Building Automation, Inc.

LONMARK 3.3

LX Lighting Control Panels

Installation and Setup Procedure

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Overview
These instructions are presented as a guideline for installing and setting up the LX Series Lighting Control Panel.

Contents
These instructions include information as follows:

Description
General Precautions
Pre-mounting Preparation
Enclosure Mounting
Interior Installation
Connecting Panel Power
Connecting Lighting Loads
Connecting Communication Network/Panel Groups
Assigning Panel Address
Operating the Panel
Troubleshooting
Panel Specifications
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Description
The LX Series of Lighting Control Panels are a completely integrated lighting control system. They feature robust and reliable 20Amp mechanical latching relays for controlling building lighting systems, programmable switch stations for on-demand, remote site control of the lighting system, and LonWorks® "Open Systems" architecture which provides seamless integration with other building systems. Moreover, through the incorporation of a handheld touch screen Tablet with Graphical User Interface, the system provides easy to use, local and remote management capabilities to the lighting system and allows it to employ dynamic and versatile scheduling functions that are easily created and modified to meet facility requirements.

The LX Series – Innovative, Integrated, Simple.

Notice: Figure 1 provides a diagram of a typical LX Series Lighting Control Panel and shows its key elements and components.

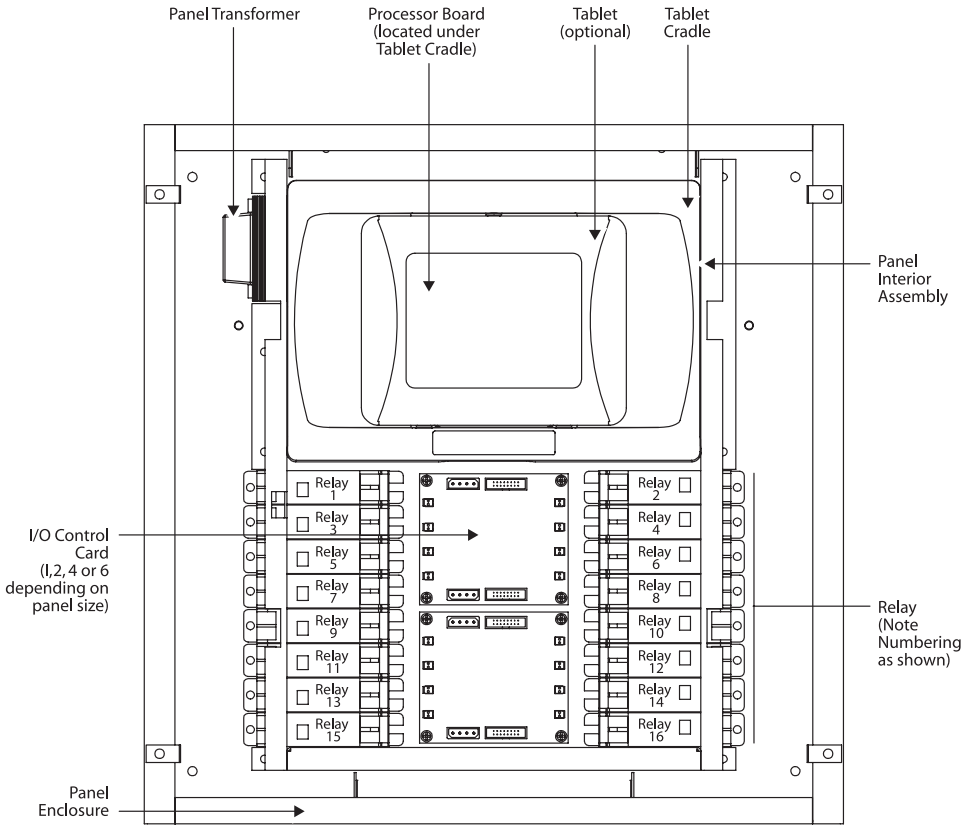

Figure 1:
LX Lighting Control Panel Overview - LX16 (16-Position Panel) shown above with panel door removed for clarity. 8, 32 and 48 relay panels have similar layout.

General Precautions

- **RISK OF ELECTRICAL SHOCK.** To prevent electrical shock, turn off power at the circuit breaker before installing or servicing unit. Do not operate unit with panel door assembly or relay guard covers removed.
- For installation by a licensed electrician in accordance with these instructions and National and/or local Electrical Codes.
- The unit is divided into high voltage and low voltage sections as shown in Figure 2. Maintain the integrity of these sections by routing wires in and though the appropriate section only.
- Installation may involve heavy lifting. To prevent personal injury, two persons should perform lifting activities as necessary.
- No user serviceable parts contained inside unit. Refer all service related questions to the factory.
- Be sure to read and understand all instructions before installing or servicing unit.
- **USE COPPER CONDUCTORS ONLY.**
- **NOTICE:** Do not install or operate unit if any damage is noticed.

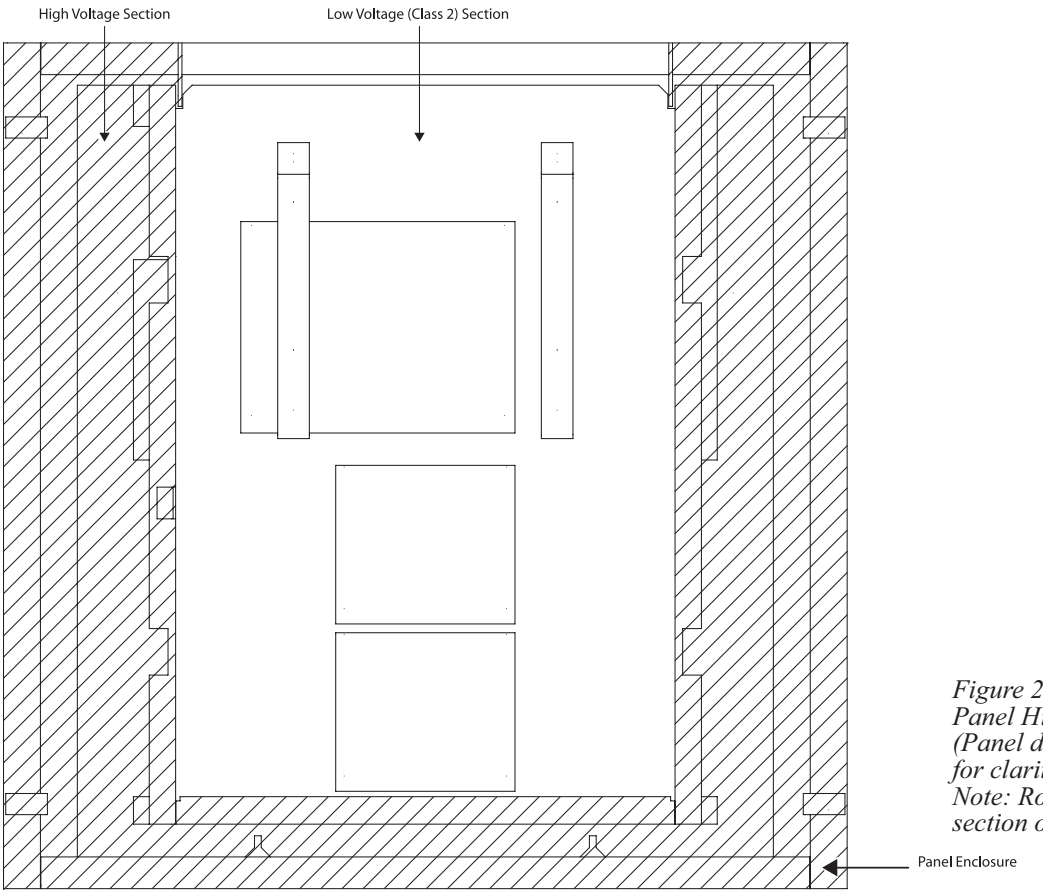

Figure 2:
Panel High and Low Voltage Sections (Panel door and Tablet Cradle removed for clarity.)
Note: Route leads through appropriate section only.

Pre-mounting Preparation

Typically the panel is installed near the circuit breaker box containing the lighting circuits to be controlled. Select an appropriate location that meets the environmental conditions listed in the specification section of this document.

The panel interior is divided into high voltage and low voltage sections as shown in Figure 2. Prior to mounting the enclosure, locate and cut an access hole (or holes) of appropriate size along the edge of the enclosure in the high voltage section to accept the lighting systems line and load leads as well as the panels dedicated power supply leads. Select an appropriate location for the hole(s) based on panels mounting location and the lead wire routing from the circuit breaker and to the lighting systems.

If the panel is to be used in conjunction with the LonWorks® network and/or interconnected with other panels in a group, locate and drill an access hole of appropriate size along the top edge of the enclosure in the low voltage section to accept the communication network and/or panel interconnection cables.

After drilling, be sure to completely remove ALL metal cuttings and dust from the enclosure cavity. Failure to do so may result in damage to the panel and void its warranty.

Notice: The panel enclosure may come with interior assembly pre- installed. If so, it will be necessary to remove the interior assembly BEFORE drilling and/or installing enclosure in the mounting location. To do this, remove panel door assembly from the enclosure. Next remove the interior assembly by removing the two mounting bolts, shown in Figure 3, then lifting interior assembly out of the enclosure. Store interior assembly in a clean, secure location away from the installation location until ready to reinstall.

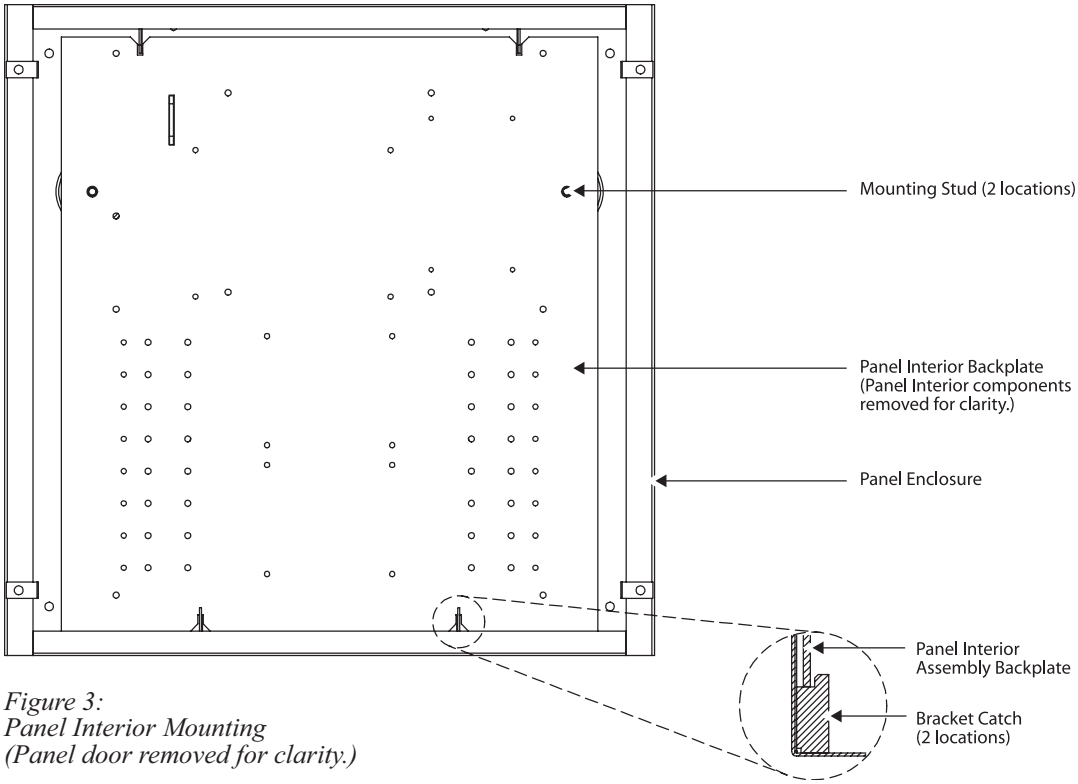

Figure 3:
Panel Interior Mounting
(Panel door removed for clarity.)

Enclosure Mounting

For surface mount applications (i.e. the panel is mounted on the surface of the wall), locate the enclosure on the mounting surface and use a level to ensure that it is properly oriented/aligned. Secure the enclosure to the mounting surface with hardware as appropriate for the application using the four pre-drilled mounting holes located near the corners of the enclosure as shown in Figure 4.

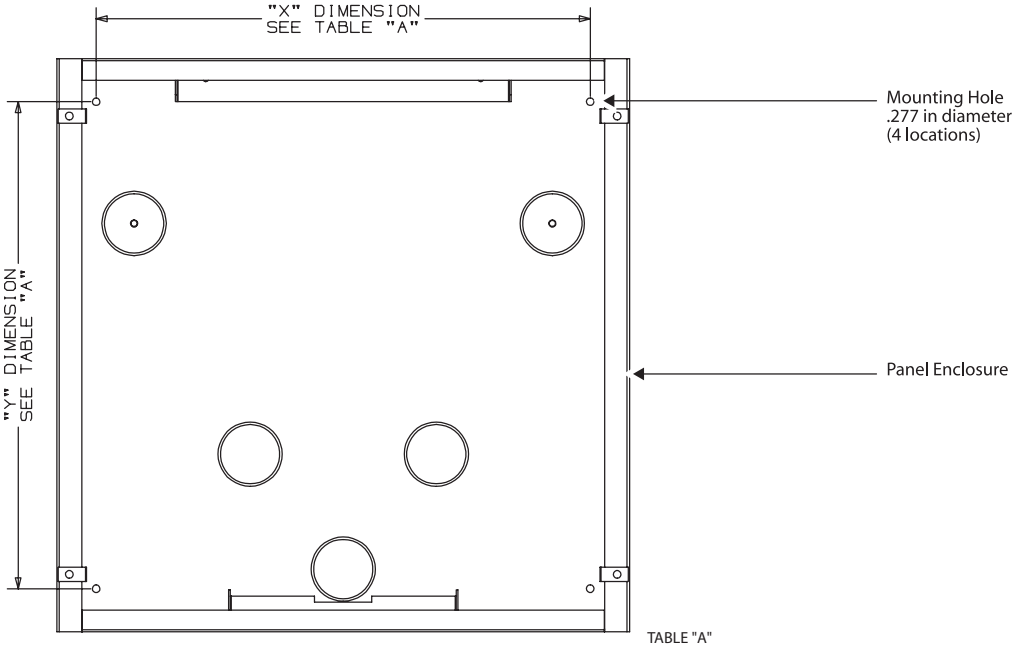

TABLE "A"

MODEL #	DIM "X"	DIM "Y"
LX 8	17.25"	13.00"
LX 16	17.25"	17.00"
LX 32	17.25"	25.00"
LX 48	17.25"	33.00"

Figure 4:
Enclosure Mounting Hole Locations

For flush mount applications (i.e. the panel is recessed into the wall), create the necessary recess in the wall using the dimensional information contained in the Panel Specifications section as a guide. Insert the enclosure into the recess and secure with hardware as appropriate for the application using the four pre-drilled mounting holes located near the corners of the enclosure as shown in Figure 4.

Caution: Due to its weight, it is essential that the panel be securely mounted to structural elements such as the wall studs or a secure mounting frame. Failure to do so could result in personal injury and/or damage

Attach conduit runs to the panel enclosure as appropriate. Feed the lighting systems line and load leads, along with the panels dedicated power supply leads through conduit and into the enclosure. If applicable, feed the communication network and/or panel interconnection cables through the appropriate access hole into the low voltage section of the enclosure.

Notice: Reference Connecting Communication Network/Panel Groups procedure for information about the Communication Network including cable selection and length restrictions.

Interior Installation

Visually inspect enclosure and clean out any dust and/or metal cuttings as necessary. Likewise, visually inspect panel interior assembly for any dust or foreign materials. Clean as necessary. Failure to do so may result in damage to the panel and void its warranty.

Remove the panel door assembly, if necessary, and the nuts from the mounting studs in the enclosure as shown in Figure 3. Lift panel interior assembly and insert into enclosure. Place panel interior assembly in the back plate catches at the low edge of enclosure then over mounting studs at top of the enclosure. Secure panel interior assembly with nuts on mounting studs. Reference Figure 3 for detail.

Connecting Panel Power

The panel is designed to operate on 120, 277, or 347VAC power that is supplied to a multi-tap transformer located in the upper left corner of the panel as shown in Figure 5. With the **power turned off**, route the dedicated panel power supply leads through the high voltage section of the panel interior to the transformer and connect them to the appropriate leads of the transformer as shown in Figure 5. Connect the power supply ground lead to the panel chassis.

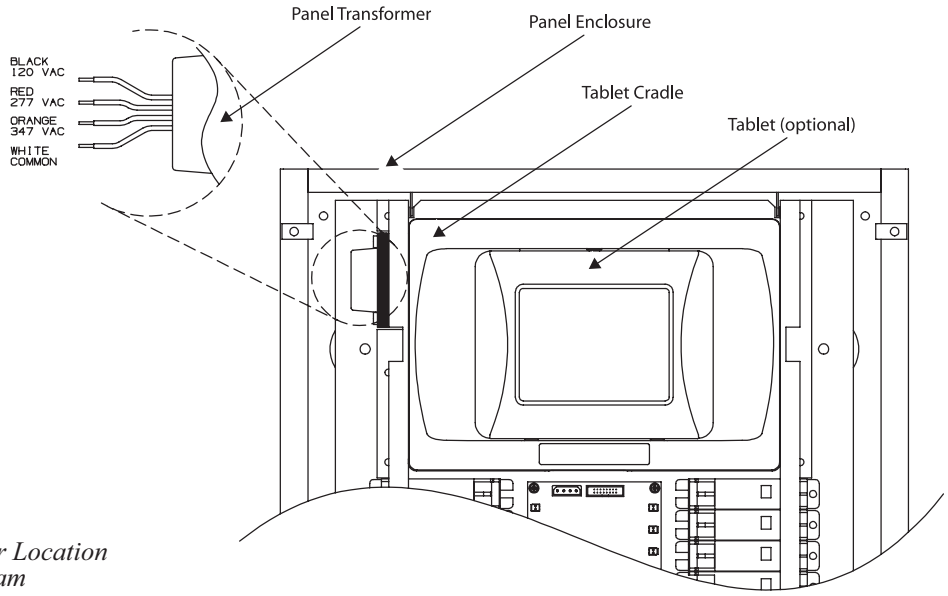

Figure 5:
Panel Transformer Location and Wiring Diagram

Caution: When power is applied to the transformer, the unused transformer leads become electrified. Cap unused transformer leads with wire nuts to prevent electrical shorting.

Connecting Lighting Loads

With the power turned off, route the lighting system line and load leads through the high voltage section of the panel. Connect line and load leads for each lighting load to the output terminals of the appropriate relay as delineated in the project plans and/or Panel Load Schedule and as shown in Figure 6.

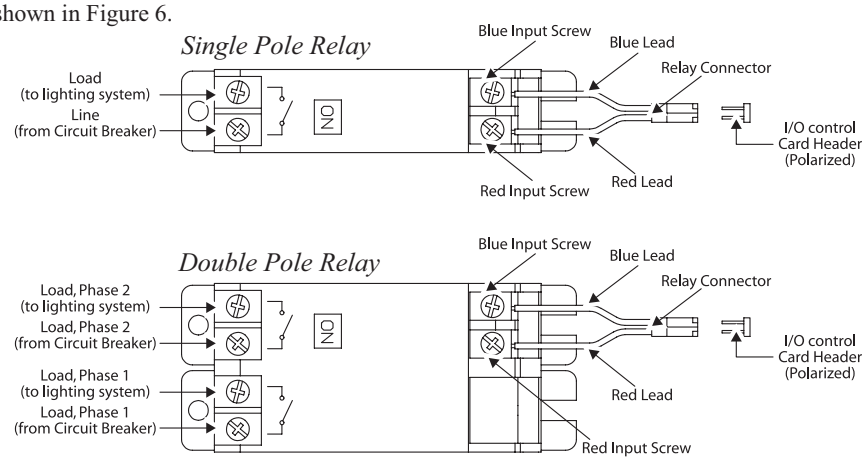

Figure 6: Relay Wiring Diagram

Notice: As a general rule, the panel is shipped with relays installed and electrically connected at their input control side. If, however, relays must be installed or relocated, reference the applicable Relay Installation Instructions on how to install and/or move the relays.

Caution: Prior to making any connections to the relay outputs, verify that none of the loads are shorted. Failure to do so may result in personnel injury, damage to the panel, and void its warranty.

After connecting the relays, install/reinstall the panel door assembly on the front of the panel enclosure.

Notice: If no Panel Load Schedule exists, make a copy of the Panel Load Schedule Form contained in this document and use it to record the lighting circuit relay assignments while connecting the relays.

Connecting Communication Network/Panel Groups

Notice: The procedure described in this section is required only if the panel is to be connected to the LonWork network and/or interconnected to other panels in a group.

Remove the Tablet Cradle by loosening its four mounting bolts as shown in Figure 7. Route the communication network lead(s) to an unused communication network terminal as shown in Figure 7. Insert communication network cable into the termials and secure by tightening screws Reinstall the Tablet Cradle and secure with mounting screws.

Setting Panel Network Address

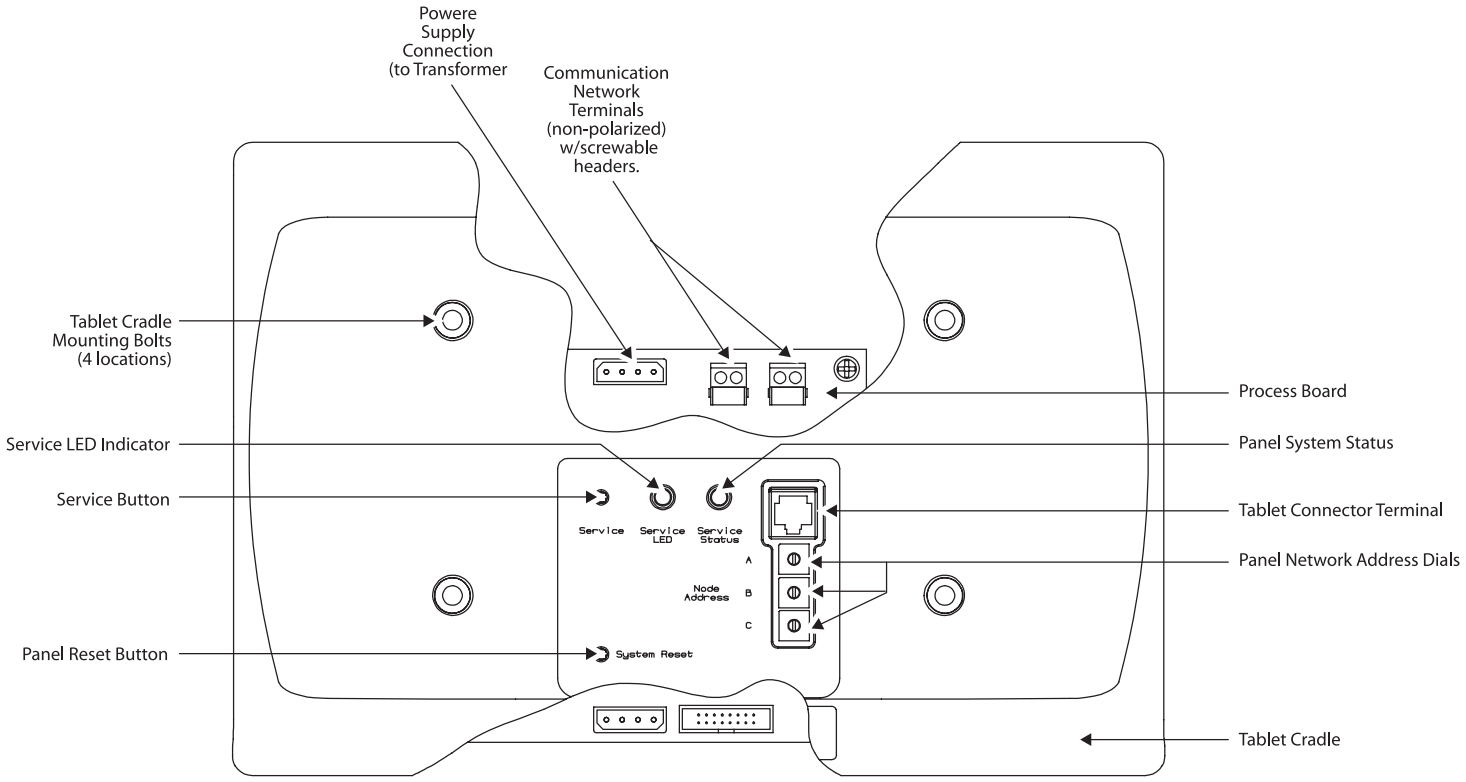

Figure 7:
Processor Board Controls and Interface

LX Communications Network

The LX network is a 2-wire communication network. It can operate using any topology (layout) or combination of topologies including Star and T-configurations.

Network cable shall be Belden 8471 or approved equal. Contact HBA for alternate cable types. Maximum total wire length per network segment (without requiring the use of the lLX Router/Repeater Module, p/n LXRRM) shall not exceed 1500 feet. Up to 56 devices can be supported per segment.

NOTE: Do not use shielded cable.

The panel network address is set via three rotary dials located in the Tablet Cradle as shown in Figure 7. Each panel is factory set to address 001 prior to shipping. For LX-only networks, each panel on the network will need to be assigned a unique network address. Addresses must be assigned in sequential order starting with address 001. For LonWorks Open System Networks, each panel on the network should be assigned address 000. This will place the panel(s) into LonMark compatible mode.

To set the panel address, rotate the appropriate dial(s) with the small, blade screwdriver till the indicator points to the appropriate number. Assign each panel its address as delineated in the project plans as applicable. Dial "A" sets the most significant digit of the network address and Dial "C" sets the least significant digit of the network address. For example, panel address 001 is set by Dial A = "0", Dial B = "0" and Dial C = "1".

Operating the Panel

Restore power to the lighting circuits and panel at the circuit breaker. The panel will take a few moments to initialize during which time the panel status light (shown in Figure 7) will be red. After initializing, the panel status light will turn green and begin blinking. The panel is now fully functional and ready to control the lighting loads.

The panel is designed to operate in stand-alone mode using the on/off control buttons contained on the I/O control card(s) or in program mode through the use of the LX Tablet. Figure 8 contains a diagram of a typical lighting system application.

For stand-alone mode, push the on and off buttons on the I/O control cards to activate/deactivate the individual lighting circuits as desired.

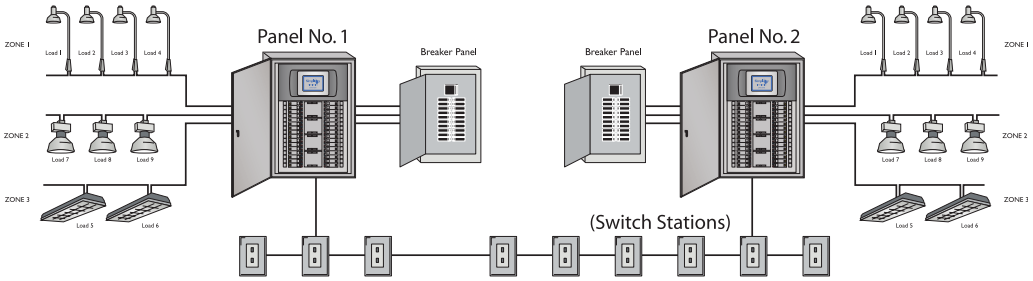

Figure 8:
Typical LX Lighting Control Panel Application

For program mode, attach the LX Tablet to the Tablet Terminal located on the Tablet Cradle as shown in Figure 7 using the CAT-5 connector cable provided within the Tablet. Follow the instructions contained in the LX Lighting Controls User's Manual to setup lighting circuit schedules and system functionality as desired. To program panel functionality within a LonWorks Open System network, a panel plug-in is available from www.hubbell-automation.com.

Troubleshooting

In the event of a problem with the panel's operation, use the procedures below to identify and correct the problem.

<u>Panel Does Not Power-up, Status Light Does Not Turn On</u>

1. Turn panel power off at the circuit breaker.
2. Step through the Connect Panel Power procedure above and verify that that the line voltage supplied to the panel is connected to the appropriate leads of the transformer.
3. Carefully remove the Tablet Cradle as shown in Figure 7 by loosening its four mounting screws. Verify that the secondary power leads are properly connected to the panel processor card as shown in Figure 7.
4. Using a voltmeter, verify that the voltage to that the transformer is supplying 12VAC between its Yellow and Red leads and 24VAC between its Blue and White leads. If the voltage between either set of leads is not correct, transformer is defective. If voltages are correct, but the panel processor is still not functioning then the panel processor is defective.

<u>Relay Does Not Actuate in Response to Command (Programmed or Push Button)</u>

1. If in program mode, verify relay assignment and program schedule and the Tablet clock settings.
2. Verify relay connector leads are properly connected at the relay and at the I/O control card.
3. Verify that all of the interconnection cables between the different circuit board cards are properly connected and seated. Carefully remove the Tablet cradle as shown in Figure 7 by loosening its mounting screws to access connector cables between the panel processor board and the first I/O control card.
4. Using a volt meter, measure the voltage across the input terminals of the relay. Voltage should be approximately 27VAC if the circuit is in the off condition and approximately 16.5VAC if the circuit is in the on condition.

5. If voltage levels differ, disconnect relay cable at the I/O control card and connect an adjacent relay's input control to the problem channel. Check functionality of the circuit with alternate relay connected by manually actuating the on and off buttons on the I/O control card. If the alternate relay functions, the problem is with the input stage of the non-functioning relay. If alternate relay does not function, I/O channel is defective.

Group of Relays Do Not Actuate in Response to Command (Programmed or Push Button)

1. If in program mode, verify relay assignment and program schedule and the Tablet clock settings.
2. Verify that all of the interconnection cables between the different circuit board cards are properly connected and seated. Carefully remove the Tablet cradle as shown in Figure 7 by loosening its mounting screws to access connector cables between panel processor board and first I/O control card.
3. If problem persist, either the panel processor board and/or an I/O control card are defective.

Relay Actuates but Lighting Load Does Not Turn On

1. Verify that circuit breaker for lighting load is closed.
2. Verify that lighting load lamp(s) are not burned out.
3. Review Panel Load Schedule assignments. Verify correlation between the relay being actuated and the lighting load that is being controlled.
4. Turn power off to the loads and relay panel. Remove panel door assembly. Carefully inspect line and load lead terminations are making good electrical contact to relay terminals.

Tablet Indicates "Duplicate Node Address Detected" While Programming Panel(s) (Applicable to LX-only Networks)

Two or more devices of the same device type (Panel, Switch Station, etc.) have the same network address. To correct this condition:

1. Review the device address settings for each device on the network and identify those devices of the same device type with the same address.
2. Change device address(es) as necessary so that each has a unique network address.

Notice: If, after stepping through applicable troubleshooting procedures described above, problem still persists or a defective condition is identified, contact factory Technical Support at (512) 450-1100 or (888) 698-3242 for further assistance.

Notice: Each relay is provided with a manual override lever that is integral to the relay. These can be used to manually force the relay into the on or off conditions by inserting a blade screwdriver into the orange label on the relay and toggling it to the desired position. This approach may be used if panel power is lost or needs to be shut off for an extended period of time and on/off control of the lighting system needs to be maintained.

Panel Specifications

Overall Dimensions:	LX8	20" x 16" x 4"
(Width x Height x Depth)	LX16	20" x 20" x 4"
	LX32	20" x 28" x 4"
	LX48	20" x 36" x 4"
Flush Door Dimensions:	8 Position Panel	22" x 18"
(Width x Height)	16 Position Panel	22" x 22"
	32 Position Panel	22" x 30"
	48 Position Panel	22" x 38"
Supply Voltage:		120/277/347VAC
Operating Environment:	Operating Temperature	0 to 50°C
	Relative Humidity	10 to 90%, non-condensing
Communications Network:	LonWorks® "Open System" Architecture	
Relay Capacity:	LX8	Up to 8 Single Pole or 4 Double Pole Relays
	LX16	Up to 16 Single Pole or 8 Double Pole Relays
	LX32	Up to 32 Single Pole or 16 Double Pole Relays
	LX48	Up to 48 Single Pole or 24 Double Pole Relays

(Note: Combinations of Single Pole and Double Pole relays are acceptable up to the limits of the enclosure size.)

Relay Ratings:	Single Pole	20A Max, 277/347VAC (General & Ballast)
		2400W, 120VAC (Tungsten)
		½ HP at 110-125VAC
		1-1/2 HP, 220-277VAC
	Double Pole	20A Max, 480VAC (General & Ballast)
		2400W, 120VAC (Tungsten)
		½ HP at 110-125VAC
		1-1/2 HP, 220-277VAC
Agency Approval		UL and cUL (Tested in accordance with UL 508)
		LonMark 3.3 Certified

LX Series Lighting Control Panel
Panel Load Schedule

Panel Indentification:_____

Panel Type:LX- (8/16/32/48)

Panel Location:_____

Panel Network Address:_____

Relay	Circuit #	Quadrant #	Zone #	Relay	Circuit #	Quadrant #	Zone #
1				2			
3				4			
5				6			
7				8			
9				10			
11				12			
13				14			
15				16			
17				18			
19				20			
21				22			
23				24			
25				26			
27				28			
29				30			
31				32			
33				34			
35				36			
37				38			
39				40			
41				42			
43				44			
45				46			
47				48			

- Using a photocopy of this form, create a record of the relay lighting circuit assignments as necessary.
- Retain copy of the filled out schedule with Panel Users Manual and in the proximity of the panel for quick reference.
- Note: Double pole relays require two adjacent relay slots. Denote which input control channel is used to control the relay in schedule above.
- Not all panels have provisions for 48 relays. Maximum number of single pole relays is denoted by the Panel Type designation above.

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