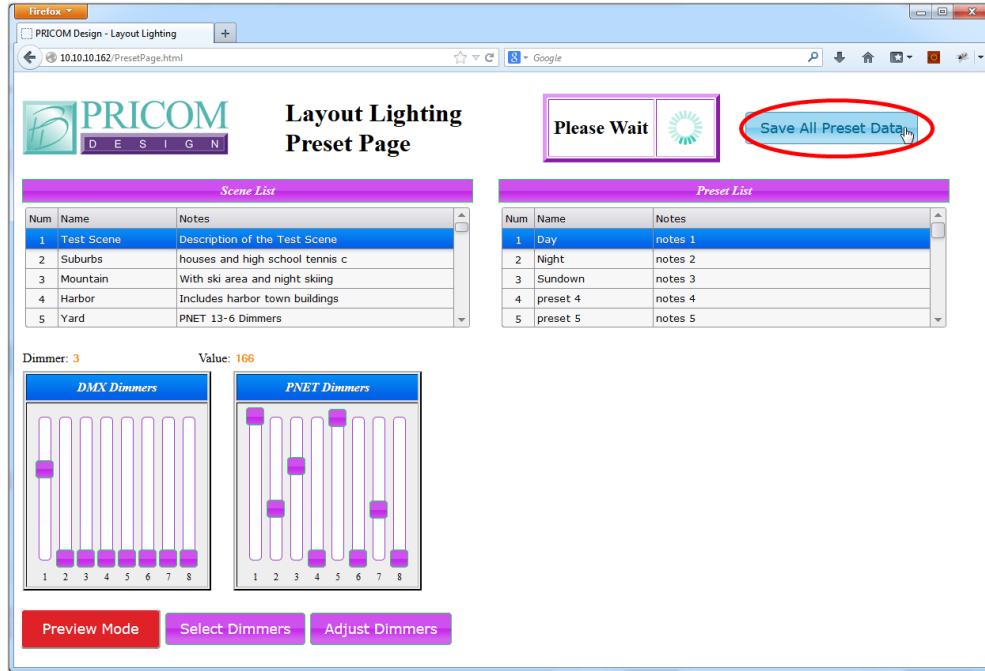
Hopefully you get the idea of how to create Scenes and Presets from the descriptions above.

**IMPORTANT:**  
**TO SAVE YOUR SCENES AND PRESETS, YOU NEED TO CLICK ON THE "SAVE ALL PRESET DATA" BUTTON ON THE TOP OF THE SCREEN!**

You can navigate away, and come back, but before you turn the power off, make sure you SAVE ALL PRESET DATA! This saves all the Scene/Preset configuration data to the SD Card on the Layout Lighting Solution Main Board.



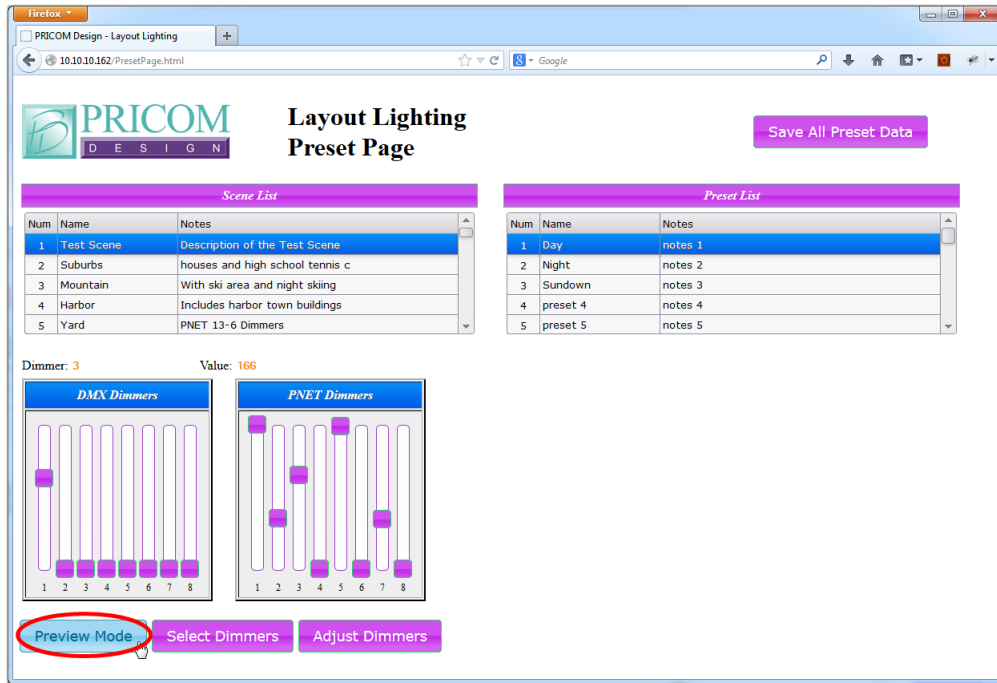




Be creative! Try things! One thing that will confuse everything is if you have dimmers associated to multiple scenes. If so, then you could set the values for the same dimmer in different scenes. This could be useful, but for now, we suggest leaving it simple and keep dimmers in one and only one scene.

The “Preview Mode” button will be colored Red while Preview Mode is active. When finished editing Scenes and Presets, be sure to click the “Preview Mode” button to turn off the Preview mode again as shown below:





Now that we have created a Scene and a Preset or two, make sure Preview Mode is off, make sure you Save All Preset Data, and then Click on the PRICOM Design logo in the top bar to take us back to the home Screen.

Now we need to create some Sequences....



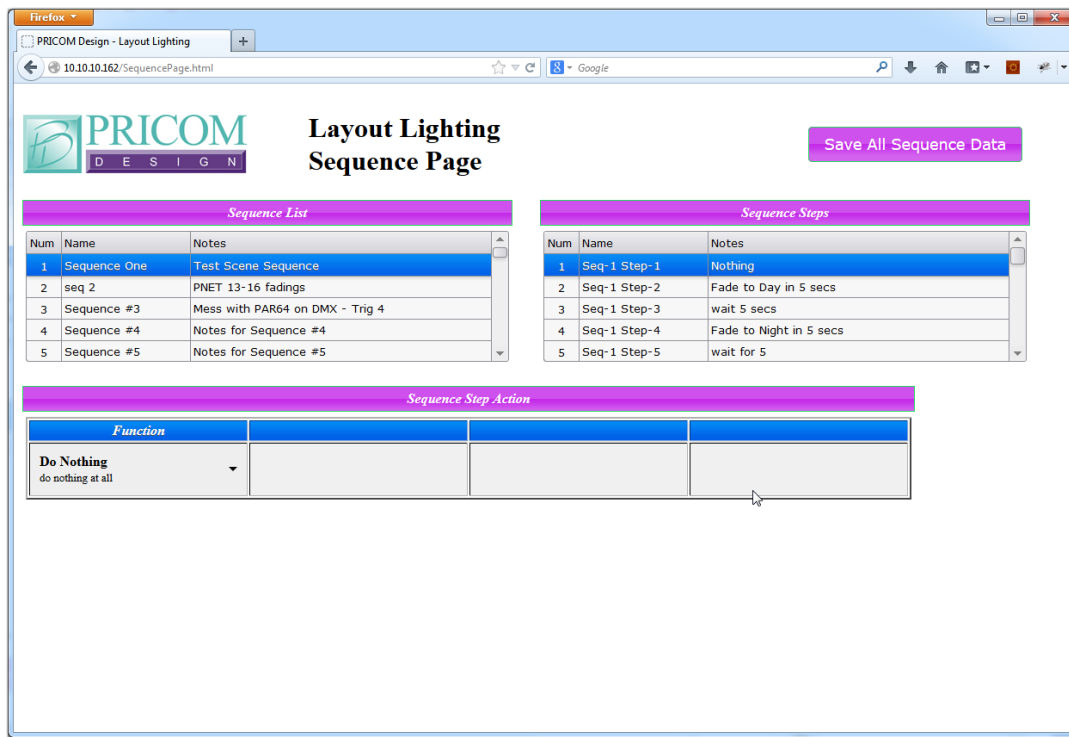
## 5.7 Creating Sequences

From the Home Page, Click on “Sequence”

You should get a screen as shown below. As discussed in our Terminology section, a Sequence and Sequence Steps form the building blocks of our triggered animations.

Similar to the Scenes and Presets page, you can double-click to edit the Name or Notes on the Sequence List, or on the Sequence Steps List.

Also notice the “Save All Sequence Data” button on the top. Just like the Scene and Preset page, you need to save your edits before turning the power off to the Layout Lighting Solution.



In this case, we have named the first Sequence “Sequence One” and the notes indicate it is associated with our Test Scene from the previous steps of creating a Scene.

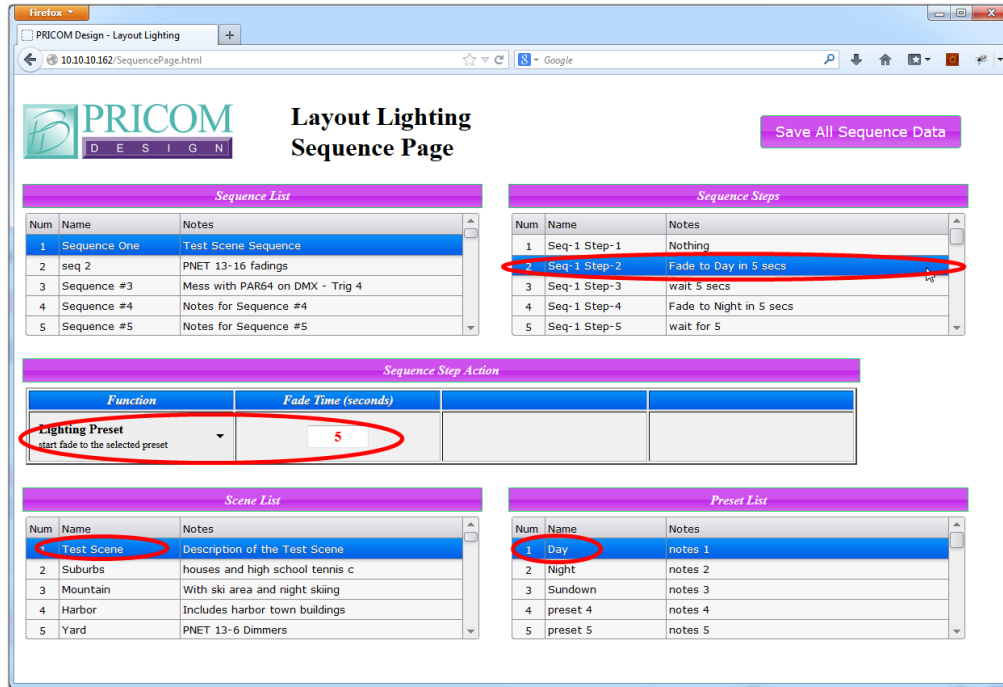
The next step is to create some “Steps” for the execution of the selected Sequence.

In the screen above, we have Sequence-1 selected, and Sequence Step-1 selected. Each Sequence Step has a single Action that can be performed, as indicated in the lower section of the screen. In the above screen capture, the Step Function is “Do Nothing”. Doing nothing is a completely valid thing to do! You can always remove a Sequence Step by replacing that Step with a “Do Nothing”. It is a good idea to leave one “Do Nothing” Step at the beginning of a Sequence. We will change this “Do Nothing” step later....



## 5.8 Creating Sequence Steps

Let's go to Sequence Step 2 and perform a fade into a Scene and Preset. See the flowing screen:



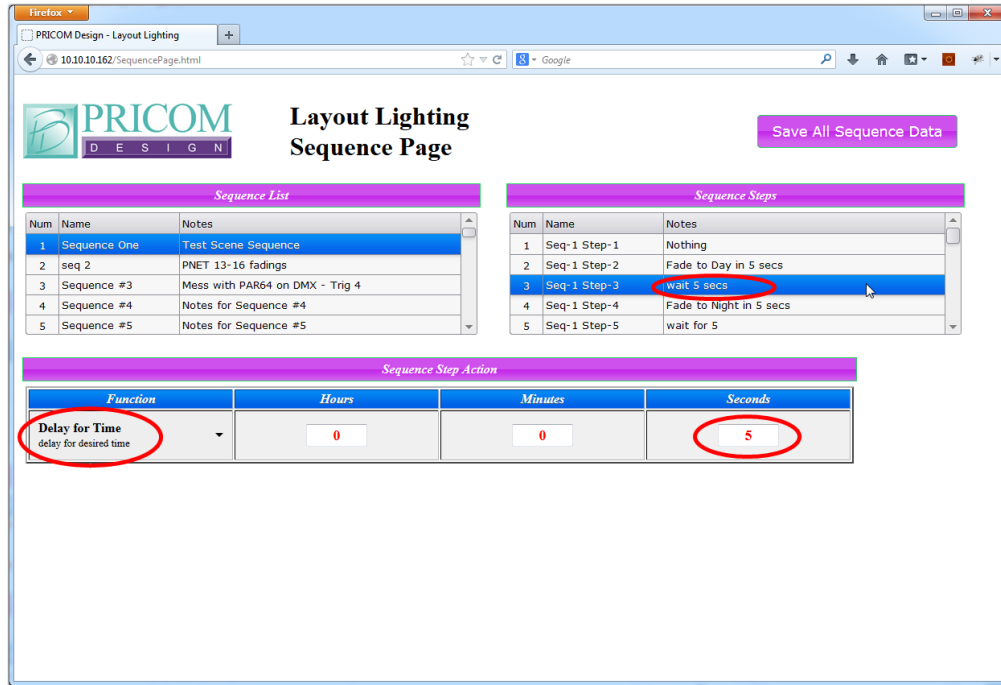
In this screen, we have selected Sequence One, then Sequence Step #2. The Sequence Step notes were changed to “Fade to Day in 5 Secs”, so we will configure for that action.

In the Sequence Step Action area, click the Function pull-down, select “Lighting Preset” and set the Fade Time to 5 (seconds). This will reveal the Scene and Preset list below the Step Action list.

Now we can select ANY Scene and Preset to fade to. To keep things simple, we will select our Test Scene, and the Day Preset. This Sequence Step Action will cause the start of a 5 second fade to the Test Scene Day Preset.



It takes literally “no time” to start the 5 second fade to the Day preset, so we need to add a time delay, or “Delay for Time” as shown below. There are cases where you might want to start a 30 second fade, then wait for 5 seconds, and start another 30 second fade. An example of this is a “Rolling Sunset” that moves from Scene to Scene using one Sequence to cause all the actions.



Here we have selected Step-3 in the Sequence, used the Step Action pull-down to select “Delay for Time” then filled in the time of 5 seconds.

In the same manner, go ahead and create a few more steps with fades and delays as seen in the above “Sequence Steps” list.

Since we didn’t ask our Sequence to wait for anything, it is already running.

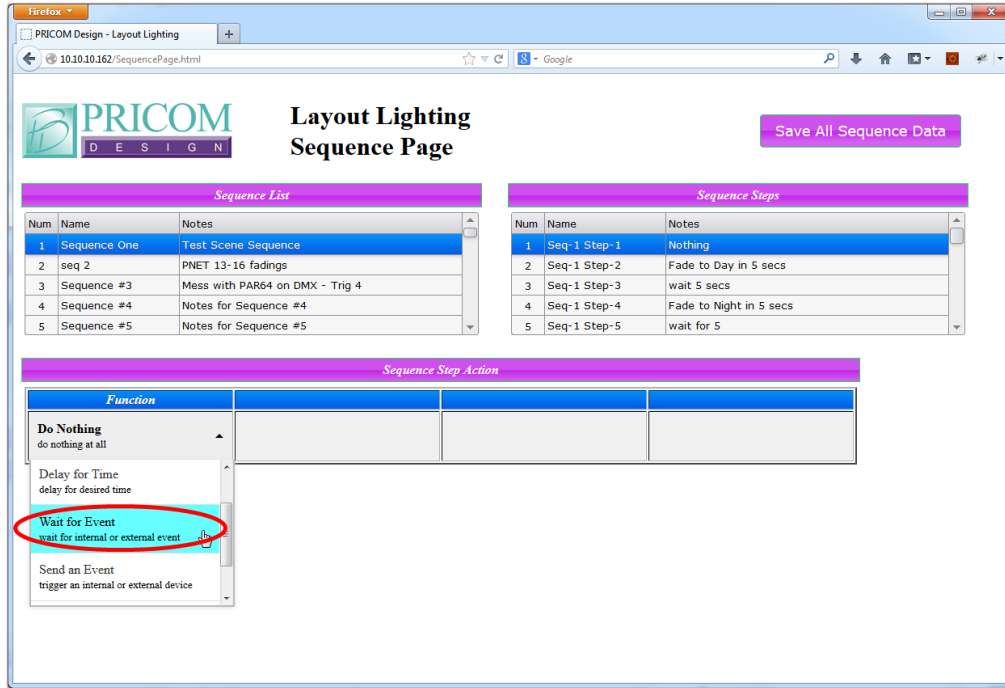
*If not already powered, provide power to the PNET DC Power Controllers now.*

You should see the PNET dimmers fading up and down as the Test Scene Sequence executes.

To enhance this Sequence, let’s add a trigger event that starts this Sequence.

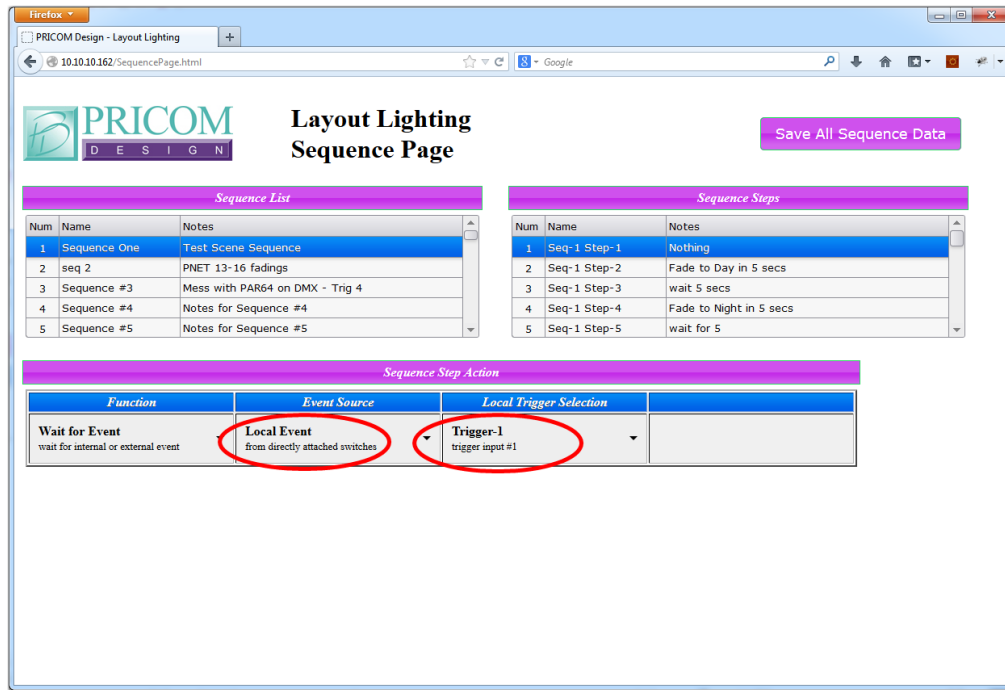
Since we have 4 push-buttons locally on our Layout Lighting Solution, let’s ask the sequence to wait for a button press.





In the above screen, we have gone back to Sequence Step #1, and then changed from “Do Nothing” and used the Function pull-down to select “Wait for Event”.

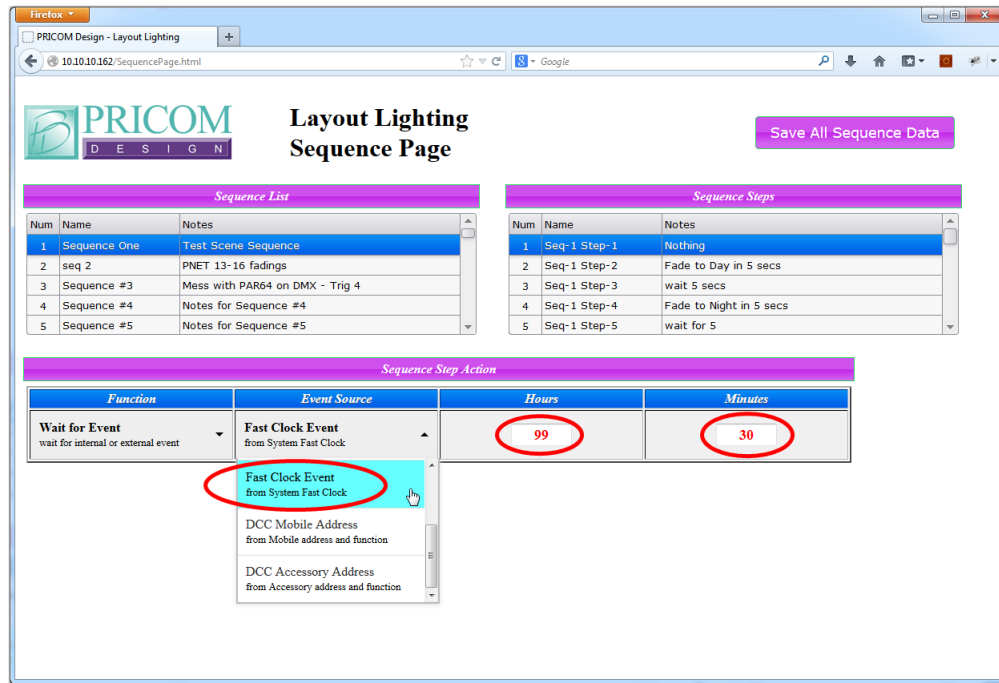
On the Event Source, select “Local Event” and then “Trigger-1”. This will cause the Sequence to wait until Trigger Input #1 is activated. Similarly, we could wait for a PNET event (such as from the OptoInput Module). Or many other sources of trigger events.





## 5.9 Fast-Clock Triggers

So what about Fast Clock Triggers? Just like we did above, “Wait for Event” can be used to wait for a Fast Clock Event as shown below.



In this case above, we have changed Sequence Step #1 to “Wait for Event” then selected the Event Source as “Fast Clock Event”. Then we can enter the Hours and Minutes (in fast clock time) that we want to wait for. Some events would be good to happen every hour, so in the example above, we have entered “99” as the Hours. This will cause ONLY the Minutes to match, in this case “30” Minutes. So our Test Sequence will run every time the Fast Clock hits 30 minutes, in Fast Clock Time.

**Remember to SAVE ALL SEQUENCE DATA!**



## 5.10 Preview Mode

With all the flexibility of so many Sequences, potentially many all running at the same time, we created “Preview Mode” to visually see what is happening on the Layout Lighting Solution dimmers.

To get to the Dimmer Monitor screen, click on the PRICOM Design Logo, then click the “Dimmer Monitor” button. The screen will update every few seconds automatically, and show the current level of ALL dimmers, DMX as well as PNET. To return to Home page, click on the PRICOM Design Logo again.



You can see that the first 8 PNET dimmers are active as a result of the Sequences we created. This screen is the best way to observe ALL actions across ALL scenes.

## 5.11 Next Steps

We hope you have gotten things to work as expected. Like most new thing, it might take some time to get used to the way your Layout Lighting Solution works. We are adding new features based on our own needs as well as many great suggestions from customers.

Please keep an eye on our web site, and keep the ideas coming!



## 6 Firmware Updates

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### 6.1 Updating Your Firmware

One very special feature of the Layout Lighting Solution is the convenience of updating firmware, no cables needed. Revisions of firmware are loaded onto the micro SD Card which allows you to load any critical updates of the firmware without having to totally dismantle your project to get the unit close to your computer.

Additionally, all boards connected to the PNET can update their firmware from the Layout Lighting Solution SD Card!

### 6.2 Downloading Firmware Updates

When firmware updates become available we will announce it on our website [www.pricom.com](http://www.pricom.com). On the download's page find the updated version of firmware and click the download link.

The firmware updates are a special PRICOM Design file called \*.PDI, which means your machine will most likely not recognize the format and so you will be prompted with a box asking if you want to Find, Save, or Cancel.

You will want to SAVE the file, and to a folder somewhere that makes sense and you can find it, "PRICOM Downloads" would be a good example.

After you save the file to your machine you may simply load it onto your micro SD Card.

For Layout Lighting Solution, the SD Card has a folder called "Firmware". Within this folder is a firmware image for the Layout Lighting Main Board, as well as any additional PNET devices you have attached.

### 6.3 How to Update Your Firmware

To initiate the firmware update process just follow the steps below.

1. Power off the Layout Lighting Main Board.
2. Remove the mirco SD Card.
3. Load the Card into your computer.
4. Copy the "LayoutLighting.PDI" file to the SD card in the "firmware" folder.
5. Insert the card back into its position on the Layout Lighting Main Board.
6. (important) Hold down the onboard button *while* reapplying power.
7. Reapply power to the Layout Lighting Master Board.
8. All three Status LED's will flash four times to indicate the unit is in update mode.
9. You may stop holding down the button at this point.
10. The Red LED will rapidly strobe while the update is taking place.



11. Then the Green LED will rapidly strobe while the update is verified.
12. Generally the update takes about 30 seconds. Upon completion of the update the LED will stop flashing, and you are ready to go.

*Note: Remember to hold down the button when reapplying power to the unit. Otherwise the Layout Lighting Solution will not look for the Firmware.*

## **6.4 Updating PNET Device Firmware**

All the PNET Devices connected to your Layout Lighting Solution Main Board can have their firmware updated over the PNET cable.

To initiate the firmware update in a PNET Device, just follow the steps below.

1. Power off the Layout Lighting Main Board.
2. Remove the micro SD Card.
3. Load the Card into your computer.
4. Copy the PNET device “\*.PDI” file to the SD card in the “firmware” folder.
5. Insert the card back into its position on the Layout Lighting Main Board.
6. Reapply power to the Layout Lighting Master Board.
7. Wait for the board to complete start-up, about 20 seconds.
8. Un-Plug the PNET Cable from the device to be updated.
9. Hold down the button on the PNET board *while* re-connecting the PNET cable.
10. Both Status LED’s on selected PNET board will flash four times to indicate the unit is in update mode.
11. You may stop holding down the button at this point.
12. The Red LED on the PNET Board will strobe while the update is taking place.
13. Generally the update takes about 15 seconds. Upon completion of the update the LED will stop flashing, and you are ready to go.

### **ATTENTION:**

#### **PNET Board Firmware must be updated one at a time!**

When updating firmware on each of your PNET boards, this must be done one board at a time. The Boards may receive partial firmware for other boards if multiple boards all try to update firmware at the same time.



## 7 Problems & Support

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Our goal is products that are robust and trouble-free for you, however in the real-world, problems unfortunately do arise.

### **7.1 Help, I broke it!**

If you are not happy, then we are not happy! If you have a mishap with your Layout Lighting Solution, please let us know. Contact us at the e-mail below if you have any questions or problems. Generally the problems end up being simple fixes that can be diagnosed and repaired by you the user with help from us here.

### **7.2 E-mail**

If you are experiencing trouble with your Layout Lighting Solution, please let us know. We are here to help you, and want your experience to be creative and fun. If you need help of any kind, please contact us via e-mail. The support e-mail address is [Help@pricom.com](mailto:Help@pricom.com).

### **7.3 Web Site**

The PRICOM web site is where we will post any upgrades, updates, and improvements. Please be sure to check for Hardware and Software updates. [www.pricom.com](http://www.pricom.com)



*Layout Lighting Solution User Manual*  
*Version 1.7*  
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