LynTec LCP

Instruction Bulletin

Lighting Control Panelboards

Retain for future use.

HAZARD CATEGORIES AND SPECIAL SYMBOLS

Read these instructions carefully and look at the equipment to become familiar with the device before trying to install, operate, service, or maintain it. The following special messages may appear throughout this bulletin or on the equipment to warn of potential hazards or to call attention to information that clarifies or simplifies a procedure.

The addition of either symbol to a "Danger" or "Warning" safety label indicates that an electrical hazard exists which will result in personal injury if the instructions are not followed.

This is the safety alert symbol. It is used to alert you to potential personal injury hazards. Obey all safety messages that follow this symbol to avoid possible injury or death.

⚠ DANGER

DANGER indicates an immediately hazardous situation which, if not avoided, **will result in** death or serious injury.

⚠ WARNING

WARNING indicates a potentially hazardous situation which, if not avoided, **can result in** death or serious injury.

⚠ CAUTION

CAUTION indicates a potentially hazardous situation which, if not avoided, **can result in** minor or moderate injury.

CAUTION

CAUTION, used without the safety alert symbol, indicates a potentially hazardous situation which, if not avoided, **can result in** property damage.

NOTE: Provides additional information to clarify or simplify a procedure.

PLEASE NOTE

Electrical equipment should be installed, operated, serviced and maintained only by qualified electrical personnel. This document is not intended as an instruction manual for untrained persons. No responsibility is assumed by LynTec for any consequences arising out of the use of this manual.

Class A FCC Statement

Contents

Chapter 1--Introduction

OVERVIEW

This bulletin explains how to install and operate the LynTec Lighting Control Panel. The controller uses remotely operated circuit breakers to control up to 168 remotely operated branch circuits. Control signals originate externally from commands received via the communications network or from dry contact inputs. Acceptable communications protocols include TCP/IP, RS-232, Telnet, sACN and DMX-512.

CONTENTS

Each LCP comes standard with the following components installed:

- LCP Controller
- Power Supply
- Primary panel control bus cables

Optional additional components include:

- I/O expansion board
- I/O-R outbound relay control board
- Multi-panel expansion board
- Current Monitoring

Controller Overview

Figure 1-1: LCP Controller

Figure 1–1 shows the parts of the LCP Controller. A brief description of each part follows in Table 1–1.
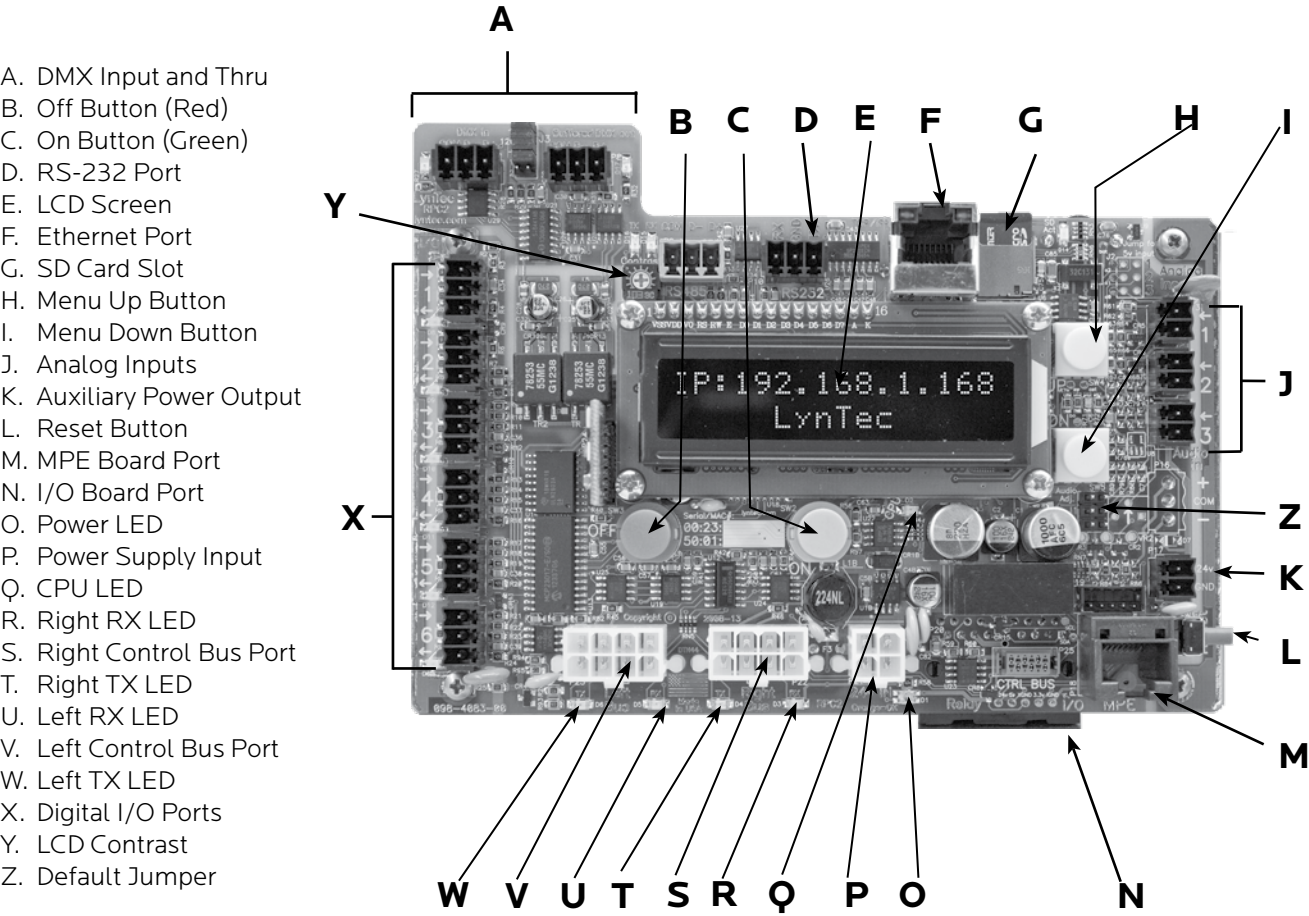
A. DMX Input and Thru
B. Off Button (Red)
C. On Button (Green)
D. RS-232 Port
E. LCD Screen
F. Ethernet Port
G. SD Card Slot
H. Menu Up Button
I. Menu Down Button
J. Analog Inputs
K. Auxiliary Power Output
L. Reset Button
M. MPE Board Port
N. I/O Board Port
O. Power LED
P. Power Supply Input
Q. CPU LED
R. Right RX LED
S. Right Control Bus Port
T. Right TX LED
U. Left RX LED
V. Left Control Bus Port
W. Left TX LED
X. Digital I/O Ports
Y. LCD Contrast
Z. Default Jumper

Table 1-1: Parts of the LCP Controller

Component	Description
A. DMX Input and Thru	Allows the panel to be directed by a secondary DMX controller. Indicator LED signal the receipt and transmission of DMX. When DMX is enabled, DMX circuits on the control page are disabled.
B. OFF Button (red)	Turns all circuits off
C. ON Button (green)	Turns all circuits on
D. RS-232 Port	Control Port for secondary controller such as AMX or Crestron.
E. LCD Screen	Screen shows the IP address, time and setup information.
F. Ethernet Port	Connects the panel to a computer or network for initial setup or long-term operation using the built-in web interface. Port also provides sACN & Telnet communications
G. microSD Card	Card slot for microSD card for firmware updates
H. Menu Up Button (yellow)	Scrolls the screen up.
I. Menu Down Button (yellow)	Scrolls the screen down.
J. Analog Inputs	Additional analog inputs to connect voltage/current monitors or light sensors.
K. Auxiliary Power Output	Auxiliary 24V power for accessories. Maximum allowable current--200mA
L. Reset Button	Resets the controller

Table 1-1: Parts of the LCP Controller

Component	Description
M. MPE Port	Connects the Multi Panel Expander Board (for use with up to 3 Secondary panels)
N. I/O Board Port	Connects additional I/O boards to the controller. Up to two boards can be added for a total of 38 contact closure inputs. Or, the I/OR board may be added to provide outbound relay control
O. Power Led	Illuminates orange when the controller is receiving power.
P. Power Supply Input	Connects the controller to the power supply.
Q. CPU LED	CPU Heartbeat
R. Right RX LED	Flashes when the controller is receiving data from the local right control bus.
S. Right Control Bus Port	Connects the controller to the local right control bus.
T. Right TX LED	Flashes when the controller is transmitting data to the local right control bus.
U. Left RX LED	Flashes when the controller is receiving data from the local left control bus.
V. Left Control Bus Port	Connects the controller to the local left control bus.
W. Left TX LED	Flashes when the controller is transmitting data to the local left control bus.
X. Digital I/O Ports	Contact closure input, indicator output, and 24VDC common
Y. LCD Contrast	Adjusts contrast on LCD screen (E)
Z. Default Jumper	Forces all settings back to factory default

Figure 1-2: I/O Expander Board

Figure 1–2 shows the parts of the I/O Board. A brief description of each part follows in Table 1–2.
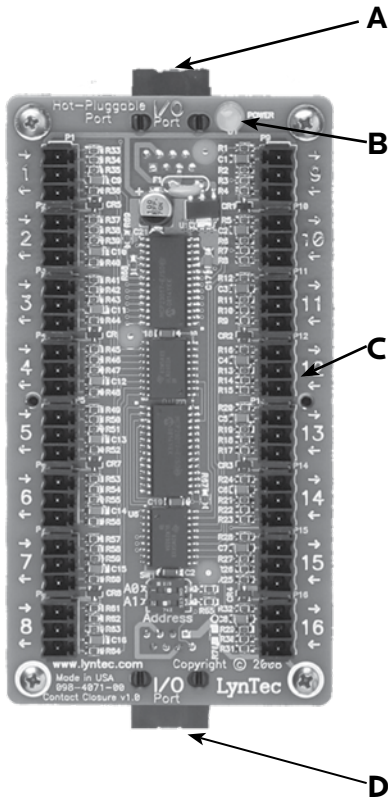
Table 1-2: Parts of the I/O Board

Component	Description
A. I/O Control Port	Connects the board to the controller.
B. Power LED	The power LED is always orange when the board is receiving power.
C. Digital I/O Headers	Allows the panel to be controlled by contact closure devices.
D. I/O Control Port Thru	Connects to an additional I/O expander board.

Figure 1-3: Multi-Panel Expander Board

Figure 1–3 shows the parts of the additional Multi-Panel- Expander board.   A brief description of each part follows in Table 1–3.
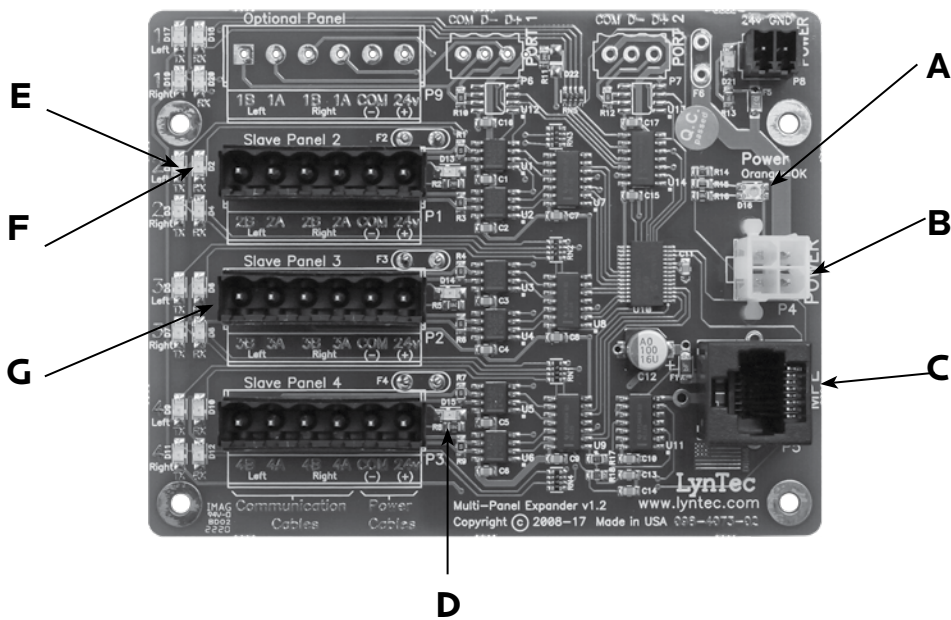

Table 1-3: Parts of the Multi-Panel Expander Board

Component	Description
A. Power LED	The power LED is always orange when the board is receiving power.
B. Power Input	Provides power to control buses on panels two, three and four.
C. Control Input	Receives control signal from control board.
D. Control Bus Power Indicator (x3)	Indicates that the control buses on panel two, three or four have power.
E. Data transmission indicator (x6)	Indicates that the Multi-Panel Expander board is transmitting data to a particular control bus (example: panel 2 left).
F. Data reception indicator. (x6)	Indicates that the Multi-Panel Expander Board is receiving data from a particular control bus (example: panel 2 left)
G. Expansion Ports (x3)	Connects the MPE board to control buses on panels two, three and four.

Chapter Two--Safety Precautions

This chapter contains important safety precautions that must be followed before attempting to install, service, or maintain electrical equipment. Carefully read and follow the safety precautions below.

READ AND FOLLOW ALL SAFETY INSTRUCTIONS

⚠ **DANGER**

HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

This equipment must be installed and serviced only by qualified electrical personnel.

- Apply appropriate personal protective equipment (PPE) and follow safe electrical work practices. See NFPA 70E.
- Turn off all power supplying this equipment before working on or inside equipment.
- Always use a properly rated voltage sensing device to confirm that power is off.
- Replace all devices, doors, and covers before turning on power to this equipment.
- Before energizing panelboard, all unused spaces must be filled with blank fillers.

Failure to follow this instruction will result in death or serious injury.

IMPORTANT SAFEGUARDS

When using electrical equipment, basic safety precautions should always be followed including the following:

READ AND FOLLOW ALL SAFETY INSTRUCTIONS.

1. Do not use outdoors unless the enclosure is rated for outdoor use
2. Do not mount near gas or electric heaters.
3. Equipment should be mounted in locations and at heights where it will not readily be subjected to tampering by unauthorized personnel.
4. The use of accessory equipment not recommended by the manufacturer may cause an unsafe condition.
5. Do not use this equipment for other than intended use.

SAVE THESE INSTRUCTIONS

Chapter Three--Quick Start Guide

INTRODUCTION   This chapter is a quick reference listing the steps necessary to install the LCP system. The steps in this chapter are provided as an installation checklist. For complete installation instructions, refer the chapter listed.
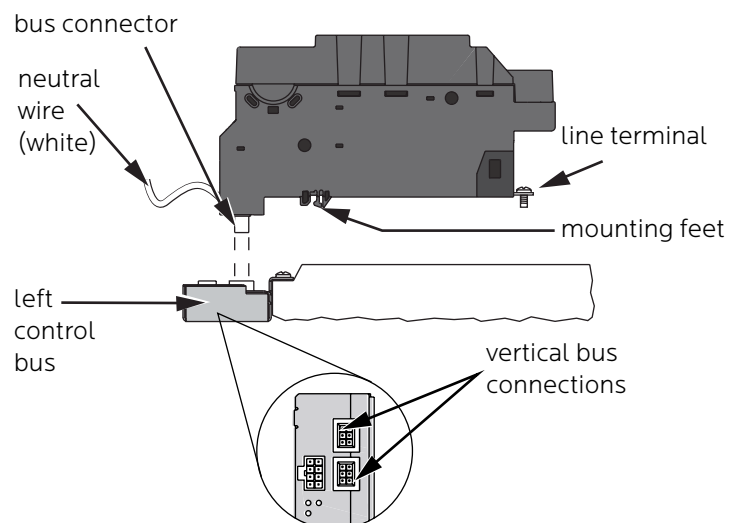
Steps	Reference
1. Install all the LCP components according to their instruction bulletins. Typical components include, but are not limited to, the following: • circuit breakers • controller (in external enclosure) • control buses • power supply • Secondary address selectors	See appropriate instruction bulletins. **Chapter 4--Wiring**
2. Wire all LCP components according to their instruction bulletins.	See appropriate instruction bulletins.
3. Connect the controller to a computer or network for panel setup.	**Chapter 4--Wiring**
4. Access the web page by entering the IP address or NetBIOS name into web browser on the aforementioned computer.	**Chapter 5--Control Setup**
5. Complete the panel setup.	**Chapter 5--Control Setup**
6. Connect the controller to a secondary controller or add contact closures if necessary.	**Chapter 4--Wiring** **Chapter 5--Control Setup**
7. If your LCP system does not operate as expected, verify that everything is installed and programmed correctly.	**Appendix A--Troubleshooting**

Chapter 4--Wiring

To initially wire the LCP follow these easy steps:

1. Install and connect all main and neutral feeds as per NEC.

2. Ensure all breakers are properly installed in the panel and that the motorized breakers are firmly plugged into the adjacent control buses.

Figure 4-1: Power Supply

bus connector

neutral wire (white)

line terminal

mounting feet

left control bus

vertical bus connections

Steps three through ten are completed at the factory. The instructions are included as a reference only.

3. Disconnect all power to the panelboard.

4. Remove the panelboard cover and deadfront. Verify that power is off using a properly rated voltage sensing device.

5. Insert the power supply's bus connectors into the vertical bus connections on the left control bus (see Figure 4-1).

6. Push the power supply onto the control bus until the mounting feet snap onto the panelboard mounting rail.

7. After installing the power supply, the line terminal will

line up with the hole on the panelboard interior bus bar. Use a screwdriver to secure the line terminal, torquing the screw 20 to 30 lbs-in.

8. Connect the power supply's white neutral wire to the panelboard neutral bar assembly.

9. Check the cable connections at the top of the breaker control buses to ensure the connectors are properly seated.

10. Replace the dead front pan and cover with door.

NOTE: If you are using a standard LCP panelboard, the power supply is installed at the top of the left control bus. If you are using a narrow-profile (column-width) panelboard, the power supply is installed at the bottom of the panelboard (see Figure 4-2).
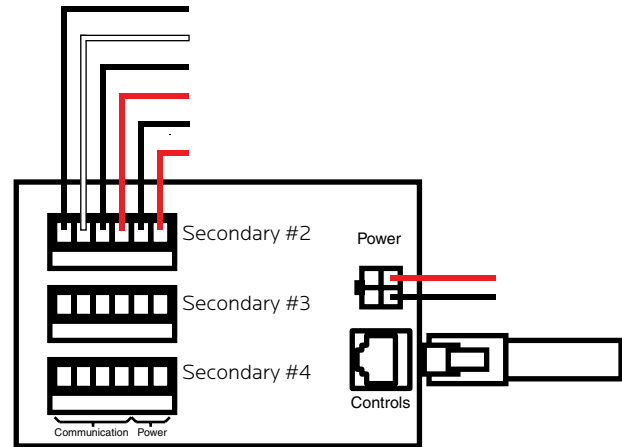
Figure 4-2: Power supplies on standard and narrow-profile panelboards

power supply

standard panelboard

narrow-profile panelboard
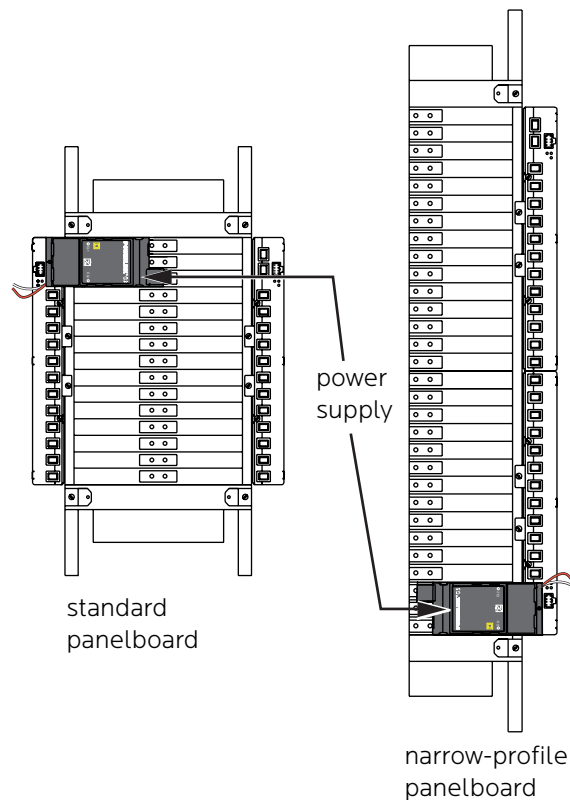
ADDITIONAL CONTROL OPTIONS

Additional circuit boards may be used to add additional panels or I/O inputs.

Figure 4-3: Multi Panel Expander

Each LCP system consists of an LCP Controller Module and an LCP primary panel with power supply. Up to three secondary panels may be added to complete the system. Each LCP Controller can control a maximum of eight control buses. 30 and 42 circuit panels each contain two control buses, while 48, 66 and 84 circuit panels each contain four control buses. Please consult the following table for the positions of each control bus.

Table 4-1: Bus Positions

Number of Circuits	First Control Bus Set		Second Control Bus Set	
	Left Position	**Right Position**	**Left Position**	**Right Position**
30	Upper Left	Upper Right	NA	NA
42	Upper Left	Upper Right	NA	NA
48	Upper Left	Upper Right	Lower Right	Lower Left
65	Upper Left	Upper Right	Lower Right	Lower Left
84	Upper Left	Upper Right	Lower Left	Lower Right
30 Narrow	Lower	Upper	NA	NA
42 Narrow	Lower	Upper	NA	NA

The first control bus set in the primary panel connects directly to the LCP Controller using the provided cables with 8-pin molex connectors. The second control bus set and all secondary panels, where applicable, connect to the Multi-Panel Expander board (MPE).

To connect bus strips to the MPE you will need either one 6-conductor, 600V jacketed, 18-14 AWG tray cable or two 4-conductor, 600V jacketed, 18-14 AWG tray cables per control bus set. Each bus requires 4 conductors but the DC power conductors can be daisy chained within the panelboard. Connect control buses to the MPE as follows.

1. At the MPE, terminate the Left Bus B, Left Bus A, Right Bus B, Right Bus A, Common (−) and 24VDC (+) in the screw-terminal header for that control bus from left to right.

2. Connect the cable to the control buses as shown in the diagram.

Figure 4-4: Multi-panel setup
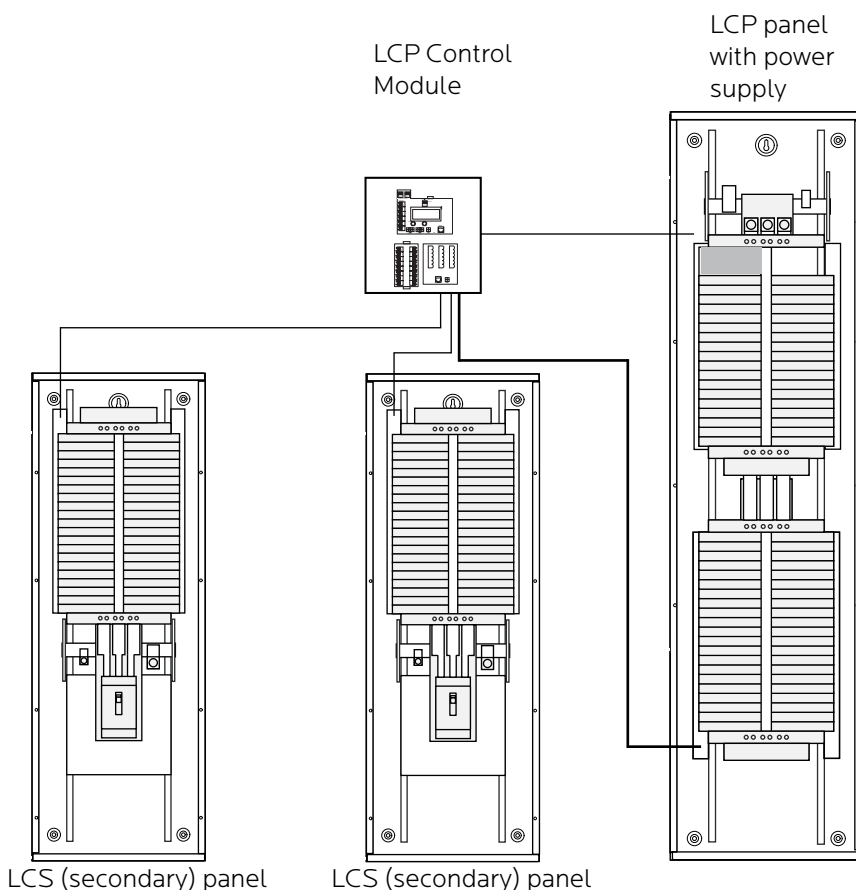
LCP Control Module

LCP panel with power supply

LCS (secondary) panel   LCS (secondary) panel

If using one 6-conductor cable, at each control bus set, strip the cable sheath back approximately 20 inches. Cut the conductors for Left Bus B, Left Bus A, − and + down to approximately 4 inches and terminate them in the Left Bus screw-terminal header from left to right. Terminate the remaining two conductors in the Right Bus B and Right Bus A positions of the Right Bus screw-terminal header. Cut two lengths of 18 AWG wire to install jumpers from Left Bus − and + to Right Bus − and +. Right Bus will not operate without these jumpers installed to provide 24VDC power and common.

3. Address the secondary address selectors as follows:

Table 4-2: Address Selector Settings

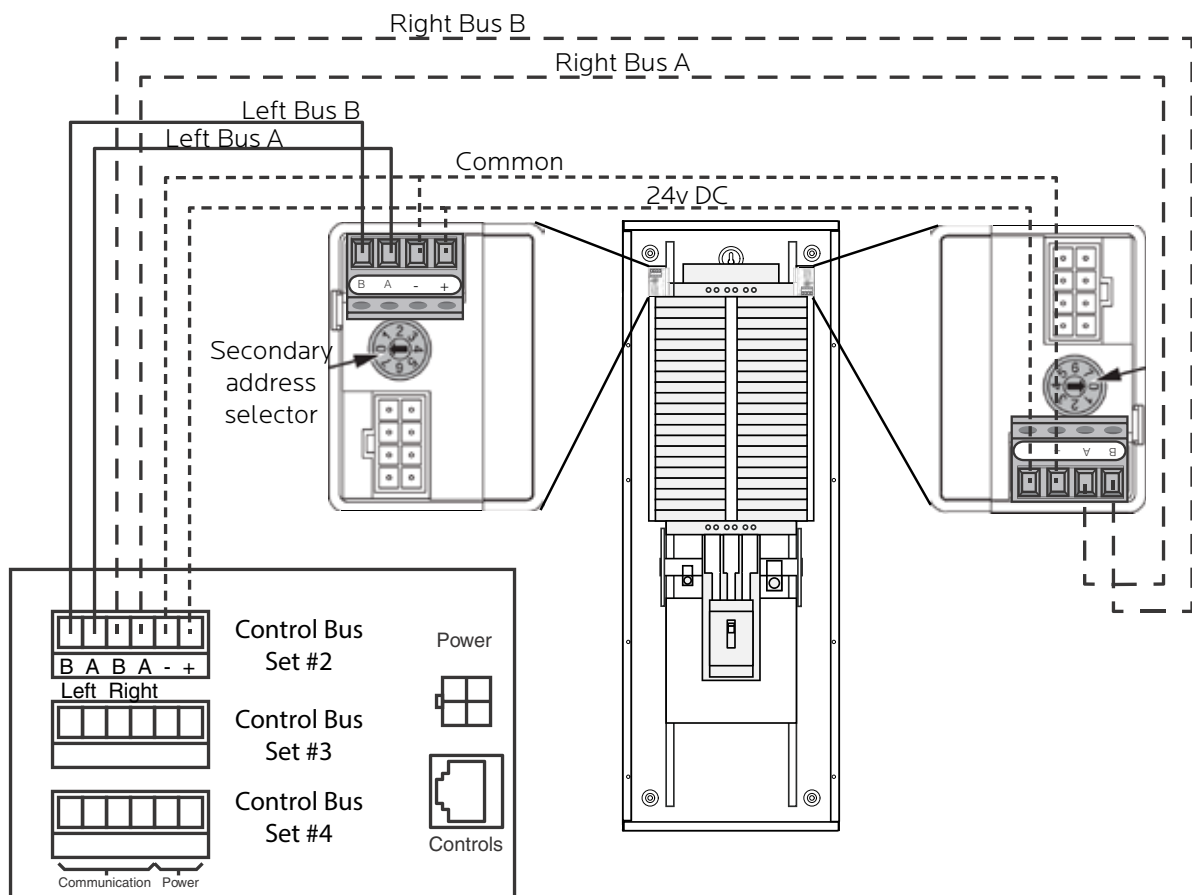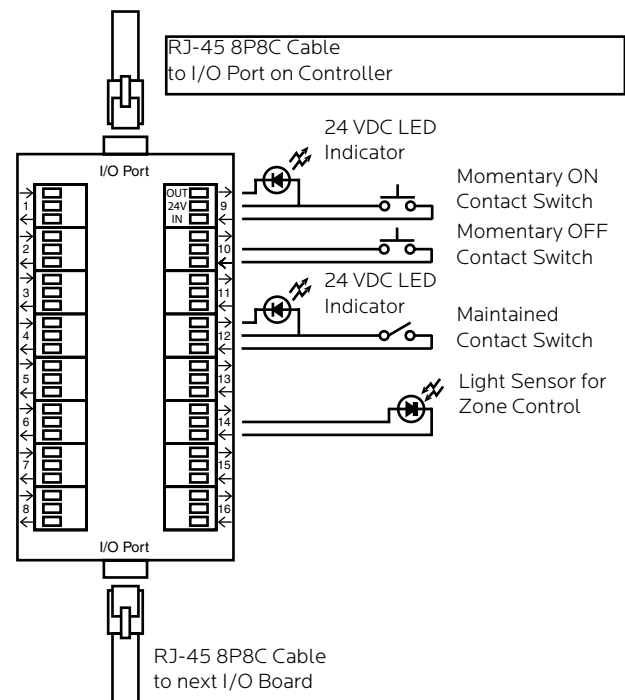|	Left Control Bus	Right Control Bus
Bus Set #2	2	3
Bus Set #3	4	5
Bus Set #4	6	7

Figure 4-5: Digital I/O Remote Switch and Sensor Wiring

Switches or sensors being used to control either sequenced or grouped zones are to be connected to the Digital I/O three-position spring-clamp headers. Each header can accommodate multiple input devices (switch, sensor, relay) and multiple output devices (indicator) maximum of 60mA.

The center terminal of each Digital I/O header is used as a 24VDC source. The input terminal is triggered when connected through a remote device to the 24VDC source. The output terminal activates an indicator by pulling down from 24VDC to 0VDC and creating current flow.

To assign both an On and Off function for one zone would require two input terminals and occupy two I/O headers. Six (6) Digital I/O headers are located on the left side of the Controller board. If more connections are required for multiple zone control, additional I/O Expander boards can be added. Each I/O Expander board provides an additional 16 headers for a maximum total of 38 input control sources and output indicators.

Emergency Lighting Wiring: To connect your fire alarm or emergency management system to the LCP, follow these steps.

1. From the fire alarm unit or latching Emergency Lighting switch, wire the Normally Open (NO) contacts to the IN and 24V positions of Digital I/O Port #6 on the Controller.

2. If a remote status indicator is used, ensure that the positive terminal is wired to the 24V position and the negative terminal is wired to the OUT position of Digital I/O Port #6.

3. When the Normally Open contacts are closed, the status indicator will immediately light and all breakers that have been selected for E. Lighting should cycle to ON.

4. When the contacts are released, the status indicator will extinguish and all breakers that were OFF before E. Lighting was activated should return to the OFF state.

See Chapter 5 to configure the software for emergency lighting.

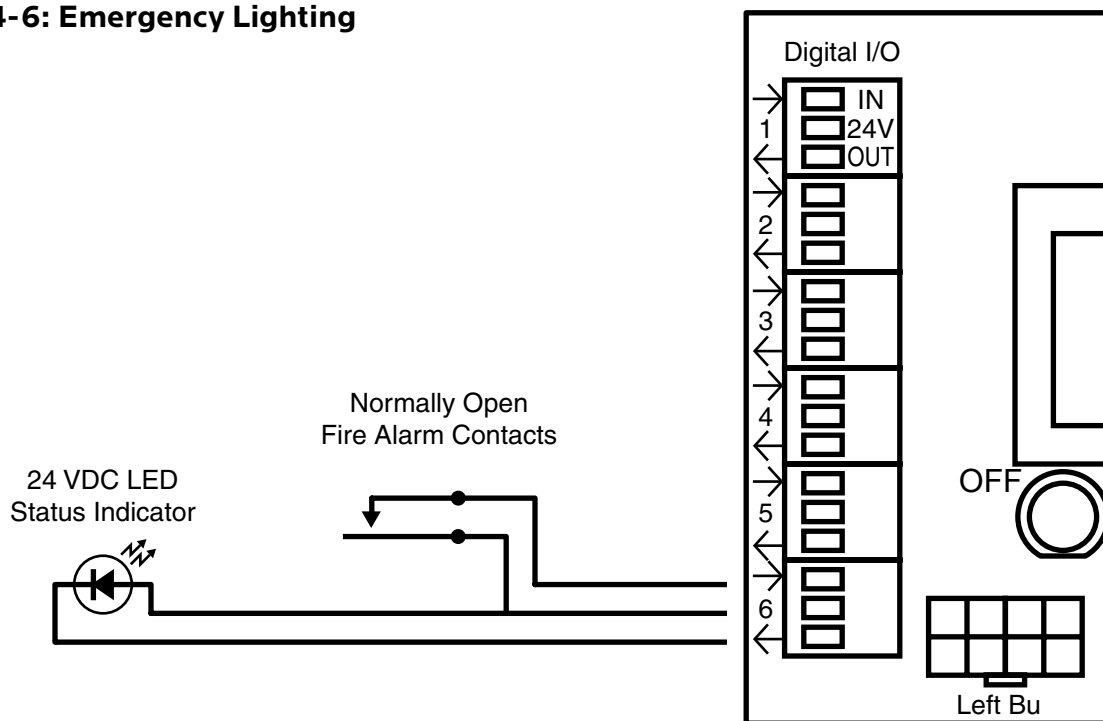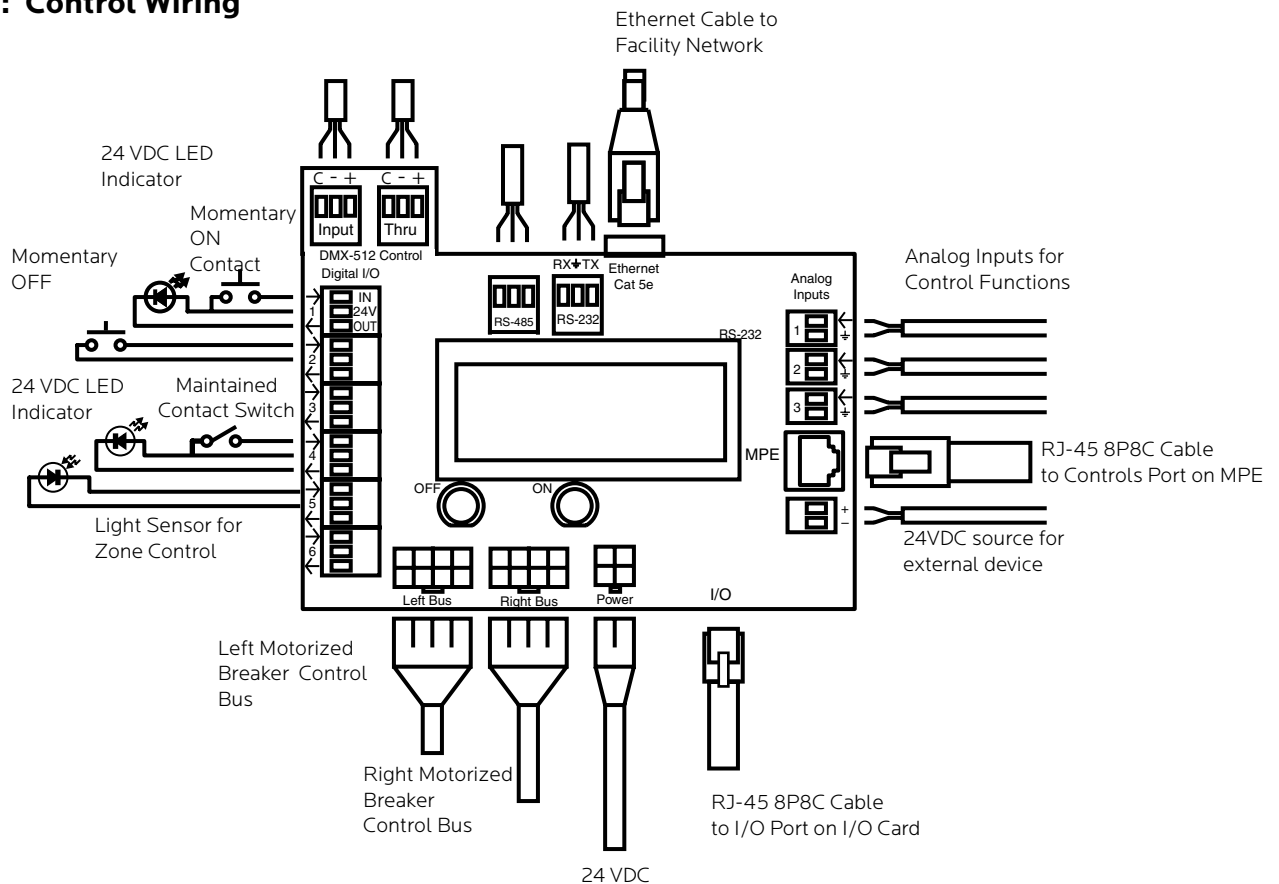**Figure 4-6: Emergency Lighting Wiring**

Figure 4-7: Control Wiring

|	
TCP/IP, sACN or Telnet	Install and connect a standard Cat5e cable from the facility 10/100 network to the Controller's Ethernet port.
DMX	If DMX-512 is being used to control the panel, install and connect a shielded pair cable from the DMX source to the Controller's DMX Input three-position spring-clamp header. Terminate common, DMX– and DMX+ from left to right in the header. Follow the same wiring guide for the DMX Thru header. Both input and output are galvanic isolated.
RS-232	If RS-232 is being used to control the panel, install and connect a shielded pair cable from the RS-232 source to the Controller's RS-232 three-position spring-clamp header. Terminate receive, ground and transmit from left to right in the header.
RS-485	RS-485 connector is reserved for use with CM-H current monitoring hardware. See manual for installation and operation instructions.

Switch Wiring Instructions

The I/O ports on your LCP Controller allow for a variety of switch options.

LynTec SS-2 Switch Set

Using a standard LynTec SS-2 Switch Set with illuminated ON switch. See Figure 4-8.

1. Wire the ON switch to Digital I/O port 1 on the left edge of the Controller board as follows:

    i.   Connect the 24VDC Common (pin 2, center terminal of the I/O port) to the C pin of the ON switch. Jumper the C pin of the ON switch to the + pin.

    ii. Connect the Input terminal (pin 1, arrow pointing towards header) to the NO pin of the ON switch.

    iii. Connect the Output terminal (pin 3, arrow pointing away from header) to the – pin of the ON switch.

2. Wire the OFF switch to Digital I/O port 2 on the left edge of the Controller board as follows:

    i.   Connect the 24VDC Common terminal to the C pin (pin 2) of the OFF switch.

    ii. Connect the Input terminal (pin 1) to the NO pin of the OFF switch
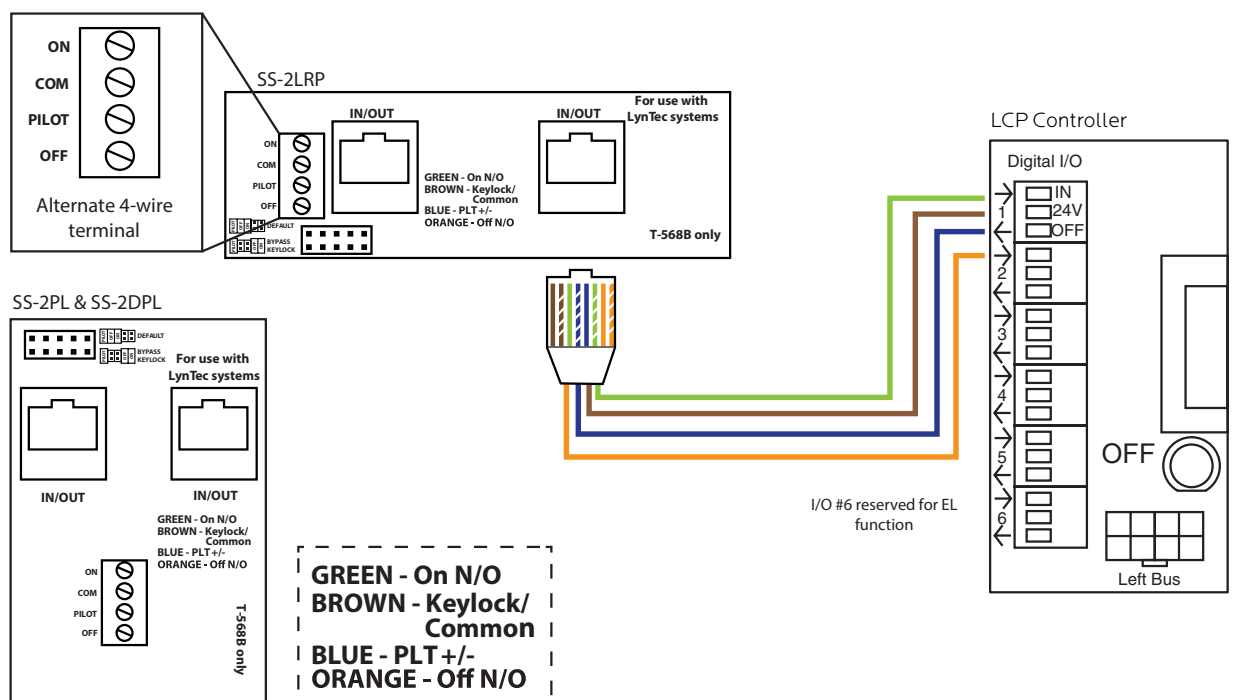
Figure 4-8:
Lyntec SS-2 Wiring Diagram
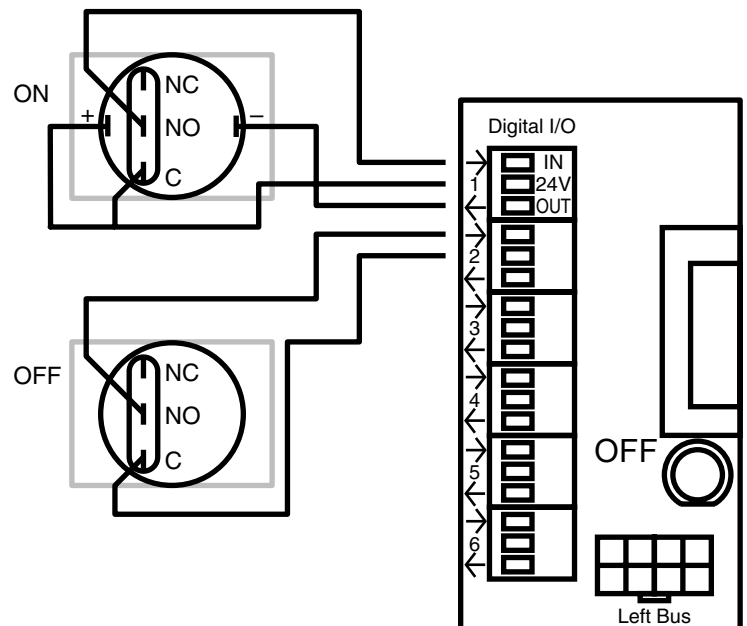
To configure the Digital I/O port and link it to a zone see Chapter 5.

SS-2PL, SS-2DPL, SS-2LRP and SS-4LRP Locking Switch Sets

Using a standard LynTec SS-2PL, SS-2DPL, SS-2LRP or SS-4LRP Switch Set with illuminated ON switch. See Figure 4-9.

1. Connect at T-568B Cat5 cable to the RJ-45 input on the back of the switch set. Alternately, you may use the provided 4- wire terminal.

2. Wire the switch set to contiguous Digital I/O ports on the left edge of the Controller board as follows:

3. Connect the green wire from the Cat5 (or the wire from the first terminal switch set terminal strip) to the input terminal (pin 1) of the first I/O port.

4. Connect the brown wire from the Cat5 (or the wire from the second terminal on the switch set) to the 24VDC terminal (pin 2) of the first I/O port.

5. Connect the blue wire (or the wire from the third terminal on the switch set) to the output terminal (pin 3) of the first I/O.

6. Connect the orange wire (or wire from the fourth terminal on the switch set) to the input terminal of the second I/O (pin 1).
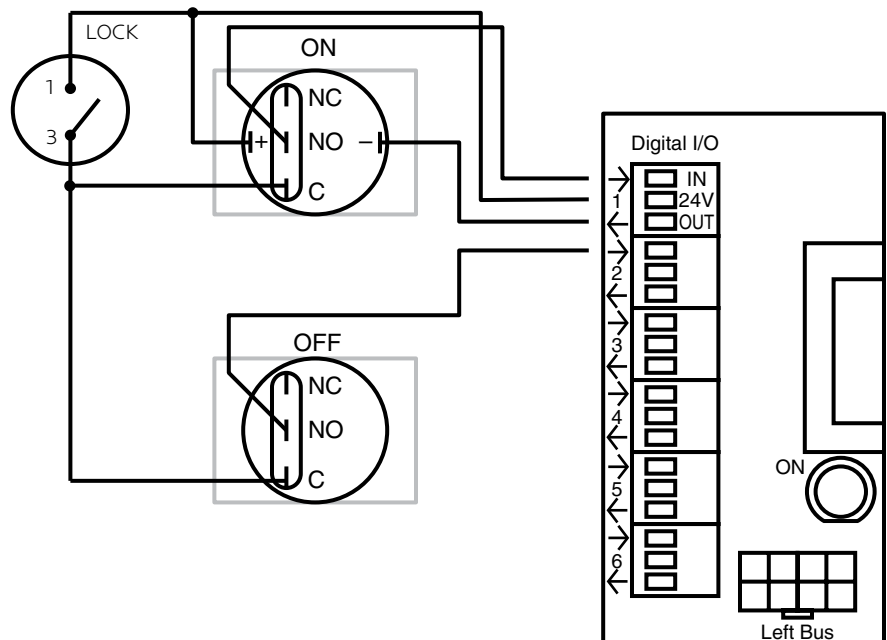
Figure 4-9

SS-2 and KS-2L Loose Components

Using a standard LynTec SS-2PL or SS-2 LRP Switch Set with illuminated ON switch. See Figure 4-10.

1. Solder the ON switch to Digital I/O port 1 on the left edge of the Controller board as follows:

    i. Connect the 24VDC Common (pin 2) to the "+" pin of the ON switch.

    ii. Connect the "+" pin on the on switch to the "1" pin on the lock.

    iii. Connect the Input terminal (pin 1) to the NO pin of the ON switch.

    iv. Connect the Output terminal (pin 3) to the "−" pin of the ON switch.

    v. Connect the "C" pin on the ON switch to the "3" pin on the lock.

2. Solder the OFF switch to Digital I/O port 2 on the left edge of the Controller board as follows:

    i. Connect the "3" pin on the lock to the "C" pin on the OFF switch.

    ii. Connect the Input terminal (pin 1) to the NO pin of the OFF switch

Figure 4-10

To configure the Digital I/O port and link it to a zone see Chapter 5.

**Figure 4-11: Complete LCP Control
Module Wiring for Motorized Breaker
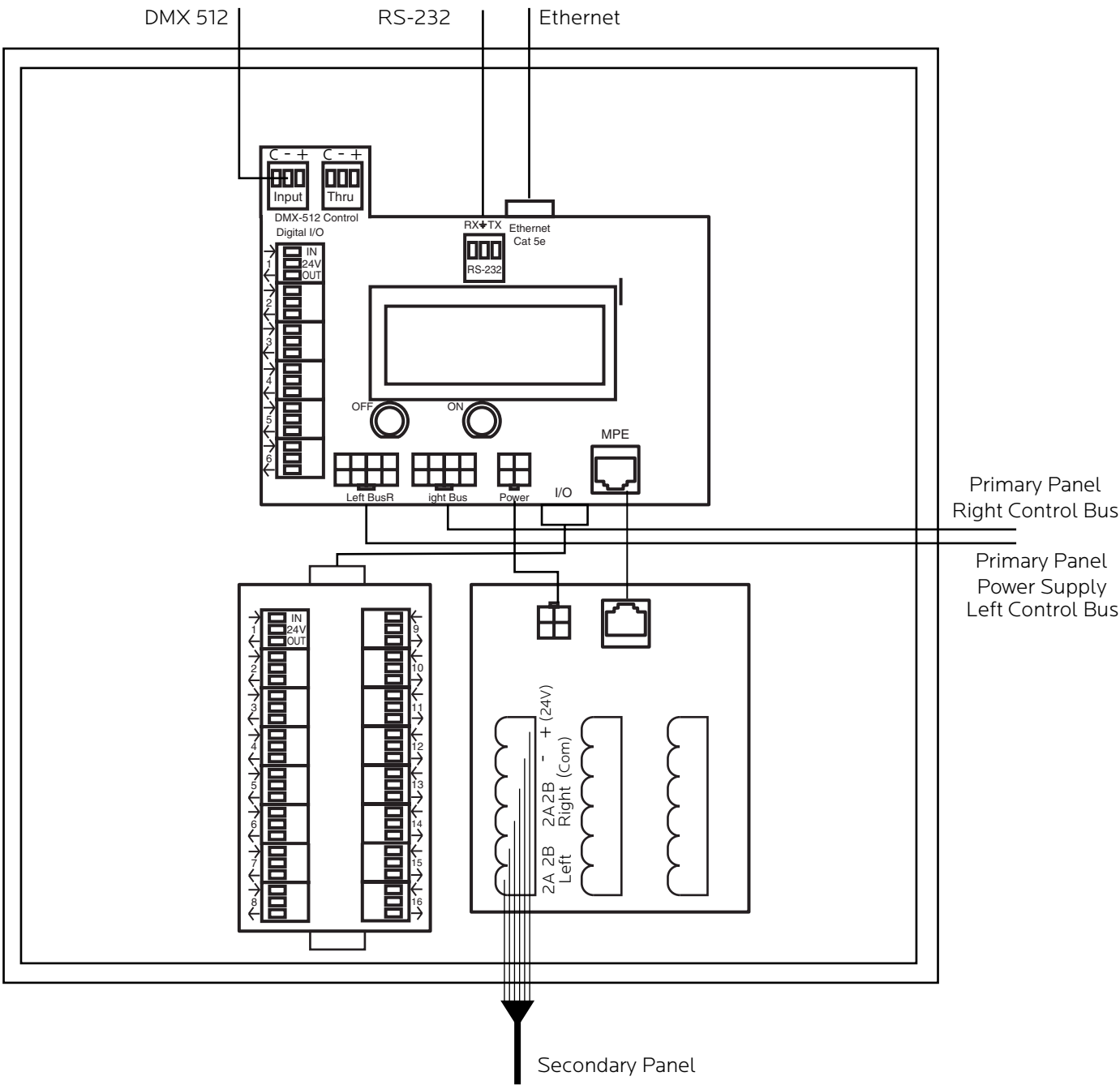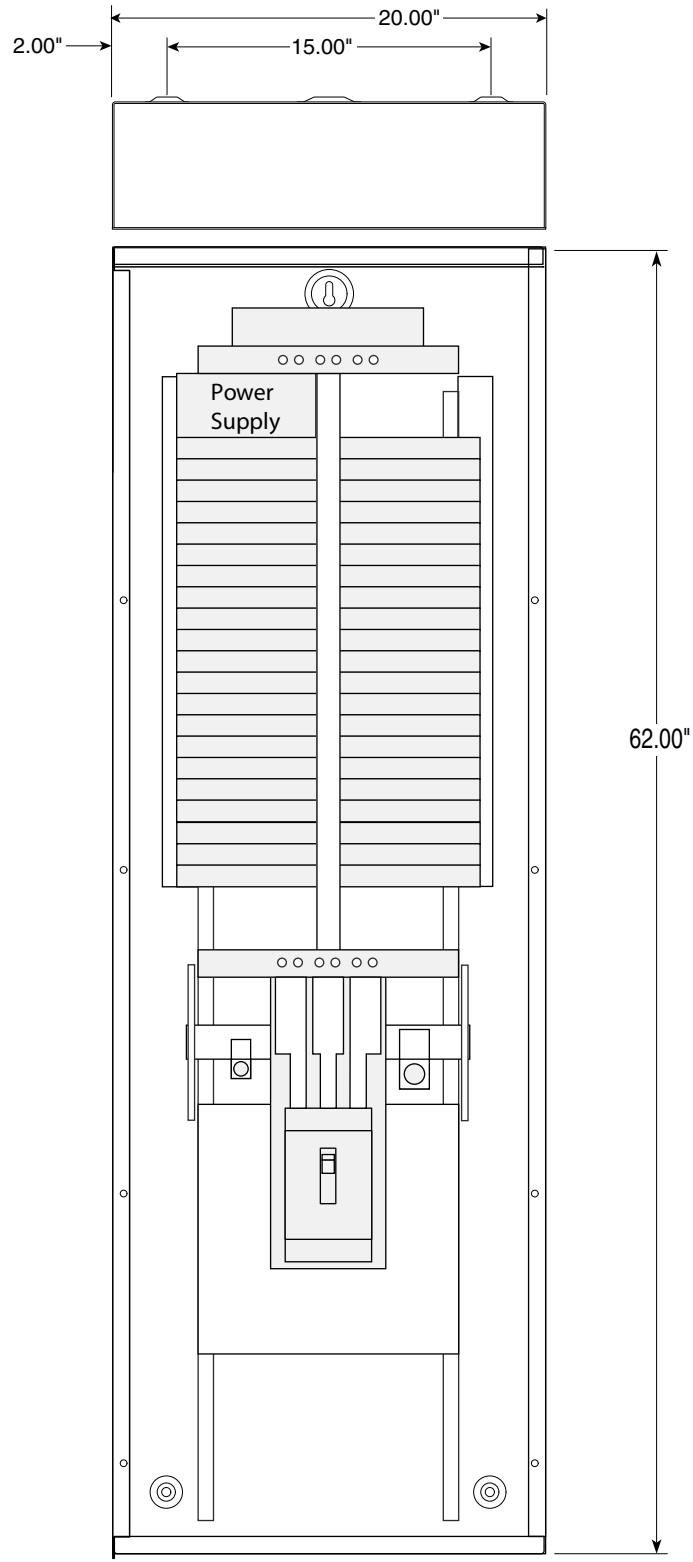Panels**

Dimensions 12"h x 12w x 6"d

DMX 512   RS-232   Ethernet

C - + C - +
Input Thru

DMX-512 Control
Digital I/O

RX TX   Ethernet
RS-232   Cat 5e

IN
24V
OUT

OFF   ON

MPE

Left BusR   ight Bus   Power   I/O

Primary Panel
Right Control Bus

Primary Panel
Power Supply
Left Control Bus

IN
24V
OUT

2A 2B   2A 2B   + (24V)
Left   Right (Com)   - -

Secondary Panel

**Figure 4-12: LCP Mechanical
Drawing**

INITIAL POWER UP PROCEDURE

With panel door open and breakers visible, turn on the panel main breaker.

The Controller LCD display and orange Power LED should illuminate. If installed, the orange Power LED's on the I/O Expander boards and the orange Power LED on the MPE board will illuminate. LCP will "beep" multiple times.

Connect a computer with an Ethernet port and open web browser program to the LCP Network connector using the provided crossover cable. Then enter the IP address for the controller.

Chapter 5--Control Setup (Web Page)

OVERVIEW

There are five main tabs on your LCP web page. This page will give you a quick overview of the pages and their functions.

STATUS

The status page allows you to view the current status of the breakers and zones. Zones and individual breakers cannot be manipulated from this page.

CONTROL

This page allows the user to manipulate individual breakers as well as breaker zones. "All ON/OFF" and "Hurry-Off" commands can also be triggered from this page.

SETUP

The setup section allows you to setup and use the LCP Controller. From this section you can manipulate the network settings, assign breakers to zones, activate emergency management features, setup the clock, change protocols, create schedules and assign contact closures.

SUPPORT

This page provides contact information for LynTec.

EVENT LOG

This page provides a simple log of power events.

Setup

This section will guide you through the process of setting up your LCP Controller. First enter the IP address or NetBios name into your web browser. When the LCP screen pulls up. Select "Setup" and "SetupHome" Tabs.

SETUP HOME

Figure 5-1: Setup Home

To set the username and password for your panel, click the Setup tab. The Setup Home tab should be displayed. The default username displayed is "admin" and the password fields is "pw". Enter the desired username in the first field, password (without spaces or symbols) in the second and then retype the password again in the third field. When ready, click the Update Login Info button to save the changes to the controller's memory. Note: Password can be any 2-8 alphanumeric characters, no symbols.

Contact information for service can also be entered on this page. Under the Customer Information field, enter the name and phone number of the installing contractor (electrician) and the system integrator (lighting technician) for future reference. Be sure to save changes.

Basic date and time information will be displayed in the Clock Set fields. Verify that the year, month and day are correct. Set the hour to the appropriate time for your time zone and verify that the minute displayed is correct. Save this information by clicking the Update Information button below the Clock Set portion of the window. Or, if connected to the internet, click "Re-sync via NTP".

In the Astronomical Clock section, select your country from the dropdown. Then select the nearest major city. The database will automatically calculate latitude, longitude, timezone and UTC offset. The astronomical clock uses this information to calculate daily sunrise and sunset times.

Click the radio buttons for any pages to be printed out under the Printable Pages header. To print the Network Setup, Panel Setup or Panel Schedules pages at any time, ensure the desired buttons have been selected and then click the Print Pages button to the right. Please print a copy for your records after all other setup is complete. For a file versionized backup RPC configuration, use "Backup RPC" configuration. You can use this file for troubleshooting or to revert from future changes.

Network Setup

**Figure 5-2:
Network Configuration**

Figure 5-2 shows the network configuration portion of the Network setup.

This screen shows the current network values. If DHCP is enabled then the fields will be grayed out. It is recommended that the user consult with the network administrator before changing these values.

The IP, Subnet and Gateway addresses are only used in the following situations:

- When DHCP is disabled
- When DHCP is enabled, but there is no DHCP server available on the network
- When the LCP provides DHCP addresses

If DHCP is enabled and available on the network, all these values will be obtained from the DHCP server.

If DHCP is disabled and a static address is used, save changes will automatially reset the LCP.

Figure 5-3: Master/Remotes IP Configuration

If you are using your LCP Controller to control other controllers or remote units on the same network (Whole Venue Control), check the master box. Then enter the IP addresses of the remote units that need to be controlled.

Secondary panels connected directly to the LCP Controller do not have independent IP addresses. Only other controllers like the NPAC or remote units like the XRS and XRM units should be entered as remotes.

You will need to scan new circuits to configure and setup Whole Venue Control.

Figure 5-4: Protocol Options

Port Type   The port type section is used to select the preferred communication protocol. The controller defaults to Ethernet (TCP/IP) for setup but can be controlled in conjunction with Telnet, RS-232, sACN or DMX-512 protocols.

RS-232   For RS-232 operation use the following steps:

Select a baud rate in the dropdown box from 300 to 115,200 Baud. The default is 115200. The data structure is set at 8 Data bits, 1 Stop bit and No Parity bit (8,1,N).

Telnet   Authenticate with the same username and password. The command structure is the same as RS-232

DMX

For DMX operation use the following steps:

Set the ON and OFF thresholds in either the 0-255 range or the percentage range.

The LCP allows up to four different sets of DMX starting addresses within a single universe.

In the first set, enter the first individual breaker address. All motorized breakers need to be assigned addresses manually. Do this by clicking on each breaker in the order you would like them to be addressed. If you need to skip an address or group of addresses, simply create a new zone and enter the desired starting address. If you would like the LCP to automatically assign all breakers to consecutive addresses or assign a single address to a zone, you may change that in the "Panels" tab in the Zone Control options.

Streaming ACN E1.31

For sACN operation use the following steps:

Set the ON and OFF thresholds in either the 0-255 range or the percentage range.

The LCP allows up to four different universes with sACN operation.

First, assign a number to the universe.

In the first set, enter the first individual breaker address. All motorized breakers need to be assigned addresses manually. Do this by clicking on each breaker in the order you would like them to be addressed. If you need to skip an address or group of addresses, simply create a new zone and enter the desired starting address. If you would like the LCP to automatically assign all breakers to consecutive addresses or assign a single address to a zone. you may change that in the "Panels" tab in the Zone Control options.

Please note that selecting sACN/DMX control for a zone will disable web browser or contact closure control for that breaker.   Although, breaker/zone status may still be monitored by web browser or smartphone.

DMX and sACN are exclusive and cannot be used on the same controller at the same time. Either can be used to control breakers in zones while other zones are controlled by RS-232/Telnet IP commands or contact closures.

IGMP is available if your router/switch blocks multicast traffic.

Priority HTP/LTP is available for two sources in each set.

Panel Setup

This section explains how to setup your panel and motorized breakers for remote operation.
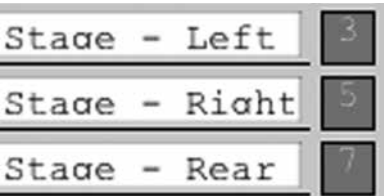
BREAKER SETUP

To setup breakers, follow these steps:

1. Under Setup, go to the Panels tab.

2. Breakers are generally installed at the factory and have been scanned during testing. If breakers have been changed, added or deleted, click the "Scan New Circuits" button. Motorized breakers are represented in white, unmotorized breakers or blank spaces are represented in gray. If the control buses in your panel are inverted, you may need to select the "top-feed" option.

Figure: 5-5

3. If panel configurations are correct, click "Accept Changes"; if not, reject and try again.

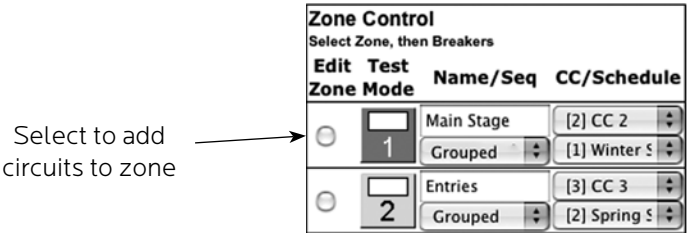4. Assign names to the breakers (Figure 5-6).

Figure 5-6

ZONE SETUP

Breakers can be controlled individually or arranged into zones. Breakers in zones can be toggled at 100ms intervals (Grouped Operation) or via DMX or sACN.

To setup a Zone follow these steps:

Figure 5-7

Select to add circuits to zone

1. Choose which zone you would like to edit (Figure 5-7).

2. Name the Zone (Figure 5-8).

3. Choose Grouped, DMX or sACN operation. Note: DMX and sACN may not be used within the same LCP (Figure 5-8).

4. If using DMX or sACN operation, select the address set (Figure 5-9) from the dropdown.
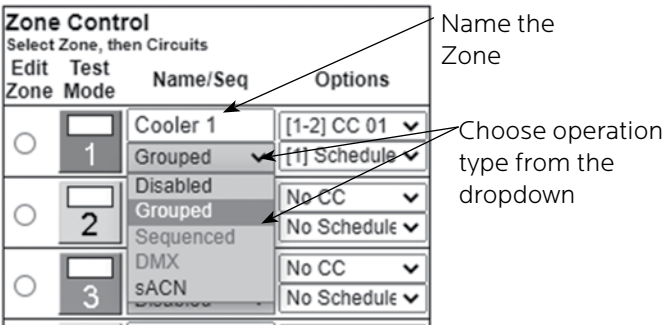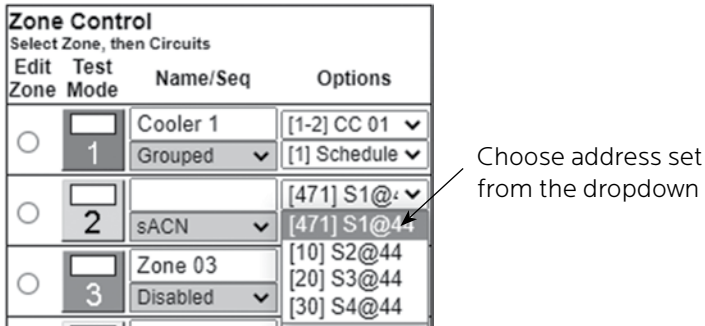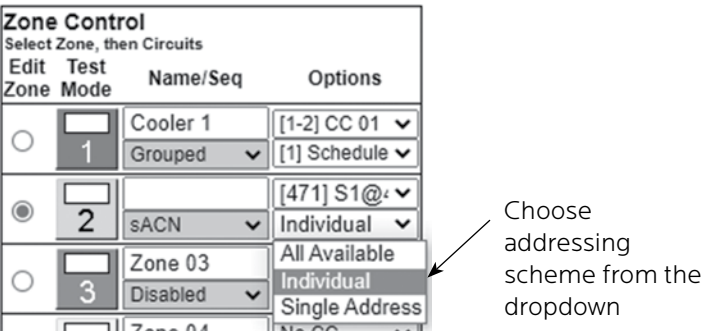
Figure 5-8

Name the Zone

Choose operation type from the dropdown

Figure 5-9



Choose address set from the dropdown

5. Select whether you want each circuit to be addressed individually or whether the zone should have a single DMX or sACN address (Figure 5-10).

Figure 5-10

Choose addressing scheme from the dropdown

6. Select a breaker to add to the zone by clicking on the breaker you want to add. Only motorized breakers (indicated in green) may be added to zones (Figure 5-11).

Figure 5-11

Address box will change color to match zone

Click on the green oval to add a breaker to a zone.
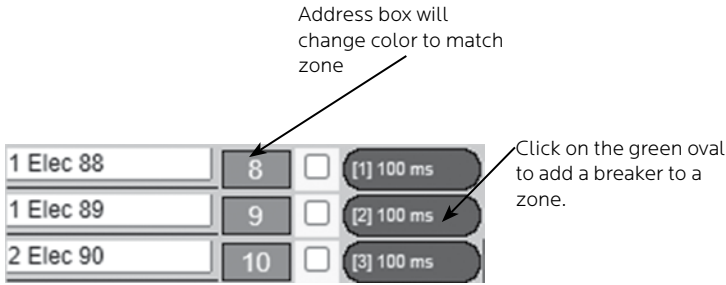
7. Optionally, use the arrows to select the position of the breaker in the zone.   This set the order in which they turn on and off. Or in the case of DMX or sACN, the address order.   Note: DMX and sACN zones default to individual addressing. If you choose "All Available" the entire panel or panels will change to DMX or sACN.

8. Add additional consecutive breakers or click the "Close" button when finished to save. Or, click "Remove" to remove the breaker from the zone.

9. When finished adding breakers to the zone, click the "Test Mode" (Figure 5-12) button to do a blind test (breakers will not actually toggle).

10. Disable zones that are not in use so they do not appear in the status and control pages

11. Click "Save Changes" (Figure 5-13) to save zone information when finished.
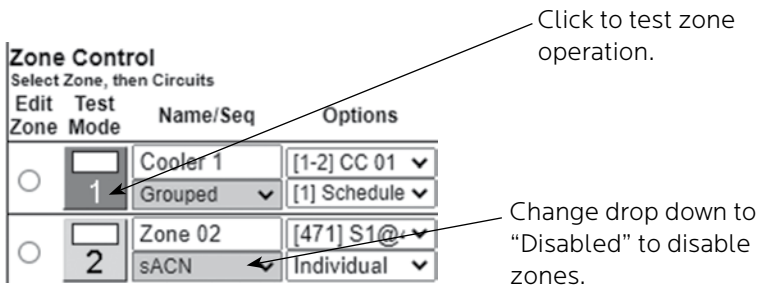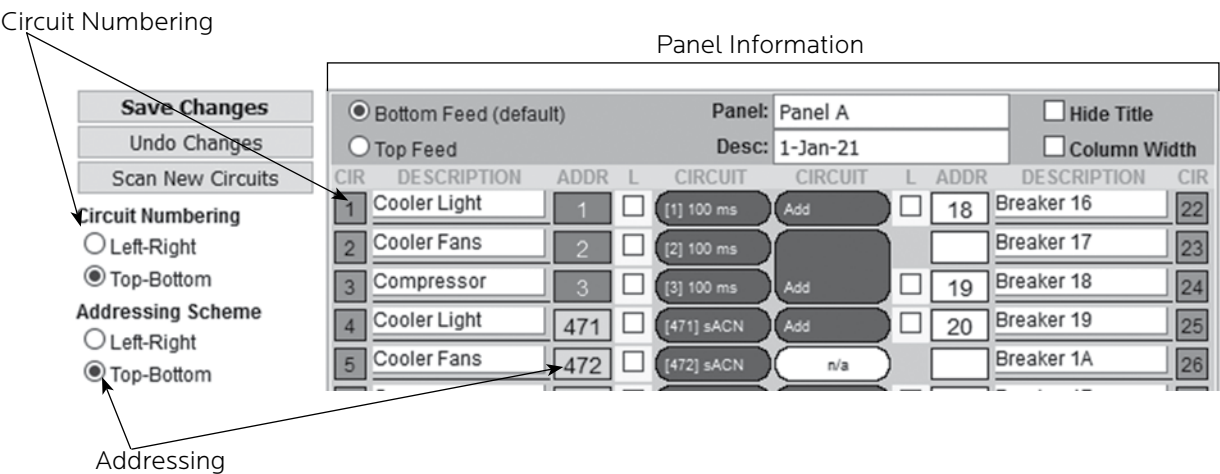
Figure 5-12

Click to test zone operation.

Change drop down to "Disabled" to disable zones.

Figure 5-13

GLOBAL PREFERENCES SETUP

This section guides you through the setup process for the many features and preferences in your LCP system.

Labeling

In addition to labeling breakers, each panel in your LCP system can be named (up to 16 characters) and a short description can be added (Figure 5-14). For multi-panel systems, scroll down to see additional panels.

Figure 5-14

Numbering and Addressing

The LCP system allows the user to choose top-bottom or left-right panel numbering (Figure 5-14). It also allows you to select the direction for addressing. Note: narrow profle panels are always "Top-Bottom"; the top bus depicted on the left and the bottom on the right.

Global Control Preferences   The following features can be selected for additional system flexibility

Figure 5-15

Table 5-1

All Breakers On/Off	Turns all the breakers on or off (both zone and unassigned breakers)
Hurry-Off	Turns breakers off rapidly
E. Lighting	Turns selected breakers ON when external contacts or emergency management system activates (uses I/O CC#6)

Selecting Breakers for Emergency Lighting

Figure 5-16

Select breakers for emergency lighting in yellow outlined check boxes.

Select breakers to turn on in the event of a fire or other emergency by checking the yellow box next to the breaker. The status of unchecked breakers will remain unaffected.

Schedule Setup

Follow these steps to set a schedule (not compatible with DMX or sACN).

1. Check "Enable Schedules" in Setup Home tab

2. Rename each schedule as desired

3. Assign day on and off times by clicking on time and off time buttons, using the pull-down menu and clicking the "pick" button to select (Figure 5-17). If using sunrise or sunset, the time will be chosen by the astronomical clock based on the selected city. A secondary offset time in increments of ±0.5 hours is optional.

4. Enable each schedule by clicking the checkbox for that line. This will make the schedules visible in the zone dropdown ("Panels" tab).

Figure 5-17

5. Click the Save Changes button at the top of the page to save updated schedules.

Assigning Schedules to Zones

To assign a schedule to a zone in the "Panels" tab:

1. Select the desired schedule from the dropdown box (Figure 5-18).

2. Save changes.

Figure 5-18

Contact Closure Setup

Configure the Digital I/O port and link it to a zone as follows:

1. Rename each contact closure as desired

2. Select contact closure action type

3. Save Changes

Note: CC Module 1 and CC Module 2 will be displayed if optional I/O Expander Boards are installed.

Figure 5-19

Assigning Contact Closures to Zones

To assign a contact closure to a zone in the "Panels" tab:

1. Select the desired zone from the dropdown box.

2. Save changes.

Figure 5-20

Individual Momentary Contact ON and OFF Pushbuttons

Using a standard LynTec SS-2 Switch Set with illuminated ON switch or two illuminated pushbuttons:

Configure the Digital I/O port and link it to a zone as follows:

1. Follow the previous instructions for naming the contact closure and setting closure type.

2. Click the M button at the right side of the first of the two ports used (Figure 5-21). The name box and M button in the second port should turn gray and the Action selections should default to Momentary NO (normally open).

3. Ensure that both of the Action selections for both ports are set to Momentary NO.

4. Enter a name in the text field of the CC used that is indicative of the zone it will control.

5. Click the "Save Changes" button at the top of the Onboard I/O box.

6. Follow the previous instructions for assigning a contact closure to a zone. The two ports will be in brackets

7. Click the Save Changes button in the upper left corner of the Panels page.

Verify proper operation of your Switch Set:

1. Press the ON switch. Breakers in the selected zone should immediately begin actuating.

2. The ON indicator should flash steadily until all of the breakers are in the on state.

3. When the zone has completed, the ON indicator should remain constantly lit (if the indicator is blinking fast, one or more breakers may be tripped).

4. Press the OFF switch. Breakers in the selected zone should immediately begin actuating.

5. The ON indicator should flash steadily until all of the breakers are in the off state.

6. When the zone has completed, the ON indicator should remain constantly dark. Note: When using two illuminate pushbuttons the OFF indicator will remain constantly lit when the zone has completed. (OFF indicator will extinguish immediately when ON is pressed again.)

I/OR Setup

The I/OR board combines the input function of the I/O board with output devices (either low-voltage SPDT relays or high-current transistors) to control external devices.

In the contact closure setup page the first eight contacts in the I/OR Module are standard I/O ports. Configure the digital I/O ports and link it to a zone as described on the previous page.

The remaining contacts (under the heading "Trigger Controls" are the outputs (relays, transistors, or a combination of both)

Configure the Trigger Controls as follows:

1. Rename each contact closure as desired

2. If desired, merge a pair of outputs. Merged outputs act as a pair of momentary normally open pulsed outputs (for example, the merged outputs would mimic the SS-2 switch set when controlling a PDS-10). Unmerged outputs act as individual maintained normally open toggle switches.

3. If outputs are merged, select a pulse rate length of 50ms-500ms from the dropdown. The PDS-10 requires 100ms, but some contactors may require a longer pulse length.

4. Save Changes

Figure 5-23

Save Changes

Onboard

Name	Action	Merge
CC 01	Momentary N.O.	U
CC 02	Momentary N.O.	M
CC 03	Momentary N.O.	M
CC 04	Maintain N.C.	M
CC 05	Momentary Toggle	
Emergency Lighting	Maintain N.O.	

IOR Module #1

Name	Action	Merge
CC 07	Momentary Toggle	M
CC 08	Momentary Toggle	M
CC 09	Momentary Toggle	M
CC 0A	Momentary Toggle	M
CC 0B	Momentary Toggle	M
CC 0C	Momentary Toggle	M
CC 0D	Momentary Toggle	M
CC 0E	Momentary Toggle	
Trigger Controls		
CC 0F	Maintain N.O.	M
CC 10	Maintain N.O.	M
CC 11	Maintain N.O.	M
CC 12	Maintain N.O.	M
CC 13	Maintain N.O.	M
CC 14	Maintain N.O.	M
CC 15	Maintain N.O.	M
CC 16	Maintain N.O.	

IOR Module #2

Name	Action	Merge
CC 17	Momentary Toggle	M
CC 18	Momentary Toggle	M
CC 19	Momentary Toggle	M
CC 1A	Momentary Toggle	M
CC 1B	Momentary Toggle	M
CC 1C	Momentary Toggle	M
CC 1D	Momentary Toggle	M
CC 1E	Momentary Toggle	
Trigger Controls		
CC 1F	Momentary 100mS	U
CC 20	Momentary 250mS	M
CC 21	Momentary 100mS	U
CC 22	Momentary 250mS	M
CC 23	Momentary 100mS	U
CC 24	Momentary 250mS	M
CC 25	Momentary 100mS	U
CC 26	Momentary 250mS	M

Email Alert Setup

Follow these steps to set an email alert

1. Go to Setup Network tab.

2. Enter email addresses.

3. Select alert types (tripped breaker, BO/EO/EL, On Recovery and/or Temperature.

4. If using Temperature alerts, enter the temperature threshold.

Figure 5-24

Chapter Six--Operating Your LCP

Figure 6-1
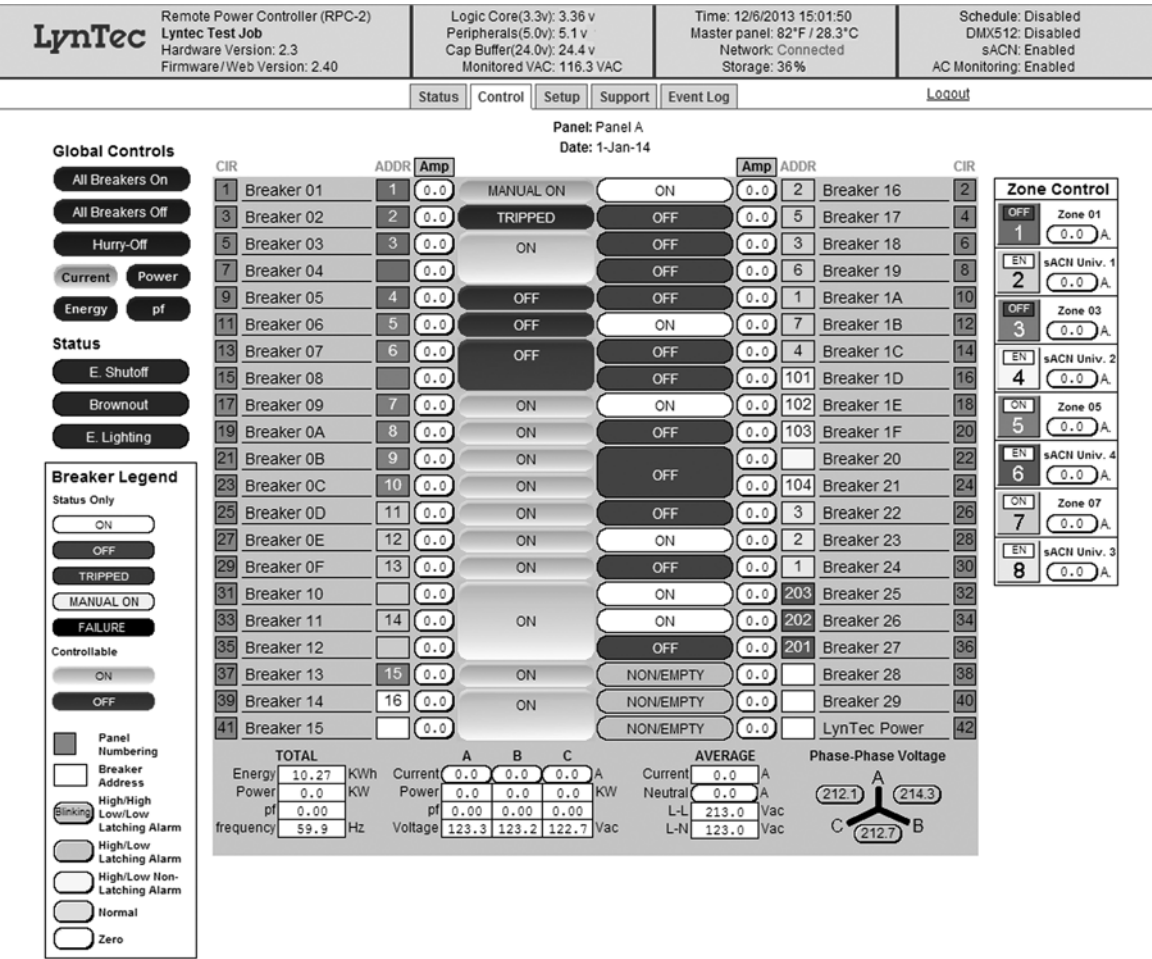
Using the Built-in Web Page

To operate the LCP using the built in web page, select the control tab from the top of the page. Once on the CONTROL page, simply click each breaker for individual control. Or, click a zone for zone control. "All Breakers ON" and "All breakers OFF" commands can also be executed from this page.

Using a Secondary Controller

For DMX and sACN follow the manufacturer's instructions using the addresses entered in the "Protocols" tab (see page 29).

RS-232 and TCP/IP schemes are in Appendix B (page 49).

Appendix A--LCP Quick Start Guides

LCP to LCS Wiring Instructions

LCP LIGHTING CONTROL PANELBOARD
PURPOSE-BUILT FOR LIGHTING AND VIDEO

PRIMARY/SECONDARY QUICK START GUIDE

A quick guide to connecting LCP primary and secondary panels to the LCP Control Module.

Each LCP system consists of an LCP Controller Module and an LCP primary panel with power supply. Up to three secondary panels may be added to complete the system. Each LCP controller can control a maximum of eight control buses. 30 and 42 circuit panels each contain two control buses, while 48, 66 and 84 circuit panels each contain 4 control buses. Please consult the following table for the positions of each control bus.

Number of Circuits	First Control Bus Set		Second Control Bus Set	
	Left Position	Right Position	Left Position	Right Position
30	Upper Left	Upper Right	NA	NA
42	Upper Left	Upper Right	NA	NA
48	Upper Left	Upper Right	Lower Right	Lower Left
65	Upper Left	Upper Right	Lower Right	Lower Left
84	Upper Left	Upper Right	Lower Left	Lower Right
30 Narrow	Lower	Upper	NA	NA
42 Narrow	Lower	Upper	NA	NA

139-0716-00

...continued from front

The first control bus set in the primary panel connects directly to the LCP Controller using the provided cables with 8-pin molex connectors. The second control bus set and all secondary panels, where applicable, connect to the Multi-Panel Expander board (MPE). To connect buses to the MPE you will need either one 6-conductor, 600V jacketed, 18-14 AWG tray cable or two 4-conductor, 600V jacketed, 18-14 AWG tray cables per control bus set. Each strip requires 4 conductors but the DC power conductors can be daisy chained within the panelboard. Connect control buses to the MPE as follows.

1. At the MPE, terminate the Left Bus B, Left Bus A, Right Bus B, Right Bus A, Common (–) and 24VDC (+) in the screw-terminal header for that control bus from left to right.

2. Connect the cable to the control buses as shown in the diagram.

   If using one 6-conductor cable, at each control bus set, strip the cable sheath back approximately 20 inches. Cut the conductors for Left Bus B, Left Bus A, – and + down to approximately 4 inches and terminate them in the Left Bus screw-terminal header from left to right. Terminate the remaining two conductors in the Right Bus B and Right Bus A positions of the Right Bus screw-terminal header. Cut two lengths of 18 AWG wire to install jumpers from Left Bus – and + to Right Bus – and +. Right Bus will not operate without these jumpers installed to provide 24VDC power and common.

3. Address the secondary address selectors as follows:
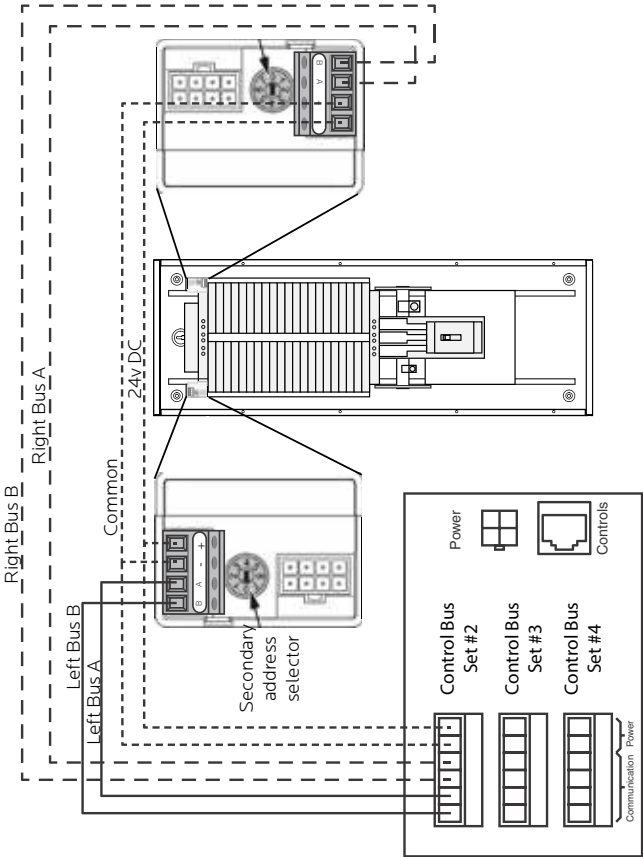
	Left Control Bus	Right Control Bus
Bus Set #2	2	3
Bus Set #3	4	5
Bus Set #4	6	7

LCP Quickstart Guide

LCP

LIGHTING CONTROL PANELBOARD

PURPOSE-BUILT FOR LIGHTING AND VIDEO

QUICK START GUIDE

This guide is a quick reference listing the steps necessary to install the LCP system. The steps in this guide are provided as an installation checklist. For complete installation instructions, refer to the instruction manual.

1) Make sure that the panel(s) have been wired by a certified electrician and that there is power to the panel(s).

2) Confirm that LCP panel and any secondary panels are connected to the controller as indicated in the "LCP Control Module Wiring Instructions" bulletin. Orange power LEDs on each board should be lit.

3) Connect a computer to the control board using a CAT5 crossover cable OR connect the LCP to your network.

If connecting via a crossover cable:

If directly connected to the LCP with a computer configured for DHCP, APIPA protocol automatically assigns an address in the 169.254.x.x range. Check the LCD or push the top yellow button twice to see the assigned IP address to use in a web browser.

If connecting via a network:

Connect the LCP to the network via the Ethernet port. Push the upper yellow button twice or until the IP address appears on the LCD screen.

DMX 512

RS-232

Ethernet

Primary Panel
Right Control Bus

Primary Panel
Power Supply
Left Control Bus

Secondary Panel

139-0714-00
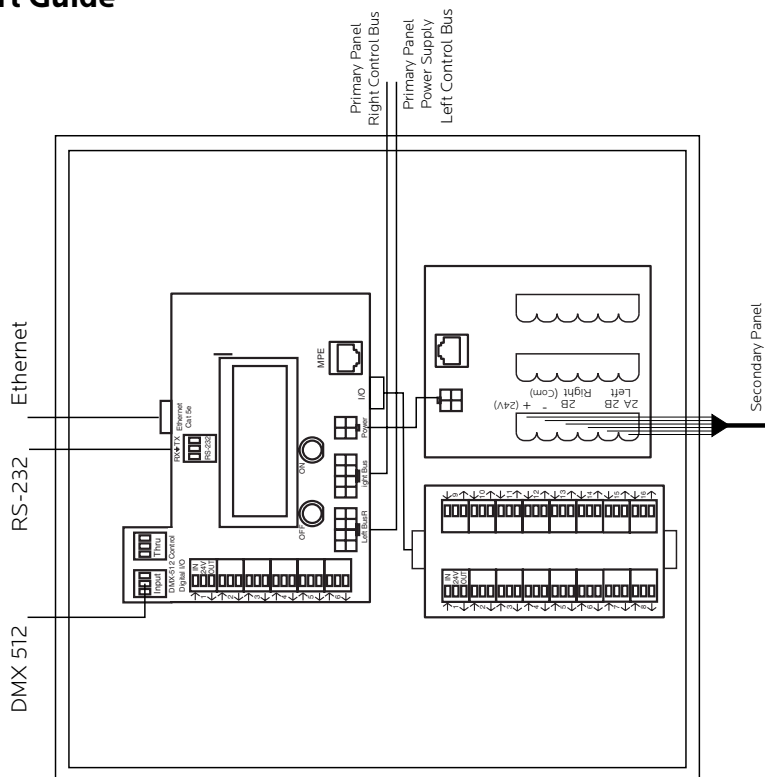
4) Open a web browser and access the status page via the IP address of the LCP (ex. http://192.168.1.250).

The default username is "admin" and the initial password is "pw".

If desired, set your username and password on the "Setup Home" page under the "Setup" tab.

Status | Control | Setup | Support | Event Log | Logout

Setup Home | Network | Protocols | Panels | Schedules | Contact Closures

Customer Information

Serial Number	
Job Name	RPC Server
Contractor Name	Contractor
Phone #	Phone #1
System Integrator	Sys Integrator
Phone #	Phone #2

Clock Set

Note: NTP requires Internet for autosync on Sundays.
Note: Only changed clock values will be updated.

Year (00-99)	21	
Month (0-12)	01	(Enter '0' to resync via NTP)
Day (1-31)	13	
Hour (0-23)	15	
Min (0-59)	52	
Sec (0-59)	49	
Day of the Week	Friday	

Astronomical Clock

☑ Enable Schedules (see tab)

Country	Select Country
City	Select City
City Name	KS, Lenexa
Latitude	33.8
Longitude	-118.3
Timezone	America/Los_Angeles
UTC Offset	-6
DST Observed	☑ 2nd Sun/Mar...1st Sun/Nov
Current City	KS, Lenexa
Sunrise (SR)	8:34 a.m.
Sunset (SS)	7:40 p.m.

Save/Refresh Astro Clock

Printable Pages

○ Network Setup
○ Panel Setup
◉ Panel Schedules

Print Pages

Password Reset

Note: If the root username or password updated successful, you will be promted for login information before the webpage will reload.

User Level	Super
Username	
Password	
Repeat Password	

Update Login Info

1. Update Firmware

File Choose File No file chosen

Upload Firmware

2. Update Web Page GUI

File Choose File No file chosen

Upload Web Pages

3. Reboot RPC

Note: New GUI and new firmware do not take affect until the RPC has been rebooted. Some updates may reset network to default.

Reboot RPC

5) Complete the LCP setup by following the steps in Chapter 5.

**LCP Contact Closure
Quick Start**

LCP LIGHTING CONTROL PANELBOARD
PURPOSE-BUILT FOR LIGHTING AND

CONTACT CLOSURE SETUP
QUICK START GUIDE

Using a standard LynTec SS-2 Switch Set with illuminated ON switch. (For other types of switches, consult chapter 4 of the instruction bulletin for wiring diagrams.)
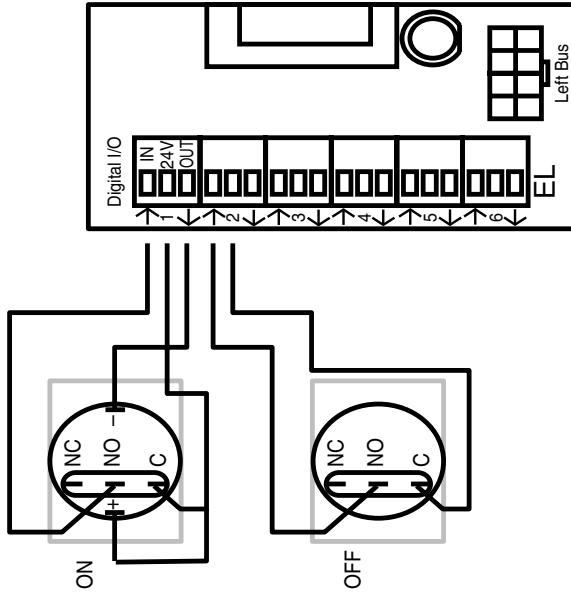
1) Complete all steps in the "LCP Quick Start Guide"

2) Confirm that LCP panel and any secondary panels are connected to the controller as indicated in the "LCP Control Module Wiring Instructions" bulletin. Orange power LEDs on each board should be lit.

3) Wire the ON switch to a digital I/O port on the left edge of the Controller board as follows:
    A. Connect the 24VDC Common (center terminal of the I/O port) to the C pin of the ON switch.
    B. Connect the Input terminal (arrow pointing towards header) to the NO pin of the ON switch.
    C. Connect the Output terminal (arrow pointing away from header) to the – pin of the ON switch.
    D. Connect a jumper between the C pin and the + pin of the ON switch.

4) Wire the OFF switch to the next consecutive digital I/O port on the left edge of the Controller board as follows:
    A. Connect the 24VDC Common terminal to the C pin of the OFF switch.
    B. Connect the Input terminal to the NO pin of the OFF switch

5) On the LCP web page, go to the contact closure page. (Setup➞Contact Closures)

6) Configure the digital I/O port:

A. Rename each contact closure as desired

B. Click the M (merge) button at the right side of the first of the two ports used. The name box and M button in the second port should turn gray and the Action selections should default to Momentary NO (normally open).

C. Ensure that both of the Action selections for both ports are set to Momentary NO.

D. Click the "Save Changes" button at the top if the Onboard I/O box.

7) Assign the contact closure to a zone in the "Panel" (Setup ⟶ Panels) screen:

A. In the ZONE CONTROL box under "Options", choose which contact closure to assign to any zone using the dropdown box.

B. Enable the zone by selecting "Grouped" operation under "Name/Seq".

C. Save changes.

Verify proper operation of your Switch Set:

A. Press the ON switch. Breakers in the selected zone should immediately begin actuating.

B. The ON indicator should flash steadily until all of the breakers are in the on state.

C. When the zone has completed, the ON indicator should remain constantly lit.

D. Press the OFF switch. Breakers in the selected zone should immediately begin actuating.

E. The ON indicator should flash steadily until all of the breakers are in the off state.

F. When the zone has completed, the ON indicator should remain constantly dark.

Note: When using two illuminate pushbuttons the OFF indicator will remain constantly lit when the zone has completed. (OFF indicator will extinguish immediately when ON is pressed again.)

Appendix B--RS-232, Telnet and TCP/IP Protocols

RS-232/TELNET PROTOCOL

Note: Telnet port = 23. Send Telnet commands to LCP using port 23 (e.g. 192.168.1.250:23)

Table B-1: Command Codes

Command	Decimal	Hexidecimal
Start Byte	176	0xB0
Activate breakers	180	0xB4
Deactivate breakers	181	0xB5
Request all breakers status	183	0xB6
Activate zones	183	0xB7
Deactivate zones	184	0xB8
Request zones status	185	0xB9
Event ON	186	0xBA
Event OFF	187	0xBB
Event status	188	0xBC
Request breakers status	189	0xBD
Request bus status	190	0xBE
Breaker status identifier	200	0xC8
Zone status identifier	201	0xC9
Event status identifier	202	0xCA
Emergency override identifier	203	0xCB
Checksum identifier	204	0xCC
Checksum digits	205-214	0xCD - 0xD6
Stop byte	240	0xF0

Addressing Scheme

Breaker address:

1 byte. Numbers 1 through 168 (0x01 – 0xA8) are assigned to populated breakers in sequential order

Zone number: 1 byte (1-12)

Breaker Related Commands

Activate breakers

0xB0, 0xB4, breaker_address_1, ..., breaker_address_m, 0xF0

breaker_address_1, ..., breaker_address_m: addresses of breakers to be activated m<=168

Deactivate breakers

0xB0, 0xB5, breaker_address_1, …, breaker_address_n, 0xF0

breaker_address_1, …, breaker_address_n: addresses of breakers to be deactivated n<=168

Activate/deactivate breakers

0xB0, 0xB5, breaker_address_1, …, breaker_address_m, 0xB6, breaker_address_1, …, breaker_address_n, 0xF0

breaker_address_1, …, breaker_address_m: addresses of breakers to be activated

breaker_address_1, …, breaker_address_n: addresses of breakers to be deactivated m+n<=168

Request all breakers status

0xB0, 0xB6, 0xF0

Request breakers status

0xB0, 0xBD, breaker _address_i, breaker _address_j, …, breaker _address_n, 0xF0

breaker_address_1, …, breaker_address_n: addresses of breakers, status of which is requested

Request bus status

0xB0, 0xBE, bus, 0xF0

bus=0-7: number of bus, status of which is requested

Reply to activate/deactivate breakers command: status of updated breakers

0xB0, 0xC8, breaker_address_i, breaker_status_i, breaker_address_j, breaker_status_j, …, breaker_address_n, breaker_status_n, 0xF0

breaker_address_i, breaker_status_i, breaker_address_j, breaker_status_j, …, breaker_address_n, breaker_status_n:

Addresses and status of breakers updated by the command reply is generated for

Reply to request breakers status command:

Same format as "Request Bus Status"; contains addresses and status of the breakers specified in the request command

Reply to request all breakers status command: status of all breakers

0xB0, 0xB6, byte_1, …, byte_84, 0xF0

byte_i: bits 7-4: status of breaker # 2i, bits 3-0: status of breaker # 2i-1, i=1-84

Reply to request bus status command: status of all breakers of the requested bus

0xB0, 0xBE, byte_1, …, byte_11, 0xF0

byte_i format is identical to 3.9, except i=1-11

Breaker status description (4 bits) (3,5 &6 panels only)

Table B-2: Breaker Status

Value	1	2	3	4	5	6
Status	Off	On	Tripped	Faulty	Empty	Manual On

Zone Related Commands

Activate zone

0xB0, 0xB7, zone_number_1, …, zone_number_m, 0xF0

zone_number_1, … zone_number_m: numbers of zones to be activated m<=12

Deactivate zone

0xB0, 0xB8, zone_number_1, …, zone_number_n, 0xF0

zone_number_1, … zone_number_n: numbers of zones to be deactivated n<=12

Activate/deactivate zone

0xB0, 0xB7, zone_number_1, … zone_number_m, 0xB8, zone_number_1, …, zone_number_n, 0xF0

zone_number_1, … zone_number_m: numbers of zones to be activated

zone_number_1, … zone_number_n: numbers of zones to be deactivatedm+n<=12

Request zones status

0xB0, 0xB9, 0xF0

Reply to activate/deactivate zone command: status of updated zones

0xB0, 0xC9, zone_address_i, zone_status_i, zone_address_j, zone_status_j, …, zone_address_n, zone_status_n, 0xF0

zone_address_i, zone_status_i, zone_address_j, zone_status_j, …, zone_address_n, zone_status_n: addresses and status of zones updated by the command reply is generated for

Reply to request zone status command: status of all 12 zones

0x40, 0xB9, byte_1, byte_2, byte_3, 0x80

byte_i: bits 7-6: status of zone # 4i, bits 5-4: status of zone 4i-1, bits 3-2: status of zone 4i-2, bits 1-0: status of zone 4i-3, i=1-3

Zone status description (2 bits)

Table B-3: Zone Status

Value	1	2	3
Status	Off	On	Sequencing

Event Related Commands

Event ON

0xB0, 0xBA, event_number_1, …, event_number_m, 0xF0

event_number_1, … event _number_m: numbers of events to be turned on

$m<=2$

Event OFF

0xB0, 0xBB, event_number_1, …, event_number_n, 0xF0

event_number_1, … event_number_n: numbers of events to be turned off

$n<=2$

Event ON/OFF

0xB0, 0xBA, event_number_1, … event_number_m, 0xBB, event_number_1, …, event_number_n, 0xF0

event_number_1, … event_number_m: numbers of events to be activated

event_number_1, … event_number_n: numbers of events to be deactivated

$m+n<=2$

Request event status

0xB0, 0xBC, 0xF0

Reply to activate/deactivate event command: status of updated events

0xB0, 0xCA, event_address_i, event_status_i, < event_address_j, event_status_j>, 0xF0

event_address_i, event_status_i, < event_address_j, event_status_j>: addresses and status of events updated by the command reply is generated for

Reply to request event status command: status of all 2 events

0xB0, 0xBC, status_byte, 0xF0

status_byte: bits 3-2: status of event #2, bits 1-0: status of event #1

Event status description (1 bit)

Table B-4: Event Status

Value	1	2	3
Status	Off	On	Processing

Device Discovery

Beacon request

"AMX\r"

Beacon

"AMXB<-SDKClass=Utility><-Make=Lyntec><-Model=RPC><-Revision=1.1.4>\r"

(rev changed from 1.1.3; 1.1.3 supported old protocol)

Emergency override response to breaker, zone, or event on/off command

If system is in Emergency Override mode, it replies to breaker, zone or event on/off command with emergency override response

0xB0, 0xCB, 0xF0

Checksum

Checksum is optional. It is calculated as a sum of all bytes of the message starting with start byte and ending with checksum identifier. Checksum is transmitted as a sequence of 3 bytes, where 1st byte is (hundreds+0xCD), 2nd byte is (tens+0xCD) and 3rd byte is (units+0xCD). For example, checksum=137 will be transmitted as:

0xCE, 0xD0, 0xD4

Code Examples (Hercules, PuTTY, TCP Test Tool 3.0) using Telnet

The following examples turn on zone #3:

Hercules SETUP Utility using TCP Client:

admin$0d$0a(SEND)
pw$0d$0a(SEND)
b0b703f0$0d$0a(SEND)

PuTTY using Telnet connection type (Figure B-1):

admin<ENTER>
pw<ENTER>
b0b703f0<ENTER>

TCP Test Tool 3.0 using Client:

admin[CR][LF](SEND), or ^M(SEND)
pw[CR][LF](SEND)
b0b703f0[CR][LF](SEND)

Figure B-1: Sample PuTTY session
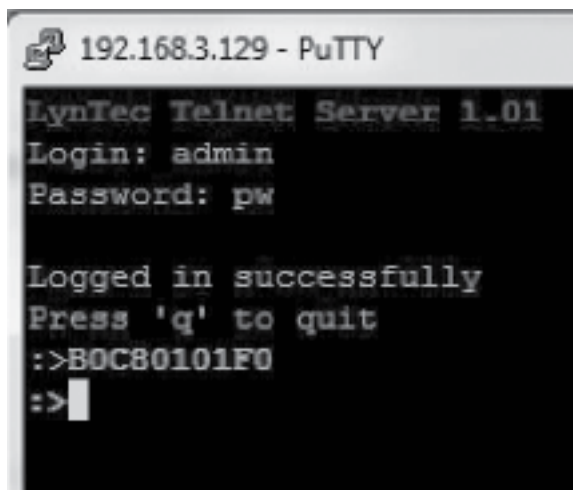
TCP/IP PROTOCOL

TCP/IP communications and control via a third party control system is facilitated by the use of the HTTP GET command. Use "&" to string multiple commands together

Example of GET command:

> *GET /p2.rpc?IPB002=1*

> *GET /p2.rpc?IPB002=0&IPB004=1*

Three modes of control are:

Breaker control = "B", Zone control = "Z", Event Control = "E"

Breaker Control = B

Refer to LynTec LCP browser set-up for breaker addressing.

> *GET /p2.rpc?IPB002=1*
> This control string will turn breaker #2 on.

> *GET /p2.rpc?IPB002=0*
> This control string will turn breaker #2 off.

Control of up to 168 breakers (4 panel system) is possible.

Zone Control = Z

Configure your zones (breaker groups) using the LynTec LCP browser set-up when connected to the LynTec LCP panel.

> *GET /p2.rpc?IPZ002=1*
> This control string will turn zone #2 on.

> *GET /p2.rpc?IPZ002=0*
> This control string will turn zone #2 off.

Events Control = E

Events include:

> Event 1 = "All Breakers ON"

> Event 2 = "All Breakers OFF"

> Event 3 = "Hurry OFF" zips all breakers off fast.

> Event 4 = "EO" Emergency override (status only)

> Event 5 = "Audio Timer" (NA) (status only)

> Event 6 = "BO" Brown-Out (status only

> Event 7 = "DMX/sACN"

> Event 8 = "EL" Emergency Lighting

GET /p2.rpc?IPE001=1
This control string will turn event #1 on.

GET /p2.rpc?IPE001=0

This control string will turn event #1 off.

Verification Scheme

Verification Scheme:

The following GET command will return the current status of all breakers, zones and events in the LCP system.

GET /p2.rpc

Your custom software will need to parse for necessary information. The system will return the following:

breakers=10110111111111111111
zones=111111111011
events=1000000

The above return is displaying the status of a 20 circuit breakers system in which all are presently ON, with the exceptions of breaker #2 and breaker #5, which are OFF.

The above return is also showing the status of 12 zones, all are ON with the exception of zone #10, which is OFF.

The events return is showing that event #1 is active = "All Breakers ON"

Table B-5: Verification Status

Status returns for Breakers:	Status returns for Zones and Events:
0 = OFF	0 = OFF
1 = ON	1 = ON
2 = Breaker Tripped (panels only)	2 = Processing
3 = Failure	
4 = Manual On (panels only)	
5 = Empty	

Code Examples (Crestron, QSC, Hercules, PuTTY, TCP Test Tool 3.0) using TCP/IP

The following examples turn on zone #3 (all SPACEs are necessary):

Crestron command string:

If RPC at 192.168.12.180, append " HTTP/1.1\nHost: 192.168.12.180\n\n" in the delimiter:
GET /p2.rpc?IPZ003=1 HTTP/1.1\nHost: 192.168.12.180\n\n

QSC command string:

GET /p2.rpc?IPZ003=1 \r\n\r\n

Hercules SETUP Utility (HW-group.com) using TCP Client:

GET /p2.rpc?IPZ003=1 $0d$0a$0d$0a(SEND)

PuTTY using Raw connection type:

GET /p2.rpc?IPZ003=1 <ENTER><ENTER>

TCP Test Tool 3.0 (SimpleComTools.com) using Client:

GET /p2.rpc?IPZ003=1 <ENTER><ENTER>(SEND), or ^M^M(SEND), Hex mode shows "20 0D 0A 0D 0A" at the end

Table B-6: Decimal to Hex Conversions   Serial and Telnet commands require hex addresses

Decimal	Hex	Decimal	Hex	Decimal	Hex	Decimal	Hex	Decimal	Hex	Decimal	Hex
1	01	36	24	71	47	106	6A	141	8D	176	B0
2	02	37	25	72	48	107	6B	142	8E	177	B1
3	03	38	26	73	49	108	6C	143	8F	178	B2
4	04	39	27	74	4A	109	6D	144	90	179	B3
5	05	40	28	75	4B	110	6E	145	91	180	B4
6	06	41	29	76	4C	111	6F	146	92	181	B5
7	07	42	2A	77	4D	112	70	147	93	182	B6
8	08	43	2B	78	4E	113	71	148	94	183	B7
9	09	44	2C	79	4F	114	72	149	95	184	B8
10	0A	45	2D	80	50	115	73	150	96	185	B9
11	0B	46	2E	81	51	116	74	151	97	186	BA
12	0C	47	2F	82	52	117	75	152	98	187	BB
13	0D	48	30	83	53	118	76	153	99	188	BC
14	0E	49	31	84	54	119	77	154	9A	189	BD
15	0F	50	32	85	55	120	78	155	9B	190	BE
16	10	51	33	86	56	121	79	156	9C	191	BF
17	11	52	34	87	57	122	7A	157	9D	192	C0
18	12	53	35	88	58	123	7B	158	9E	193	C1
19	13	54	36	89	59	124	7C	159	9F	194	C2
20	14	55	37	90	5A	125	7D	160	A0	195	C3
21	15	56	38	91	5B	126	7E	161	A1	196	C4
22	16	57	39	92	5C	127	7F	162	A2	197	C5
23	17	58	3A	93	5D	128	80	163	A3	198	C6
24	18	59	3B	94	5E	129	81	164	A4	199	C7
25	19	60	3C	95	5F	130	82	165	A5	200	C8
26	1A	61	3D	96	60	131	83	166	A6	201	C9
27	1B	62	3E	97	61	132	84	167	A7	202	CA
28	1C	63	3F	98	62	133	85	168	A8	203	CB
29	1D	64	40	99	63	134	86	169	A9	204	CC
30	1E	65	41	100	64	135	87	170	AA	205	CD
31	1F	66	42	101	65	136	88	171	AB	206	CE
32	20	67	43	102	66	137	89	172	AC	207	CF
33	21	68	44	103	67	138	8A	173	AD	208	D0
34	22	69	45	104	68	139	8B	174	AE	209	D1
35	23	70	46	105	69	140	8C	175	AF	210	D2

Appendix C--Troubleshooting

TROUBLESHOOTING THE CONTROLLER

Use the following table if you need to troubleshoot the LCP Controller.

⚠ DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

This equipment must be installed and serviced only by qualified electrical personnel.

- Apply appropriate personal protective equipment (PPE) and follow safe electrical work practices. See NFPA 70E.
- Carefully inspect the work area for tools and objects that may have been left inside the equipment.
- Use caution while removing or installing panels so that they do not extend into the energized bus; avoid handling the panels, which could cause personal injury.

**Failure to follow this instruction will result in death or serious injury.**

Table C-1: LCP Controller Troubleshooting

Condition	Possible Causes	Solutions
Controller's CPU LED is not blinking, Power LED is not orange, or MPE's Power LED is not orange (red may indicate a short circuit)	Power supply is not energized.	Verify that the power supply's LED status indicators are ON. Also, verify that the power supply line terminal is secured. Refer to the Power Supply instruction bulletin for installation and safety information.
	Controller is not receiving power from the power supply.	Call LynTec 800-724-4047
	The power supply is not operating.	Verify that the power supply is wired correctly and CL1 and CL2 lights are illumitated. See **Chapter 4**.
Motorized circuit breaker does not respond to input change or does not respond as desired.	Controller or power supply is not powered or operating properly.	Verify that both the controller and power supply are energized by observing that all power LEDs are illuminated. Verify that the controller is operating by observing that the CPU LED is blinking.
	Breakers have been moved.	Scan new circuits.
	Circuit breaker handle is OFF.	Turn circuit breaker handle to ON.
	Circuit breaker is tripped.	Reset the circuit breaker by turning it OFF and then back ON.
	Circuit breaker Manual mode is engaged.	Restore the circuit breaker to Auto mode by engaging the white button located on the face of the circuit breaker.
	Input is not connected or wired properly.	Verify that the input wiring is properly connected. Wiring specifics depend on the type of external switching device being used. Refer to **Chapter 4--Wiring** for more information.
	Circuit breaker is not included in zone, or an incorrect circuit breaker is included in zone.	To test all circuit breakers assigned to a zone, first verify that all circuit breakers are in Auto mode. Enter the Setup page and verify that the breaker is assigned to the correct zone. If the circuit breakers are not responding as desired, refer to **Chapter 5--Control Setup** for more information on how to add or delete a circuit breaker in a zone.
	Sub-net wiring error.	Circuit breakers in Secondary panels must have properly wired sub-net communications and power. Refer to **Chapter 5--Control Setup**, as well as instruction bulletins for the control bus, power supply, and Secondary address selector, for more information.
	Sub-net addressing error.	Each Secondary panel must have a unique address. Verify that no two Secondary address selectors have the same address setting and that no Secondary address selector is set to zero, unless the power supply and controller are remotely mounted with no control bus attached. Refer to the Secondary Address Selector instruction bulletin for more information.
Scan New Circuits is non-responsive.	Multi-pole breaker spanning control buses.	In panels where control buses meet end to end (e.g. LCP 348, Narrow Profile Panelboards), multi-pole breakers may not span more than one control bus. Move the multi-pole breaker so that the entire breaker is positioned on a single control bus.

Appendix D--LCP System Components

The LynTec system consists of control buses, a panelboard, remotely operated circuit breakers, a power supply and a controller. Figure D–1 identifies main components which are described in this appendix.
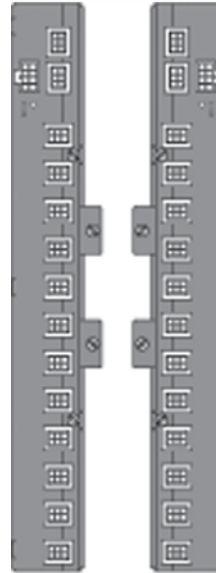
Figure D-1
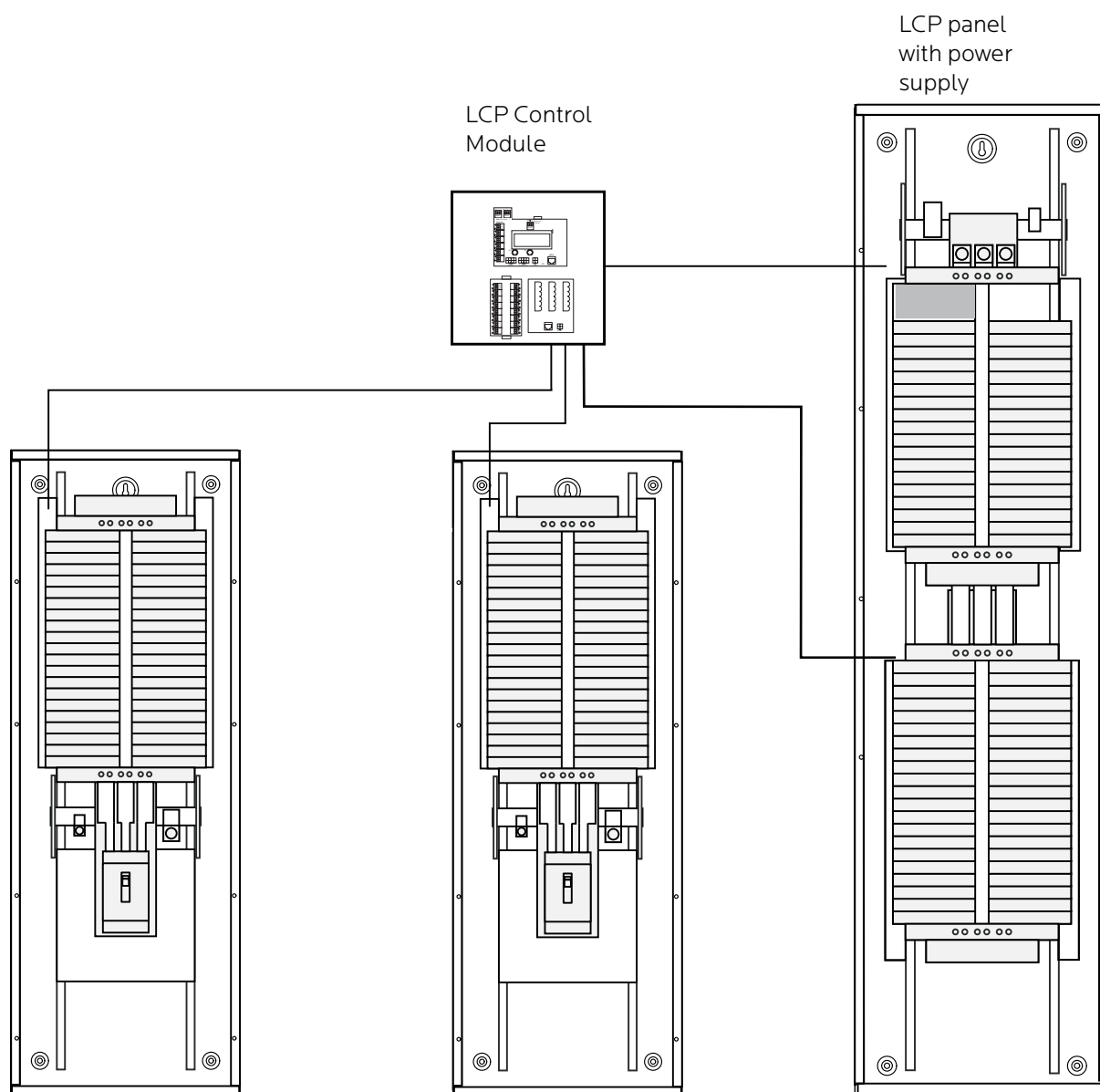
Control Bus

The control buses provide control and data monitoring for remotely operated circuit breakers and are connected to the power supply and controller. Installed control buses will not interfere with the installation of standard circuit breakers into the panelboard.
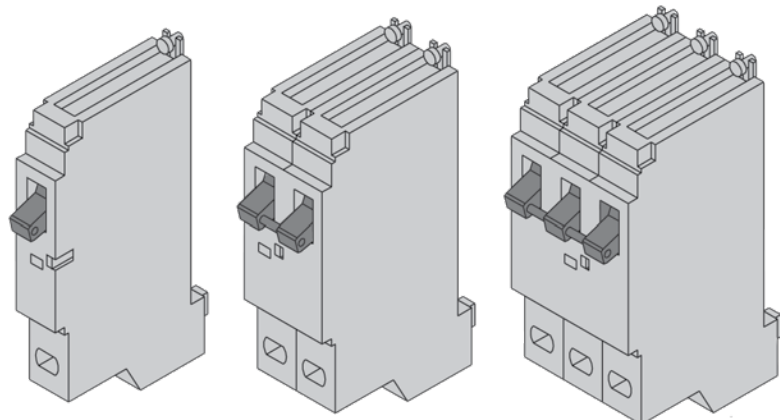
Figure D-2

Remotely Operated Circuit Breakers

Remotely Operated Circuit Breakers provide the same overcurrent protection as standard circuit breakers, and have an integral operator that can remotely switch the circuit breaker ON and OFF. The circuit breaker works with the LCP controller, power supply, and control buses to provide a remote power switching system in a panelboard.

Figure D-3

Part Numbers:	Part Numbers:	Part Numbers:
MBR-15	MBR-215	MBR-315
MBR-20	MBR-220	MBR-320
MBR-30	MBR-230	MBR-330

Power Supply

The Power Supply connects directly to the first control bus and provides 24VDC, <1A power to the RPC controller.
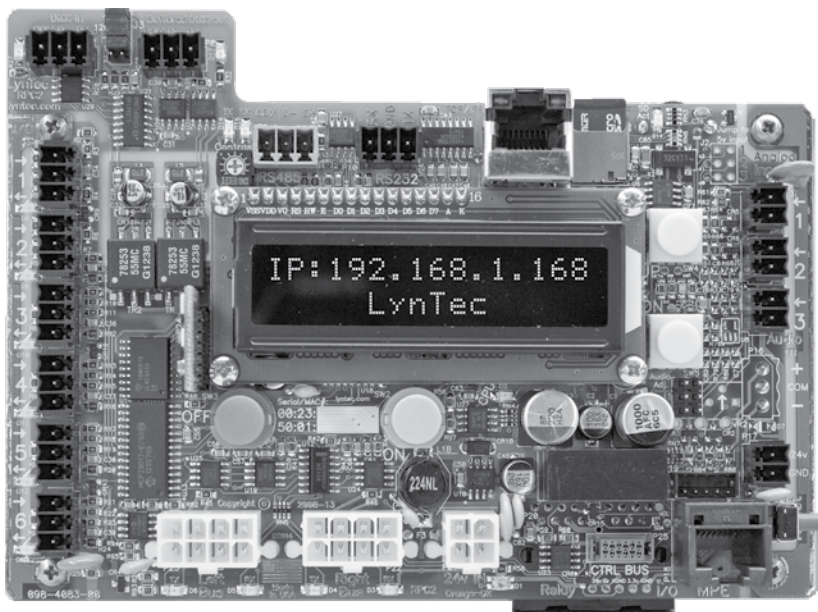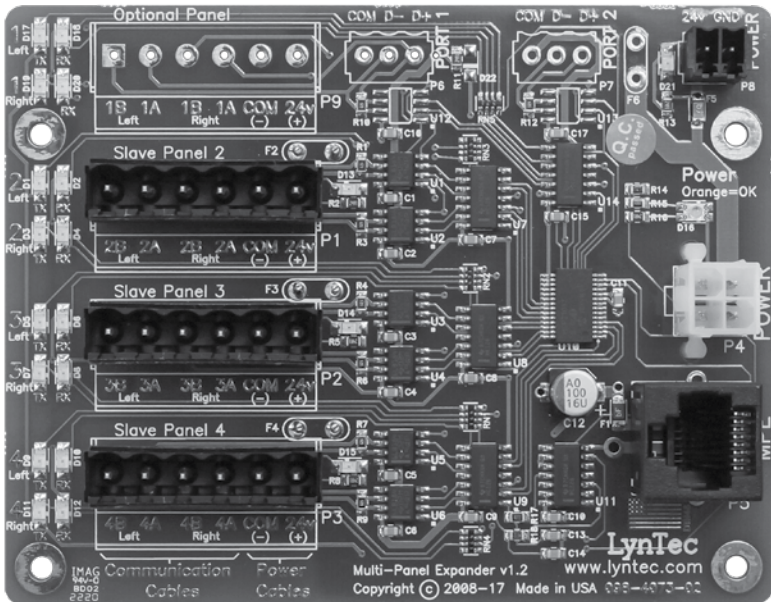
Figure D-4

Controller

The LCP Controller provides control logic for the operation of a LCP system. The controller uses remotely operated circuit breakers to control up to 168 remotely operated branch circuits.   The built-in web server allows for easy setup and operation. Also, it provides input channels for connecting external dry-contact control devices.

Figure D-5

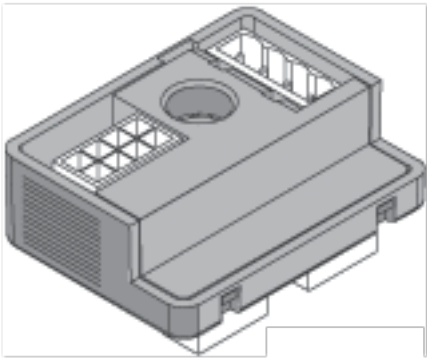**Multi-panel Expander Board**   Connects secondary panels to the controller. For more
                                     information, see page 8.

Secondary Address Selector   The Secondary address selector is used to set an address for
                                     a control bus on a Secondary panelboard.

Figure D-8

Appendix E-- Specifications

Inputs	Six (6) independently configurable digital inputs/outputs
Input Types	Maintained N.O. Maintained N.C. Momentary N.O. Momentary N.C. Momentary toggle Three (3) analog inputs 0-5 or 0-10VDC Thirty-two (32) I/O ports on optional expander boards
Status Output	24 Vdc (60mA maximum load per individual output) Indicator output on each I/O port
Auxiliary Power Supply	24 Vdc (200mA maximum Current)
Communication Interface	10/100 Base-T, Ethernet/Web Server DMX in/thru 3-wire RS-232 3-wire
DMX Isolation	Galvanic isolated at 1500VDC
Circuit breaker delay	100ms
Environmental Standards	Operating Temperature: −5°C to +65°C (internal panelboard temperature) Storage Temperature: −20°C to 85°C Operating Humidity: 5% to 95%
Time Clock	Operation during absence of power = >8 years
Memory Retention	Program: > 20 years
Standards	UL 508A CSA C22.2-14
ESD Immunity	IEC 1000, Level 4
RF Susceptibility	IEC 1000, Level 3
Electrical Fast Transient Susceptibility	IEC 1000, Level 3
Electrical Surge Suceptibility--power line	IEC 1000, Level 4
Electrical Surge Suceptibility--data line	IEC 1000, Level 3
FCC--Part 15, Class A	
ETL Tested to: CU 22.2-14 and UL508A	