

PRECAUTIONS

- READ AND FOLLOW ALL SAFETY INSTRUCTIONS.
- CAUTION: USE COPPER CONDUCTOR ONLY
- CAUTION: RISK OF ELECTRICAL SHOCK. To prevent electrical shock, turn off power at the circuit breaker before installing or servicing unit. Never wire energized electrical components
- NOTE: For installation by licensed electrician in accordance with the National and/or Electrical Codes and the following instructions
- NOTE: Do not install if the product appears to be damaged. Be sure to read and understand all instructions before installing or servicing unit
- Run low voltage wiring with line voltage wiring in their respective compartments
- For indoor use only. Do not use outdoors unless all environmental requirements are met
- Do not mount near gas or electric heater
- Disconnect switch or a circuit breaker must be provided and marked as the disconnecting device
- The use of accessory equipment not recommended by the manufacturer may cause an unsafe condition
- Confirm that device ratings are suitable for the application prior to installation
- No user serviceable parts contained inside unit. Refer all service related questions to the factory
- All servicing shall be performed by qualified service personnel
- Equipment should be mounted in locations and at heights where it will not readily be subjected to tampering by unauthorized personnel
- Use only approved materials and components (i.e. twist on connectors, electrical box, etc.) as appropriate for installation
- If the equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired
- Do not use this equipment for other than intended use
- If any Emergency Circuits are fed or controlled from this panel, it must be located electrically where fed from a UPS, generator, or other guaranteed source of power during emergency and power outage situations
- The CX panel enclosure and door are a complete assembly. Doors are not purchased separately
- **SAVE THESE INSTRUCTIONS!**

DESCRIPTION

The CX Lighting Control Panels are lighting control systems designed to control lighting loads as well as motor loads up to 2 HP. The system includes an enclosure, power supply and or transformer, motherboard with Class 2 I/O user interface, and relay cards to control loads. The relay card is an open-type accessory intended for installation inside the panel.

PRODUCT CONFIGURATION

MODEL	SPACES	INPUT VOLTAGE	ENCLOSURE	RELAY QUANTITY	RELAY TYPE	OPTIONS		
CX	16	16 relay spaces	2	120-277VAC	S NEMA 1 Enclosure	00 No relays included (Required SP Relay Type)	SP Space Only	M Master (available in CX16 or CX24)
	24	24 relay spaces	3	347-480VAC		16 16 relays installed (fully populated)	2N 1-Pole elect. held N.O. relays (CXR2N)	S Secondary (available in CX16 or CX24)
						24 24 relays installed (fully populated)	3N 1-Pole latching relays (CXR3L)	
							TN 2-Pole elect. held N.O. relays (CXR2N)	

Examples: CX162S162NM - CX 16 Relay Panel, 120-277VAC universal input, with 16 20A/1P N/O Electrically Held Relays installed in NEMA 1 Surface Mount Master Panel.

RELAY MODEL	RELAY TYPE
CXR	2N 1-Pole, Electrically Held, N.O.,120/277VAC
	3L 1-Pole, Latching,120/277/347VAC
	3LEM* 1-Pole, Latching,120/277/347VAC
	TN 2-Pole, Electrically Held, N.O., 208/240/480VAC
	TC* 2-Pole, Electrically Held, N.C., 208/240/480VAC

PANEL NOTES

- CX Panels are manufactured fully populated with relays or empty without relays. Relays to be purchased separately and to be installed in the field by a certified electrician.
- Relays are mounted with lighting circuit terminals in the high voltage area. The low voltage control inputs are in the low voltage area of the panel.
- 2-Pole relays take the same amount of space as 1-Pole relays.
- Installed relays must be all the same type. Relay Type CXR3LEM* and CXRTC* are not available in fully populate panels and must be ordered separately to be installed in the field.
- "00" option has no relays; any purchase relays must be installed in the field.
- Secondary panels have a pre-installed Secondary Interface Card and separately packaged Master Interface Card. Join panels with a Cat5e/6 cable, T568B wiring scheme (Not to exceed 750')
- The following information describes the CX 16 and 24 relay panel installation. For programming information, refer to the "CX Panel Quick Start Guide" provided as a separate document with the Panel.
- All CX panels come with 2 door lock keys, taped to the interior

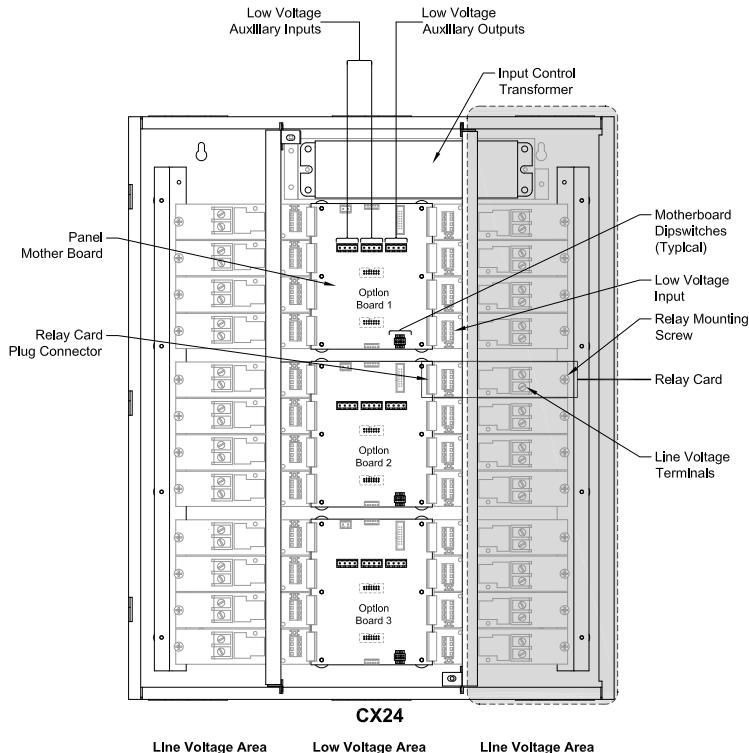
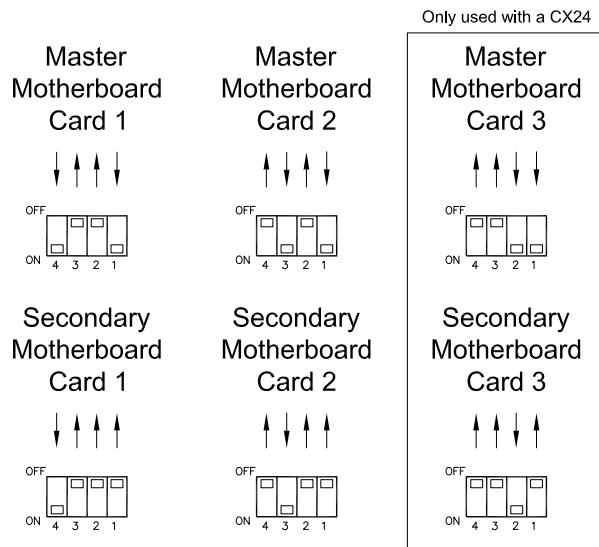


Figure 1

CX 16-24 Mother Board Dipswitch Settings



CX LIGHTING CONTROL PANEL DIP SWITCHES

CX Panel Motherboards are differentiated by dip switches located on the physical motherboard. By default, the dip switches for the CX panel motherboards should be configured in the factory, however it may be necessary to confirm the dip switches based on lack of communication or replacement of motherboards.

- The CX motherboard dip switches are located on bottom right location of each motherboard.
- Secondary CX panels do not have a CX Master Controller connected.
- Card 1 is indicated as the top most motherboard in either panel size configuration.
 - Card 1 is the motherboard the CX Master Controller is to be affixed to.
 - Card 2 is the preceding card below Card 1
 - Card 3 is only found on a CX24 panel configuration and would be located at the bottom of the 3 motherboard cards

INSTALLATION PREPARATION

Prior to installation of the CX panel, review this manual, review site drawings, verify a relay schedule has been provided prior to installation, onsite contact to confirm functionality, associated diagrams and electrical bill of material. A CX Panel is never to be energized during installation or replacement of any components.

ENCLOSURE MOUNTING

Materials

- CX Panel (20"W x 24"H x 3.5"D)
- Construction Level
- 4 - Minimum, #12 mounting screws, length and anchor support material capable of supporting the weight of a CX panel and associated cabling.
- #2 x 4" Phillips head screw driver for CX Relay Line voltage terminals and CX Relay mounting screws
- 2.5mm x 50mm Precision flat head screw driver for low voltage input terminations
- Wire Stripper/Cutter appropriate for low voltage and line voltage applications

Typically, a CX panel is installed near the circuit breaker panel or in the ceiling of the room 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 areas as shown in Figure 1 as shown on page 2. Select an appropriate location for incoming line voltage panel power, branch circuits to be controlled and low voltage input wiring.

- Top and bottom part of the enclosure provided each with 7 conduit openings and knockouts. Knockouts are min. 1.5 mm thick.

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- It is not necessary to locate all the branch circuit neutral cables into the CX Line Voltage gutter(s). Doing so may result in cramp space to work in and increased complexity when servicing the panel in the future.
- All terminations within the panel enclosure require installation by a licensed electrician in accordance with National and/or local Electrical Codes.
- If mounting a CX24 relay panel it will be necessary to remove the bottom four (4) relays located on the bottom motherboard prior to marking or attaching mounting screws. (See next section)

CX24 RELAY REMOVAL FOR PANEL MOUNTING. (Fully populated version)

Using a Philips head screw driver remove the bottom 4 relay mounting screws (shown below) holding those relays to the mounting rails. Gently pull and separate the relay from the motherboard's relay plug connector staying under the metal barrier.

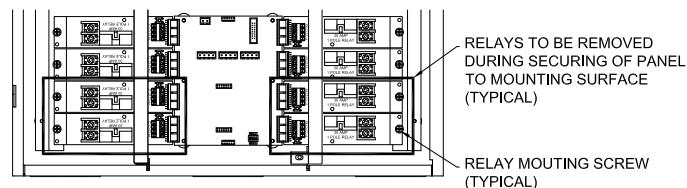


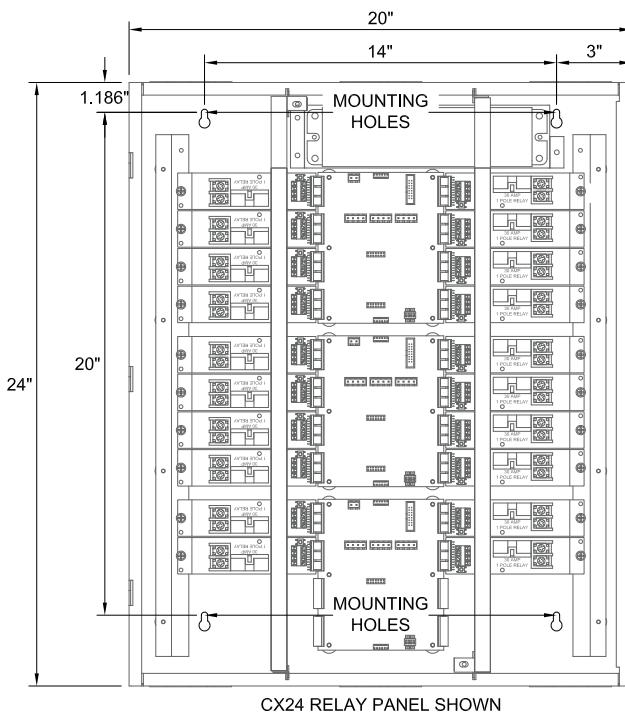
Figure 2

- Locate the enclosure on the mounting surface and use a level to ensure that it is properly oriented and aligned.
- Secure the enclosure to the mounting surface with hardware as appropriate for the application using the four keyed mounting holes located near the top and bottom corners of the enclosure as shown in the image to the below. The location of the mounting holes is the same for a CX 16 and CX 24 relay panel.

CX24 Relay Panel; After the panel is mounted and secured, reconnect the 4 CX relays temporarily removed during the installation process.

1. Navigate the relay card under the metal barrier
2. Align the pins of the relay card and the relay plug connector and press into the motherboard connector.
3. Secure with the relay mounting screw.
4. Verify the pins aligned correctly.

Once the CX panel is mounted and for the CX24 relays are reattached, remove any debris caused by installation. It may be necessary to remove the door for panel mounting. (See next section)



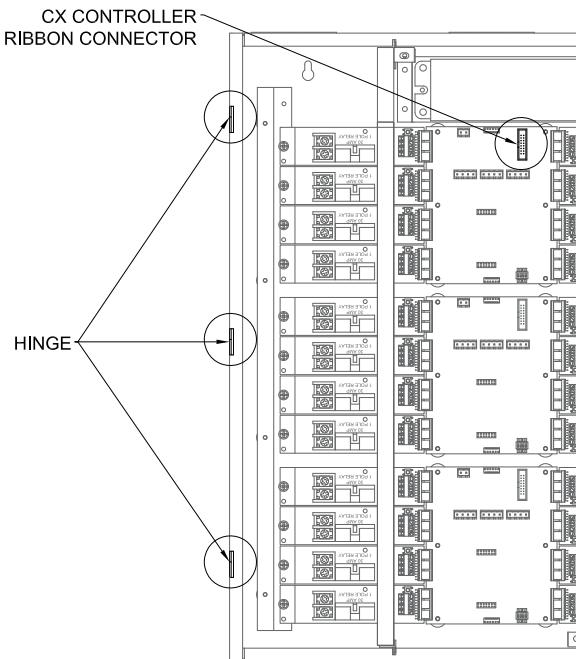
CX24 RELAY PANEL SHOWN
BOTTOM RELAYS REMOVED FOR INSTALLATION

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CX DOOR REMOVAL

It may be necessary to remove the door for ease of installation.

1. In all instances the CX door is to be removed, verify the panel is not energized.
2. Disconnect the CX Controller ribbon cable from the CX controller ribbon connector by simply pulling the end piece off the mother board.
3. Opening the door slowly you will see the location in the hinge where the door can be lifted to detach the door from the enclosure.
4. Once lifted place the door in a safe place to ensure the controller is not damaged by field work.

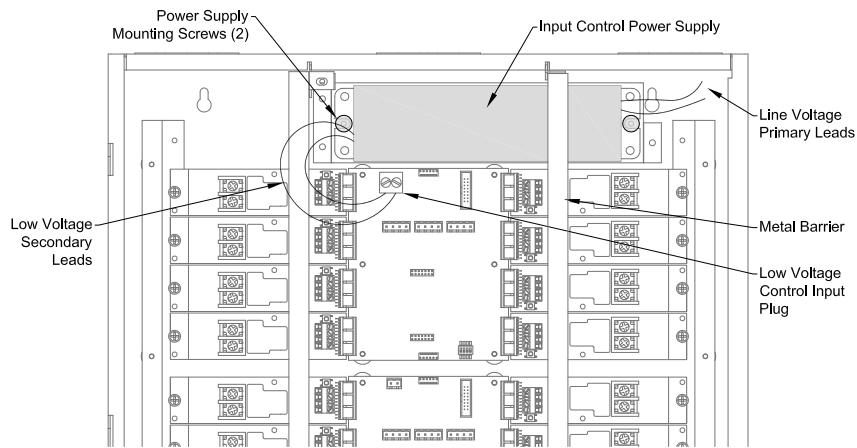


ATTACHING THE CX DOOR

1. In all instances the CX door is to be removed, verify the panel is not energized.
2. Align the door hinge and the enclosure, slide and rotate the door to slide into the hinge slot.
3. Connect the CX Controller Ribbon Cable into the CX Controller Ribbon Connector.
4. The end connector of the ribbon cable is slotted and should not be forced into place.

CONNECTING PANEL POWER

The panel is designed to operate on 120, 208, 240, or 277VAC for input voltage "2" designator, or 347VAC for input voltage "3" designator. Panel input power is supplied to the power supply located in the upper right of the panel as shown in Figure below. The output power to the CX Motherboard is in the upper center channel of the panel. With the power turned off, route the dedicated panel power supply leads to the transformer and connect them to the appropriate system voltage specific leads. Connect the power supply ground lead to the panel chassis grounding lug. A label indicating this ground lug is located adjacent to the connection location.



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The connections from supply power to the panel power supply, is depicted on the Input Control Power Supply.

NOTE: If validation of the transformer output is required; the voltage output should be 24VDC and can be tested from the low voltage secondary leads connected to the low voltage control input plug.

NOTE: If the panel will be controlling emergency circuits, the panel power supply feed must be connected from uncontrolled normal power.

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.

CAUTION: Panel supply power must be de-energized during installation and servicing of the CX panel.

CONNECTING LIGHTING LOADS

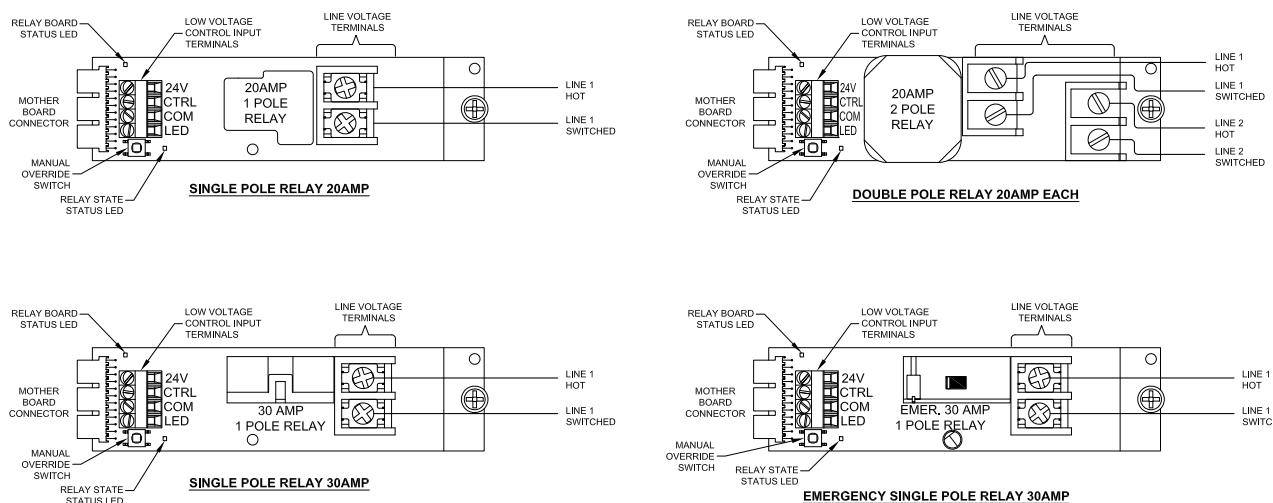
With the power turned off, route the lighting system line and load leads through the high voltage area of the panel shown in Figure 1 on page 2. Connect line and load leads for each lighting load to the output terminals of the appropriate relay as delineated in the project plans and/or Panel Load Schedule.

There are no Neutral connections to be made on the physical CX 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

NOTE: If no Panel Load Schedule exists, use the Panel Load Schedule Form supplied in the clear plastic pocket inside the Panel Door to record the lighting circuit relay assignments while connecting the relays. The relays are designated as odd numbers on the left side and even on the right side from top to bottom of the relay panel. For example, the top left relay is designated as relay "1"; the top right relay is designated as relay "2".

NOTE: The panel is shipped with relays installed and electrically connected at their input control side. If, however, relays must be installed, reference the applicable Relay Installation Instructions supplied with the individual Relay Cards on how to install relays.



RELAY CONNECTION DIAGRAMS

CONNECTING LOW VOLTAGE INPUTS

Bring the low voltage wiring for the contact inputs in through the knockouts in the low voltage wiring area where indicated on Page 2. Below are typical connections for singular devices. Wire size 14, 16, 18, 20, 22 AWG Recommended Tightening Torque: 0.45 N·m (4 in-lbs.)

- Inputs are software configurable through programming to support momentary switches, maintained switches (latching), motion sensors, or photo sensors.
- Each Relay Card includes one low voltage input. These inputs may be connected prior to programming.
- Each mother board includes 2 Auxiliary Inputs and 1 output with N.C. and N.O. dry contacts. These inputs may be connected prior to programming.
- Input devices may be connected to any terminal location regardless of final control programming. Connect contact closure input devices to the input terminals using recommended 18 AWG wire.
- All relay inputs located on a relay card can control the relay they are affixed as a momentary N.O. contact. This programming is not seen in the CX Controller programming and is a default function.
 - Auxiliary inputs do not, by default, control anything.

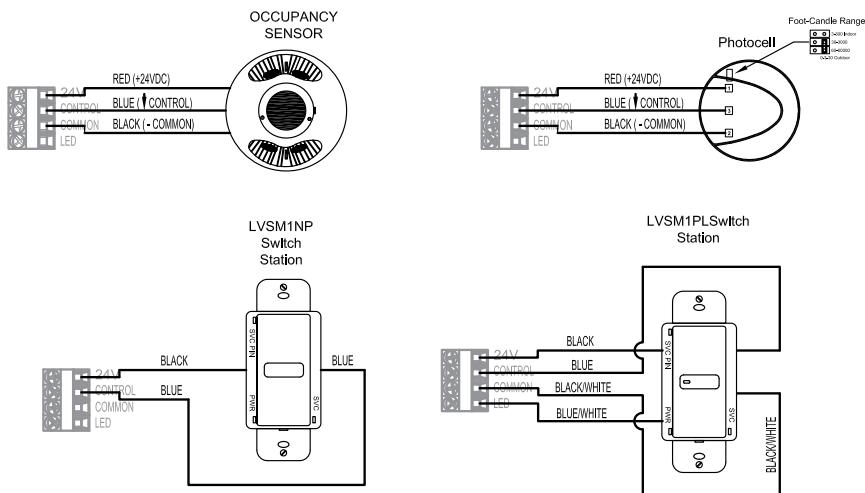
NOTE: Use the Panel Load Schedule Form supplied in the clear plastic pocket inside the Panel Door to record the low voltage input types while making connections.

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NOTE: Most input connected devices can be located up to 500+ feet away from the panel. Exact distances are based on quantity of devices, mixtures of devices connected as well as the gauge of the wire used.

NOTE: In some instances it may be necessary to use an auxiliary power supply to power occupancy sensors due to more sensors required than the panel can energize. In these instances it is required to use an -RP occupancy sensor from HCS and use the dry contacts to activate the relays. Do not mix power from the power pack and the panel voltage. (see HCS catalog of CX wiring diagrams for details)

NOTE: The CX16/24 relays panels are to power up to 24 input powered devices. (Occupancy Sensors, Daylight Sensors, Wall Stations with pilot lights)

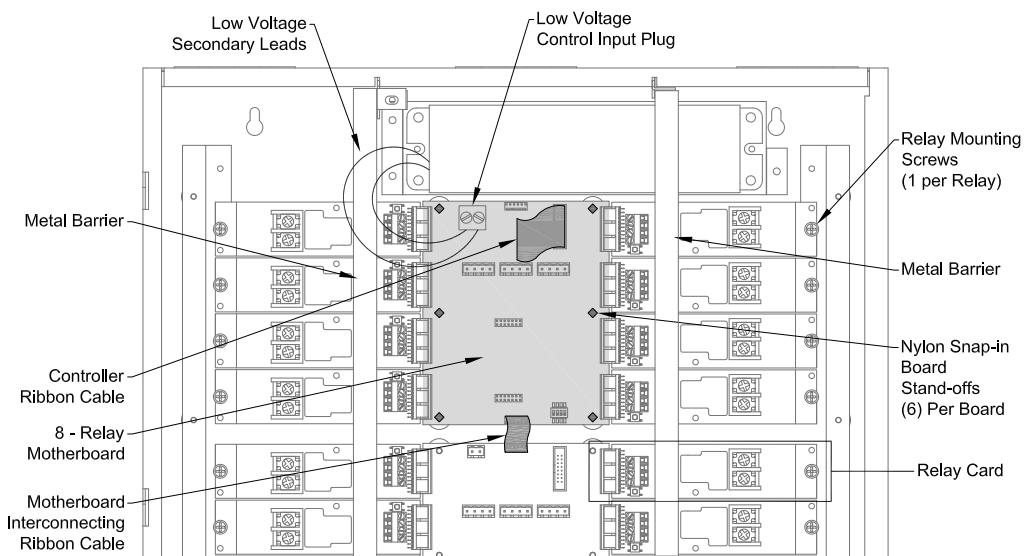


CX CONTROLLER

A CX Controller is required to program and operate the CX Lighting Control Panel. There is to be only one CX Controller for any singular or Master/Secondary configuration. All Master CX Panels are pre-installed with a CX Controller. No Secondary CX Panels come with a CX Controller. **The supply power must be de-energized when removing or adding a CX Controller to a CX panel.**

Battery back up for the time clock is located in the back of the CX Controller. Disconnect power to the CX Panel, remove Controller stand-offs with a Phillips head screw driver and detach the controller. The battery is visible and reachable when detached from the CX Door. Then reassemble after replaced.

NOTE: It is possible to convert the Master panel to a Secondary panel, however dip switch settings must be updated to reflect the function change of the CX panel, see CX 16-24 Mother Board Dipswitch Settings chart on page 3. It will be needed to remove the CX Controller from the panel. By default, the CX Controller is connected and pre-installed by a ribbon cable that connects from the top most motherboard to the back of the CX door. The ribbon cable is keyed and on the connection to the motherboard pin number #1 in downward facing on the vertical connector.



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LCD Display: The display is to provide an interface to visual programming. It shows time and can be used for troubleshooting. See **Programming guide for functional instructions.**

SD Card Slot: When inserted, the CX Panel provides logging of events automatically. The text file is downloadable onto a PC to be reviewed during troubleshooting or validating programming. Logging shows, time stamps, and control events.

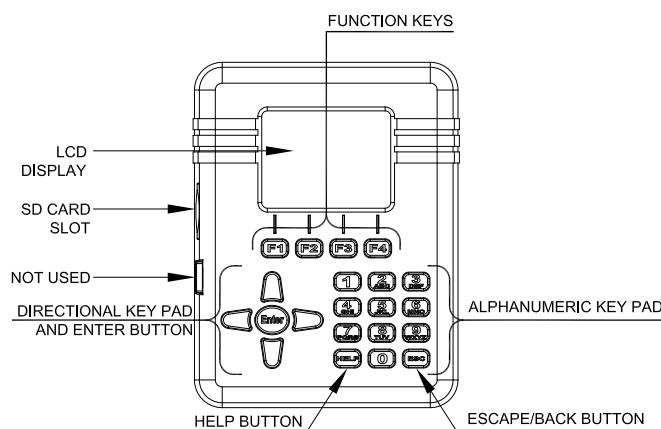
Programming can also be loaded from another panel or to another panel to perform the same exact function and share the exact same configuration.

Programming can be completed using the CX Configurator software located on the Hubbell controls website: CX Config V 2.07 (<https://www.hubbell.com/hubbellcontrolsolutions/en/tools>). This software enables remote programming to be created, copied onto an SD card and then loaded onto the CX Controller. **To create remote programming, it is required that the panel loads match the programming of the CX Configuration or the panel will not function as desired.**

Function Keys: The Function Keys are used for added functions shown above them on the display, for example; Edit, Save etc. These functions are defined in the user guide.

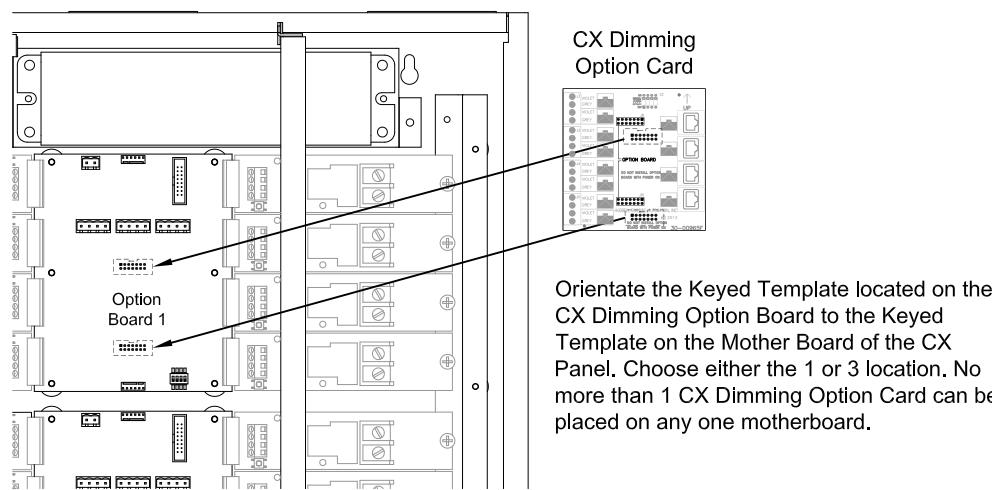
Alphanumeric Keypad: The keypad is to make selections, add/change names in the programming. An additional function is the **ESC** to go back during programming. The **HELP** button is used to view, on a popup, additional information to better define highlighted items on the screen that are defined that may need more description.

Directional Keypad: The keypad is used to navigate through the menu selection of the CX Programming. The center **ENTER** button is used to confirm the selection.



CX DIMMING INTERFACE CARD

The dimming interface card is to provide 8, 0-10V dimming control by syncing the 0-10V current provided by the dimming driver of the fixture. Each channel on the dimming card can sync up to 30mA per channel. The only wall stations approved to connect to the RJ45 connectors are the CXSW wall stations. No more than 4 dimming cards can be used with any Master/Secondary configuration. Each Motherboard is designed to accommodate 1 dimming card. For additional information see Install guide for the CXDIMCONTRBD.



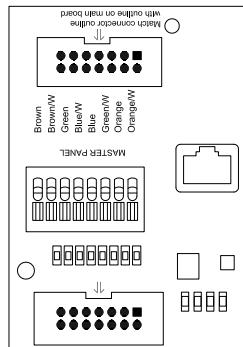
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MASTER/SECONDARY INTERFACE CARD

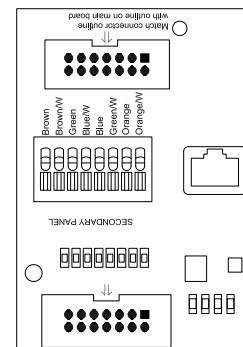
The Master/Secondary cards are used to join 2 CX Lighting Control panels. Only two panels can be joined in this method. One must be a Master panel and the second must be a Secondary panel. These two panels should not be further than 700 feet apart. Standard Cat5e/6 cable is to be used in a T568B configuration using standard RJ45 connectors.

The Master or Secondary cards are to mount either on a Motherboard or stacked on top of a CX Dimming card that is seated on a motherboard. The Option board connectors are keyed. Please see Master/Secondary Interface instructions for more detail.

CX Master Card



CX Secondary Card



OPERATING PANEL

The User Interface control ribbon cable is supplied connected between the User Interface Ribbon Cable Connector on the Mother Board and the User Interface Module that is attached to the panel door.

The red indicator in the cable should align with the Pin 1 designation. The green ground jumper is supplied connected between the panel door and the panel housing ground lug, labeled "GND".

Provide control power to the panel and restore power to the lighting circuits at the source circuit breakers. The panel will take a few moments to initialize during which time the User Interface screen on the front of the panel door will initiate and display the clock, date, and time zone un-programmed factory defaults.

Inside the panel the Mother board power status LED will show continuous "green". The Relay board status LED will turn on "green" for approximately 2 seconds and then go off. Push, but do not hold the Relay Manual Control button on each relay card to operate each relay to test functionality. The Relay State Status LED will turn on "red" when the relay is energized and be off when the relay is un-energized. The panel is now fully functional and ready to control the lighting loads.

TROUBLESHOOTING

A blinking "green" Relay board status LED indicates that communication has not been properly established for this card. Contact Hubbell Controls Technical Service at (800) 888-8006 for assistance and replacement as required. A complete Troubleshooting Guide is contained in the "CX Panel User Manual" provided as a downloadable document at www.hubbellcontrolsolutions.com.

CX PANEL SPECIFICATIONS

Panel Input Power Requirements	Input Voltage "2" designator – 120-277VAC universal Input Voltage "3" designator – 347-480VAC universal
Overall Dimensions	Surface mount, 20" W x 24" H x 4" D
Relay Load Ratings	CXR2N –1-Pole, Elect. Held N.O. 20A@120VAC-Tungsten; 16A @ 277VAC-Elect. Ballast; 20A @277VAC-Mag. Ballast; 14K SCCR@277VAC; 50/60Hz CXR3L – 1-Pole Latching 20A @120VAC-Tungsten; 16A @120/277VAC-Elect. Ballast; 30A @120/277VAC-Mag. Ballast; 20A @347VAC-Elect. Ballast; 18K SCCR @347VAC; 50/60Hz CXR3LEM* – 1-Pole, Latching 20A @120VAC-Tungsten; 16A @120/277VAC-Elect. Ballast; 30A @120/277VAC-Mag. Ballast; 20A @347VAC-Elect. Ballast; 20A @347VAC-Mag. Ballast; 5K SCCR @347VAC; 50/60Hz CXRTN – 2-Pole, Elect. Held N.O. 20A @208/240/480VAC Mag. Ballast; 14K SCCR @480VAC; 50/60Hz CXRTC* – 2-Pole, Elect. Held N.O. 20A @208/240/480VAC Mag. Ballast; 14K SCCR @480VAC; 50/60Hz *CXR3LEM and CXRTC do not come in a fully populated CX panel Inrush withstand rating for CXR3LEM relay; 500A@2ms
Low Voltage Inputs:	CX 16-Relay Panel – 20 available inputs CX 24-Relay panel – 30 available inputs. Low Voltage Switches – momentary or maintained style, with or without LED indication. LED indication support is LED – "ON" when switch is active and LED – "OFF" when switch is inactive. Green; "ON" with Red "OFF" indication is not supported. Motion Sensor Input – Three wire 24 VDC Photocell – Three wire 24VDC power, 0-10V DC control input.
Output Relay Contacts	Two each for 16-Relay panel only – Dry Contact Output, NO/NC, 24V AC/DC, 50mA Three each for 24-Relay panel only – Dry Contact Output, NO/NC, 24V AC/DC, 50mA
Operating Environment	Indoor Use Only; 0 to 50°C; Relative Humidity: 0 – 90% non-condensing

Accessory Components:

Clock Battery (replacement) - Not Provided by HCS - Renata, Type CR2032 or equivalent

CXDIMCONTRBD - CX Panel 8-Channel dimming Interface board 0-10V Dimming 30mA, sinking current. 4-RJ45 ports for CXSW wall stations.

CXKITSECINTFC - Master/Satellite Interface Card Replacement Kit (2card set)

CX1624MTHRBD - CX16/24 Motherboard (Single)

CXMSTRCONTR2 - CX Master Controller

CXUICABLE - CX Master Controller Cable from door to Motherboard